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# MAHISHADAL RAJ COLLEGE

**SESSION: 2018-2019**

**Number of book published: 01**

**Books:**

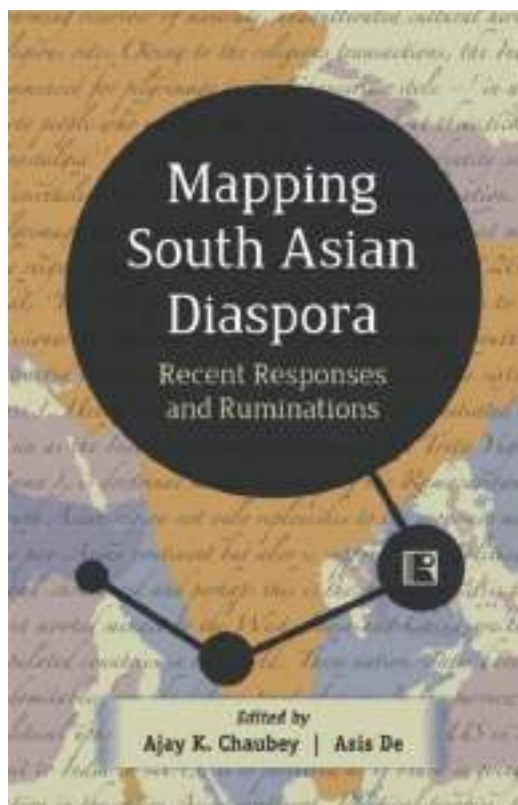
1. Ajay K. Chaubey and **Asis De** (Eds.). 'Mapping South Asian Diaspora: Recent Responses and Ruminations', Jaipur: Rawat Publications, 2018, (ISBN: 978-81-316-0901-9), Print.

**Number of book chapters published: 07**

**Book Chapters:**

1. **Asis De**. 'Amitav Ghosh ka Sahitya lok' (Hindi) and 'The Literary Universe of Amitav Ghosh' (English) in the **Jnanpith Literary Souvenir** of the 54<sup>th</sup> Jnanpith Award on Amitav Ghosh, June, **2019**, pp. 4-6 (Hindi) and pp. 11-13 (English).
2. **Asis De**. "Empire and Exile: Representation of the Burmese Royal Family across the Border in Amitav Ghosh's *The Glass Palace* and Sudha Shah's *The King in Exile*", in ***Beyond Borders and Boundaries: Diasporic Images and Re-presentations in Literature and Cinema***, by Nilufer E. Bharucha, Sridhar Rajeswaran and Klaus Stierstorfer (Eds.), [Diaspora Studies Series], India Diaspora Centre, University of Mumbai, Mumbai: Navvishnu Publications, 2018, pp. 132-147.
3. **Asis De**. "Representation of Female Subjugation and Domestic Violence in P. Sivakami's *The Taming of the Women*", in ***Quintessence of Dalit Literature: Rebel Narratives***, by Ashish Kumar Gupta and Soni Sharma (Eds.), Delhi: Akhand Publishing House, 2018, pp. 17-26.
4. **Asis De**. "Transforming Continuum of South Asian Diaspora: In Conversation with Vijay Mishra," in ***Mapping South Asian Diaspora***, by Ajay K. Chaubey and Asis De (Eds.), Jaipur: Rawat Publications, 2018, pp. 19-29.
5. Ajay Chaubey and **Asis De**. 'Introduction' in ***Mapping South Asian Diaspora***, by Ajay K. Chaubey and Asis De (Eds.), Jaipur: Rawat Publications, 2018, pp. 1-16.
6. **Subikash Mookherjee**, and Debasish Mondal. "Major Components of Green Urbanization and Their Relative Importance: A Study on Some Districts of West Bengal (India)." In Handbook of Research on Economic and Political Implications of Green Trading and Energy Use, pp. 315-339. IGI Global, 2019, DOI: 10.4018/978-1-5225-8547-3.ch018, ISBN13: 9781522585473, ISBN10: 1522585478, EISBN13: 9781522585497.
7. **Swati Basak**. "Women, Science and Education: Kalpana Chawla, the True Heroine", *Pondering the Past*, Paschimbanga Anchalik o Lokosanskriti Charchakendra, Vol. II, Print, ISBN 978-93-88207-00-3, pp. 248-253.

**Ajaya K. Chaubey and Asis De, eds. *Mapping South Asian Diaspora: Recent Responses and Ruminations*. Jaipur and Delhi: Rawat Publications, 2018. 296 pp. ISBN 978-81-316-0901-9.**



The phenomenal progress of technological modernity has gradually increased the need to reconfigure the notion of identity. Even our sense of belonging demands revisionary perspectives. In today's globalised world, diaspora is being characterized more by routes than by roots. As a result, diasporic identities are now becoming fluid. Moreover, the phenomenon of diaspora is still evolving, and, is, therefore, refusing any fixed definition. Diaspora studies is now preoccupied with the shifting patterns of experiences. In such a context, the publication of *Mapping South Asian Diaspora: Recent Responses and Ruminations*, edited by Ajaya K. Chaubey and Asis De (with a foreword by Emmanuel S. Nelson), is a welcome addition to the corpus of diaspora studies.

In the Introduction to the volume under review, the editors have sketched the evolution of diaspora to facilitate the reader's understanding of the premise

of the book. They claim, “the fast changing socio-economic and cultural scenario due to globalization” (9) has given rise to certain issues in South Asian diasporic context that deserve immediate critical attention. Hence, they feel the need for the publication of a book like this. They refer to some important diaspora theorists, among whom Khachig Tololyan observes that diaspora as “a term that once described Jewish, Greek, and Armenian dispersion now shares meanings with a larger semantic domain that includes words like immigrant, expatriate, refugee, guest-worker, exile community, overseas community, ethnic community” (qtd. in Chaubey and De 1). Diaspora, in a way, has now become an umbrella term. In spite of its multiple meanings, diaspora, as the editors assert, is basically concerned with “the issue of human migration from the place of origin to some other transnational locations” (3). In order to offer a theoretical overview of South Asian diaspora, the editors have historically divided it into three phases: “(a) Diaspora in the pre-colonial period, (b) Dislocation and transportation in the colonial period, and (c) Postcolonial Diasporic movement to the West” (4). In the first phase the diasporic movement was voluntary and largely motivated by “trade and religious transactions” (4) while, in the second, it was largely forced and motivated by economic reasons. The diasporic movement in the third phase has become largely voluntary, and motivated by the longing for “a better living and global privileges” (4) and can be regarded mainly as “a postcolonial phenomenon and then, as natural consequence of globalization” (6). Section A, “Diaspora in Flux: Newer Insights,” exclusively discusses critical responses of Vijay Mishra, a renowned scholar and critic of Indian origin, to questions regarding the shifting patterns of South Asian Diasporic experiences and the emergence of the newer forms of diasporic imaginary. Dwelling on several important issues related to the old (“egalitarian”) diaspora and the new (“selfish”) diaspora, and the role of the cyber world, he observes that “in the transnational modern Indian diaspora culture is a memory that is commodified, a memory that has now been transformed into different types of items and these items take the form of cinema or YouTube, Skype and the like” (22). He suggests that it is really difficult to “theorize a diaspora which is no longer a diaspora traditionally defined within the semantics of home, absence, trauma, belonging, and loss” (22).

Section B, “Considering Diasporic Literatures of South Asia: Texts and Contexts,” which accommodates eleven essays, makes an attempt to critically explore the literatures of South Asian Diaspora. It opens with the essay “What Diaspora? Whither Diaspora?: Some Random Questions, Answers and Ruminations,” by Somdatta Mandal, a distinguished academic and an expert on Diaspora studies, which deals with the contours of diaspora and focuses on the ever-evolving processes the concept has undergone. She underlines the shifting nature of diaspora studies when she comments, “It seems that the whole branch of diaspora studies is becoming passé and being replaced by studies on



transnationalism” (33). Amritjit Singh, another eminent academic and critic, outlines a theoretical trajectory of the South Asian American experience and critically examines how “the diasporic populations and their ‘Imaginary homelands’ remind us of how culture and identity are reconstituted as they travel to new places” (60). The essay titled “Interrogating Borders in Amitav Ghosh’s *The Shadow Lines* and *The Hungry Tide*” by Sharmistha De Dutta also deserves mention as it records the celebration of the cross-border socio-cultural interactions often taking place in defiance of the political border. In fact, it examines how Ghosh “problematizes the concept of borders,” thereby showing that “man-made borders are basically porous” (100). Along similar lines, another essay written jointly by Sulagna Mohanty and Amrita Satapathy, deals with the issue of crossing boundaries and its effect on “the cultural memory of contemporary postcolonial selves” (118) as illustrated in Vikram Chandra’s *Red Earth* and *Pouring Rain*. Rositta Joseph Valiyamattam’s essay titled “Of Diaspora and Native Literatures: Reading Benyamin’s *Goat Days*” traces the Indian diasporic experience in the 1990s in the Gulf region and portrays the horrible effects of contemporary neo-colonialism. Actually, it examines the Indian diaspora’s rootlessness as well as its assimilation of the Arab culture in the 1990s in the post-Cold War period. Raj Gaurav Verma in his “Home No/w/here: A Study of Diasporic Dilemma in Khaled Hosseini’s *The Kite Runner*” focuses on the Afghan diaspora in America and critically analyses how nowhere do the diasporic people find their home. However, some other essays in the section critically deal with the issues relating to exile, dislocation, displacement, race, ethnicity and so on.

Section C, “Conversations and Discussions,” covers interviews of some well-known writers and critics. Tabish Khair critically discusses multiple dimensions of diaspora in the contemporary scenario while Murali Kamma’s conversation focuses on the discourse of identity as well as the politics of language. Eminent critics like Somdatta Mandal, Makarand Parajape and Manjit Inder Singh respond to the questions of negotiating identities, the issue of crossing borders and such. In fact, these interviews reveal the shifting patterns of lived experiences especially in South Asian diasporic contexts. It is, however, not clear why Vijaya Mishra’s interview is placed in a single section and not included here.

The four essays included in Section D, “South Asian Diaspora: Interdisciplinary Responses,” have presented the interdisciplinary responses to the issues related to less discussed South Asian diasporic groups. The first essay (a reprint) titled “Reconfiguring Asian Australian Writing: Australia, India and Inez Baranay” by Paul Sharrad deftly deals with the dynamics of Indo-Australian connection. Quite interestingly, it discusses Sharrad’s feeling that “Indian and Australian writers are beginning to wander into each other’s spaces and settle there in increasingly numerous and complex ways” (261). The essay “One Nation,

Two Diasporas: Nepali Migrants and Bhutanese Refugees in the United States” by Lopita Nath is also significant as it critically examines the role that the Nepali diaspora in the US can play in dealing with the Bhutanese refugees who are of ethnic Nepali descent. In fact, the essay seeks to address questions like: “How will these two diasporic communities identify themselves? Can they be clubbed as one community or will they choose to stay different?” (232). Another essay “The Bhutanese Diaspora: A View on History” by Alice Anna Verheij critically examines how the Bhutanese “Lotshampas,” (meaning “people from the south”) found themselves in a state of exile at the hands of the Bhutan government in the 1990s. Violet Cho’s essay “Searching for Home: Explorations in New Media and the Burmese Diaspora in New Zealand” examines the role of new media in addressing the Burmese diasporic identities. The essay also presents the new media as “a source of empowerment for members of diaspora communities... in the public sphere in the host country, their country of origin and across international boundaries” (278-79).

In the last two decades or so, there has been a proliferation of scholarly articles and books on diaspora. The present book evidently enjoys some distinction as it has dealt with some important aspects of diaspora. First, the concept of South Asia has been extended to include Burma (Myanmar) and Afghanistan and indeed, the airtight nomenclature (South Asia) fails to suggest the interactions that go on in the border states where history and lived experiences of bordering nation states have socio-cultural dialogues. Secondly, in South Asian context, India is generally foregrounded, resulting in the marginalisation of the smaller nation-states. This issue is addressed here with the inclusion of articles on Nepalese and Bhutanese diasporas. Thirdly, the book accords some prominence to the Indian labour diaspora in the Gulf in the 1990s – an area that is not much explored. Fourthly, the inclusion of interviews has enriched the volume as the direct responses as well as the personal views of some eminent writers and critics of South Asian origin bring to the fore the nuances of diasporic experiences. Finally, the book not only provides the literary and cultural representations of the changing patterns of South Asian diasporic experiences, but also includes interdisciplinary responses to them. On the whole, the book gives new directions to the South Asian diaspora studies in the context of globalisation.

**Sanjoy Malik**  
**University of Burdwan, India**  
**Email: sanjoymalikbu@gmail.com**

54<sup>वाँ</sup> ज्ञानपीठ पुरस्कार, 2018

54<sup>th</sup> Jnanpith Award, 2018

श्री अमिताभ घोष

Shri Amitav Ghosh



## वाग्देवी : पुरस्कार-प्रतीक

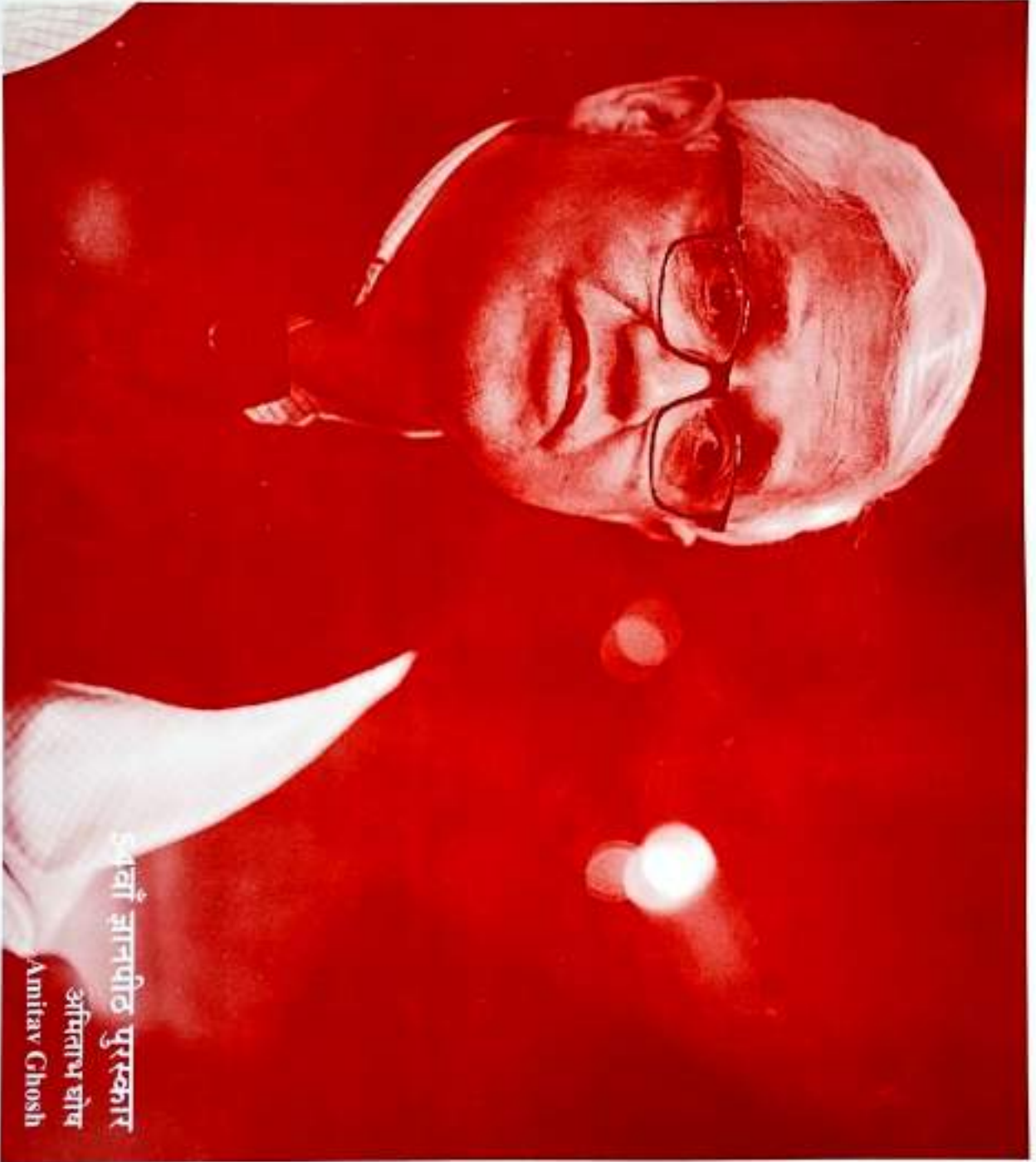
ज्ञानपीठ पुरस्कार के प्रतीक के रूप में स्वीकृत वाग्देवी सरस्वती की यह कांस्यमूर्ति सरस्वती-कण्ठाभरण-प्रासाद नामक मन्दिर में विराजमान श्री जिसका निर्माण मध्य प्रदेश की धारा नगरी में विद्याव्यसनी नरेश भोज ने 1035 ई. में कराया था। अब यह मूर्ति लन्दन के ब्रिटिश संग्रहालय में प्रदर्शित है। भारतीय ज्ञानपीठ ने वाग्देवी के मस्तक के पूछ भाग में प्रभासण्डल सम्मिलित किया है जिसमें सम्राट्, मशुरा के कंकाली टीला से प्राप्त प्राचीनतम जैन तीरथा 'रत्न-त्रय' का प्रतीक है। वाग्देवी द्वारा गृहीत पुस्तक, कम्पण्डलु, अक्षमाला और कम्बल क्रमशः ज्ञान, संयम, वैराग्य और अन्तर्दृष्टि के प्रतीक हैं।

ज्ञानपीठ पुरस्कार से सम्मानित साहित्यकार को वाग्देवी की कांस्य-प्रतिमा भेंट की जाती है।



## ज्ञानपीठ पुरस्कार





सायॉ ज्ञानपीठ पुरस्कार  
अमितभ घोष  
Amitav Ghosh

## The Literary Universe of Amitav Ghosh

Asis De

**B**haratiya Jnanpith Award, being the highest literary honour in India for outstanding contribution to literature and the philosophy of literature, makes a marked difference in shaping the identity of an Indian author. To me, the news of Amitav Ghosh being awarded with the honour of the 54th Jnanpith Laureate was astonishing and delighting at the same time. Astonishing for the reason that, there is no English-language Indian writer earlier to him to win this highly prestigious award and delighting for the reason that alongside this honour of Amitav Ghosh's literary genius, it is also the beginning of the possibility for future potential Indian authors writing in English to become Jnanpith Awardees. 'Amitav da', as we love to call him, is the harbinger of a new message in the world of Indian literature in English: the human scenario in his literary works is essentially diverse and transcultural. Ghosh chronologically succeeds Rushdie, though his creative imagination takes a different route, and his depiction of humanity is more tolerant and less controversial.

Ghosh's novels broaden our sense of cultural interconnection at several points in time and space and effortlessly blur the boundaries of origin, class, language, religion, ethnicity and even nationality. A storyteller with a deep interest in history and cultural studies, he covers in his works a large spectrum of topics like Pasteurian science, malaria re-

search, social and cultural anthropology, cetology, ecology and climate change, village life in medieval Egypt, the Burmese movements for independence, Indian partition and the plight of the refugees, or even the opium trade in nineteenth century Canton. Human movement through the waterways of the sea and rivers finds important expression in every novel of Ghosh-beginning with *The Glass Palace* through *The Hungry Tide* and the *Ibis Trilogy* to the forthcoming *Gun Island*. The characters in Ghosh's novels appear to be cosmopolitans, with attachment to many places as they travel through multiple cultural spaces and often through the borders of several nations, though somehow or other they are bound by the ties of circumstances and endeavour, language, culture and community interest.

In most of his novels, Ghosh's creative imagination finds its foundation on factual history and emphasizes the constant interaction between 'Eastern' and 'Western' cultures in South and South-East Asia. His literary works make us historically conscious about dislocations, movements and migrations and also unsettles our notions of the past in the reverberations of the present. Ghosh leads his readers to a vision of transcultural identity, where plurality is a compulsory condition without unsettling the sense of the self. In his choice of using words and phrases from several languages of different communities in India with a particular preference for Bangla-



phor of the 'hungry tide' that acts as the force behind the transformation of the region, Ghosh nicely paints the transformation of the cosmopolitan characters in the novel. The following ten years of Ghosh's literary career rest on the composition of the grand narrative of the Ibis Trilogy. Opening up an almost forgotten chapter of opium trade in the socio-economic history of colonial India, *Sea of Poppies* (2008), the first of the proposed trilogy, an epic saga itself, depicts a journey of sailors and stowaways, coolies and convicts on board the *Ibis* from Calcutta to Mauritius in 1838. While *Sea of Poppies* takes the readers along the poppy fields by the Ganges and the town of Ghazipur where opium is grown and produced, *River of Smoke* (2011) explores the streets of China where the opium is sold. This novel, along with depicting the lives of the Indian exiles in China also presents characters belonging to different cultural spaces, speaking different languages. The final book of the trilogy, *Flood of Fire* (2015) is set in the historical time of 1839 showing another journey of an array of characters in a ship called *Hind*, from Bengal to China and revisits history in depicting the growing tension between China and British India, leading towards the first opium war. In the latest book, which he loves to call a 'non-fiction about fiction' - *The Great Derangement* (2016), Ghosh raises the issue of climate change and emphasizes the fact that the climate crisis is also a crisis of culture, and thus of the imagination. The readers of Amitav Ghosh presently await the publication of the forthcoming novel *Gun Island*, another promising tale of love and loss, transnational travel and transcultural human realities.

**Literary legacy on writers of the next generation:** Amitav Ghosh's novels, it has been acknowledged by several writers of the successive generation, have exercised potential

impact on their creative instinct. The *Glass Palace*-Ghosh's fourth novel, has served as an inspiration to Sudha Shah in writing a book entitled *The King in Exile* (2012) on the history of deposition and forced exile of King Thibaw and the Royal Family of Burma by the British, across the border to India. The *Glass Palace* also serves as an inspiration to Rita Chowdhury to translate her Assamese novel *Makam* (2010) into English under the title of *Chinatown Days* (2018), and also to Amit Baishya in translating the *Sahitya Akademi Award*-Assamese novel *Jangam* by Debendranath Acharya into English-both these novels being fictional representations of exodus of Indo-Chinese people and Indians across the border of India during the troubled time of the Second World War. The *Hungry Tide*, Ghosh's fifth novel, centering round the Sundarban delta and its ecological transformation, works as a significant inspiration behind the composition of the Indian Anglophone 'island novel' *The Last Wave* (2015) by Pankaj Sekhsaria, as Sekhsaria tells the author of this article (me) in a personal interview. There is no denying that Ghosh's literary works exercise certain influences-either moral consciousness, ethical values or simply the message of humanity against the suffering and trauma of life, over several writers and scholars, which remain unnoticed, or often, even unacknowledged. But on this solemn occasion of honouring Amitav Ghosh with the *Jnanpith Award*, as readers and admirers, we should admit that every word of praise falls short to this scholar-writer and to the aesthetic harmony and universality of his literary works.

*Asis De is Associate Professor and Head of the Department of English at Mahabubnagar Raj College (Widyasagar University, West Bengal).*



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**Empire and Exile: Representation  
of the Burmese Royal Family  
across the Border in Amitav  
Ghosh's *The Glass Palace* and  
Sudha Shah's *The King in Exile***

Asis De

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**Abstract**

The salience of the border emerges from a confrontation between the anthropological idea of confined cultures with a recent focus on the diasporic flow of people and ideas across nations. Diaspora studies mainly concentrate on the re-imagining of communities and the subjects' "multi-locationality within and across territorial, cultural and psychic boundaries" (Brah 1996: 197). Though it shows a primary connection with cartography and geographical borders, the study of diaspora is deeply conditioned by historical events like colonisation, expansion of the British Empire and enforced exiles across the 'national' border, for example, the historical exile of the last Indian Mughal emperor Bahadur Shah Zafar to Rangoon and of the last Burmese King Thibaw to Ratnagiri, near Mumbai. This paper concentrates on the exile of the last Burmese King as represented in literary fiction and historical research. This is done through Amitav Ghosh's *The Glass Palace* (which is more a product of an aesthetic imagination, than historical representation) and Sudha Shah's *The King in Exile* (which is less a fictional representation, than a historical documentation) as case studies and attempt a critical examination of the concept of border, essentially as ideological, generating and reinforcing a sense of cultural difference. It also attempts to show how the colonial strategy of the political exile of the Burmese Royal family, to the Indian town of Ratnagiri, is

further after the King's death, and makes a quick wrap-up of historical events, like Queen Supayalat's return to Burma, her daughters' settling down with their husbands, all within a little more than two pages (GP 211-213): "So it happened that of the four Princesses, the two who'd been born in Burma both chose to live on in India. Their younger sisters, on the other hand, both born in India, chose to settle in Burma: both married and had children" (GP 213). All this is a historical reality, and Ghosh challenges the idea of border, as it is related to one's place of origin, by presenting this historical reality in an ironic manner: the first two Princesses, born in the land of the Burmese Empire 'chose to live on in India', while the last two Princesses who were born in the land of their exile, 'chose to settle in Burma'. The whole complex question of ethnicity, someone's natal relation, to a piece of land on earth and the idea of border seem to be apparently interrelated, but, ultimately, the fundament of representation vis-à-vis the issue of identity is determined by the spatio-temporal location of the individual. The issue of identity is, in every way, subject to the idea of bordering between the past and the present, between the place of origin and the place of residence, between the powerful and the pitiable. Amitav Ghosh's representation of the last sovereign King of Burma, before and after the historical event of exile, across the border of his empire, in *The Glass Palace* insists on the novelist's unique fidelity to historical research and simultaneously takes home the philosophical point that it is only the issue of power that decides an empire or equally, an exile.

### Bibliography

- Brah, Avtar. (2005). *Cartographies of Diaspora: Contesting Identities*. London/ New York: Routledge.
- Carter, Anne. (2012). *Bewitched by Burma*. Leicestershire: Troubador Publishing Ltd.
- Chattopadhyay, Sobha. (2003). "From Computer to Mangalabibi: A

historically original 'Thibaw', used in Shah's family biography of the exiled Burmese King; in her account Shah has often put the word 'King' with a small 'k', whereas Ghosh never puts a small 'k' in the word 'King'.



Conglomeration of Heterogeneous Elements: A (post) Post-Colonial Project". *Indian Writing in English*, ed. Rama Kundu, New Delhi: Atlantic, 119-133.

Ghosh, Amitav. (2005). *The Glass Palace*. New Delhi: Harper Collins.

Grossberg, Lawrence. (2011). "Identity and Cultural Studies: Is That All There Is?". *Questions of Cultural Identity*, eds. Stuart Hall and Paul du Gay, London: Sage Publications, 87-107.

Shah, Sudha. (2012). *The King in Exile: The Fall of the Royal Family of Burma*. New Delhi: Harper Collins Publishers India.

### Webliography

Aldama, Frederick Luis. (2002). An Interview with Amitav Ghosh. *World Literature Today*, Vol. 76, No. 2, pp. 84-91. <<http://go.galegroup.com/ps/i.do?id=GALE%7CA90307335&v=2.1&u=inbhc&it=r&p=AONE&sw=w>>.

Sethi, Sunil. (2013). "1984 Made Me Think Of The Ways My Life Has Been Enmeshed In Riots". Interview with Amitav Ghosh. *Outlook India Magazine*. <<http://www.outlookindia.com/article.aspx?287848>>.

# Quintessence of Dalit Literature

Rebel Narratives



Ashish Kumar Gupta  
Soni Sharma

**Quintessence  
of  
Dalit Literature  
Rebel Narratives**

**Dr. Asis De**  
Associate Professor & Head  
Department of English  
**MAHISHADAL RAJ COLLEGE**  
(NAAC Accredited 'A' Grade College)  
WEST BENGAL, INDIA

*Edited by*  
Dr. Ashish Kumar Gupta  
Soni Sharma



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**Representation of Female Subjugation  
and Domestic Violence in P. Sivakami's  
*The Taming of Women***

*Dr. Asis De*

---

Indian rustic life is generally focused by the media, art and literature as picturesque, abounding humble sources so as to instigate mankind with numerous archetypal ideologies of simple and content living, though with limited means. Men and women are portrayed as modest beings, naively surviving on the face of earth, whether it is R.K. Narayan's Malgudi or Manoj Das's depiction of the remote villages of India. But, lately after a host of writers from the 'periphery' of the sub-continent came into the realms of the study of literature, we witness a paradigm shift in the depiction of Indian rural retreat. These writers made us rethink the cannons of aesthetics in literature as their perspective diverted from beauty to social values. The Tribal writers depict the Adivasis as people living the life of forest animals. The Nomadic and Criminal Tribes are shown to be bereft of villages and homes. And Dalits are depicted even in worst condition as they lie in the lowest strata of the Hindu religious order where their untouchability permits them to live a segregated life, outside

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**Dr. Asis De**- Associate Professor and Head, Department of English, Mahishadal Raj College, Vidyasagar University

on the other hand, stands as a mighty proof of resistance against the exploitation of Periyannan. She dares to kick Periyannan in his nether regions and even threatens to stab him raising a sickle when he tries to hit her.

To conclude, in *The Taming of Women*, Sivakami points out many crucial societal issues of the Dalit women that put their identity into crisis. Throughout the narrative, Sivakami did not apply 'Dalit' in its rather socio-political sense for the so-called 'untouchables' or 'downtrodden' who suffer immeasurably due to their impoverished stature in the society. She particularises the condition of Dalit women who get trapped in their domestic space and are both mentally and physically maimed due to the continuous violence and torture by the patriarch/s inside the house. Whether rising up before the sun and toiling hard in the fields in the scorching heat and being the bread winners at home, the Dalit women are still in due to be placed in their rightful position inside their houses, and broadly, in the society they dwell.

#### Works Cited

1. Bama. *Sangati*. Trans. Lakshmi Holmstrom. New Delhi: Oxford University Press, 2005. Print
2. Holmstrom, Lakshmi. "Introduction". *Sangati*. Bama. Trans. Lakshmi Holmstrom. New Delhi: Oxford University Press, 2005. Print.
3. Jogdand, P.G. *Dalit Women - Issues and Perspectives*. New Delhi: Gyan, 2013. Print.
4. K. Divya. *Domestic Violence Induced Social Exclusion of Dalit Women: Evidence from Puducherry*. International Journal of Innovative Research & Development. Vol. 4, Issue 12. www.ijird.com. Web. November, 2015.
5. Limbale, Sharankumar. *Towards an Aesthetic of Dalit Literature*. New Delhi: Orient Blackswan, 2004. Print.
6. Paswan, Sanjay and Paramanshi Jaideva, eds. "An Overview." *Encyclopedia of Dalits in India, Volume 9*. Delhi : Kalpaz, 2004. Print.



# Mapping South Asian Diaspora

Recent Responses  
and Ruminations



Edited by  
**Ajay K. Chaubey | Asis De**

This book is our academic endeavour in contributing to the ever-growing corpus of diaspora criticism. Scholars from India and abroad have profusely contributed to this academic anthology and their exegeses and explications are worthy to be appreciated for multiple reasons.

They have critically evaluated the texts against the backdrop of literary theories as applied to the typology of literary taxonomy of many diasporic authors who overtly and covertly belong to the South Asian nations. This anthology deals with multiple theses on the issues of diasporic overtones, inter-ethnic relations, re/dislocations and merger of mental/physical boundaries represented in the literary texts authored by the young and veteran writers of the South Asian origin.

The volume offers explorations and unravellings that inscribe multifarious themes, issues and agenda concomitant with the South Asian diaspora critiqued by young, vibrant and enthusiastic authors who have earned their reputation in academic field at the global fronts. There is a need for more holistic understanding of the entire phenomenon to facilitate researchers and participants engaged in innumerable homilies related to diaspora and trans-nationalism. Hence, we hope that this volume will be a trustworthy tool to comprehend the dynamics of emerging trends in the area though the continuous progress and flow in the ontological apparatus cannot be denied.

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# Transforming Continuum of South Asian Diaspora

In Conversation with Vijay Mishra

ASIS DE

At the very dawn of 2017 (January 11-17), the Department of English of Mohanlal Sukhadia University organized a seven-day course entitled 'Postcolonial, Transnational and World Literatures' for teachers and researchers of Anglophone literatures, under the scheme of the 'Global Initiative of Academic Networks' sponsored by the Ministry of Human Resource Development, Government of India. The course coordinator, Professor Pradeep Trikha, made the programme immensely successful even in the chill of January at Udaipur by introducing Professor Vijay Chandra Mishra of Murdoch University as the chief resource person of the course. A Fellow of the Australian Humanities Academy, Professor Vijay Mishra virtually requires no introduction to the scholars of Diaspora and Cultural Studies, Postcolonial Anglophone literatures and Bollywood cinema around the world. A believer in disciplined scholasticism and rigorous archival research, Professor Mishra's forthcoming books on Salman Rushdie based on a rigorous reading of the Emory Salman Rushdie Archive would certainly be a glorious addendum to the already existing list of his substantial contribution to academia.

Born to parents of Indian origin, Mr. Hari Karan Mishra and Mrs. Lilawati Mishra (née Singh) at a place named Suva (near Nausori where he grew up) in Fiji, Vijay Mishra is the eldest of three children. It is a family of diasporic Indians, in which he was born and brought up with two siblings, one brother and a sister. In the paternal wing, his grandfather and on the maternal side, his great grandfather moved to the sugar plantations of Fiji before 1917, when the state-supervised system of indentured migration



was suspended by the Indian and imperial governments. From both sides, Professor Mishra belongs to a family, which is, in its essence, 'diasporic'. In 1973, he married Nalini Mishra (née Singh) and they have two children, one son and a daughter - Rohan and Paras Mishra respectively. Professor Vijay Mishra presently resides in Perth, and besides his academic enterprises he even finds time to play the Indian harmonium, and listen to the Beatles. Throughout the course, what struck us most was his profound knowledge and understanding of the Indian epics like the *Ramayana* and the *Mahabharata*, and of Sanskrit language/Indian cultural traditions.

It was very much like a New Year gift, as Professor Vijay Mishra consented to answer some of my queries in the form of an interview outside the lecture hall. In spite of his busy schedule of lectures in the course, we managed to squeeze in some time for discussion, and the interview took three consecutive afternoons, with varying slots of time ranging from thirty minutes to forty-five minutes. In all, we recorded nearly two hours of discussion and what follows, is a redacted version of that roving conversation. With surprising amazement, I felt the warmth of his clear and insightful observations while talking on the fast changing scenario of Diaspora Studies after a decade of his publication entitled *The Literature of the Indian Diaspora: Theorizing the Diasporic Imaginary* (2007). His reflections over the transformation of both the theoretical and practical dimensions of diasporic condition and literature certainly deserve critical attention, as his statements invite dynamic discussions over the currency and relevance of the term 'diaspora' in the present-day scenario, and ignite thoughts over the possibility of any such condition that could be called 'post-diasporic'.

**Asis De (AD):** You have made an observation a decade back at the very beginning of your book *The Literature of the Indian Diaspora: Theorizing the Diasporic Imaginary* (2007): 'All diasporas are unhappy, but every diaspora is unhappy in its own way. Diasporas refer to people who do not feel comfortable with their non-hyphenated identities as indicated on their passport.' Being/feeling 'unhappy' is a state of individual mind conditioned by different types of socio-cultural or historico-political determinants outside the 'national' border of one's own homeland. This 'unhappiness' also normally affects the idea of one's own self and identity. But in the post-Globalization scenario, as transnational migration is a common experience of the people of middle and upper economic order, how do you like to find the differences between the conditions of 'diaspora' and 'dislocation'? Do you think temporary and purposive transnational dislocation is equally 'unhappy'?

**Vijay Mishra (VM):** That's a very revealing observation. My book, as you know, was written almost ten years ago, and dealt with this proposition of 'unhappiness' in a very broad sense. The principal idea that I was

working on related to a kind of phenomenological notion of how people reacted to homelands, which was the starting point of my book, and because the book dealt primarily with the literary production of the Indian diaspora it had to read the historical Indian diaspora in two particular ways that you know, I was also conscious of what's now known as transnational diaspora, the diaspora basically of largely middle class Indians moving out of India and I should imagine that this is primarily an economic diaspora. I was also aware of the earlier 19th century diaspora where the movement of people to the particular sugar plantations was marked by, say, an absolute break with the homeland. Given my background I suspect I was more sensitive to the old plantation diaspora and as I wrote the book I recall giving the old diaspora the best lines.

**AD:** You mean the transportation of Indian indentured labourers and their 'diasporic melancholia'?

**VM:** Yes, precisely the process of indenture. Because that was not travel, there was no way of return as such, and that absence of the possibility of return of course created a serious sense of unhappiness. It was not simple unhappiness in the normal sense of the word but a kind of traumatized unhappiness. As if - and I think in the book (*The Literature of the Indian Diaspora: Theorizing the Diasporic Imaginary*) I borrow the phrase from *Machbeth* - one had been unceremoniously ripped apart from the mother's womb. As such the unhappiness is related to the idea of pain and being ripped apart and because you could never return, that pain was always there. And I think it's a pain which one finds in V.S. Naipaul's *An Area of Darkness* a work which really captures that sort of pain because indentured labourers had been ripped away from the mother's womb and then going back to find that the motherland was not that glorious land full of milk and honey and gold so forth. But what you now refer to is a more interesting issue and begs the question why the Indian diaspora is defined in terms of some quality of 'unhappiness' when one doesn't come across such usage with reference to, say, the Chinese diaspora or even Black Diaspora. I must say that the unhappiness of the indentured diaspora is certainly different from the transnational, the late 1960s and early 1970s Indian diasporas in America, the Settler nations and of course in Britain and Europe, too. For these particular new Indian transnational diasporas any sense of traumatic unhappiness because they have not been ripped apart in that old 'plantation diaspora' sense. They left the homeland of their own volition and unlike indentured labourers for them leaving the nation was not necessarily marked by a great release from economic inequality, the poverty of the homeland and so on. It may well be that indentured labourers to the plantation colonies (Mauritius, Fiji, Guyana, Trinidad and even South Africa) left as bonded coolies with the hope of



returning home rich. Of course this never happened as their function in the plantations was defined principally in terms of their value as a 'unit of labour' on paltry payments. In the case of the transnational 'new diaspora' by and large that issue is not there because they entered a world capitalist economy. You have your doctors, your engineers, your computer scientists in the Silicon Valley and their job is to make money, which they do with remarkable ease. But the question arises, and this question is central to diaspora theory: where is the link to the motherland? Indeed why do we refer to them as a diaspora? Why would you? Because if a diasporic condition is marked by a sense of an absence or a loss, if diaspora by definition, means dispersion of people from the homeland to elsewhere, either through persecution, or exile, or forced movement, that's what diaspora certainly is. Then built into the term there would be some kind of loss, some kind of unhappiness for the motherland. So if the 'transnational' actually is a 'willed' condition, shall we say a movement where nobody has asked you to go, nobody has controlled your movement, nobody has said that you'd be put on a ship and sent there for five years and then if you do well you stay there for another five years and then stay there permanently. All that is missing and hence the idea of the traumatized body has to be read differently or discarded altogether. There is a question of volition on the part of the individual, and so how do we theorize that, what is the relationship of the 'new' middle class diaspora to the homeland? It has to be in fact theorized in very different ways because this diaspora's movement coincided with a different advanced technology. The aeroplane had replaced the ship, and then subsequently it is the digital that replaced the analogue and cinema, especially Bollywood, became the mediated form through which one read the homeland. So instead of reading the *Ramayana* by Tulsiadas, which was also part of oral tradition, you watched *Ramayana* as a film, then even going further it's not cinema but the computerized YouTube which brings every kind of film into one's home. This way culture has been commodified. So whereas in the old diaspora culture was linked to notions of memory, to the notion of a past that one could recall and then talk about, in the transnational modern Indian diaspora culture is a memory that is commodified, a memory that has now been transformed into different types of items and these items take the form of cinema or YouTube, Skype and the like. The moment you have Skype, space disappears, time disappears. So it is something that requires a different kind of theorizing. So how do you theorize a diaspora which is no longer a diaspora traditionally defined within the semantics of home, absence, trauma, belonging and loss?

**AD:** Do you think it better to use the term 'dislocation' in place of 'diaspora' in such cases, I mean transnational dislocation?

**VM:** Yes. It's slightly dislocation, but there is no sense of removal and there is no sense of distance. Because the digital has in some ways destroyed the idea of distance.

**AD:** It is very true, as you point it out, that with the loss of the sense of 'distance' and even 'time' in transnational dislocations by the introduction of the cyber communication demands a reorientation of the theories of diaspora and the associated issue of ethno-cultural identity. Do you think that the modes of cyber communication have brought in a newer kind of 'Cosmopolitanism'?

**VM:** Yes, the cyber world is different kind of communication. The new global, the cosmopolitan is no longer one that works within a spatio-temporal context defined by distance and time. It's synchronous. The 'Doordarshan' (Indian television channel) controlled by the Government of India) can be heard in New York at the same time it is heard in Delhi. Nowadays films are released in Mumbai at the same time as they are released in Sydney and in New York. So how do we theorize it? I think this theorization takes the form of, shall we say, a diaspora, a transnational diaspora, trying to capture and carry Indian forms as a fetish and the fetish takes the form of a Bollywood dance or a Bollywood film. The curious thing about the new Indian transnational diaspora is that regardless of whether you come from Bengal or whether you come from Madras or from Bombay, wherever, gradually the children in these Western nation-states become unified because they all follow Bollywood cinema. So when you attend Indian weddings and especially what in Indian weddings is called the 'Sangeet' evening, whether you are Tamil or Bengali or whatever it's all around Bollywood. So it's one way in which one can rethink the notion of national identity ... and the logic, the cultural logic of return because diaspora's basic theory was built around the idea that there must always be a return to the homeland. The 'old' plantation diaspora always felt that way - in the way of return - and V.S. Naipaul's problem, for example, was that when he did return, he couldn't handle it, he had a near mental collapse because of a failure to bring the real and his mental projection of the nation together. It's a kind of the incommensurable - the mind, the notions of India, and the reality of India - so he produced a text which is highly fractured - a text which is traumatized; a text that carries a sense of unevenness and disruptions and so forth. So I am not too sure if the same statement about unhappiness applies to the transnational because there is not that deep longing for return ... but largely because it's an economic diaspora, it doesn't have the sense that it cannot return. It can return. It's by choice. So the homeland simply becomes a cultural context or a space where you come with your American dollars, to spend money and stay in five-star hotels, and you buy 'culture' as commodified items and you take them back. So you buy the most expensive sarrees or salwar kameez



[Indian dress for ladies], your best DVDs, and your best art forms and put it in a mansion in New York. It's a tricky idea I've not been able to analyse, which is perhaps why I don't write about it anymore, partly because I don't know how to explain that. I think people like you have a better understanding of what that diaspora is. It's a strange sort of diaspora, the modern, cosmopolitan, transnational Indian diaspora. These people come to India to travel, basically as tourists. They do not come to India to replenish cultural heritage. This type of people come here as any Western tourist, not to absorb but purchase culture as a commodity, the latest in fashion, which can then be used in the so-called 'sangeets' and the Bollywood 'tamashas' and so forth going on 'there', in the West. It is a diaspora that doesn't really have any real commitment as such to the homeland itself because the homeland may be 'purchased' in fragments and not carried as a phenomenological reality. Which is why, in the only area I know well, Indian diasporic entrepreneurs are far behind their Chinese and Jewish counterparts in establishing homeland cultural studies programs in Western universities. Well, how many rich people of the Indian diaspora in America have actually funded departments in universities here in India? What is their commitment? The other sad thing about transnational diaspora is that the other diaspora, the 'old' diaspora, was always radical in a sense, and a sense of egalitarianism was its driving force (which of course led them into trouble when it came to relating to other races). That ideology of egalitarianism is largely missing from an increasingly self-centred, self-content, and largely conservative in the primarily 'fundamentalist' transnational Indian diaspora. It celebrates all the things in India that you yourself could subject to pretty radical critique. I mean it is very uncomfortable (especially for someone like me from the old indenture diaspora) to hear the transnational diasporas disapprove of reservations for the Dalits and affirmative action for the underprivileged in India. So there is a kind of 'ultra-conservatism' that has become part of the 'new' diaspora, which is very different from the 'unhappiness' of the 'old' diaspora. The 'old' diaspora was unhappy because it always felt that there was something great about the nation which s/he has left behind. This 'new' diaspora is basically rich in its own right and I don't think it has the same kind of deep-rooted relationship with the nation of origin. It wishes to make lots of money. I am sure you'd know that story yourself about American-Indian tourists who come here.

**AD:** That is very true and the fictional characters of Mr. and Mrs. Das in Jhumpa Lahiri's short story 'Interpreter of Maladies' could be seen as good examples of what you say - the American-Indian tourists, without any deep-rooted commitment to the homeland. Now do you think that issues like 'feeling uprooted', 'self-imposed sense of exile' or 'nostalgia for the home left behind', are more related to the people who have been

transnationally dislocated from their lands of origin for the first time (henceforth, the First generation) and the issue of 'hyphenated identity' being something that refers mainly to the offspring of these people who are born and brought up outside their parents' land/s of origin (henceforth, the 'second generation')?

**VM:** It is an issue that takes number of forms. A lot of the writers from the diaspora these days - a number of them what you would call second generation were actually born in Canada, in America - they bring a different kind of sensibility to the writing. Sometimes it is the recollection of their parents' memories and so forth which make their way into their writing. At other times they quite consciously move away from any sense of 'Indianness', any sense of inherited literary tradition which is Indian, as they see themselves in a much more cosmopolitan light. So Jhumpa Lahiri, for instance, seems to be a diaspora writer becoming more cosmopolitan in her latest novel (*The Lowland*, 2013). There she transcends the confines of diasporic sensibility and becomes cosmopolitan. So what you point to is vital in the sense that there is the original migrant who comes to the new land and his/her aim is to establish themselves economically, materially in this new land and there is a grand kind of sense, not so much as a grand but certainly a sense of living here and belonging elsewhere. It is a kind of the diasporic condition that you live here and belong elsewhere. The second generation writers of the diaspora become cosmopolitan, being born in the new nation to which their parents came. Their consciousness became slightly more complicated in many ways because they face other questions about exclusion from the grand narrative of the nations in which they were born, they are concerned about other questions relating to belonging, they are concerned about legitimizing themselves as citizens of the nation and of course they are concerned fundamentally and above all with the question of racism. This becomes a very powerful factor, not so much a force, but a very powerful presence in their lives and you notice that the second generation of diaspora writers cease to be - let me rephrase it - become less concerned with questions about homeland, less conscious about the desire to go back to their 'homeland', beyond a kind of superficial engagement with Indian popular culture and principally that cultural dominant of Indian modernity that goes by the name of Bollywood. But their great concern is how, if we speak of writers, how to write about themselves into the nation-state they occupy, and thereby legitimizing their 'hyphenated' selves which is how the dominant community reads them. These writers may have passports where the citizenship is Canadian or Australian, but in real day-to-day life, their lives are certainly hyphenated; they are Indian-Canadian or Indian-Australian. The condition makes for the idea of belonging and trauma itself very different. As I said before, I find myself increasingly



incompetent to adequately address the diasporic condition of those born in the nations to which their parents had migrated.

**AD:** You mean the hyphenated identity is a result of intergenerational shift of ethno-national identity, very much like David Dabrydeen's British-Guyanese type, without the least trace of 'Indianness' in it?

**VM:** Yes, that is what happens. So the second generation is one that carries a lot of, in a sense, intergenerational trauma of their parents, but they consciously try to make sense of the nation-state which they are occupying and trying to transform the nation-state itself as a space that would allow for multiple identities, that allow for hyphenated identities to exist as equal citizens and that is easier said than done - easier said than done because there is still a notion in the nation they are occupying, that the country they live in, the nation-state where they live in already has a grand narrative of itself. It already has a grand narrative in settler nations going back to their foundational moments whether it is the settlement of Australia or the 'First Fleet' or the May Flower in America, or the arrival of the English in New Zealand. In all these instances, what one gets is that a grand narrative is established centred on a relationship that the original settler has with the land and it takes a number of forms. One form is the 'compact' that the original settler makes with the natives. In some cases this 'compact' is totally one-sided and takes the form of total territorialisation overlooking native rights. In New Zealand, of course it takes a form of a more established 'compact' going back to the Treaty of Waitangi (1840) between the indigenous Maoris and White men - so it is a 'compact' - it is a relationship between the indigenous and the white men which established the New Zealand grand narrative. So can you imagine once that 'compact' is established how does the outsider fit in? It's very hard. The outsider, the Indian, the Chinese, whoever comes to New Zealand has to come into a nation which already has a bicultural compact and therefore uneasy with multi-culture. Where there is a compact of sorts or where there are first nation peoples, a diaspora's entry into the grand narrative of the nation gets even more complicated and problematic.

**AD:** The historicity of the 'bi-culture Compact' inspiring grand narratives of different places, which were erstwhile settler colonies, is a vital issue related to the idea of diasporic identity, or to say it in a more pointed manner, related to the erasure of the ethno-cultural identity of the trans-national diasporic minorities amid the grand narrative of the concerned nation-state. Now, I would like to seek your opinion about the most relevant kind of definition of South-Asian Diaspora, which you prefer?

**VM:** Well as I said in my book, I think, South Asian Diaspora has to be located not necessarily in compatible minds. And I have referred to it as the 'old' and 'new' diasporas, and I have referred to 'classic capital' and 'late modern' diasporas. And the reason why we need to keep this

particular distinction in mind is that the South Asian diaspora has a long history, not as long as the Jewish diaspora but certainly as long as the Chinese diaspora. In other words there was a labour-migration in the 19th century starting in Mauritius - from the late 1830s or 1840s onwards and all the way to 1917. So you had a period of 80 years of movement of labour which was really the 'first' diaspora which has to be understood in terms of the politics of the time and immigration policies that excluded non-whites as denizens of predominantly white nation states (and in Australia until 1967 even indigenous people did not have citizenship rights!). So the only movement that took place was the movement of labour - to the 19th century plantations in non-white nations. That constituted for a long time, the dominant Indian diaspora up until the 1960s - the dominant Indian plantation diasporas mainly in South Africa, Mauritius, West Indies, Surinam, Guyana, Fiji. But there was of course a much earlier historical movement of Indians as evangelists to South-East Asia, bringing Hinduism to Indonesia and Malaysia, Buddhism to South-East Asia, and Sri Lanka. So that is a different diaspora because diasporas by definition cease to be one if they have totally assimilated - they had become assimilative to the culture. Diasporas must have a sense of 'difference' inside them. The plantation diasporas are classic cases where they remained in many ways exclusive - very few in them, for instance, inter-married outside their socio-ethnic and religious groups in South Africa, West Indies, Mauritius or Fiji. And in that exclusivity they recreated a kind of 19th century Indian culture they had brought with them, very much 'different' from the local cultural conditions and so forth. So that distinction ought to be kept in mind and that distinction actually produces a different kind of literature. The great exponent of this type of literature is V.S. Naipaul. If you look at V.S. Naipaul's works, you would see how central they are to our understanding of the 'old' plantation diaspora. So that 'old' plantation diaspora's relationship with the homeland is different. Its highly traumatized relationship is based on the experience of not being able to 'return'. So in that respect it was closer to the old Jewish definition of diaspora - so there was a harking back to the homeland - Palestine, Israel - that they had left, and to which in many instances the Jews could never return. Because Palestine has been taken by the Ottoman Empire how could you return to the homeland? And so for the Jews, the idea of recreating a homeland became very important, because for them diaspora was a question of returning. So in the South Asian 'old' plantation diaspora at one level - they knew that they could never return and at the same time, in their thoughts there was a kind of feeling that maybe we could return some day - and which was not really possible. Herein lay a paradox that becomes part of the literary output. So when you read the novel of V.S. Naipaul - *A House for Mr. Biswas* - you read a brilliant paragraph where Mr. Biswas comes to a shop and at that shop there are people sitting and smoking opium or chillum, and Naipaul says that these people sitting there, reminiscing



about the homeland and of course they knew that they could never return – they live within what he refers to it as a ‘familiar temporariness’ – this phrase he uses – the ‘familiar temporariness’, is temporary but it becomes familiar and therefore it becomes a re-creation of the homeland. Now the ‘new’ Indian diaspora begins in the 1960s because white nations began to change their immigration policies – people of colour could migrate and get citizenship there. This sort of diaspora, as I’ve already said, I like to refer to it as ‘late capitalist’ or late-modern diaspora and this diaspora is defined basically not so much by ‘coolie’ labour and in some ways forced, but one of free movement and this is by and large an economic migration. People of Indian origin are going to America, Canada, Australia, New Zealand, Britain, in the US to improve their lives, to better their lives. And for them it was never a matter of not being able to return – the mobility is free, unrestricted – and they are never disconnected. And from the moment they started leaving their countries in South Asia – largely from late 1960s – air travel made it possible for them to return, once, twice, three times or even more in a year and then of course digital technology made the homeland present in the diaspora itself. These days it is this new late-capital diaspora which is the dominant way of looking at the Indian diaspora. As the plantation diaspora recedes, the new diaspora talks over and with its massive wealth, becomes the diaspora with which the homeland itself too is more comfortable. The ‘Indian Pravasi Divas’ celebrations and the GOPIO Newsletter, for instance, are a celebration of this new, rich and powerful Indian diaspora. The working class of indenture recedes given the onslaught of capital. Diaspora theory too cannot be disentangled from the movement of capital generally.

**AD:** In one of your articles entitled ‘Postcolonial Differend: Diasporic Narratives of Salman Rushdie’, you have found diaspora ‘as an immediate, increasingly mobile idea’ (115) which has its reference point in the past, and which has ‘no sense of a teleological end’ (112). So, as I find it, you inspire the scholars of Diaspora Studies to trace the stages of the evolution in theorizing and redefining transnational diaspora along with the indeterminate dimensions of the ‘Diasporic imaginary’ across the globe. Would you kindly elaborate a little more on your equation between diasporic experience and ‘rebirth’: ‘... the diasporic world is very much the world in which one undergoes a rebirthing’ (119)? Is there any allusion to Bharati Mukherjee’s *Jasmine*, where one can find a sentence like: ‘We murder who we were so we can rebirth ourselves in the images of dreams’ (my emphasis)?

**VM:** The essay you refer to picked up Jean-François Lyotard’s idea of the differend as marking a radical incommensurability between two positions and was deployed to think through the crisis in literary representation around Rushdie’s *The Satanic Verses*. Of course the latter is primarily a text about migration and about newness within a diasporic

framework as the chief protagonists – Gibreel and Saladin – are migrants to Britain and relate to the Indian diaspora there. In that context, and taking off from Rushdie himself, diaspora is seen as the ideal condition of late modernity, the condition that allows one to be flexible and malleable, a little of this, a little more of that notion. In that reading diasporas cannot have a distinctive and exclusive teleology because the latter presupposes some idea of historical fulfilment and a grand narrative of the nation. And of course Rushdie’s work is the classic instance of a rebirthing, which always happens and in making the case Rushdie argued that Islam itself was a kind of rebirthing and therefore fitted well with our understanding of the diaspora as the condition of the outsider looking in. Again all this begins to get considerable traction once we begin to theorize diaspora in transnational and indeed in ‘worlding’ terms. In the rebirthing that you refer to the self that emerges is an image, a fiction, part of the imaginary apparatus whereby the image represents what we would like to be. Bharati Mukherjee may have had this definition in mind which is more like mine but different from the idealist postmodern readings of diaspora found in Rushdie for whom in diaspora lies the salvation of nation states.

**AD:** Thank you so much for being so generous with your time and for sharing some of your illuminating ideas with me. Hope I would have more chances to meet you and to enrich myself with your ideas in future. *Pranam!*

**VM:** Thank you so much for this interview and best wishes for your research and publication. It has been a pleasure, and speaking to you reinforces what I said at the end of my final lecture: *Aone logo se bair-cit karne ka maksad aur maza kuch aur hai.*

**Note:** This interview took place at Mohanlal Sukhadia University, Udaipur (Rajasthan), India, 14–16 January 2017. In place of full names, after the first exchange, initials of Vijay Mishra and Asis De have been used as VM and AD respectively. The words/phrases in bold have been marked by Professor Mishra himself, mainly for an effect of emphasis, when the transcription of this interview was sent to him for approval. I express my sincere gratitude to Professor Mishra for his generosity.

#### Note

1. Please see *Linked Histories: Postcolonial Studies in a Globalized World*, edited by Pamela McCallum and Wendy Faith, Calgary: University of Calgary Press, 2005, pp. 111–44, Print.



# Mapping South Asian Diaspora

Recent Responses  
and Ruminations



Edited by

**Ajay K. Chaubey | Asis De**

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# Introduction

## South Asian Diaspora: A Theoretical Overview

AJAY K. CHAUBEY AND ASIS DE

Diaspora studies, as a branch of social sciences and humanities, has secured the attention of the academia mainly within the last three decades. One of the pioneering figures of Diaspora studies, William Safran finds that terms like 'diaspora' and 'diasporic community' are being increasingly deployed as 'metaphoric designations for several categories of people – expatriates, expellees, political refugees, alien residents, immigrants and ethnic and racial minorities *tout court*' (1991: 83) who live mainly outside their 'homeland', as the 'myth' of diaspora includes the issues of 'homeland' and 'return'. Robin Cohen, in his seminal volume *Global Diasporas: An Introduction* (1997; 2008) points out four phases in the evolution of diaspora studies, namely the classical or Jewish Diaspora ('systematically extended' to 'the dispersion of Africans, Armenians and the Irish'), 'a more varied cluster of diasporas' in the 1980s and onwards, a third phase of the postmodern construction of identities in relation to diaspora and its cultural productions (from the mid-1990s), and the fourth and final 'phase of consolidation' featured by 'a modified reaffirmation of the diasporic idea, including its core elements, common features and ideal types' (1–2). In the first issue of his landmark journal *Diaspora: A Journal of Transnational Studies*, published in May 1991, Khachig Tölölyan broadens the issue of diaspora to 'ideas and practices of collective identity,' the study of nation, national border and the calibration of transnational politics in 'all cultural productions' (1991: 3). Tölölyan, himself an Armenian diasporic, also traces the scope of the notion of 'Diaspora' as a 'term that once described Jewish, Greek, and Armenian dispersion now shares meanings

- Lal, Malashri and Sukrita Paul Kumar. *Interpreting Homes in South Asian Literature*. Delhi: Pearson Longman, 2007. Print.
- Mannur, Anita. *Culinary Fictions: Food in South Asian Diasporic Culture*. Philadelphia: Temple University Press, 2010. Print.
- Mohanty, Sachidananda. Foreword. *Tracing an Indian Diaspora: Contexts, Memories, Representations*. Eds. Parvati Raghuram, et al. New Delhi: Sage, 2008. xii-xiii. Print.
- Nasta, Susheila. *Home Truths: Fictions of the South Asian Diaspora in Britain*. New York: Palgrave Macmillan, 2002. Print.
- Oonk, Gijsbert, ed. *Global Indian Diaspora: Exploring Trajectories of Migration and Theory*. Amsterdam: Amsterdam University Press, 2007. Print.
- Paranjape, Makarand, ed. *In Diaspora*. New Delhi: Indialog, 2001. Print.
- Rai, Rajesh, Peter Reeves, eds. *The South Asian Diaspora: Transnational Networks and Changing Identities*. London and New York: Routledge, 2006. Print.
- Safran, William. 'Diasporas in Modern Societies: Myths of Homeland and Return.' *Diaspora: A Journal of Transcultural Studies*. Vol. 1, No. 1. (1991): 83-99. Print.
- Safran, William, Ajaya K. Sahoo, Brij V. Lal, eds. *Transnational Migration*. New Delhi: Routledge, 2009. Print.
- Sharma, Kavita A., Adesh Pal and Tapas Chakrabarti, eds. *Interpreting Indian Diasporic Experience*. New Delhi: Creative Books, 2004. Print.
- Singh, Manjit Inder, ed. *Contemporary Diasporic Literature: Writing History, Culture, Self*. New Delhi: Pencraft International, 2010. Print.
- Tölölyan, Khachig. 'The Nation-State and Its Others: In Lieu of a Preface.' *Diaspora: A Journal of Transnational Studies*, Vol. 1, No. 1 (1991): 3-7. Print.
- Vertovec, Steven. 'Three Meanings of 'Diaspora' Exemplified among South Asian Religions.' *Diaspora: A Journal of Transnational Studies*. Vol. 6, No. 3 (Winter 1997): 277-99. Print.



## Chapter 18

# Major Components of Green Urbanization and Their Relative Importance: A Study on Some Districts of West Bengal (India)

**Subikash Mookherjee**  
*Mahishadal Raj College, India*

**Debasish Mondal**  
*Vidyasagar University, India*

### **ABSTRACT**

*Aspirations for being urban in character are considered as a significant phenomenon of socio-economic development in developing countries. Urbanization, in economic sense only, means intensive economic activities by a large number of people in a relatively small plot of land, where secondary and tertiary sectors play a dominant role and where certain amenities are bound to be available for general citizens, though it doesn't seem complete without addressing the issue of nature. Though urbanization of an area is tried to be measured by some academicians through applying the method of indexing with available indicators and their data-driven weights, environmental issues are not incorporated there for any kind of factor analysis to identify their individual relative importance. This chapter intervenes at this juncture and focuses on construction of an urbanization index for some selected "town area units" belonging to some selected districts of West Bengal and run a factor analysis of it on some identified environmental factors. It observes negative relationship between QVSE and IGU, positive association between IGU and PR, and positive relation between IWDS and IGU.*

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### **Major Components of Green Urbanization and Their Relative Importance**

- Mookherjee, S., Pattanayek, S. K., & Mondal, D. (2017). An Appraisal of Urbanization Status of Villages in A Particular Block of West Bengal: An Exploration through Construction of A Generalized Urbanization Index. *ZENITH International Journal of Business Economics & Management Research*, 7(12), 97–110.
- Noorbakhsh, F. (1998). The Human Development Index: Some Technical Issues and Alternative Indices. *Journal of International Development*, 10(5), 589–605. doi:10.1002/(SICI)1099-1328(199807/08)10:5<589::AID-JID484>3.0.CO;2-S
- Palazzi, P., & Lauri, A. (1998). The Human Development Index: Suggested Corrections. *Quarterly Review. Indexes - Banca Nazionale del Lavoro*, 51(205), 193–221.
- Pattanayek, S. K., & Mondal, D. (2016). Educational Development in Blocks of Paschim Medinipur District (West Bengal) between 2005-06 and 2012-13: Panel Data Analysis through Education Index. *Artha Vijnana*, 58(1), 71–93. doi:10.21648/arthavij/2016/v58/i1/121274
- Pattanayek, S. K., & Mondal, D. (2016). Nature of Development in Health through Health Index in the Blocks of Paschim Medinipur District in West Bengal during 2005-06 to 2014-15. *International Research Journal of Basic and Applied Sciences*, 2(1), 1-6.
- Pearson, K. (1901). On Lines and Planes of Closest Fit to Systems of Points in Space. *Philosophical Magazine, Series 6*, 12(11), 559–572. doi:10.1080/14786440109462720
- Primary Census Abstract of West Bengal. (2011). Director General of Census Operations, Ministry of Home Affairs, Government of India.
- Ramachandran, R. (2012). *Urbanization and Urban Systems in India*. Oxford, UK: Oxford University Press.
- Ravallion, M. (1997). Good and Bad Growth: The Human Development Reports. *World Development*, 25(5), 631–638. doi:10.1016/S0305-750X(96)00141-6
- Ravallion, M. (2012). Mash-up Indices of Development. *The World Bank Research Observer*, 27(1), 1–32. doi:10.1093/wbro/lkr009
- Ravallion, M. (2016). The World Bank - Why It Is Still Needed and Why It Still Disappoints. *The Journal of Economic Perspectives*, 30(1), 77–94. doi:10.1257/jep.30.1.77
- Sivaramkrishnan, K. C., Kundu, A., & Singh, B. N. (2011). *Handbook of Urbanization in India* (2nd ed.). Oxford University Press.
- Srinivasan, T. N. (1994). Human Development - A New Paradigm or a Reinvention of the Wheel. *The American Economic Review*, 84(2), 238–243.



## KEY TERMS AND DEFINITIONS

**Average Correlation:** In statistics, *correlation* is defined as a measure of relationship between the statistical dispersion within individual categories and the dispersion across the whole population or sample. The measure is defined as the ratio of two standard deviations representing these types of variations. ‘Average Correlation’ of a particular variable (or dimension) is defined as the average value of its all sorts of correlations, i.e., its squared simple correlation (i.e.,  $r^2$ ), its squared ortho-partial correlation and its squared semi ortho-partial correlation(s), if any.

**Factor Analysis:** It is a statistical process in which the values of observed data are expressed as functions of a number of possible causes in order to find which are the most important. Factor analysis is a technique that is used to reduce a large number of variables into fewer numbers of factors. This technique extracts maximum common variance from all variables and puts them into a common platform.

**Green Urbanization:** It is defined as the practice of creating some sort of balances between urbanization and ecology which is supposedly to be beneficial to both human and the environment. It can be considered as an attempt to shape more sustainable places, communities and lifestyles, and consume less of the world’s resources. It is interdisciplinary, combining the collaboration of landscape architects, engineers, urban planners, ecologists, transport planners, sociologists and economists.

**Index:** In economics, an index is defined as a statistical measure of changes in a representative group of individual data points. These data may be derived from any number of sources, including company performance, prices, productivity, employment, etc. Economic indices generally track economic health of an identified geographical area from different perspectives.

**Principal Components:** Principal component analysis (PCA) is a statistical procedure that uses an orthogonal transformation to convert a set of observations of possibly correlated variables (entities each of which takes on various numerical values) into a set of values of linearly uncorrelated variables called principal components. Principal component analysis is an approach to factor analysis that considers the total variance in the data, which is unlike common factor analysis, and transforms the original variables into a smaller set of linear combinations.

**Relative Importance:** The relative importance of a factor represents its basic value-weight, including any imputations. It is nothing but the true (i.e., actual) contribution of an individual factor in explaining the dependent variable excluding the overlapping (i.e., joint) contributions as appeared from other factors.

**Weights:** In statistics, imputing weights is known as a technique in which a data item (such as an average) is emphasized more than other data items comprising a group or summary. A number (weight) is assigned to each data item that reflects its relative importance based on the objective of the data collection.

# Women, Science and Education: Kalpana Chawla, the True Heroine

Swati Basak

Education is the most important thing in our life. There are social, ethical, moral, economic, political and cultural connotations of education in our everyday life. Though many of us are now concerned about basic education but very few really think about the necessity of higher education especially among women. To be more precisely I concentrate on participation of womenfolk in the field of science. In medical science though women participate quite satisfactorily all over the world but in the field of engineering and technology their participation rate is very low. Very few women have become scientists. Now a question may be raised here, do they lack the proper intelligence for acquiring that much potential?<sup>1</sup> Women all over the world have little access to scientific research like astronomy and in our country there is almost very little scope for this kind of education for women. The low participation rate of women in the field of science has become a concern among the scientists all over the world. Several Academy fellows are really concerned about the problem and want to reduce the gender gap in the field of science and scientific research. In January, 2003 the council of the Indian Academy of Sciences constituted a committee named "Women in Science" to give recognition to the real talents. In India in the year 1973 in Mumbai Indian Women Scientists' Association was formed to get the real picture of women participation in scientific fields.

Report by AAUW, (American Association of University of Women), 2010 tried to find out the answer.<sup>2</sup> STEM (Science and Technology in Engineering and Mathematics) also points out to the environmental and social constraints as well as gender biases in colleges and Universities especially in science and engineering departments.<sup>3</sup> It is mentioned in the report that knowledge is considered as "static" according to the individuals who have "fixed mindset." But on the contrary, the individuals those who have "growth mindset" believe that intelligence can be developed and one can develop it day by day.<sup>4</sup> They constantly upgrade



facilitating the welfare and education of women in general and of the state concerned in particular.<sup>8</sup>

As before, the emphasis was more on home science and home craft, including sick nursing, nutrition, dietetics and food preservation, sewing and tailoring, cottage industries, music, dancing and painting. Preference was also vouchsafed for vocational education of girls. It was thus in line with the conservative mentality of the pre-independence period that the Durgabai Deshmukh Committee formulated its ultimate recommendations. It did take into perspective the need for socio-economic freedom of the Indian woman, her potential to contribute to national development, but was drafted the report in a very limited sense. Thus, vocational instruction at the middle level was encouraged instead of core science subjects. This was justified on the grounds that most girl students dropped out at the middle stage and that training in vocational courses prepared them as would be efficient homemakers, good mothers and successful wives. Thus higher educational opportunities for women did not find a place in the recommendations of the Committee.

Education for women as the Durgabai Committee understood it was reduced to a very limited sense. It merely touched the tip of the iceberg, when it proposed recommendations for the primary education of women in the rural and urban areas and for the removal of illiteracy.<sup>9</sup> Although the democratic spirit in our Constitution guaranteed equal rights and opportunities to women, higher education in the core subjects of science even in the 1950s largely a preserve of a handful privileged minority, for other women it remained a wishful thinking.

## Notes & References

1. Meredith Borthwick; *The Changing Role of Women in Bengal, 1849-1905*; Princeton: Princeton University Press; 1984; pp. 66-67.
2. Shanta Devi; *Purbasmriti (Memories from the Past)*; Calcutta: Papyrus; 1983; p. 21.
3. Report of the *University Education Commission*; December 1948- August 1949, Vol. 1; Simla: Government; Delhi; 1949; p. 36.
4. Humayun Kabir; *Education in New India*; London: George Allen and Unwin Ltd; 1956; p. 2. 5. *Ibid.*; p. 394.

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2. **প্রভাস কুমার রায়**, "অমৃতপুরুষ বিদ্যাসাগর", মহিষাদল রাজ কলেজ, ISBN: 978-81-936308-0-8, ২০১৯।
3. **Swati Basak**. *Tales of Women in India, From Slavery to Bravery*, Ababil Books, Kolkata, Print, ISBN 978-93-89217-12-4.

**Number of book chapters published: 05**

## **Book chapters**

1. **Asis De** and Nirmalendu Maiti. 'The Partitioning "Shadow Lines": The Border, the "Other" and the Eco-literary in *The Hungry Tide* and *The Great Derangement*' in Esterino Adami, Carmen Concilio, Alessandro Vescovi (eds.), *Crossing the Shadow Lines : Essays on the Topicality of Amitav Ghosh's Modern Classic (Quaderni di RiCOGNIZIONI, XI)*, Dipartimento di Lingue e Letterature Straniere e Culture Moderne – Università degli Studi di Torino, Torino 2020, pp. 95-107, ISBN 9788875901738, DOI: <https://doi.org/10.13135/2420-7969/11>
2. **Asis De**. 'The Portrait of the Author as Indian: Representation of Identity in Ruskin Bond's *Lone Fox Dancing: An Autobiography*' (Book Chapter: ISBN: 978-9381563-27-4), in *Representing the Self: Addressing Issues of Ethnicity and Identity across Domains*, by Moumita Dey (Ed.), Visakhapatnam: Global Publishing House, December, 2019, pp. 68-80.
3. **Shyamal Mondal**. "Re-reading and Re-writing Satyajit Roy's *Charulata*(1964) in a Postcolonial Rubric" in *Trends in Postcolonial Language, Literature and Culture* edited by Abhilasa Phakun, **Purbayon Publishers**, Guhawati , 2020 ISBN 978-93-89940-72-5.
4. **Shyamal Mondal**. "Bengali Art Films: Women's Subjectivity and Use of Transgression in *Ekla Cholo* and *Nirbasita*" in *Off the Line: Transgression and Representation in Literature and Culture* edited by Tanmoy Kundu and Srirupa Mahalanabis, **Atlantic Publishers**, Kolkata, 2019 ISBN 978- 81-269-3112-5.
5. **Prakash Bisui**. Partition and Indo Bangladesh Relation, Reflection on Movie: A historiographical Analysis, Pondering the Past Glimpses of Our Society and Culture, Vol-III, Edited by Dr. Sutapa Sengupta, (Ed), P.A.I.O.L.C.L, Kolkata, 2019. ISBN-978-93-88207-48-5.

**Number of Papers published in Conference proceedings: 01**

## **Papers published in Conference proceedings**

1. Jaydeep Das, **Anwasha Mukherjee**, Soumya K. Ghosh, and Rajkumar Buyya. "Geo-cloudlet: Time and power efficient geospatial query resolution using cloudlet." In International Conference on Advanced Computing (ICoAC), IEEE, pp. 180-187, 2019, <https://doi.org/10.1109/ICoAC48765.2019.246837>, Electronic ISBN: 978-1-7281-5286-8, Print on Demand(PoD) ISBN: 978-1-7281-5287-5.



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সম্পাদক

ড. প্রভাসকুমার রায়

প্রধান, বাংলা বিভাগ

সহসম্পাদক

অধ্যাপক সমীরকুমার পাত্র (প্রধান, ইতিহাস বিভাগ)

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ড. শম্পা বসু, (বাংলা বিভাগ)

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শ্রী তিলককুমার চক্রবর্তী (সভাপতি, পরিচালন সমিতি, মহিষাদল রাজ কলেজ)

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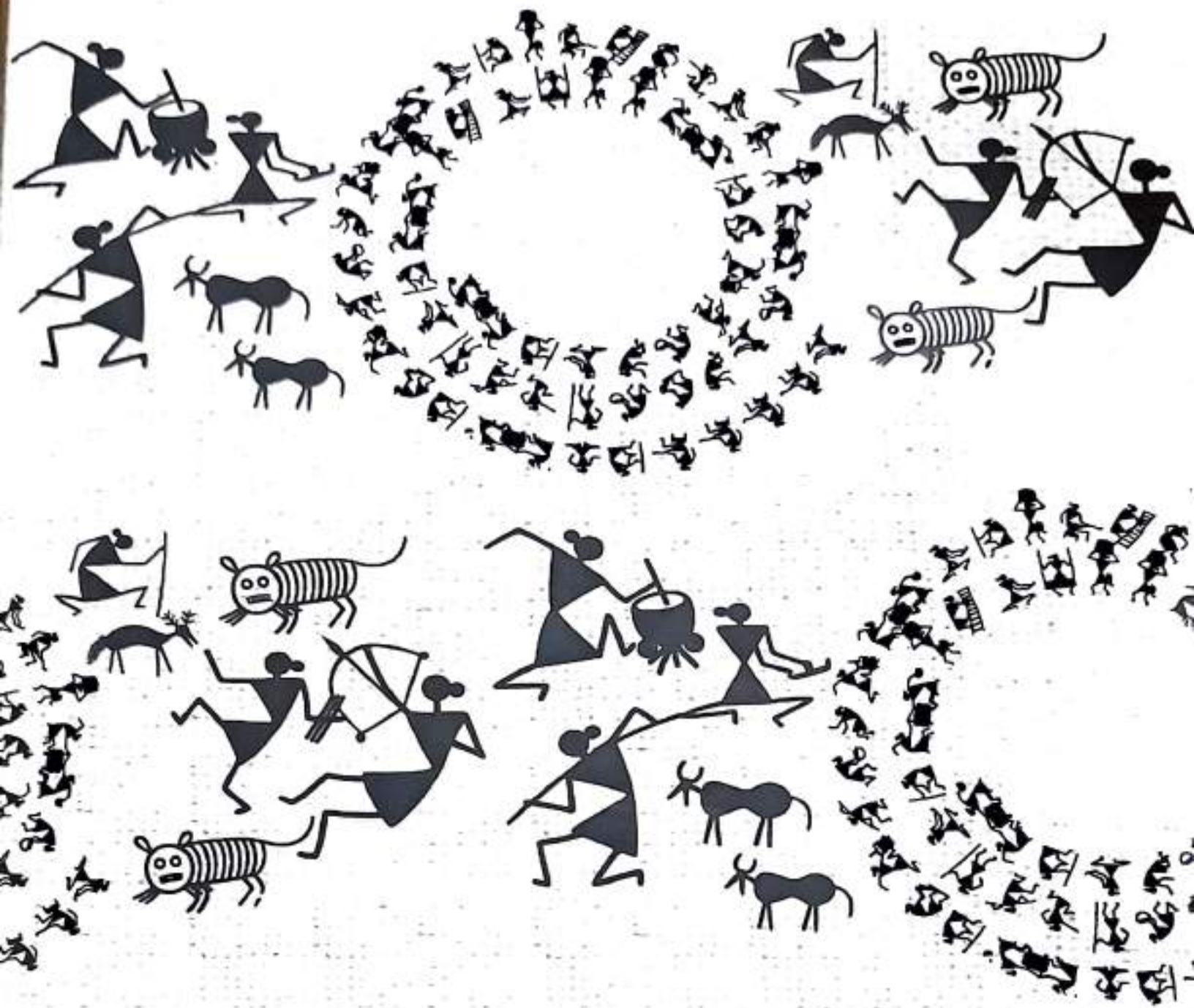
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Tales of Women in India

## Introduction

Gender studies is a new trend in historical writing. My inclination towards gender history indulged me to pursue a lot of research work on gender history. Feminism and women studies are two parts of Gender studies where gender history is a sub field. The pioneer in this field is Mary Wollstonecraft. In her book *Vindication of the Rights of Women* (1792) she demanded for equal rights for women. She also said that education is the only thing which will reduce exploitation against women and they would be equal to men. Another two stalwarts were Clara Zetkin and Simon de Beauvoir. Clara Zetkin raised her voice for the working class women. She felt that destruction of capitalism will reduce the grievances of women. She was also aware of family oppression on women in our society.

The difference between sex and gender is the basic idea of gender studies where Simone de Beauvoir discussed a lot in her *The Second Sex* (1949). It is the starting point of second wave feminism. She pointed out that woman is regarded as the 'other.' She also said that women must be valued by their qualities not by their physiological abilities. Kate Millett discusses the role of patriarchy behind sexual relations in her book *Sexual Politics* (1970). Another scholar Natsuki Aruga pointed out in her book *A Social History of American Feminism* (1988) that the differences between sex and gender have been explained clearly by the work of gender historians. Judith Butler is well known for her works *Gender Trouble: Feminism and the Subversion of Identity* (1990) and *Bodies that Matter: On the Discursive Limits of Sex* (1993). She discussed the new idea of





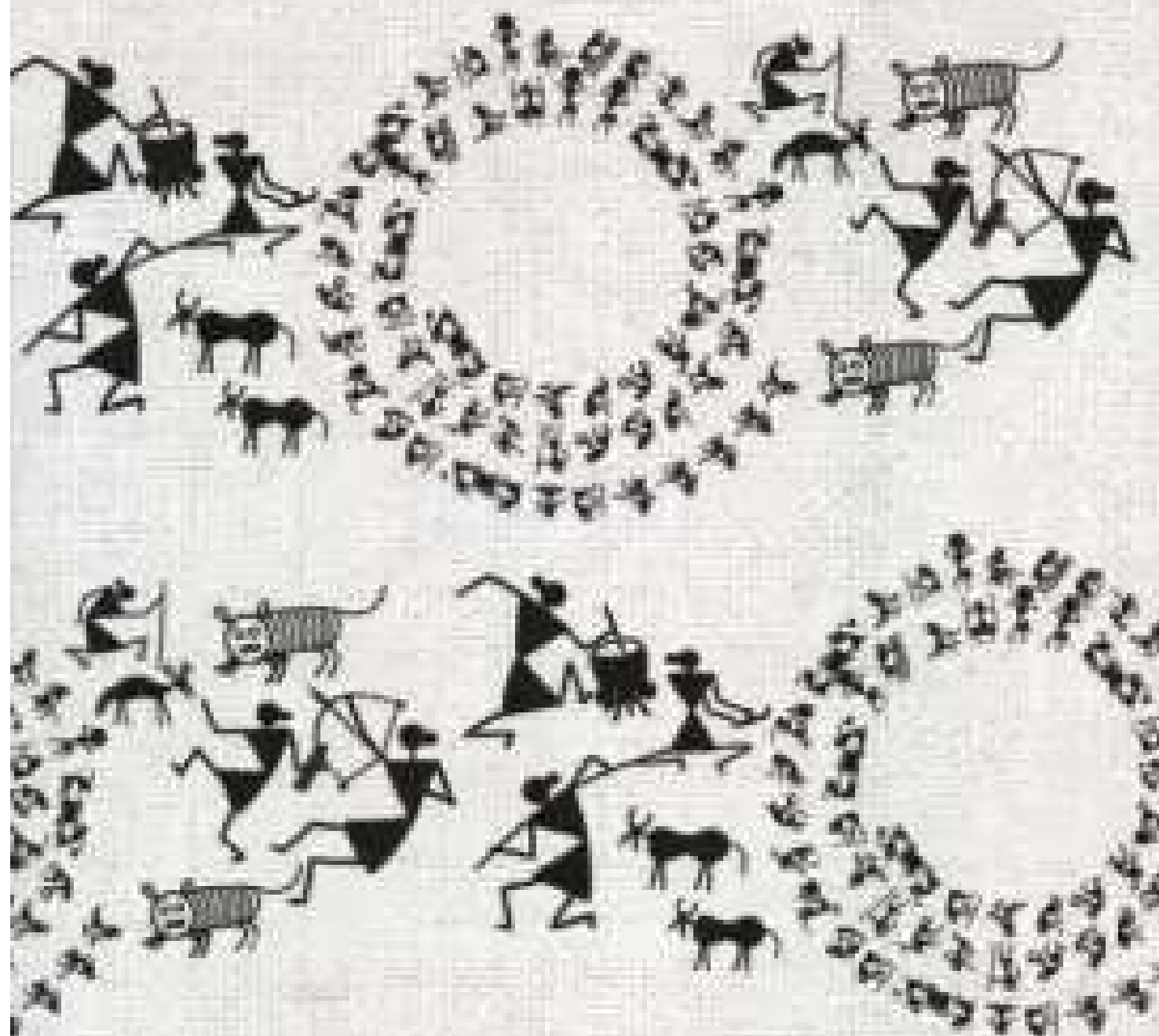
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## Tales of Women in India

### *From Slavery to Bravery*

SWATI BHASKAR

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*Crossing the Shadow Lines:  
Essays on the Topicality  
of Amitav Ghosh's Modern Classic*

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edited by

Esterino ADAMI, Carmen CONCILIO and Alessandro VESCOVI



«QuadRi»  
Quaderni di RiCOGNIZIONI

The scholarly essays which are gathered in this issue of “Quadri. Quaderni di RiCognizioni” have been selected as a result of a call for papers among those presented at the International Conference on *The Shadow Lines* Thirty Years After, held at the University of Milan and the University of Turin on 12-13 November 2018. New contributions have also been added, due to the enormously rich and rewarding response. We thank the Italian Association for the Study of Cultures and Literatures in English (AISCLI [www.aiscli.it](http://www.aiscli.it)) for sponsoring both the conference and the present publication, which is published thanks to the co-funding by Dipartimento di Lingue e Letterature Straniere e Culture Moderne and the Dipartimento di Studi Umanistici dell’Università di Torino.



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# THE PARTITIONING “SHADOW LINES”

The Border, the “Other” and the Eco-Literary in *The Hungry Tide*  
and *The Great Derangement*

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Asis DE, Nirmalendu MAITI

**ABSTRACT** • Amitav Ghosh’s second novel *The Shadow Lines* (1988), published a little more than three decades ago, aims at a philosophical understanding of the significance of borderlines between nations and their people on politico-cultural levels. The political and ethno-religious contexts of the post-Partition Bengal in the eastern part of India serve as the canvas to bring home the cultural significance of the “Partition” between the Bengali-speaking people of two different religions across the border of two nations. In this proposed article we wish to establish the point that, as the notion of the “national” border (which Ghosh likes to find as “shadow” line) in post-Partition Bengal has its role in bifurcating the religio-cultural life of the Bengali people by creating a sense of the “Other”, a similar kind of “border” could be perceived in the human response to the non-human within the organic reality of existence. Taking Ghosh’s concept of the borderline from *The Shadow Lines*, this article explores the author’s employment of the notion of border between the human and the non-human, the human exploitation and the violence exerted on the non-human and the environmental anxiety which finds eco-literary expression in his fiction *The Hungry Tide* (2004) and the non-fiction *The Great Derangement* (2016). We shall explore how the “partitioning” or deepening the imaginary gulf between Nature and Culture” (GD 92) has contributed to the age-old indifference towards eco-literary expressions as simple nature writings and how climate literature is not just a literary “other” but an urgent demand of time with references to *The Great Derangement*.

**KEYWORDS** • Partition; Border; Other; Refugee; Violence; Ecology; Environmental Humanities.

*Between the idea  
And the reality  
[...]  
Between the conception  
And the creation  
Between the emotion  
And the response  
Falls the Shadow”*

T. S. Eliot, *The Hollow Men*



- 
- Nixon, Rob. *Slow Violence and the Environmentalism of the Poor*, Cambridge, Massachusetts and London: Harvard University Press, 2011.
- O'leary, Brendan. "Partition" in *A Companion to Border Studies*, Wilson and Donnan (Eds), Malden and Oxford: Wiley-Blackwell, 2012.
- Rahman, Mahmudur. *The Political History of Muslim Bengal: An Unfinished Battle of Faith*, Newcastle upon Tyne: Cambridge Scholarly Publishing, 2019.
- Roy, Rituparna. *South Asian Partition Fiction in English: From Khushwant Singh to Amitav Ghosh*, Amsterdam: IAS / Amsterdam University Press, 2010.
- Schendel, van Willem. *The Bengal Borderland: Beyond State and nation in South Asia*, London: Anthem Press, 2004.
- Sen, Udit. *Citizen Refugee: Forging the Indian Nation after Partition*, Cambridge and New York: Cambridge University Press, 2018.
- Taibbi, Matt. *The Great Derangement: A Terrifying True Story of War, Politics and Religion at the Twilight of the American Empire*, New York: Spiegel & Grau, 2008.
- Wastl-Walter, Doris. "Introduction" to *The Ashgate Research Companion to Border Studies*, Farnham and Burlington: Ashgate, 2011.
- Wilson, Thomas M. and Hastings Donnan (Eds). *A Companion to Border Studies*, Malden and Oxford: Wiley-Blackwell, 2012.
- Vescovi, Alessandro. "The Uncanny and the Secular in Amitav Ghosh's *The Great Derangement* and *The Hungry Tide*", *Le Simplegadi*, Vol. XV-No 17 November 2017, DOI: 10.17456/SIMPLE-68, pp. 212-222.

# REPRESENTING THE SELF

Addressing Issues of Ethnicity and  
Identity Across Domains

Edited by  
**Dr. Moumita Dey**

**REPRESENTING THE SELF**

Addressing Issues of Ethnicity and Identity Across Domains

**Dr. Moumita Dey**



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*I dedicate the book to the students of the Dept. of English*

Holy Cross College,  
Agartala, Tripura



affiliated mainly to ethnicity, family, nation, religion, complexion and gender is a tricky one and usually subject to self-perception within a particular frame of time and space, as Stuart Hall points out: "Precisely because identities are constructed within, not outside, discourse" (Hall, 1996: 4). This paper attempts to concentrate on the problematic of identity in the context of Indian postcolonial literary productions with particular reference to Ruskin Bond's recently published personal memoir entitled *Lone Fox Dancing: My Autobiography* (2017). Born with a British hereditary identity in colonial India, Bond's self-perceived ethnic identity is that of an Indian, as the subtitle of the 'Epilogue' pretty fairly affirms: 'A Son of India'. Throughout this 277-page 'personal history', in Bond's own language—"a record of times gone by...and a glimpse into one kind of writerly life" (Bond, 2017: 3), the issue of identity has been foregrounded: "I decided I'd just be myself, all-Indian, even if it meant being a minority of one" (Bond, 2017: 175).

It is needless to say that the title of my paper owes connection to the celebrated novel of James Joyce—*A Portrait of the Artist as a Young Man* (1916), which is certainly a different type of narrative—a novel, a 'bildungsroman' or a 'Kunsterroman' in particular, that represents the development of an artist. Compared to this novel of Joyce, the autotelic narrative of Ruskin Bond is a kind of looking back, the autobiography of an author published when he is 83! Is this autobiography relevant just for the reason that it charts the growth and development of an 'Author' out of a boy, a young man? In an interview with S. Ravi, the correspondent of 'The Hindu' on 23<sup>rd</sup> June, 2017, after the release of his autobiography, Bond makes a simple confession about how he became a writer out of a lonely childhood—"Here it is my life's story from the beginning covering my growing up and early years as a writer, about Delhi, London, Dehradun, coming back to India and moving to the hills where I have spent 50 years. It is about an author who had a lonely childhood and used that loneliness in a way to become a writer." But is the story as simple as it appears on the surface level? Is the 'loneliness' he talks about here, is related to a writerly feeling of abandonment from the people

## The Portrait of the Author as Indian: Representation of Identity in Ruskin Bond's *Lone Fox Dancing: My Autobiography*

"The most fictional of all my characters is myself".

(*Lone Fox Dancing*: 135)

Dr. Asis De

One of the chief concerns of postcolonial studies is the inherent politico-cultural conflict between the 'East' and the 'West', mostly on the issue of cultural identity. Salman Rushdie, in his *Imaginary Homelands* (1991) asks about the cultural identity of Indian writer outside India, particularly those living in Britain—"What does it mean to be 'Indian' outside India?", and then also complements this question with his observation—"To be an Indian writer in this society is to face, every day, problems of definition" (Rushdie, 1991: 17). The spatiality of "this society" in Rushdie's observation is of any socio-cultural space of the 'West' outside the geo-political boundary of the Indian nation, where the dislocated Indian writer finds his/her self in diasporic condition. My purpose in this paper is to substantiate that this is true even inside India, where the issue of resident Indian writers of British descent is concerned. As the decolonization of India, the resultant religious-political partition and independence in the middle of the previous century had altered every long-existing colonial power discourse related to the ruler-subject equation and identity, writers of British descent still living in India were initially not much fairly acceptable as Indians to the Indian readers for their 'natural' association with the Empire. The idea of 'cultural identity', being a construct





# Trends in Postcolonial Language Literature and Culture

Editors:

Abhilasha Phukan

Sukanya Das

Nirupam K. Sinha





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# Re-reading and Re-writing Satyajit Ray's *Charulata* (1964) in a Postcolonial Rubric

Shyamal Mondal  
Assistant Professor  
Mahishadal Raj College  
West Bengal

*I am no bird; and no net ensnares me; I am a free human being with  
an independent will, which I now exert to leave you.*

— Charlotte Brontë, *Jane Eyre*

The quote is an embodiment of Jane's independence and strong exterior, which are relatively connected to a sense of liberty and independence of *Charulata* in a late 19<sup>th</sup>-Century Bengali middle-class household. Throughout the novel, we conceive that Jane is a young woman longing for love and a family. Similarly, *Charulata*, too, longs for someone to love her and care for her. Like *Jane Eyre*, *Charulata* tries to break through the four walls of her room and the stereotypes and hyper-morality of the society. *Charulata* asks questions to the society for its unfair rules and conditions, emerging as a voice of a generation of women who challenge religious jingoism, untouchability, and the caste system. *Charulata*, the lonely wife, tries to emancipate herself from oppression to a postcolonial generation for whom Victorian morality had long since collapsed.

Re-contextualising Rabindranath Tagore (1861-1941) as the towering figure of the Bengal Renaissance as well as the poet and playwright of humanity is one of the prevalent historical interpretations. Tagore's works have been adapted, analysed, deconstructed, and rethought even today to the timelessness of his



Bhupati. There is nothing left but for the forsaken woman and her humiliated husband to forge reconciliation. It is important to note that Tagore's novella *Nastanirh*, from which Ray's film is adapted, ends with a Bengali word 'Thak' (let it be). So, in his quest of an evenly meaningful cinematic resolution, Ray concludes the film with a freeze frame motivated by the final shot of French director François Truffaut's *The 400 Blows*: two hands, Charu and Bhupati's, attempt to reach uncertainly out to each other, close but not yet joined.

So, it is quite evident that *Charulata* from *Nastanirh* and *Charulata* from the film become representative of a generation of women motivated to demonstrate a sense of liberty and independent will in pre-Independent India. But it is evident that in *Charulata*, Ray displays a noticeable emphasis on Charu's perspective as it yearns towards emancipation from *prabina* to *nabina*, and from a conservative woman to a modern woman in postcolonial Bengal. Colonial/Postcolonial modernity and tradition look for power over the human family and the domestic space. The woman is supposed to be fixed and unchanging, even though postcolonial nation-states undergo changes. Therefore, *Charulata* is exclusively embedded with postcolonial trends not only in the retelling of Tagore's classic story of a lonely wife, but also in the representation of the discourse on British imperialism.

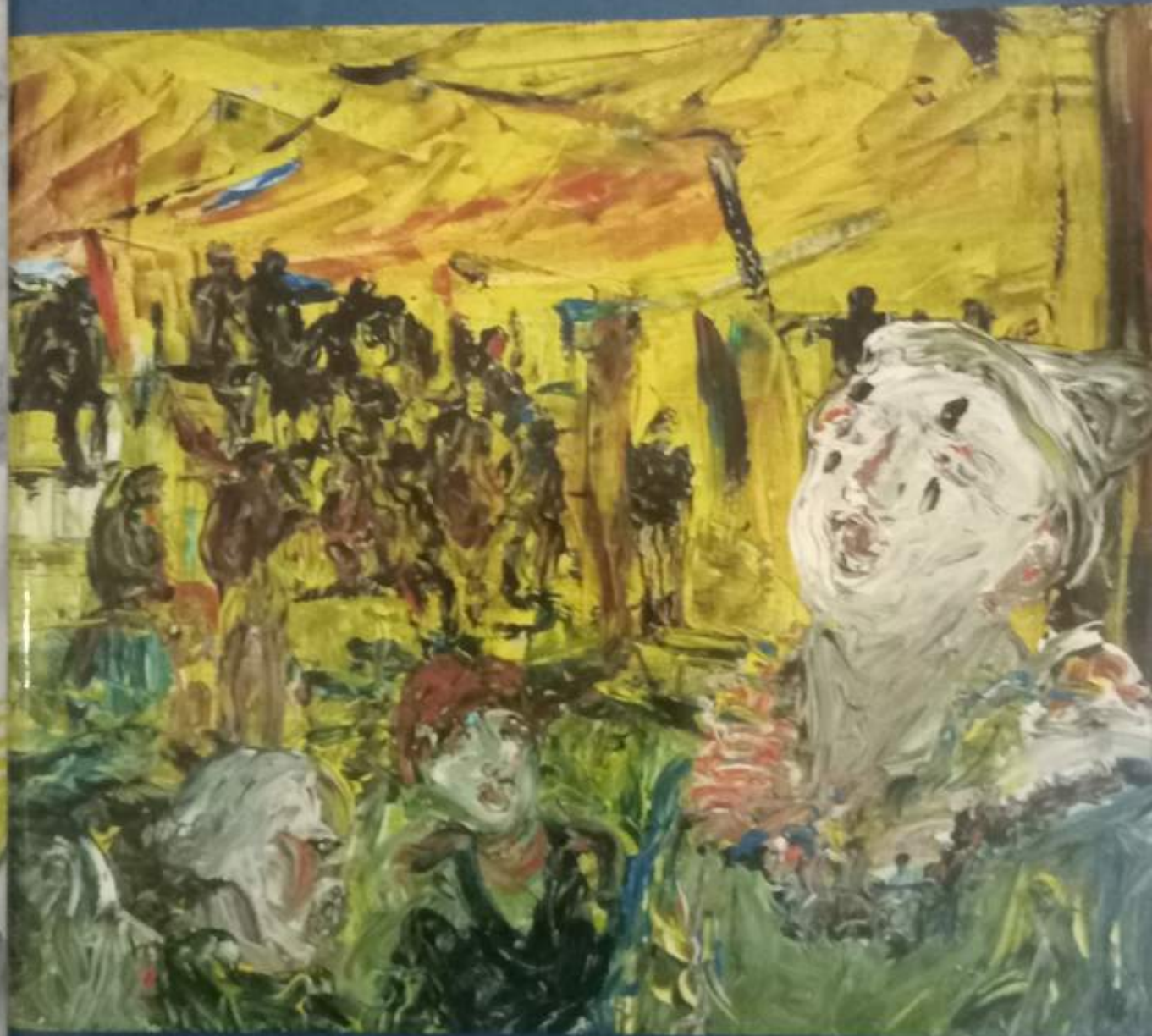
### References

- Brontë, Charlotte. *Jane Eyre*. Peterborough: Broadview Press, 1999. Print.
- Charulata*. Dir. Satyajit Ray. Perf. Soumitra Chatterjee, Madhabi Mukherjee, Shailen Mukherjee, and Shyamal Ghoshal. The Criterion Collection, 2013. DVD.
- Chatterjee, Partha. *Nationalist Thought and the Colonial World: A Derivative Discourse*. 2<sup>nd</sup> ed. Minneapolis: U of Minnesota P, 1993. PDF.
- Dyer, Richard. "Introduction to Film Studies." *The Oxford Guide to Film Studies*. Eds. John Hill and Pamela Church Gibson. New York: Oxford UP, 1998. PDF.



# Off the Line

Transgression and Its Representation  
in Literature and Culture



*Edited by*

**Tanmoy Kundu**

**Srirupa Mahalanabis**

**ATLANTIC**

**Shyamal Mondal** is an Assistant Professor at Mahishadal Raj College, Mahishadal, Purba Medinipur. His research interests focus on the postcolonial writings and literary theory.

**Arpan Adhikary** is a Doctoral Research Scholar in the Department of English and Culture Studies, the University of Burdwan, West Bengal. His area of research is 19<sup>th</sup> Century Gothic Fiction.

**Supriya Mitra** is a Ph.D. Research Scholar in the Department of English, Sidho-Kanho-Birsha University, Purulia. He also works as an assistant teacher at Nagatentul Jr. High School, Bankura.

**Alice Abraham** is currently doing her M.Phil. in Comparative Literature from the University of Hyderabad. Her areas of interest include, gender, sexuality, queer, and marginalised literature.

**Debarghya Ganguli** is an M.Phil. research scholar at the University of Calcutta and a Guest Lecturer at Acharya Jagadish Chandra Bose College, Kolkata. He is also a visiting lecturer at Women's College (P.G.), Bagbazar, Kolkata. His interest areas include T.S. Eliot, Modern and Postmodern Theatre, Romantic Poetry, and Bengal Renaissance.

**Basundhara Chakraborty** is an M.Phil. research scholar at the School of Women's Studies in Jadavpur University, Kolkata. Her research interests include Feminism, Gender Studies, Indian Writing in English, Cultural Studies, and Linguistics.

**Temitope Ogungbemi** is a fellow of Next Gen Social Science Research Council, USA, and currently a Fulbright Scholar at the University of Pennsylvania, Philadelphia, USA. His research interest covers new media discourse analysis, critical linguistics, pragmatics, etc.

**Neha Chatterjee** is pursuing M.Phil. from the University of Burdwan. Her arenas of research interest incorporate South Asian Literature, Indian English Literature, Diaspora Studies, Trauma Studies, Gender Studies, and Eco-criticism.

**Twinkle Dasari** is pursuing Ph.D. in English Literature from Acharya Nagarjuna University, Guntur, Andhra Pradesh. She



## Bengali Art Films: Women's Subjectivity and Use of Transgression in *Ekla Cholo* and *Nirbashito*

*Shiyamal Mondal*

"one is not born, but rather becomes, a woman."

Simone de Beauvoir, a famous French feminist and social theorist, writes in her seminal work, *The Second Sex* (1949). According to Beauvoir, the woman is a process, a becoming rather than a fixed identity. She opines that identities are the effects of institutions, practices, discourses with multiple and diffused points of origin. This paper is an attempt to explore a woman's identity, subjectivity, and transgression in modern Bengal. Bengal, a region in the Indian subcontinent, is predominantly a male-dominated society where women have been regarded as inferior to men in practical life (Gupta 2003). Although in ancient Indian scriptures women have been given a higher position, in reality, the case is just the opposite (Altekar 1955). Even in contemporary modern Bengal women are not allowed to take part in many domestic as well as external matters, especially, which demands decision making. They are always under the influence of their parents before marriage and their husbands after marriage (Chakrapani and Kumar, 1994). It is also important to point out that in the remote village milieu of Bengal overall levels of education were low with only 5% of females and 15% of males having high school education.

The unequal treatment of woman is vividly portrayed in the media, in general, and in the Indian cinema industry, in particular. The Indian film industry is also full of patriarchal byproducts



in the film, *Nirbashito*, where a woman cannot speak, placing its emphasis on the status quo of the patriarchal discourse.

Examining these two influential films which have tried to convey some positive messages regarding the strength and power of a woman in modern Bengal, this paper depicts the onwards movement of women from home to the world.

#### WORKS CITED

- Agarwal, Malti. *New Perspectives on Indian English Writings*. Delhi: Atlantic Publisher and Distributors, 2005. Print.
- Ahmed, Talat. "Realism in South Asian Cinema", *Film International*, Vol. 4, No. 6, pp. 40-47, 2006. Print.
- Beauvoir, Simone de. *The Second Sex*. London: Jonathan Cape, 2009. Print.
- Braidotti, Rosi. *Nomadic Subjects: Embodiment and Sexual Difference in Contemporary Feminist Theory*. New York, 2011. Print.
- . "Becoming Woman: Or Sexual Differences Revisited", *Theory, Culture and Society*, Vol. 20, Issue 3, pp. 43-64, 2016. Print.
- Sherman, T.C. et al. Ed. *From Subjects to Citizens: Society and the Everyday State in India and Pakistan*. Cambridge, 2014. Print.



# PONDERING THE PAST



*Glimpses of Our Society and Culture*

VOLUME III



EDITED BY

*Sutapa Sengupta*



# Partition and Indo-Bangladesh Relations, Reflection on Movie: A Historiographical Analysis

Prakash Bisui

Cinema today being a very popular medium of communication and awareness, subjects like history, society, literature and polity seek refuge to present themselves in a more effective form through cinema.<sup>1</sup> Cinema with its magical spell has mesmerized the Indian populace since the beginning of the last century. In 1895 Lumiere brothers invented cinematography. In 1898 cinematography was introduced in India and shown in Bombay. Then it was comprised of a few moving pictures being projected through a machine. Later in 1913 the first Indian feature film *Raja Harishchandra* was produced. This initiated the era of cinema but in a silent mode. In 1931 with the release of '*Alamara*' the days of silent cinema came to an end. Thereafter this mode of entertainment never had to turn back. In the 1920s and 30s the subject of Indian cinema basically focused in romance and religious devotion.<sup>2</sup> India being the land of great philosophical understandings and realizations coupled with the romantic being of *Radha* and *Krishna* had intense influence on cinema makers.<sup>3</sup> All forms of art and cultural expositions have revolved around this theme since its age of inception. The father of Indian cinema *Dadasaheb Phalke* was greatly influenced by famous and revered painter *Raja Ravi Varma* and both had the same focus found deep into our scriptures and romanticism.<sup>4</sup> In the decade of 1930, the release of *Achhut Kanya* dared to penetrate into the prevailing social vices and initiated reformatory awareness.<sup>5</sup> In contrary during the period of upheaval of the independence movement, it was surprising that this concern mysteriously missed from being the subject of cinema. After the Second World War the production of cinema in India flourished as well as its subject varied.<sup>6</sup> It is because of the transformation of thought which occurred in the post-world war era which affected the global society in manifold aspects and reflected on the silver screen. While colonialism



time Anil Sharma's *Gadar: Ek Prem Katha* (2001) and Yesh Chopara's *Veer Zara* (2004) was a healing touch to the long borne injuries. On the eastern side Bappaditya Bandopadhyay in his film *Kanta Tar* (2005) showed border smuggling, human trafficking along with infiltration and the government's inaction to solve such problems and lingering with the 'Chitmahal' issue. Tanvir Mokammel in his *Chitra Nodir Pare* in 1999 focused on the same. Tareque Masudin in his film *Matir Moyna* 2002 delved deep into the concern. In this cinema the difference of opinion between Anu's father and uncle exhumed the conflict of identity between being Bangladeshi and being Fundamentalist. The heart touching dialogue of Anu's mother Asma 'women have no war' is a very important view of a women losing everything in war.

In the second decade of this century both the governments took measures to solve problems like border, infiltration, *Chitmahal*, smuggling etc to enhance financial cooperation. Cinema also benefitted from such change in attitude. Kamar Ahmad Simon's *Sunte Ki Pao* (2012), Tanvir Mokammel's *Jibon Dhuli* (2014) narrated the untold story more boldly. In *Jibon dhuli* the distinguishing features of migration of 1947 and that of 1971 was portrayed.<sup>23</sup> The film echoed the sobbing souls of the marginal Hindus and their suffering. Srijit Mukherji's *Rajkahini* (2015), Goutam Ghose's *Shankhachil* which was the joint venture of India Bangladesh hit the screen one after another. *Shankhachil* (2016) portrayed the sympathetic nature of the border forces which has metamorphosed from the hostile past which happened because of the change in mindset of the two nations. In Koushik Ganguly's *Bishorjan* (2017) showed how the people from either side forgetting their religious identity mingle with each other. Jointly directed film *Maati* (2018) by Saibal Banerjee and Leena Gangopadhyay tried to create a path where Bengalis of both the countries will walk together towards newer future.

### Notes and References

1. Mike Chopra-Gant; *Cinema and History the Telling of Stories*; London: Wallflower Press; 2008; pp. 1-15.
2. A. Gangar and V. Dharmasey; *Indian Cinema: A Visual Voyage*; Delhi: Publications Division, Ministry of Information and Broadcasting; Government of India; 1998; p. 97.

# Geo-Cloudlet: Time and Power Efficient Geospatial Query Resolution using Cloudlet

Jaydeep Das\*, Anwasha Mukherjee<sup>†</sup>, Soumya K. Ghosh<sup>‡</sup>, Rajkumar Buyya<sup>§</sup>

\*Advanced Technology Development Centre

Indian Institute of Technology Kharagpur, West Bengal, 721302, India

<sup>†</sup>Department of Computer Science

Mahishadal Raj College, Purba Medinipur, West Bengal, 721628, India

<sup>‡</sup>Department of Computer Science and Engineering

Indian Institute of Technology Kharagpur, West Bengal, 721302, India

<sup>§</sup>Cloud Computing and Distributed Systems (CLOUDS) Lab

School of Computing and Information Systems

The University of Melbourne, VIC 3010, Australia

E-mail: \*jaydeep@iitkgp.ac.in, <sup>†</sup>anweshamukherjee2011@gmail.com, <sup>‡</sup>skg@cse.iitkgp.ac.in, <sup>§</sup>rbuyya@unimelb.edu.au

**Abstract**—Geospatial data analysis is an emerging area of research today due to the potential to enable varied location-aware services. The existing centralized cloud-based analysis becomes time and computing-intensive for huge amount of geospatial data processing. This paper addresses the challenge of time and power-efficiency in QoS-aware geospatial query resolution. We propose a cloudlet based hierarchical paradigm, namely Geo-Cloudlet, where the cloudlets contain the geospatial data of the districts. The state and national level geospatial data are stored inside the state cloud and country cloud respectively. The query resolution is performed by either the cloudlet or by the state cloud or country cloud depending upon the geographical region related to the query. The experimental analysis illustrates that the proposed architecture Geo-Cloudlet reduces the latency up to 61.3% and power consumption up to 61.1% over the use of only remote cloud servers for geospatial query resolution.

**Index Terms**—Geospatial Query; Geo-Cloudlet; Quality of Service; Time-efficient; Power-efficient

## I. INTRODUCTION

Geospatial data storage and analysis is a major challenge due to its large volume. With the advancement in location acquisition systems, sensor networks, and mobile computing, a huge volume of geospatial data is collected [1]. For resolving geospatial queries, the huge volume of data has to be processed, which is computationally intensive and requires ubiquitous network access. Cloud computing offers a platform for geospatial data processing because of its ability to provide ubiquitous network access, on-demand self-service, resource pooling, rapid elasticity, and measured services [2]–[4]. Geospatial cloud computing is a cloud computing paradigm that is driven by geospatial sciences and optimized by spatio-temporal principles for enabling geospatial science discoveries within a distributed computing environment [1]. However, storing and processing of data completely inside the long distant cloud servers increases latency in query resolution. As a solution towards this problem, fog computing has been used for geospatial data processing in [5]. However, the intermediate devices like switch, routers which act as fog devices, partially offload data or computation. In our work, we will use cloudlets for geospatial data processing. Cloudlet is a computer or cluster of computers, which stores the frequently accessed data and acts as an agent between the client device and cloud [6]. Cloudlet has reduced the energy and

latency over remote cloud servers in computation offloading [7]. Our objective is to provide a time and power-efficient paradigm for geospatial query resolution. In this paper, we have introduced a cloudlet based hierarchical architecture for geospatial information storage and processing, and the mathematical model of latency and power consumption for the proposed paradigm is developed. In our paradigm, mobile devices are the clients, which generate geospatial queries.

## A. Related Work

Geospatial information refers to the data with respect to a geographical place, in terms of geographic coordinates. Geospatial data collection takes place by Geographic Information System (GIS) [8]. Using multi-dimensional data set, a method has been proposed for geospatial query resolution in [9]. The use of cloud data centres for geospatial data storage and analysis has been demonstrated in [1], [2], [3]. For massive geospatial data processing, a GIS querying framework has been proposed in [10]. In Geospatial Cloud computing, the application tier is used for geospatial services. There are various categories of geospatial services: Web Map Service (WMS) [11], Web Coverage Service (WCS), Web Feature Service (WFS) [12], Catalog Service for the Web (CSW) and Web Processing Service (WPS) [13]. Open Geospatial Consortium (OGC) constraints geospatial service chain based geospatial query resolution on the cloud has been discussed in [4]. For VM allocation with geospatial service chain learning a method has been discussed in [14]. However, access to long distant cloud servers for geospatial data processing increases the latency. As a solution, fog computing has been used for geospatial data analysis in [5], [15], [16]. Fog devices are the intermediate devices between the user and the cloud servers, which participate in data processing [17]. Edge devices are also nowadays used for offloading computation and storage [18]. Geospatial query processing in edge devices has been discussed in [16]. However, the processing of voluminous geospatial data requires high-end processing, which is beyond the capability of the edge or fog devices. Cloudlet being a computer or cluster of computers, has the ability to store and process a large volume of data [6]. In our work, we use cloudlets and propose a hierarchical paradigm for geospatial query resolution.

analyzed, and ‘filter’ operation is used. After resolving the geospatial query using GCP VM, the result is sent back to the mobile phone 1. The latency for resolving this query and the power consumption of the mobile device during this period are presented in Table III. As GCP VM is used for resolving query 4, the latency and power consumption of the mobile device is the same for the proposed model and if GCP resolves the query.

In Fig.10 the latency in query resolution and power consumption of user devices during that period are presented with respect to four experimental studies. From the experimental results of the four case studies of query analysis (see Table III and Fig.10), we observe that using the cloudlet up to 61.3% reduction in latency and 61.1% reduction in power consumption of the mobile device can be achieved than only remote cloud-based system, and the QoS is improved.

## VI. CONCLUSIONS AND FUTURE WORK

In this paper, a cloudlet based hierarchical paradigm for geospatial query resolution, namely Geo-Cloudlet, has been proposed. The cloudlets contain geospatial data of the district regions. For the state and national level geospatial data storage and analysis, state cloud and country cloud are used respectively. When a geospatial query is received from a mobile device regarding the district region, the cloudlet resolves the geospatial query after analyzing the geospatial data and responds to the mobile device. Otherwise, if the geospatial query is regarding the state or national level geospatial data, the cloudlet responds using the state cloud or the country cloud. The experimental results illustrate that our proposed system improves the QoS by reducing the latency up to 61.3% and power consumption of the user device up to 61.1% than only remote cloud-based query resolution. Thus we can conclude that the proposed framework, Geo-Cloudlet, is a time-efficient paradigm as well as provides low power consumption of the user device during the query resolution period. As we are using a multi-tier framework, partial data processing and dealing with the inter-dependency among different task segments during geospatial data processing is a challenging future scope.

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## REFERENCES

- [1] C. Yang, M. Yu, F. Hu, Y. Jiang, and Y. Li, “Utilizing cloud computing to address big geospatial data challenges,” *Computers, Environment and Urban Systems*, vol. 61, pp. 120–128, 2017.
- [2] C. Yang, M. Goodchild, Q. Huang, D. Nebert, R. Raskin, Y. Xu, M. Bambacuc, and D. Fay, “Spatial cloud computing: how can the geospatial sciences use and help shape cloud computing?” *International Journal of Digital Earth*, vol. 4, no. 4, pp. 305–329, 2011.
- [3] K. Evangelidis, K. Ntouros, S. Makridis, and C. Papatheodorou, “Geospatial services in the cloud,” *Computers & Geosciences*, vol. 63, pp. 116–122, 2014.
- [4] J. Das, A. Dasgupta, S. K. Ghosh, and R. Buyya, “A geospatial orchestration framework on cloud for processing user queries,” in *Proceedings of the 2016 IEEE International Conference on Cloud Computing in Emerging Markets (CCEM)*. IEEE, 2016, pp. 1–8.
- [5] R. Barik, H. Dubey, S. Sasane, C. Misra, N. Constant, and K. Mankodiya, “Fog2fog: augmenting scalability in fog computing for health GIS systems,” in *Proceedings of the Second IEEE/ACM International Conference on Connected Health: Applications, Systems and Engineering Technologies*. IEEE Press, 2017, pp. 241–242.
- [6] M. Satyanarayanan, V. Bahl, R. Caceres, and N. Davies, “The case for vm-based cloudlets in mobile computing,” *IEEE pervasive Computing*, 2009.
- [7] A. Mukherjee, D. De, and D. G. Roy, “A power and latency aware cloudlet selection strategy for multi-cloudlet environment,” *IEEE Transactions on Cloud Computing*, 2016.
- [8] C.-R. Shyu, M. Klaric, G. J. Scott, A. S. Barb, C. H. Davis, and K. Palaniappan, “GeoIRIS: Geospatial information retrieval and indexing system—content mining, semantics modeling, and complex queries,” *IEEE Transactions on geoscience and remote sensing*, vol. 45, no. 4, pp. 839–852, 2007.
- [9] M. Malensek, S. Pallickara, and S. Pallickara, “Fast, ad hoc query evaluations over multidimensional geospatial datasets,” *IEEE Transactions on Cloud Computing*, vol. 5, no. 1, pp. 28–42, 2017.
- [10] K. M. Al Naami, S. Seker, and L. Khan, “GISQF: An efficient spatial query processing system,” in *Proceedings of the 2014 IEEE International Conference on Cloud Computing*. IEEE, 2014, pp. 681–688.
- [11] J. Wenjue, C. Yumin, and G. Jianya, “Implementation of OGC web map service based on web service,” *Geo-spatial information Science*, vol. 7, no. 2, pp. 148–152, 2004.
- [12] P. A. Vretanos, “Web feature service implementation specification,” *Open Geospatial Consortium Specification*, vol. 1325, pp. 04–094, 2005.
- [13] P. Schut and A. Whiteside, “Opengis web processing service, version 1.0. 0, ogc 05-007r7, open geospatial consortium,” *Inc*, vol. 87, 2007.
- [14] J. Das, A. Dasgupta, S. K. Ghosh, and R. Buyya, “A learning technique for vm allocation to resolve geospatial queries,” in *Proceedings of the 2017 International Conference on Advanced Computing, Networking and Informatics (ICACNI)*. Springer, 2019, vol. 1, pp. 577–584.
- [15] R. K. Barik, H. Dubey, A. B. Samaddar, R. D. Gupta, and P. K. Ray, “FogGIS: Fog computing for geospatial big data analytics,” in *Proceedings of the 2016 IEEE Uttar Pradesh Section International Conference on Electrical, Computer and Electronics Engineering (UP-CON)*. IEEE, 2016, pp. 613–618.
- [16] R. K. Barik, A. Tripathi, H. Dubey, R. K. Lenka, T. Pratik, S. Sharma, K. Mankodiya, V. Kumar, and H. Das, “Mistgis: Optimizing geospatial data analysis using mist computing,” in *Progress in Computing, Analytics and Networking*. Springer, 2018, pp. 733–742.
- [17] H.-J. Hong, “From cloud computing to fog computing: unleash the power of edge and end devices,” in *Proceedings of the 2017 IEEE international conference on cloud computing technology and science (CloudCom)*. IEEE, 2017, pp. 331–334.
- [18] R. Sosa, C. Kiraly, and J. D. P. Rodriguez, “Offloading execution from edge to cloud: a dynamic node-red based approach,” in *Proceedings of the 2018 IEEE International Conference on Cloud Computing Technology and Science (CloudCom)*. IEEE, 2018, pp. 149–152.
- [19] S. Shekhar and S. Chawla, *Spatial databases: a tour*. prentice hall Upper Saddle River, NJ, 2003, vol. 2003.
- [20] Q. D. Team *et al.*, “QGIS geographic information system,” *Open Source Geospatial Foundation Project. Disponivel em: http://www.qgis.org/. Acesso em*, vol. 27, 2015.



# MAHISHADAL RAJ COLLEGE

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1. **Asis De.** “Colony, Cane-field and Coolies: Indenture, Indo-Caribbean Diaspora and Belongingness in David Dabydeen’s *The Counting House*”, in Nilufer E. Bharucha, Sridhar Rajeswaran and Klaus Stierstorfer (eds.), *New Directions in Diaspora Studies: Revisiting the Past, Reviewing the Present and Looking at the Future*, Diaspora Studies Series, Vol. 2, ISBN : 978-1-63944-425-0, CoHaB IDC, University of Mumbai, 2021, pp. 71-79.
2. **Asis De.** ‘The Partitioning “Shadow Lines”: The Border, the “Other” and the Eco-literary in *The Hungry Tide* and *The Great Derangement*’ (co-authored by N. Maiti) in Esterino Adami, Carmen Concilio, Alessandro Vescovi (eds.), *Crossing the Shadow Lines : Essays on the Topicality of Amitav Ghosh’s Modern Classic (Quaderni di RiCOGNIZIONI, XI)*, Dipartimento di Lingue e Letterature Straniere e Culture Moderne – Università degli Studi di Torino, Torino 2020, pp. 95-107, ISBN 9788875901738, DOI: <https://doi.org/10.13135/2420-7969/11>.
3. **Asis De.** “Amitava Ghosh: The Great Derangement”. *The Literary Encyclopaedia*. Published 05 April, 2021. <https://www.litencyc.com/php/sworks.php?rec=true&UID=39436>
4. **Swati Basak.** “Women and Acid Attack in India: A Shame on Humanity”, *Representation on Women Space* (vol. III), Kunal Books, New Delhi, Print, ISBN: 978-93-89224-71-9, pp. 111-127.
5. **Prakash Bisui.** Tribal Religious Identity and Ethnic Politics in Chotonagpur Region During the Jharkhand Movement, Art & Review, Vol. II, Edited by Rajib Banu, 2020, ISBN-978-81-939021-9-6.
6. **Sujit Mondal.** “Hari Chand Thakur: The pioneer of Matuya Movement”, Indian Social reformer edited by Dr Suryakant Kapshikar, Kapshikar publication, Oct.2020,ISBN-978-81-943484-74, pp.-59-65.
7. **Soma Chanda** and Ambarish Mukherjee. “Food Plants from Wilderness of Ayodhya Hills in Purulia District, West Bengal (India): Aspects and Prospects in the Context of Food Security.” in Plant- A Valuable Resource of Sustainable Agriculture, Food and Medicine- Edited by Dr. Dwaipayan Sinha & Rajendra Prasad De, ISBN: 978-9391002-25-2.

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**Diaspora Studies Series**

Volume 2

# **New Directions in Diaspora Studies:**

Revisiting the Past,  
Reviewing the Present  
and Looking at the Future

Editors

Nilufer E. Bharucha

Sridhar Rajeswaran

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Vol. 2

**New Directions in Diaspora Studies:**

Revisiting the Past, Reviewing the Present and Looking at the Future

Bharucha

Rajeswaran

Stierstorfer



For the past several decades, researchers have made scholarly interventions with respect to defining "diaspora". An over-used, over-theorized yet an uncontested term, scholars have now begun to not only use it as a collective noun but also an adjective, a verb and an adverb: 'diasporic', 'diasporization', 'post-diaspora'.

In this Volume, we ask, what lies next? The basic focus of *New Directions in Diaspora Studies: Revisiting the Past, Revising the Present and Looking at the Future*, is to examine, within an inter-disciplinary and an alternative framework, both the historical phenomenon of 'diaspora' and contemporary alternative approaches to diaspora studies. We have sought to explore how the use of the concept of diaspora has become dispersed through different semantic, conceptual and disciplinary spaces and the Diaspora term itself has become 'Diaspora'.

Through this publication, an attempt has been made to understand the diurnal growth of the diasporic subjectivity in the wake of the current global refugee crisis, political moves such as Brexit and the Travel Ban, recent changes in visa terms for immigrants, we also need to accommodate the new rootlessness in the diasporic experience. The Volume also sheds light on the upcoming idea of the internal diaspora, especially in the Indian context.

Tracing the evolutionary trajectories of the term, Diaspora reveals a process of expansion. The languages of various disciplines (travelling and intermingling) have come to bear on its terrain, continually redefining its contours.

*New Directions in Diaspora Studies: Revisiting the Past, Revising the Present and Looking at the Future* aims at revisiting past concepts, reassessing current ideas and revisiting boundaries.

The contributors of this volume are from India, Germany, UK, U.S.A., Canada, Romania, Italy and Mauritius. This publication thus aims to be part of an emerging global interdisciplinary research initiative that would promote a dialogue to encourage new developments in diaspora studies. It would be of value to students, researchers and teachers of diaspora studies at universities around the world.



**New Directions in Diaspora Studies:  
Revisiting the Past, Reviewing the  
Present and Looking at the Future**



**Indian Diaspora Centre**

Diasporic Constructions of Home and Belonging Indian Diaspora Centre  
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Room No. 102, Ranade Bhavan

University of Mumbai

Santacruz (East), Mumbai 400098, India

Tel: +91 22 2653 0262

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**Colony, Cane-field and Coolies: Indenture, Indo-Caribbean  
Diaspora and Belongingness in David Dabydeen's *The Counting  
House***

Asis De

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**Abstract**

Diasporic movements across borders and their impact on life and literature have been researched mostly as a twentieth century 'postcolonial' phenomenon. However, the British colonial economy inspired diasporic transnational movements in the nineteenth century after the abolition of the slave trade has remained a less attended area by scholars. The system of indenture and the subsequent arrival of the economically, socially and culturally disadvantaged Indians as coolies in islands like Guiana (Guyana), Trinidad and Tobago and the stories springing out of their history are unique tales of assimilation and even failure in a land far away and foreign. This essay takes the Indo-Caribbean Guyanese novelist David Dabydeen's *The Counting House* (1996) as its case study and attempts to show how the colonial economy contributed to forming serfdom in the Caribbean cane-fields and those plantations stood for the Empire in miniature, where exploiting the dislocated was the only principle.

**Keywords:** *Indenture Labour, Indo-Caribbean, Coolie, Colonial Economy, Hybridity, Assimilation*

There is no denying the fact that with the fast expanding global economy and market, human mobility across the globe has increased particularly after the end of European colonialism. But if one considers the issue of European colonialism mainly as an economic enterprise, it becomes clear that colonial masters in different parts of the globe did not exploit only the natural resources, but also the people of those countries. It's not a simple fact that the

crafted in Malabar teak, Irish oak, American mahogany, though they wore the flag of only one country (CH 102).

It is to Dabydeen's credit that he stitches all the small bits of realities of the plantation economy of British Guiana in a unified pattern—how the Empire used to run its economy: “The place got to run perfect, the factory machine demand cane, the cane demand cutlass, the cutlass demand black hand. Nigger, coolie, cane, bagasse, punt, mule, molasses, sugar, rum, ship, barrel, money—all this complication white man in control of, day and night” (CH 122-123).

Dabydeen throughout the narrative shows how the indentured plantation-worker Indian coolies had their homeland in their heart and future plans to settle in this far and foreign land for the rest of their lives, if only they had some money to set up a home and a small shop to run after the tenure of their contract was over. The coolie experience, as represented by Dabydeen in *The Counting House*, is ultimately of a “hop-and-drop life” (CH 128), without any hope of achieving anything more than a little money and a “plateful of steaming baigan-choka and rice” (CH 131).

### **Bibliography**

- Basdeo, Sahadeo and Brinsley Samaroo. “Indo-Caribbean Political Leaders during the Twentieth Century”. *Tracing an Indian Diaspora: Contexts, Memories, Representations*, edited by Parvati Raghuram et al., Sage, 2008.
- Dabydeen, David and Brinsley Samaroo, editors. *India in the Caribbean*. Macmillan, 1987.
- Dabydeen, David. *The Counting House*. 1996. Peepal Tree Press, 2005.
- Kale, Madhavi. *Fragments of Empire: Capital, Slavery and Indian Indentured Labor Migration in the British Caribbean*. University of Pennsylvania Press, 1998.
- Mishra, Vijay C. *The Literature of the Indian Diaspora: Theorizing the Diasporic Imaginary*. Routledge, 2007.
- Rawley, James A. *The Transatlantic Slave Trade: A History*. Revised ed., Nebraska UP, 2005.
- Ward, Abigail. *Caryl Phillips, David Dabydeen and Fred D'Aguiar: Representations of Slavery*. 2011. 1st paperback ed., Manchester UP, 2015.

*Crossing the Shadow Lines:  
Essays on the Topicality  
of Amitav Ghosh's Modern Classic*

edited by

Esterino ADAMI, Carmen CONCILIO and Alessandro VESCOVI



«QuadRi»  
Quaderni di RiCOGNIZIONI



The scholarly essays which are gathered in this issue of “Quadri. Quaderni di RiCognizioni” have been selected as a result of a call for papers among those presented at the International Conference on *The Shadow Lines* Thirty Years After, held at the University of Milan and the University of Turin on 12-13 November 2018. New contributions have also been added, due to the enormously rich and rewarding response. We thank the Italian Association for the Study of Cultures and Literatures in English (AISCLI [www.aiscli.it](http://www.aiscli.it)) for sponsoring both the conference and the present publication, which is published thanks to the co-funding by Dipartimento di Lingue e Letterature Straniere e Culture Moderne and the Dipartimento di Studi Umanistici dell’Università di Torino.



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# THE PARTITIONING “SHADOW LINES”

The Border, the “Other” and the Eco-Literary in *The Hungry Tide*  
and *The Great Derangement*

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Asis DE, Nirmalendu MAITI

**ABSTRACT** • Amitav Ghosh’s second novel *The Shadow Lines* (1988), published a little more than three decades ago, aims at a philosophical understanding of the significance of borderlines between nations and their people on politico-cultural levels. The political and ethno-religious contexts of the post-Partition Bengal in the eastern part of India serve as the canvas to bring home the cultural significance of the “Partition” between the Bengali-speaking people of two different religions across the border of two nations. In this proposed article we wish to establish the point that, as the notion of the “national” border (which Ghosh likes to find as “shadow” line) in post-Partition Bengal has its role in bifurcating the religio-cultural life of the Bengali people by creating a sense of the “Other”, a similar kind of “border” could be perceived in the human response to the non-human within the organic reality of existence. Taking Ghosh’s concept of the borderline from *The Shadow Lines*, this article explores the author’s employment of the notion of border between the human and the non-human, the human exploitation and the violence exerted on the non-human and the environmental anxiety which finds eco-literary expression in his fiction *The Hungry Tide* (2004) and the non-fiction *The Great Derangement* (2016). We shall explore how the “partitioning” or deepening the imaginary gulf between Nature and Culture” (GD 92) has contributed to the age-old indifference towards eco-literary expressions as simple nature writings and how climate literature is not just a literary “other” but an urgent demand of time with references to *The Great Derangement*.

**KEYWORDS** • Partition; Border; Other; Refugee; Violence; Ecology; Environmental Humanities.

*Between the idea  
And the reality  
[...]  
Between the conception  
And the creation  
Between the emotion  
And the response  
Falls the Shadow”*

T. S. Eliot, *The Hollow Men*

- 
- Nixon, Rob. *Slow Violence and the Environmentalism of the Poor*, Cambridge, Massachusetts and London: Harvard University Press, 2011.
- O'leary, Brendan. "Partition" in *A Companion to Border Studies*, Wilson and Donnan (Eds), Malden and Oxford: Wiley-Blackwell, 2012.
- Rahman, Mahmudur. *The Political History of Muslim Bengal: An Unfinished Battle of Faith*, Newcastle upon Tyne: Cambridge Scholarly Publishing, 2019.
- Roy, Rituparna. *South Asian Partition Fiction in English: From Khushwant Singh to Amitav Ghosh*, Amsterdam: IAS / Amsterdam University Press, 2010.
- Schendel, van Willem. *The Bengal Borderland: Beyond State and nation in South Asia*, London: Anthem Press, 2004.
- Sen, Udit. *Citizen Refugee: Forging the Indian Nation after Partition*, Cambridge and New York: Cambridge University Press, 2018.
- Taibbi, Matt. *The Great Derangement: A Terrifying True Story of War, Politics and Religion at the Twilight of the American Empire*, New York: Spiegel & Grau, 2008.
- Wastl-Walter, Doris. "Introduction" to *The Ashgate Research Companion to Border Studies*, Farnham and Burlington: Ashgate, 2011.
- Wilson, Thomas M. and Hastings Donnan (Eds). *A Companion to Border Studies*, Malden and Oxford: Wiley-Blackwell, 2012.
- Vescovi, Alessandro. "The Uncanny and the Secular in Amitav Ghosh's *The Great Derangement* and *The Hungry Tide*", *Le Simplegadi*, Vol. XV-No 17 November 2017, DOI: 10.17456/SIMPLE-68, pp. 212-222.



# THE LITERARY ENCYCLOPEDIA

Exploring literature, history and culture

## Amitav Ghosh: *The Great Derangement*

(2016)

Asis De

Genre: Non-Fiction. Country: India, United States.

Amitav Ghosh's non-fiction *The Great Derangement: Climate Change and the Unthinkable* is a literary introspection on the relationship of humanity with 'nature' which explores the literary, historical, and political treatments of the civilizational crisis of climate change. The genesis of the book lies in Ghosh's memory of a devastating tornado that took its route through the campus of Delhi University in the early evening of 17 March 1978, killing 32 and injuring more than 700 people within five minutes. However, Ghosh's commentary on climate change came in the form of a lecture series on "Fiction, History, and Politics in the Age of Global Warming" (Randy L. and Melvin R. Berlin Family Lectures) at the University of Chicago (delivered on 29-30 September and 6-7 October 2015). A cluster of three essays successively subtitled "Stories", "History", and "Politics", *The Great Derangement* primarily addresses the pressing planetary crisis of climate change and questions the partitioning of human culture from nature, the anthropogenic environmental degradation across the world and the human reluctance to consider the spiralling scale and violence of weather events on the literary, historical and political levels. For the first time, this non-fiction work allows the reader to learn that Ghosh's "ancestors were ecological refugees long before the term was invented" (4). Dedicated to Mukul Kesavan, a friend since Ghosh's early youth, and quite remarkably "In memory of the 1978 tornado", *The Great Derangement* contains 216 endnotes emphasizing Ghosh's scholastic endeavour and urgency in drawing the readers' attention to the environmental disasters.

The book's strength lies in Ghosh's inimitable way of critiquing the imaginative failure of modern writers to recognize the pressing issue of environmental crises across the globe. In a spirit of environmental engagement, Ghosh emphasizes that the cult of individualism since the European Enlightenment has replaced the idea of collective coexistence in the biosphere, and has dissociated humankind from the nature. The "great derangement" of the title is not a metaphorical play on any Doomsday-like catastrophic event; rather, it insists on the failure of humanity in recognizing "their kinship with other beings" (217) and the human indifference to the equity of the non-human. Ghosh observes that the materialistic attitude to nature as an inanimate resource – particularly preached by western imperialism and capitalist economy – and is central to the understanding of the cultural crisis associated with climate change: "the Anthropocene presents a challenge not only to the arts and humanities but also to our common-sense understandings and beyond that to contemporary culture in general" (12). In one of its earliest reviews, the acclaimed Indian novelist Neel Mukherjee points out:

Each page of this book contains a compressed and original idea that could be pulled out to create several theses or books: the political effects of the distinct materialities of coal and oil; the Western modernity's insistence on its uniqueness; oil as an instrument for disempowering the people who constitute a



democracy: the marginalization of the collective in Western thinking (Mukherjee 59).

To Ghosh, the marginalization of the collective on the condition of prioritization of the individual is the reason behind the dissociation of humanity from nature. In *The Great Derangement*, Ghosh interweaves his arguments often by referencing some of his previously published novels like *The Circle of Reason* (1986), *The Glass Palace* (2000), *The Hungry Tide* (2004), and *Flood of Fire* (2015). Throughout the corresponding three sections of the book, Ghosh insists on a wholly subjective way of looking at the issue of climate change – not just by approaching it as scientific and rational, but as something related to traditional knowledge, the mysterious and the uncanny, as “the weather events of this time have a very high degree of improbability” (35).

The first section of *The Great Derangement*, subtitled “Part I: Stories”, is the longest chapter where Ghosh foregrounds the aesthetic limitation of modern writers and artists in addressing and representing the issue of climate change as an “imaginative and cultural failure” (10): “let us make no mistake: the climate crisis is also a crisis of culture, and thus of the imagination” (12). The crux of this section lies in Ghosh’s critique of realist literary fiction. Ghosh declares that though poetry “has long had an intimate relationship with climatic events” (35), the modern novel came into existence “through the banishing of the improbable and the insertion of the everyday” (23). This banishment of “the improbable” from serious fiction is a mark of the imaginative failure of the writer and, therefore, a cultural crisis, which came into existence as “a new and ‘modern’ worldview” two hundred years back: “the nineteenth century was indeed a time when it was assumed, in both fiction and geology, that Nature was moderate and orderly” (29). The centrality of “the everyday” in modern realist novel shows its incapability to deal with the exceptional, the uncanny, and the catastrophic. Ghosh observes that the cultural adoption of the “realist European-style fiction” in colonial late nineteenth-century India replaced “many old and very powerful forms of fiction, ranging from ancient Indian epics to Buddhist Jataka stories and the immensely fecund Islamic tradition of Urdu *dastaans*” (23; original emphasis). Though western theorists and literary historians – from Max Weber to Franco Moretti, hold the view that the mimetic ambition of serious fiction focuses on the “rationalization” of modern life, “turning it into a world of few surprises, fewer adventures, and no miracles at all” (25), Ghosh points out “the irony” of serious fiction: “the very gestures with which it conjures up reality are actually a concealment of the real” (31). The prioritization of the “real” and “the everyday” in realist fiction over “the improbable” represented in other forms of fiction has resulted in a politics of marginalization: “those generic outhouses that were once known by names such as ‘the Gothic’, ‘the romance’, or ‘the melodrama’, and have now come to be called ‘fantasy’, ‘horror’, and ‘science fiction’” (32).

The criteria of generic partitioning of literature have always remained contested, and Ghosh observes that “the uncanny and improbable events that are beating at our doors seemed to have stirred a sense of recognition” (40–41). Drawing upon the ideas of eminent environmental humanists like Timothy Morton and George Marshall, Ghosh recognizes “the presence and proximity of non-human interlocutors” (40), their “ability to intervene directly in human thought” (41), and “the uncanny intimacy of our relationship with the non-human” (43). Ghosh calls this relationship the “environmental uncanny,” which is “not the same as the uncanniness of the supernatural” (42). Neat ‘partitioning’ between nature and culture, and literature and science is the product of European Enlightenment and modernity, and it is “through the imposition of these boundaries, in time and space, that the world of a novel is created” (79). However, “the zeitgeist of late modernity could not tolerate Nature-Culture hybrids” (96), and therefore, the writers of the present times have found a “new task” of discovering newer “ways in which to imagine the unthinkable beings and events of this era” (44). In this age of global warming and climate change, with the “renewed awareness of the elements of agency and consciousness that humans share with many other beings” (85), the conventional spatio-temporal models used in the realist novels has changed and even opened a doorway to “a universe animated by non-human voices” (97). Ghosh opines that even the materiality of coal and oil has different political effects on the art and cultures of literary expression. Referring to Abdel Rahman Munif’s novel *Cities of Salt*, which he had considered in a review almost thirty years back as “the first novel” with a perfect form “that can give the Oil Encounter a literary expression” (102), Ghosh finds himself in subtle disagreement with John Updike’s 1988 review of this novel where Updike views a perfect



novel as "individual moral adventure" (103). Ghosh contradicts Updike's view on this single point by saying, "what is banished from the territory of novel is precisely the collective" (104). Referring to the works of Melville, Tolstoy, Émile Zola, and Upton Sinclair, Ghosh proposes that the priority of the collective over the individual is more relevant than ever in this era of global warming, as it is itself a "collective predicament": "humanity finds itself in the thrall of a dominant culture in which the idea of the collective has been exiled from politics, economics and literature alike" (108).

The second chapter, subtitled "Part II: History", begins by pointing out the usual role of capitalism in the history of climate crisis alongside identifying the equal contribution of "empire and imperialism": "capitalism and empire are dual aspects of a single reality" (117). Historically, "the discourse on global warming remains largely Eurocentric", Ghosh admits, and then focuses on the "unthinkable" future of environment in Asia, where a "great majority of potential victims" live: "the continent of Asia is conceptually critical to every aspect of global warming: its causes, its philosophical and historical implications, and to the possibility of a global response to it" (117-18). In this chapter, Ghosh offers a brilliant annexation of the history of Western imperialism and its carbon-intensive economy with the sudden rise of industrialization in the populous Asian countries in the late twentieth century. Citing several historical statistics of extreme weather events in South and East Asia since the 1950s, Ghosh categorically points out recent scenarios of climate threats like the cyclones, periodic floods, the melting of the Himalayan glaciers, droughts, and the fast accelerating water crisis in "the deltas of the Chao Phraya, the Krishna-Godavari, the Ganges-Brahmaputra and the Indus" (119). He also points out that the alarming rise of the sea-level in South Asia has already swallowed up "over 1 million acres of agricultural land" in Pakistan, and "could lead to the loss of some 6000 square kilometres" in India, and may "result in the migration of up to 50 million people in India and 75 million people in Bangladesh" (120). To Ghosh, another form of severe environmental collapse is desertification, which is slowly turning "24 per cent of India's arable land" (120) into desert and "causing direct annual losses of \$65 billion" (121) in China. These references and many such described in the second chapter of *The Great Derangement* make it evident that climate change is intricately related not just to an eco-friendly biosphere, but to the economy and human migration as well.

An anthropologist by academic training, Ghosh attempts to comprehend the issue of climate change by historicizing the economic and imperial vectors of industrial civilization and the fast transforming modernity across the world since the sixteenth century: "exchanges of technology and knowledge accelerated in the early modern period" (127). It is historically wise, Ghosh argues, to see modernity as a global phenomenon, and not singularly as a Western contribution to the world: "it is increasingly apparent that the early modern era nurtured not one or two but 'multiple modernities'" (129). To bring home the point, he cites the reference to "the use of fossil fuels, which has a long non-Western history" (129). Ghosh's historical exploration of the "genealogy of the carbon economy" (145) centers round the point that "carbon emissions were, from very early on, closely correlated to power in all its aspects" (146). The Western industrial innovations and carbon-intensive technologies of the eighteenth and nineteenth centuries are usually held responsible for the beginning of climate change. However, paradoxically, the imperial presence of the Western colonial powers in Asia and Africa "actually delayed the onset of the climate crisis by retarding the expansion of Asian and African economies" (147) as it ensured "that poor nations always remained at a disadvantage in terms of both wealth and power" (148).

Western imperialism and industrial capitalism as its close ally have indeed violated the norms of distributive justice but contributed to determining "the shape of global carbon economy" (145) and, therefore, remain relevant "in the politics of contemporary global warming" (146). If the politics of global warming is seen as a "contemporary" one, and the rapid industrialization of certain Asian economies like Japan, India, and China are to be blamed for the crisis of global warming, Ghosh's philosophical explanation rests on the ethical, conforming to his historicizing strategy: "our lives and our choices are enframed in a pattern of history that seems to leave us nowhere to turn but towards our self-annihilation" (149). Referring to Mahatma Gandhi, Ghosh underlines that "the universalist premise of industrial civilization" and "a consumerist mode of existence" may lead "literally, to the devouring of the planet" (150). Ghosh also appreciates the Indian and the Chinese success "in retarding the



wholesale adoption of a consumerist, industrial model of economy in their countries", which he considers as "a very significant material sacrifice, for which they can, quite legitimately, demand recognition" (153). Ghosh wraps up the second chapter of *The Great Derangement* with the proposition that climate crisis should not be taken "as a problem created by an utterly distant 'Other'" (154). To Ghosh, the stark climate scenarios of this era are "distillations of all of human history" (155).

The third and final section, subtitled "Part III: Politics", sums up *The Great Derangement* by broadening the bandwidth to the larger "idea of freedom" (159) and its relation to modernity, the intense "political engagements of writers and artists through the twentieth century and into the twenty-first" (162) on the one hand, and "the astonishing failure of the creative community to own and tackle climate change" (Abbott 370) on the other. Though much political energy has been spent to address issues of identity like "religion, caste, ethnicity, language, gender rights and so on", and politically engaged writers and artists have displayed enough sincerity in depicting individual moral performance with the highest regard to issues of political and personal liberty, Ghosh laments that the contemporary "political is no longer about the commonweal or the 'body politic' and the making of collective decisions" (169) on the issue of climate change that concerns "our collective survival" (170). Ghosh's emphasis on the 'collective' and the 'commonweal' brings forth "the notion of 'the moral'", which acts as "the hinge that has made possible the joining of the political and the literary imaginary" (170). Quite significantly, Ghosh points out that "as novels have come to be seen as narratives of identity", as individual moral adventures, "so too has politics become, for many, a search for personal authenticity, a journey of self-discovery" (171). As politics has become an art of personal "performance" in the public sphere of statecraft, with hardly any responsibility of "actual governance" (172), the wellbeing of the collective remains a faraway dream. As "personal expressiveness" permeates contemporary politics, so it has influenced "contemporary culture" by turning fiction into narratives of self-discovery: "the public sphere, where politics is performed, has been largely emptied of content in terms of the exercise of power: as with fiction, it has become a forum for secular testimony, a baring-of-the-soul in the world-as-church" (175). It is remarkable how gradually Ghosh becomes inclusive, as he connects the sacred space alongside morality, politics and market economy while dealing with climate change. As Ghosh refers to the rhetorical politics of denialism in the Paris Agreement, so he includes the inspirational reference to "Pope Francis' encyclical letter *Laudato Si'*" (201) and its role in questioning "the idea of the limitlessness of human freedom" (213) in the politics of climate change.

The role of the "moral-political" becomes paralytic in the "public politics of climate change" (177), for the world is run by the power of market economy and "laissez-faire ideas" (182). The politics of self-definition, deeply rooted within the Anglosphere's history and culture, faces a failure of governance while dealing with global warming and similar climate crises. The "politics of armed lifeboat" (193), increasing militarization in the West and in some developing Asian countries, are the result of those nations' worry about "their country's standing in the world's hierarchies of power as well as wealth" (195). To Ghosh, the "distribution of power in the world" (196), which has historically "been shaped by empire and its disparities", forms "the basis of (their) resistance to climate science in general" (195), and "therefore lies at the core of the climate crisis" (196). The idea of a global norm of climate justice is hyperbolic as the distribution of power and wealth stands "on a system of colonial-style inequality" (199) historically and politically: "the impetus for industrialization in much of the world was a part of the trajectory of decolonization, and the historical legacy of those conflicts is also embedded in the context of climate change negotiations" (200). Considering the historical legacy of imperialism and the indifference of the policymakers to climate change, Ghosh envisions a bleak future:

When future generations look back upon the Great Derangement, they will certainly blame the leaders and politicians of this tie for their failure to address the climate crisis. But they may well hold artists and writers equally culpable—for the imagining of possibilities is not, after all, the job of politicians and bureaucrats (181).

The significant force of Ghosh's vision in *The Great Derangement* lies in its insistence on urgent inclusive



collectivity even with the "involvement of religious groups and leaders" (213) in confronting climate crisis as an intergenerational long-term moral responsibility. Ghosh concludes with a hopeful message that out of the intergenerational struggle against the climate crisis, people of future generations would be able to "rediscover their kinship with other beings", and "this vision, at once new and ancient, will find expression in a transformed and renewed art and literature" (217). *The Great Derangement: Climate Change and the Unthinkable* stands, by every means, as Amitav Ghosh's vision document in response to the planetary crisis of climate change.

### Works Cited

Abbott, Elizabeth. "Review of *The Great Derangement: Climate Change and the Unthinkable*." *International Journal of Environmental Studies*, vol. 75, no. 2, 2018, pp. 368-71.

Ghosh, Amitav. *The Great Derangement: Climate Change and the Unthinkable*, Penguin Books, 2016.

Mukherjee, Neel. "How global warming has frozen fiction." *New Statesman*, 4 October 2016, pp. 57-59.

<https://www.newstatesman.com/culture/books/2016/10/how-global-warming-has-frozen-fiction>.

Asis De

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## Women and Acid Attack in India: A Shame on Humanity

*Swati Basak*

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The movie Chappak opened my eyes and I could realize the pain of the innocent persons who are the victims of acid attack. I got scared when I saw the open sale of acid in our neighbourhood in South Kolkata. I started shivering when I think that anybody can buy a bottle of acid and commit the crime easily and within a fraction of second. So I felt that it is my moral duty to write down something on this crime and create awareness among the people. Anybody can be the victim of this heinous crime which cannot be pardoned in any way.

Acid attack can be explained as a gender based crime against women. It can be said that it is the result of nurturing deep hatred and jealousy towards another person. It is said by the National Commission of Women, India that "any act of throwing acid or using acid in any form on the victim with the intention of or with knowledge that such person is likely cause to the other person permanent or partial damage or deformity or disfiguration to any part of the body of such person."<sup>1</sup> The prey of this atrocious crime mainly is the girls in the age between 11 to 30 years.<sup>2</sup>

Mrs. Arundhati Das and Dr. Subhomoy Banik; "A Study on Acid Attack in India and its Impact," in JTEIR; January, 2019; Vol.6; Issue.01; pp.1-21.

Ibid.

<https://www.firstpost.com>; date of access; 28/07/20.

Uma Chakravarti; *Gendering Caste, Through a Feminist Lens*; Kolkata; STREE; 2003.

<https://www.firstpost.com>; date of access; 28/07/20.

<https://onlinelibrary.wiley.com>; date of access; 30/07/20.

Ibid.

Ibid.

Ibid.



# Tribal Religious Identity and Ethnic politics in Chotonagpur Region during the Jharkhand Movement.

Prakash Bisui\*

Since ancient times, supreme castes have connections with the religious thoughts.<sup>1</sup> It is difficult to figure out the exact time of origin of religion and its mixing with politics. Presently, the religious thoughts play a key role along with other factors to construct the identity of a caste.<sup>2</sup> India is the land of multi languages, diverse culture and many religious thoughts. Many tribes live in India. Naturally it is difficult to explain the Indian caste perception, on the basis of religious identity.<sup>3</sup> Social factors are also associated with Indian caste perception. India, where mixing of Aryans and non-Aryans gave birth to new Sanatan Religious concept which too did not remain as carrier for ethnic identity.<sup>4</sup> During formation of so called mainstream Indian society, the parts of Non- Aryans who were detached used to be called 'Nishad', while those of Aryan counter parts were called 'Bratya'.<sup>5</sup> Few of them, with salient features used to live in a specific region. Before colonial era, in these areas, primitive administration system was followed up by the trials' according to their own features. Besides, their religious thoughts and practices were totally nature centric.<sup>6</sup> They had intimate connections with regional administration and with the new religious concept, originated from the perception of religion that prioritizes ethnic identity. But after Gupta era, the administrative system started to change after the invasion of Rajputs in these tribal infested middle India.<sup>7</sup> And Rajput myth also started influencing their religious beliefs which introduced them with the mainstream administrative structure of society. Further the advent of Buddha and Vaishnava religion connected the tribal people with the mainstream religious beliefs.<sup>8</sup> But in colonial period, with the arrival of British administration in India, the activities of Christian Missionaries, created complexity among tribal and their social, political and cultural practices.<sup>9</sup>

Chotonagpur plateau region is one of the significant tribal infested areas of India. About the geographical features, here the terrain is made up with ancient stone and is surrounded by jungles, climate is dry and rough. In this region various tribes with multi languages and culture used to reside together through ages and 'Austic' and 'Dravid' speaking clan were predominant among them.<sup>10</sup> A negative repercussion was noticed after the introduction of British land colonial revenue policy. As a consequence, revolt against the British took place.<sup>11</sup> Colonial administration particularly marked the region and tried to separate the land from their main administrative map by passing different Laws.<sup>12</sup> Indeed few British civilians being over enthusiastic took initiative to note down many important data about the region.<sup>13</sup> Activities of Christian Missionaries including spreading of education, social and religious conversion, were run along with colonial rule. Though British spontaneously tried to spare the region from Indian National movement, they did not succeed to do so.<sup>14</sup> This region also participated in Indian National Movement and unity.

Since 1930, the effort of development of tribal ethnicity in this region started,<sup>15</sup> which is the outcome of pan tribal identity grown up in this region in this decade. Many studies have already done on growth of Jharkhandi identity revealing various results. It is to remember that during 19<sup>th</sup> Century, an endeavour of development of regional tribal ethnicity was taking place side by side with national integration.<sup>16</sup>

\*Assistant Professor, Mahishadal Raj College

similarities slowly found the way of establishing their regional identity and ethnic unity. In this region Santals was the most conscious tribal groups. They refused their religious identity as Hindu. They like to establish their own religion, namely "Sari" or "Sama", which means nature lover religion. In last few census report we have seen some of the Santals refused to register themselves as Hindu but there was no option of "Sari" religion in census format. As a result, government had to face lots of criticism by local and tribal newspapers and magazines, and tribal civil society.<sup>21</sup> In this way their religious thoughts paved the way of their cultural identity. According to 'Danshaya' festival and tribal literature, Durga is the Devi of Santals, who was stolen by someone and the Santals are still looking for their Goddess. This reveals the impression of long time conflict of Aryans and non-Aryans.<sup>22</sup>

Christian religion plays a pivotal role over the tribal religion and their culture. Christian Missionaries always chose these tribal infested areas to preach Bible. The first American Baptist Mission Society was established in 1938 in Jaleshwar, Orisa, followed by foundations of Church Missionary Society, Northern Evangelical Lutheran Church, Methodist Missionary Society and Roman Catholic Mission. The Mission Societies took the advantage of poverty of tribals, their lack of religious awareness and conception (till 19<sup>th</sup> Century) to preach Christianity. Many people have seen this trick as religious oppression.<sup>23</sup> Renowned Writer Ms. Mahashewta Devi, in her writings highlighted Christian Missionaries' endeavour to control tribal movement by religious conversion of Santhal leader Birsha Munda.<sup>24</sup>

Birsha Munda's revolt in 1899 and the 1914 Thana Bhagat movement was influenced by the revivalist movement which was influenced by the religious reformation among the tribes.<sup>25</sup> During the Jharkhand movement religious consciousness played important role to develop the ethnic identity in Jharkhand region. On one side influence of Baishnavism among the tribe played an important role to connect between the lower castes of local Hindus, lower cast of converted Muslims who participate with local religious practices and the various group of tribes in same region, on the other side the "Har Mitran" idea in tribal society which came from religious awareness played a role to unite the same groups and castes who practiced the local religious festivals and traditions. 'Har Mitran' <sup>26</sup> idea and Vaishnavism have unified the local people by the spiritual and social activities which also influenced 'Pan-Tribalism' idea among the tribes and lower castes in Jharkhand region.<sup>27</sup> This all type of religious consciousness have played significant role in the period of Jharkhand movement to overcome the subjugation and conversion from Hindu, Christian, and Muslim, religion, and support to evolving their own identity and ethnicity.

#### End Notes :

1. Veer, Peter Van Der, *Nationalism and Religion*, Breuilly, Jhon, (ed), *The Oxford Handbook of the History of Nationalism*, Oxford, 2013.
2. Spohn, Wilfried, *Multiple Modernity , Nationalism and Religion: A Global Perspective* , Martin, Etolsa & Patel, Sujata, (Ed), *Current Sociology*, Sage, March, 2016.
3. Guha, Ramchandra, *India After Gandhi*, Macmillan, Great Britain, 2007.
4. Thapar, Romila, *Historical Beginning of the Concept on the Aryan*, National Book Trust, Delhi, 2007 .
5. Mahato, Pashupati Prasad , *Sanskritization Vs Nirbakaization ( A Study on Cultural Silence and Ethnic Memocide in Jharkhand)*, Purbalok, Kolkata, 2012.
6. Mahato, Pashupati Prasad, *Bharoter Adibasi O Dalit Samaj*, Purbalok, Kolkata, 1985.
7. Sinha, Surojit, *State Formation and Rajput Myth in Tribal Central India*, Cambridge University Press, London, 1962.



8. Mukhopadhyay, Subhas, *Prachin Puruliyā: Bangadeshe Arya-Sabhyata O Samanya Bad Sahayoge Agrani Bhomika*, *Janak, Dakharsari (Ed), Ahiyabhumi Puruliyā, First Part, Deep Prakashana, Kolkata, 2003*
9. Frowen, Paddy, *Religions Division and Social Conflict: The Emergence of Hindu Nationalism in India*, *India, Adivasi Christian and Church, Chap-3, Social Science Press, Delhi, 2007*
10. Basu, Udaychandra, *Paschimvanger Adibasi Samaj, First Part, Subarnarekha, Kolkata, 2006*
11. Sen, Sachchandra, *Erosion of the Mardal System of the Santals of the South West Bengal aDonal to Their Cultural Identity*, *banarjee, Tarasankar, (ed), Changing Land Systems and Tribals in Eastern India in the Modern Period, Subarnarekha, Kolkata, 1989*
12. Nayak, Binod Mohan, *Santal Parganas Tenancy Manual*, *Malhotra Bros Pub, Patna, 2000*. *The Santal Parganas Act, 1855, Santal Parganas Regulation, 1872, Chotanagpur Tenancy Act, 1908 Etc.*
13. Hoyle, W W, *Statistical Account of Bengal*, *Mulay, O, Bengal District Gazette, etc*
14. Kothari, Rajni, *State and Nation Building in the Third World*, *Kothari, (ed), State and Nation Building, ahed Publication Privat Ltd., Delhi, 1976*
15. Ghosh, Ananyashtu, *A Study in the the Politics of Regionalism*, *Minerva Associates Pvt. Ltd., Calcutta, 1988*
16. Ghosh, S I, *Emangling, Tribal Image*, *Rawat Pub, Delhi, 1997, Chap-2, Tribals; An Assimilationist Society and National Integration*
17. Mahato, Bhankim Chandra, *Jharkhand Lokasahitya, Creation, Kolkata, 1978*
18. Neelvan, Primal, *Kherani theke Jharkhand*, *Saradiya Adibasi Jagor Prabandha Samagra 2001-2003, Latter Print, Howrah, 2014*
19. Mahato, Pasupati Prasad, *Jangal Mahal O Jharkhandi Lokadarshan*, *Jayashree, 2004*
20. Karik Hansda, *Jhujhul Jhema*, *Adibasi Press Club and Publication, 1st Oct, 2008*
21. Munis, Binod Bihari, *Santal Bhasha O sari dhama Bhabna*, *Saradiya Adibasi Jagor Prabandha Samagra 2001-2003, Latter Print, Howrah, 2014*
22. Hansda, Surjya Kumar, *Danshal*, *Saradiya Adibasi Jagor Prabandha Samagra 2001-2003, Latter Print, Howrah, 2014*
23. Upadhyay, R, *Impact of Christianity on the Tribes of Jharkh*, <http://www.hindumet.org/iv/articles/1103/48.html>
24. Acharya, Devi, *Aranyer Adhikar & Chetti Munda O far Tir*, *Karuna, Kolkata*
25. Tella, Philip, *Revivalist movement among the tribals of chotanagpur*, in, *Singh, Kumar, Suresh, (Ed), Motilal Banarasidasas, Delhi, 1986, P-420*
26. Mahato, 2004
27. Sinha, Parasank Samponker *Mudhyam O Prakriti*, in, *Bandopadhyya, Sekher, Jat Bama O Bangal Samaj, ACBS, Delhi, 1998*



## Harichand Thakur: The Pioneer of Matuya Movement

Dr Sujit Mondal ,

Assistant Professor, Dept. of History, Mahishadal Raj College,  
Mahishadal, Purba Medinipur W.B.

### INTRODUCTION:

Social reforms movements and struggles for social justice are incomplementary, rather, they are conflicting and contradictory. Colonial Bengal concurrently witnessed a social reforms movement and a social justice movement in the 19<sup>th</sup> and 20<sup>th</sup> centuries. While the social reforms movement focused the upper-castes, aged-old orthodox rituals and ugly practices, such as sati, polygamy, child marriage, dowry system, debdasi, throwing child in Ganga sagar and so on, the social justice movement aimed to terminate illiteracy and generating awareness about human dignity in the lower social strata.

The Bengali intellectual class was bound by the inflexibility of the caste system, inspite of having received a western education and having been taught liberal humanism, enlightenment and science. It may also be remembered that social reforms of the nineteenth century in India did not reach the huts of the poor and the innumerable multitude of common people. It was limited only to the elite and erudite sections of the society. The weaker sections were exploited by the upper classes. It is the duty of a religion to protect them from the social degradation, but none of the religious groups in Bengal extended their kind hands to establish the equality of mankind. The curse of untouchability further added to the suffering of low castes. There were depressed, down-trodden people and untouchables in the society who were suffering from poverty, unawareness and superstitions and to them the sermon of nationality, fairness or purity and unity were meaningless.<sup>1</sup>

An early 20<sup>th</sup> century document underlines what the Brahmins and other upper castes thought about chandals; the largest Hindu caste in East Bengal (now Bangladesh) 1. The chandals live outside the villages; 2. their wealth consists of dogs and asses; 3. they put on rags gathered from dead bodies; 4. they have vagrant lives; 5. their principal occupation is to burn the dead; 6. they hang criminals by the command of the king and 7. they are untouchables.<sup>2</sup>

Harichand Thakur, a Hindu votary and founder of the Matuya sects of Hinduism (the son of Jasabanta Thakur and Annapurna Devi) was born in a Namastuta family

Matuyas are Jay Danka or Danka, Kansar ang Shing. The symbol of revolution and victory is the flag of Matuy's hand and sounds of Danka, Kansar and Shinga to announce the victory in war. The community observes Wednesday as the day of communal worship. The gathering, which is called 'Hari Sabha' (the assembly of Hari), is an occasion for the Matuya to sing Kirtan in praise of Hari till they almost fall senseless. Musical instruments such as jaydabka, kansar, conch, shibga, accompany the kirtan. The Gonsai garlanded with karanga (coconut shell) and carrying ebhata sticks near about 12 inch long and red flags with white patches, lead the singing.<sup>20</sup>

In the occasion of birthday anniversary of Harichand Thakur at Orakandi in East Bengal erstwhile East Pakistan the Matuyas from different part of India used to throng being divided into many groups of different sizes under the leadership of a Matuya, known as Dalpati (leader) in every group. After the partition of India Thakurbari of Thakurnagar has been organising also such festival in this occasion. Guruchand Thakur felt the necessity of bringing them together on a common platform by which a big group comprising the small ones can be formed to gain adequate strength capable of fighting out all the devils and evils. This big group was termed later 'Matuya Mahasangha'. Matuya Mahasangha believe in 'Swayam-Dikshiti' (Self-Realisation). Therefore, anyone who has faith in the Darshan or Philosophy of Harichand belongs to Matuya Mahasangha. At first Matuyas formed an organisation at Orakandi district in Faridpur district of Bengal Presidency (now in Bangladesh). After partition, followers formed a second organisation at Thakurnagar in West Bengal. The temple was initially looked after by Thakur's family, but as of 2011 A.D. it was managed by trustee chosen by the followers.<sup>21</sup>

**CONCLUSION :**

In the late 19<sup>th</sup> century, the Namashudra movement was started in Bengal presidency under the leadership of Harichand Thakur and his unfinished task was started by his elder son Guruchand Thakur. The movement is considered as the most powerful Dalit literary movement in Bengal as well as in India. The movement may be divided as - 1. the pre-partition movement (1872-1947); 2. the post partition movement (1947-1992); 3. the contemporary movement (1992-present day). The pre-partition movement may be classified as - i) Religious phase, ii) Educational phase and iii) political phase. In the first phase, Harichand Thakur tried to find an alternative way of life that resolves as a new religion known 'Matuya Dharma'. In the second phase, the movement gave emphasis on modern education under the leadership of Guruchand Thakur. In this phase Matuya movement deals with the unification of 'Dharma' (religion) and 'Karma' (work) or amalgamation of spiritualism and materialism. One has to follow the combined roots of 'Dharma' and 'Karma' to keep the continual flow of life. The third phase, the movement gave more emphasis to gain political power (Raj Shukti) under the leadership of Jagendranath Mondal.

REFERENCES:

1. S. P. Sen (Edited). "SOCIAL AND RELIGIOUS REFORM MOVEMENTS IN THE NINETEENTH AND TWENTIETH CENTURIES". Institute of Historical Studies, Calcutta, 1779, pp.-1-15.
2. Kalyani Thakur Charal(Edited). "Dalit Sahitya O somoskriti Bisayak Taimasik Patrika", Chaturtha Duniya, Kolkata, June 2011, pp.-96-108.
3. Naresh Chandra Das. "Lord HARICHAND GURUCHAND". Biswas Printing House, Kolkata, Nov. 1996, pp.-5-11.
4. Oneil Biswas. "The Namah Shudras: Origin and Develpoment". Jyoti Printers, Kolkata, 2004, pp.-1-35.
5. Tarakchandra Sarkar. "SRI SRI HARILILAMRITO", Matuya Sahito Mandir, Orakandi, 1417 Bangabdo, pp.-1-23.
6. Debdas Pandey. "An Approach to Matuism". Matuya Maha Sangha, Thakurnagar, 2008, pp.21-22.
7. Srimat Bicharan Pagal. "SRI SRI HARIBGURUCHAND CHARITSUDHA", Palla, North 24 Parganas 1416 (Bengali year), pp. 13-14.
8. Debdas Pandey, op.cit, p.-22
9. Naresh Chandra Das, op.cit, pp.-pp. 10-11.
10. Kapil Krishna Thakur. "Life History of Hari-Guru Chand Thakur, their philosophy and Activities in brief". Matuya Mahasongha, Thakurnagar, p.-5.
11. Nandadulal Mohanto. "Matuya Andolon O Dalit Andolon Annap urna prakashani, Kolkata, pp.13-18.
12. Kapil Krishna Thakur, op.cit, p.-2.
13. Naresh Chandra Das, op.cit, pp.-6-7.
14. Kapil Krishna Thakur, op.cit, pp.-5-11.
15. Santosh Kumar Barui. "Thakur Sri Sri Harichand Manab Purus: Adhyta Purus". Ananta Bardhaman, 2011, pp.-17-21.
16. Santosh Kumar Barui, op.cit, pp.-242-43.
17. Kapil Krishna Thakur, op.cit, pp.-5-12.
18. Manashanto Biswas. "Banglar Matuya Andolon Samaj Somoskriti Rajniti". Setu Prakashani, Kolkata, May 2016, pp.-49-71.
19. Ibid.
20. Interview, Binapani Devi (Baroma), on 11 Sept. 2012, at 3.35 P.M, Thakurnagar.
21. Debdas Pandey, op.cit, pp.-105-127.



A handbook of Agricultural and Plant Sciences is an attempt to compile information related to the field of agriculture and plant science. The book encompasses both the domains of agriculture and plant sciences. Plants have been associated with humans since antiquity and have been providing food to the ever-growing population of the globe. The main purpose of the book is to provide relevant information to the readers on aspects largely centered on plants. The book is divided into three sections namely agriculture and sustainable development, plants and microbes as nutraceutical agents, and medicinal potential of plants. Selected chapters in relevance to the sections have been accommodated to provide an overview of the importance of plants to humans and also update readers about the recent trends in plant science research. The book is divided into three sections which center on topics related to agriculture and sustainable development, nutraceuticals, and medicinal plants. The book is also accompanied by several tables within each chapter which gives a clear and systematic description of the theme that is discussed upon. The book is an academic venture and would benefit the scientific community and readers who are interested in the field of plant sciences.



**Dwaipayan Sinha** is an Assistant Professor in Botany and is presently serving Government General Degree College, Mohanpur, Paschim Medinipur under West Bengal Education Service. He previously served the Department of Botany, Bidhannagar College, Kolkata, and has more than 10 years of teaching experience in the field of Plant Sciences. He has graduated with Botany honours from the prestigious Presidency College and masters from the University of Delhi in the same subject with specialization in plant molecular biology and crop genetics. He has done his

Ph.D. from CSIR-Indian Institute of Toxicology Research on the antioxidant potential of gymnosperms. He has more than 16 years of research experience and is actively involved in the exploration of antioxidant potentials of Gymnosperms. He is also involved in ethnobotanical studies and is presently involved in exploring ethnobotanical knowledge of various regions of West Bengal. He is also exploring the phytodiversity pattern of the Mohanpur block in the Paschim Medinipur district of West Bengal. He is also actively involved in writing articles related to plant sciences and is presently having several publications in peer-reviewed journals. He is also associated with the editorial board and review panel of journals of international repute.

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# 5

*Soma Chanda<sup>1\*</sup>*  
*Ambarish Mukherjee<sup>2</sup>*

*1-Department of Botany,  
Mahishadal Raj College,  
East Midnapur.*

*2-Department of Botany,  
Centre for Advanced  
Studies, University of  
Burdwan.*

## **Food Plants from Wilderness of Ayodhya Hills in Purulia District, West Bengal (India) : Aspects and Pros- pects in the Context of Food Security**

\*Corresponding Author :

Soma Chanda, Department of Botany, Mahishadal Raj College, NAAC accredited “A” Grade College, Mahishadal. Purba Medinipur, West Bengal, Pin - 721628.

Email : somac10@gmail.com

### **Introduction**

**T**he centres of economically useful plants and those of plant diversity abound in richness of crop and wild plants. Moreover, the areas rich in floristic diversity are regions where tribals have settled. In other words, wide floristic diversity and tribal richness maintain a good correlation, integrating into the same ecosystem where the ethnic groups live in harmony with nature, domesticating wild plants and animals through the ages according to

products and medicinal plants conservation, improvement and sustainable utilization. (eds. Sanjay Singh and R. Das). Pp-123-129.

- Chanda, S., Sen, S., Pal, D. C. (2012) Practises in ethnomedicine by the economically challenged people of Ayodhya hills, Purulia district, West Bengal. In. Multidisciplinary Approaches in Angiosperm Systematics (Ed. Gaugopal Maiti and Sobhan Kumar Mukherjee). Vol.2. pp.633-636. University of Kalyani, Kalyani. (ISBN: 978-93-5067-867-1).
- Deb, D., Sarkar, A., Debbarma, B., Datta, B. K., & Majumdar, K. (2013). Wild edible plants and their utilization in traditional recipes of Tripura, Northeast India. *Advances in Biological Research*, 7(5), 203-211.
- Gopalan, C., Ramasastri, B. V., & Balasubramanian, S. C. (1984). Nutritive value of Indian foods, National Institute of nutrition, Hyderabad. *Indian council of medical research, New Delhi*, 66-117.
- Guha Bakshi, D. N. (1984). *Flora of Murshidabad District West Bengal, India*. Scientific publishers, Jodhpur, India.
- Jain S. K. , Rao R. R. (1977). A Handbook of Field and Herbarium Methods. Today & Tomorrow's Printers and Publishers, New Delhi.
- Majumder, S., & Mukherjee, A. (2015). Wild edible plants recorded from Hogalbaria village of Nadia district, West Bengal, India. *Indian Journal of Life Sciences*, 5(1), 63.
- Murti, S. K., & Panigrahi, G. (1999). Flora of Bilaspur district. *MP, Botanical Survey of India, Calcutta*, 2, 397-906.
- Panigrahi, G. and Murti, S. K. (1989) Flora of Bilashpur District, M.P. 1:1-396. Botanical Survey of India, Calcutta.
- Prain, D. (1903). Bengal Plants, Calcutta, West Bengal.
- Rao, R. R. (1989). Methods and techniques in ethnobotanical study and research: some basic consideration. *Methods and approaches in Ethnobotany*, 13-23.
- Saklani, A., & Jain, S. K. (1994). *Cross-cultural ethnobotany of northeast India*. Deep publications.
- Singh, V., & Singh, P. (1981). Edible wild plants of Eastern Rajasthan. *Journal of Economic and Taxonomic Botany*, 2, 204.
- Tag, H., Tsering, J., Hui, P. K., Gogoi, B. J., & Veer, V. (2014). Nutritional potential and traditional uses of high altitude wild edible plants in eastern Himalayas, India. *International Journal of Biological, Biomolecular, Agricultural, Food and Biotechnological Engineering*, 8(3).







## Power-efficient and Latency-aware Offloading in Energy-harvested Cloud-enabled Small cell Network

Anwesha mukherjee<sup>\*(1)</sup>, Debashis De <sup>(2)</sup>, Soumya K. Ghosh <sup>(3)</sup>

(1) Department of Computer Science, Mahishadal Raj College, Mahishadal, Purba Medinipur, West Bengal, PIN - 721628, India

(2) Department of Computer Science and Engineering, Maulana Abul Kalam Azad University of Technology, West Bengal, BF-142, Sector-I, Salt Lake, Kolkata-700064

(3) Department of Computer Science and Engineering, Indian Institute of Technology Kharagpur, West Bengal 721302, India

### Abstract

This paper has proposed an energy-harvested small cell network that is composed of large cells containing cloud-enabled small cell base stations inside to provide the users communication and computation services simultaneously. An application offloading strategy has been proposed based on small cell zooming. This is observed that the proposed network reduces the power consumption of small cells by approximately 14% and the proposed offloading method reduces the power consumption of the user device by 23-54% approximately during offloading an application.

### 1 Introduction

The objective of future generation mobile network is to provide high bandwidth and low latency services to the users. To address the challenges, small cells have become the principle elements of fifth generation (5G) mobile network [1]. The small cells refer to the picocells and femtocells, which are deployed inside the large cells like macrocells and microcells [2, 3]. However, to offer the users communication and computation services simultaneously Small Cell cloud enhanced eNodeB (SCcNB) [4, 5, 6] and femtolet [7, 8] come into the scenario. These small cell base stations have in build storage and computation ability so that the users registered under them can make and receive voice call as well as can offload their data and applications inside these devices. However, the radiation due to dense small cell allocation and rapid growth in multimedia traffic are increasing the  $CO_2$  emission and polluting the air. To overcome this problem, an energy-efficient small cell network design has become important. Energy harvesting has become a promising solution for designing energy-efficient small cell network [9, 10, 11]. In energy harvesting the renewable energy resources such as solar, wind are used as a source of power supply. Moreover, the base stations transmit energy which can charge the batteries of other devices. Here energy harvesting occurs from radio-frequency environment. Though a small cell consumes very less amount of power, large number of small cell allocation increases the power consumption of the network. To address the issue, there are

two major objectives of this work:

- To reduce the power consumption of the small cells in the network to provide a green small cell network.
- For energy-efficient offloading cloudlets [12, 13], fog devices [14], edge devices [8] are used. However, in cellular network indoor base stations providing data and computation offloading are available to reduce the latency as well as energy consumption. But if these devices have not enough power level to execute a requested code, then remote cloud has to be accessed. The objective is to propose a strategy that will provide power and latency aware offloading if the small cell has not enough power to execute computation.

To address the objectives, the contributions of the paper are:

- An energy-efficient small cell network has been proposed, where cloud-enabled small cell base stations (C-SB) are used inside the large cells for simultaneous computation and communication service provisioning. Femtolets and SCcNBs are used as C-SBs in the network. These C-SBs are powered using renewable energy resources. However, they can charge up using transmission energy from the adjacent C-SBs as they are located densely.
- A small cell zooming based offloading strategy has been proposed to save the latency and power consumption of the user device during offloading.

Rest of this paper is organized as: Section 2 discusses the proposed strategy, Section 3 studies the performance of the proposed strategy and Section 4 concludes the paper.

### 2 Energy-harvested C-SB based Network

In the network we have considered macrocell and microcell base stations and inside their coverage C-SBs are allocated. The solar and wind resources are used to charge the C-SBs.

**Table 1.** Experimental results

Code	Latency in proposed scheme	Latency in existing scheme [7]	Power consumption in proposed scheme	Power consumption in existing scheme [7]	Latency reduction in proposed scheme	Power reduction in proposed scheme
Linear search	18.6 ms	18.6 ms	1.11 mW	1.11 mW	Nil	Nil
Merge sort	33.6 ms	61 ms	1.936 mW	4.235 mW	44.92%	54.28%
4-Queens puzzle	60.6 ms	88 ms	3.421 mW	5.72 mW	31.1%	40.19%
Converting a bmp image to PGM file	507.8 ms	592 ms	28.325 mW	36.96 mW	14.23%	23.36%

mental results demonstrate that the proposed method reduces the offloading latency by 14-44% approximately and power consumption of the user device during offloading by 23-54% approximately than the existing scheme. In Fig.4 the communication latency while offloading data using proposed and existing approaches [7] with respect to the size of the data are presented. The data transmission rate is 1 Mbps approximately. In the proposed scheme the C-SB under which the mobile device is registered if has lower power, then adjacent C-SB expands coverage and the mobile device is handed over to it. The mobile device then offloads the data to that C-SB. In the existing approach [7] the remote cloud is used to offload the data if the C-SB under which the mobile device is registered has lower power to offload the data. In Fig.5 the power consumption of the user device while offloading data using proposed and existing approaches [7] with respect to the data size are presented. In Fig.4 and Fig.5 the latency and user device's power consumption while offloading 50-500 MB data using proposed and existing methods [7] are compared. For high amount of data offloading (> 200 MB), the C-SB's energy level falls. Hence, in the existing scheme [7], the remote cloud stores the data. In the proposed method, the adjacent C-SB expands coverage and the mobile device offloads the data to it. This is observed that up to 80% reduction in latency and power consumption in offloading is achieved using the proposed approach. From the theoretical and experimental analysis, it is observed that the proposed method reduces power consumption of the small cells, offloading latency and power consumption of the user device.

## 4 Conclusion

In this paper we have proposed an energy-harvested small cell network which reduces the power consumption of the small cell base stations and the user devices. In the proposed network, the small cell base stations provide communication and computation services. They can expand coverage and execute applications of the user devices. When a small cell has very low energy level to afford computation service to its users, its adjacent small cells expand coverage and provide service to its users. This is observed that the proposed network reduces approximately 14% power consumption. This is also observed that the proposed method reduces approximately 23-54% power consumption of the user device during application offloading.

## References

- [1] X. Ge, J. Yang, H. Gharavi, and Y. Sun, "Energy efficiency challenges of 5g small cell networks," *IEEE Communications Magazine*, vol. 55, no. 5, pp. 184–191, 2017.
- [2] A. Mukherjee, S. Bhattacharjee, S. Pal, and D. De, "Femtocell based green power consumption methods for mobile network," *Computer Networks*, vol. 57, no. 1, pp. 162–178, 2013.
- [3] A. Mukherjee, P. Deb, D. De, and M. S. Obaidat, "Wma-mifn: A weighted majority and auction game based green ultra-dense micro-femtocell network system," *IEEE Systems journal*, p. Accepted, 2019.
- [4] S. Barbarossa, S. Sardellitti, and P. Di Lorenzo, "Joint allocation of computation and communication resources in multiuser mobile cloud computing," in *2013 IEEE 14th workshop on signal processing advances in wireless communications (SPAWC)*. IEEE, 2013, pp. 26–30.
- [5] P. Deb, A. Mukherjee, and D. De, "A study of densification management using energy efficient femto-cloud based 5g mobile network," *Wireless Personal Communications*, vol. 101, no. 4, pp. 2173–2191, 2018.
- [6] S. Yu, R. Langar, X. Fu, L. Wang, and Z. Han, "Computation offloading with data caching enhancement for mobile edge computing," *IEEE Transactions on Vehicular Technology*, vol. 67, no. 11, pp. 11 098–11 112, 2018.
- [7] A. Mukherjee and D. De, "Femtolet: A novel fifth generation network device for green mobile cloud computing," *Simulation Modelling Practice and Theory*, vol. 62, pp. 68–87, 2016.
- [8] A. Mukherjee, P. Deb, D. De, and R. Buyya, "C2of2n: a low power cooperative code offloading method for femtolet-based fog network," *The Journal of Supercomputing*, vol. 74, no. 6, pp. 2412–2448, 2018.
- [9] S. Zhou, J. Gong, Z. Zhou, W. Chen, and Z. Niu, "Greendelivery: Proactive content caching and push with energy-harvesting-based small cells," *IEEE Communications Magazine*, vol. 53, no. 4, pp. 142–149, 2015.
- [10] Y. Mao, Y. Luo, J. Zhang, and K. B. Letaief, "Energy harvesting small cell networks: feasibility, deployment, and operation," *IEEE Communications Magazine*, vol. 53, no. 6, pp. 94–101, 2015.
- [11] S. Lohani, E. Hossain, and V. K. Bhargava, "Joint resource allocation and dynamic activation of energy harvesting small cells in ofdma hetnets," *IEEE Transactions on Wireless Communications*, vol. 17, no. 3, pp. 1768–1783, 2018.
- [12] A. Mukherjee, D. De, and D. G. Roy, "A power and latency aware cloudlet selection strategy for multi-cloudlet environment," *IEEE Transactions on Cloud Computing*, vol. 7, no. 1, pp. 141–154, 2019.
- [13] M. Satyanarayanan, Z. Chen, K. Ha, W. Hu, W. Richter, and P. Pillai, "Cloudlets: at the leading edge of mobile-cloud convergence," in *6th International Conference on Mobile Computing, Applications and Services*. IEEE, 2014, pp. 1–9.
- [14] H. Gupta, A. Vahid Dastjerdi, S. K. Ghosh, and R. Buyya, "ifogsim: A toolkit for modeling and simulation of resource management techniques in the internet of things, edge and fog computing environments," *Software: Practice and Experience*, vol. 47, no. 9, pp. 1275–1296, 2017.
- [15] A. Mukherjee, P. Deb, and D. De, "Small cell zooming based green congestion control in mobile network," *CSI transactions on ICT*, vol. 5, no. 1, pp. 35–43, 2017.

# Voice-Based Railway Station Identification Using LSTM Approach



Bachchu Paul, Somnath Bera, Tanushree Dey, and Santanu Phadikar

**Abstract** Enormous research is going on Automatic Speech Recognition (ASR) in the past decade. Human-Computer Interaction (HCI) will become more efficient and hands-free through voice-based commands. In our proposed work of speech recognition, we have taken a list of ten major railway stations in South Eastern Railway (SER) from Howrah (One major railway station in West Bengal, India) to Medinipur (A station in West Bengal, India). We have chosen the ten important stations where most number of passengers travels through the local train. The passengers spent a huge amount of time in the long queue for collecting the tickets. We have created a small speech corpus, where 20 people have uttered these stations ten times; a total of 2000 audio samples. We have done a preprocessing phase, followed by a Mel-Frequency Cepstral Coefficients (MFCC),  $\Delta$  MFCC and  $\Delta \Delta$  MFCC feature extraction method and finally a Long Short-Term Memory (LSTM) sequence classification has been used for correct identification of the station's name and obtained the highest training accuracy of 96.87% for the different hyperparameters discussed in Sect. 5.

**Keywords** Short time energy · ASR · Zero crossing · FFT · MFCC · Deep learning · LSTM · Mini-batch

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B. Paul (✉) · S. Bera · T. Dey  
Department of Computer Science, Vidyasagar University,  
Midnapore 721102, West Bengal, India  
e-mail: [ableb.paul@gmail.com](mailto:ableb.paul@gmail.com)

S. Bera  
e-mail: [somnathh.beraa@gmail.com](mailto:somnathh.beraa@gmail.com)

T. Dey  
e-mail: [deytanu87@gmail.com](mailto:deytanu87@gmail.com)

S. Phadikar  
Department of Computer Science and Engineering, Maulana Abul Kalam Azad  
University of Technology, Kolkata 700064, India  
e-mail: [sphadikar@yahoo.com](mailto:sphadikar@yahoo.com)

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11. Bachu, R.G., Kopparthi, S., Adapa, B., Barkana, B.D.: Separation of voiced and unvoiced using zero crossing rate and energy of the speech signal. In: American Society for Engineering Education (ASEE) Zone Conference Proceedings, pp. 1–7 (June 2008)
12. Scarr, R.: Zero crossings as a means of obtaining spectral information in speech analysis. *IEEE Trans. Audio Electroacoust.* **16**(2), 247–255 (1968)
13. Palia, N., Kant, S., Dev, A.: Performance evaluation of speaker recognition system. *J. Discrete Math. Sci. Cryptogr.* **22**(2), 203–218 (2019)
14. Sak, H., Senior, A., Beaufays, F.: Long short-term memory recurrent neural network architectures for large scale acoustic modeling. In: Fifteenth Annual Conference of the International Speech Communication Association (2014)



## Power-efficient and Latency-aware Offloading in Energy-harvested Cloud-enabled Small cell Network

Anwesha mukherjee<sup>\*(1)</sup>, Debashis De <sup>(2)</sup>, Soumya K. Ghosh <sup>(3)</sup>

(1) Department of Computer Science, Mahishadal Raj College, Mahishadal, Purba Medinipur, West Bengal, PIN - 721628, India

(2) Department of Computer Science and Engineering, Maulana Abul Kalam Azad University of Technology, West Bengal, BF-142, Sector-I, Salt Lake, Kolkata-700064

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4-Queens puzzle	60.6 ms	88 ms	3.421 mW	5.72 mW	31.1%	40.19%
Converting a bmp image to PGM file	507.8 ms	592 ms	28.325 mW	36.96 mW	14.23%	23.36%

mental results demonstrate that the proposed method reduces the offloading latency by 14-44% approximately and power consumption of the user device during offloading by 23-54% approximately than the existing scheme. In Fig.4 the communication latency while offloading data using proposed and existing approaches [7] with respect to the size of the data are presented. The data transmission rate is 1 Mbps approximately. In the proposed scheme the C-SB under which the mobile device is registered if has lower power, then adjacent C-SB expands coverage and the mobile device is handed over to it. The mobile device then offloads the data to that C-SB. In the existing approach [7] the remote cloud is used to offload the data if the C-SB under which the mobile device is registered has lower power to offload the data. In Fig.5 the power consumption of the user device while offloading data using proposed and existing approaches [7] with respect to the data size are presented. In Fig.4 and Fig.5 the latency and user device's power consumption while offloading 50-500 MB data using proposed and existing methods [7] are compared. For high amount of data offloading (> 200 MB), the C-SB's energy level falls. Hence, in the existing scheme [7], the remote cloud stores the data. In the proposed method, the adjacent C-SB expands coverage and the mobile device offloads the data to it. This is observed that up to 80% reduction in latency and power consumption in offloading is achieved using the proposed approach. From the theoretical and experimental analysis, it is observed that the proposed method reduces power consumption of the small cells, offloading latency and power consumption of the user device.

## 4 Conclusion

In this paper we have proposed an energy-harvested small cell network which reduces the power consumption of the small cell base stations and the user devices. In the proposed network, the small cell base stations provide communication and computation services. They can expand coverage and execute applications of the user devices. When a small cell has very low energy level to afford computation service to its users, its adjacent small cells expand coverage and provide service to its users. This is observed that the proposed network reduces approximately 14% power consumption. This is also observed that the proposed method reduces approximately 23-54% power consumption of the user device during application offloading.

## References

- [1] X. Ge, J. Yang, H. Gharavi, and Y. Sun, "Energy efficiency challenges of 5g small cell networks," *IEEE Communications Magazine*, vol. 55, no. 5, pp. 184–191, 2017.
- [2] A. Mukherjee, S. Bhattacharjee, S. Pal, and D. De, "Femtocell based green power consumption methods for mobile network," *Computer Networks*, vol. 57, no. 1, pp. 162–178, 2013.
- [3] A. Mukherjee, P. Deb, D. De, and M. S. Obaidat, "Wma-mifn: A weighted majority and auction game based green ultra-dense micro-femtocell network system," *IEEE Systems journal*, p. Accepted, 2019.
- [4] S. Barbarossa, S. Sardellitti, and P. Di Lorenzo, "Joint allocation of computation and communication resources in multiuser mobile cloud computing," in *2013 IEEE 14th workshop on signal processing advances in wireless communications (SPAWC)*. IEEE, 2013, pp. 26–30.
- [5] P. Deb, A. Mukherjee, and D. De, "A study of densification management using energy efficient femto-cloud based 5g mobile network," *Wireless Personal Communications*, vol. 101, no. 4, pp. 2173–2191, 2018.
- [6] S. Yu, R. Langar, X. Fu, L. Wang, and Z. Han, "Computation offloading with data caching enhancement for mobile edge computing," *IEEE Transactions on Vehicular Technology*, vol. 67, no. 11, pp. 11 098–11 112, 2018.
- [7] A. Mukherjee and D. De, "Femtolet: A novel fifth generation network device for green mobile cloud computing," *Simulation Modelling Practice and Theory*, vol. 62, pp. 68–87, 2016.
- [8] A. Mukherjee, P. Deb, D. De, and R. Buyya, "C2of2n: a low power cooperative code offloading method for femtolet-based fog network," *The Journal of Supercomputing*, vol. 74, no. 6, pp. 2412–2448, 2018.
- [9] S. Zhou, J. Gong, Z. Zhou, W. Chen, and Z. Niu, "Greendelivery: Proactive content caching and push with energy-harvesting-based small cells," *IEEE Communications Magazine*, vol. 53, no. 4, pp. 142–149, 2015.
- [10] Y. Mao, Y. Luo, J. Zhang, and K. B. Letaief, "Energy harvesting small cell networks: feasibility, deployment, and operation," *IEEE Communications Magazine*, vol. 53, no. 6, pp. 94–101, 2015.
- [11] S. Lohani, E. Hossain, and V. K. Bhargava, "Joint resource allocation and dynamic activation of energy harvesting small cells in ofdma hetnets," *IEEE Transactions on Wireless Communications*, vol. 17, no. 3, pp. 1768–1783, 2018.
- [12] A. Mukherjee, D. De, and D. G. Roy, "A power and latency aware cloudlet selection strategy for multi-cloudlet environment," *IEEE Transactions on Cloud Computing*, vol. 7, no. 1, pp. 141–154, 2019.
- [13] M. Satyanarayanan, Z. Chen, K. Ha, W. Hu, W. Richter, and P. Pillai, "Cloudlets: at the leading edge of mobile-cloud convergence," in *6th International Conference on Mobile Computing, Applications and Services*. IEEE, 2014, pp. 1–9.
- [14] H. Gupta, A. Vahid Dastjerdi, S. K. Ghosh, and R. Buyya, "ifogsim: A toolkit for modeling and simulation of resource management techniques in the internet of things, edge and fog computing environments," *Software: Practice and Experience*, vol. 47, no. 9, pp. 1275–1296, 2017.
- [15] A. Mukherjee, P. Deb, and D. De, "Small cell zooming based green congestion control in mobile network," *CSI transactions on ICT*, vol. 5, no. 1, pp. 35–43, 2017.



# Voice-Based Railway Station Identification Using LSTM Approach



Bachchu Paul, Somnath Bera, Tanushree Dey, and Santanu Phadikar

**Abstract** Enormous research is going on Automatic Speech Recognition (ASR) in the past decade. Human-Computer Interaction (HCI) will become more efficient and hands-free through voice-based commands. In our proposed work of speech recognition, we have taken a list of ten major railway stations in South Eastern Railway (SER) from Howrah (One major railway station in West Bengal, India) to Medinipur (A station in West Bengal, India). We have chosen the ten important stations where most number of passengers travels through the local train. The passengers spent a huge amount of time in the long queue for collecting the tickets. We have created a small speech corpus, where 20 people have uttered these stations ten times; a total of 2000 audio samples. We have done a preprocessing phase, followed by a Mel-Frequency Cepstral Coefficients (MFCC),  $\Delta$  MFCC and  $\Delta \Delta$  MFCC feature extraction method and finally a Long Short-Term Memory (LSTM) sequence classification has been used for correct identification of the station's name and obtained the highest training accuracy of 96.87% for the different hyperparameters discussed in Sect. 5.

**Keywords** Short time energy · ASR · Zero crossing · FFT · MFCC · Deep learning · LSTM · Mini-batch

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B. Paul (✉) · S. Bera · T. Dey  
Department of Computer Science, Vidyasagar University,  
Midnapore 721102, West Bengal, India  
e-mail: [ableb.paul@gmail.com](mailto:ableb.paul@gmail.com)

S. Bera  
e-mail: [somnathh.beraa@gmail.com](mailto:somnathh.beraa@gmail.com)

T. Dey  
e-mail: [deytanu87@gmail.com](mailto:deytanu87@gmail.com)

S. Phadikar  
Department of Computer Science and Engineering, Maulana Abul Kalam Azad  
University of Technology, Kolkata 700064, India  
e-mail: [sphadikar@yahoo.com](mailto:sphadikar@yahoo.com)

11. Bachu, R.G., Kopparthi, S., Adapa, B., Barkana, B.D.: Separation of voiced and unvoiced using zero crossing rate and energy of the speech signal. In: American Society for Engineering Education (ASEE) Zone Conference Proceedings, pp. 1–7 (June 2008)
12. Scarr, R.: Zero crossings as a means of obtaining spectral information in speech analysis. *IEEE Trans. Audio Electroacoust.* **16**(2), 247–255 (1968)
13. Palia, N., Kant, S., Dev, A.: Performance evaluation of speaker recognition system. *J. Discrete Math. Sci. Cryptogr.* **22**(2), 203–218 (2019)
14. Sak, H., Senior, A., Beaufays, F.: Long short-term memory recurrent neural network architectures for large scale acoustic modeling. In: Fifteenth Annual Conference of the International Speech Communication Association (2014)

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2. **Asis De** and Alessandro Vescovi (Eds.). '**Amitav Ghosh's Culture Chromosome: Anthropology, Epistemology, Ethics, Space**', [Cross/Cultures 216] Leiden/Boston: Brill, 2022. (ISBN: 9789004404311 (hardback) | ISBN: 9789004360341 (eBook))
3. Sonia Sahoo and **Deblina Hazra** (Eds.). "William Congreve's *The Way of the World*", Worldview Publications in 2021 (ISBN: 978-93-82267-74-4).
4. **Anwesha Mukherjee**, Debashis De, Soumya K. Ghosh, and Rajkumar Buyya (Eds.). "Mobile Edge Computing." Springer International Publishing, 2021, eBook ISBN: 978-3-030-69893-5, DOI: 10.1007/978-3-030-69893-5, Hardcover ISBN: 978-3-030-69892-8, <https://www.springer.com/gp/book/9783030698928#aboutBook>.

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2. **Asis De** and Alessandro Vescovi. 'A Few Words from Amitav Ghosh on *Gun Island: An Interview*' in *Amitav Ghosh's Culture Chromosome: Anthropology, Epistemology, Ethics, Space* by Asis De and A. Vescovi (eds.), Leiden & Boston: Brill (ISBN: 978-90-04-40431-1), DOI: [https://doi.org/10.1163/9789004360341\\_022](https://doi.org/10.1163/9789004360341_022), pp. 335-338, 2022.
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4. **Asis De**. 'Urbanity and Transformation of Island Life: Jail, Jungle and the Jarawa in Pankaj Sekhsaria's *The Last Wave: An Island Novel*' (co-authored by N. Maiti), in *Ecology, Literature and Culture: An Anthology of Recent Studies*, Ed. Animesh Roy, New Delhi: Atlantic Publishers (ISBN: 978-81-269-3285-6), 2022, pp. 1-17.
5. **Sangita Mitra**. 'Bhupendranather Itihaschetana' in *Itihascharcha: Sampratik Gabeshana*, Ed. by Samir Kumar Patra, Shekhar Bhowmik, Arindam Chakraborty, Ashadeep Publication (ISBN:978-93-92533-20-4), Kolkata, 2022, pp:385-395.
6. **Bivash Mistri**. Nyāyabaiśeṣikadarśanē jñāna o jñānatattvabīcāra, Page no. 81-88, Nyāyavaiśeṣikanibandhāvlī, ISBN NO. 978-81-952049-3-9, Lalbaba College, 2021.
7. **Shyamal Mondal**. 'Gender (In) equality of Female Detectives: Rethinking Samar Sheikh's *Bobby Jasoos* (2014) and Arindam Shil's *Mitin Masi* (2019)' in *21<sup>st</sup> Century Cinematic Adaptations in Indian Cinema: A Reflection of Socio cultural Aspects*. Published by Sarojini Naidu Vanita Mahavidyalaya ISBN – 978-81-922167-3-7, 2022.



8. **Anwasha Mukherjee**, Debashis De, Soumya K. Ghosh, and Rajkumar Buyya, "Introduction to mobile edge computing." In *Mobile Edge Computing*, Springer Cham, pp. 3-19, 2021, [https://doi.org/10.1007/978-3-030-69893-5\\_1](https://doi.org/10.1007/978-3-030-69893-5_1), Print ISBN: 978-3-030-69892-8, Online ISBN: 978-3-030-69893-5.
9. Anindita Ray Chaudhuri, **Anwasha Mukherjee**, and Debashis De. "SMEC: Sensor Mobile Edge Computing." In *Mobile Edge Computing*, Springer Cham, pp. 89-110, 2021, [https://doi.org/10.1007/978-3-030-69893-5\\_5](https://doi.org/10.1007/978-3-030-69893-5_5), Print ISBN: 978-3-030-69892-8, Online ISBN: 978-3-030-69893-5.
10. Priti Deb, **Anwasha Mukherjee**, and Debashis De. "Mobile health monitoring for senior citizens using femtolet-based fog network." In *Contemporary Medical Biotechnology Research for Human Health*, pp. 197-204, 2022, <https://doi.org/10.1016/B978-0-323-91251-8.00021-0>, ISBN: 978-0-323-91251-8.
11. Sukhendu Maity, Madhuchhanda Adhikari, **Rajkumar Guchhait**, Ankit Chatterjee, Ajishnu Roy, and Kousik Pramanick. "Strategies for Improving the Efficiency of Nanomaterials." In *Nanomedicine for Cancer Diagnosis and Therapy*, pp. 47-65. Singapore: Springer Singapore, 2021, [https://doi.org/10.1007/978-981-15-7564-8\\_2](https://doi.org/10.1007/978-981-15-7564-8_2), Print ISBN: 978-981-15-7563-1, Online ISBN: 978-981-15-7564-8.

## Papers published in Conference Proceedings: 06

1. **Anwasha Mukherjee**. "A Partial Computation Offloading Strategy for Microcell-femtolet based Future Generation Edge-Cloud Network." In *URSIGA, IEEE*, pp. 1-4, 2021, <https://doi.org/10.23919/URSIGASS51995.2021.9560190>, Electronic ISBN: 978-9-4639-6-8027, Print on Demand(PoD) ISBN: 978-1-6654-2995-5, Electronic ISSN: 2642-4339, Print on Demand(PoD) ISSN: 2640-7027 (Young Scientist Paper).
2. Shreya Ghosh and **Anwasha Mukherjee**. "Cloud-Fog-Edge Computing Framework for Combating COVID-19 Pandemic." In *International conference on advanced computing applications*, pp. 247-255, 2021, [https://doi.org/10.1007/978-981-16-5207-3\\_22](https://doi.org/10.1007/978-981-16-5207-3_22), Print ISBN: 978-981-16-5206-6, Online ISBN: 978-981-16-5207-3.
3. Chayan Biswas, Sukhendu Maity, Madhuchhanda Adhikari, Ankit Chatterjee, **Rajkumar Guchhait**, and Kousik Pramanick. "Pharmaceuticals in the Aquatic Environment and Their Endocrine Disruptive Effects in Fish." In *Proceedings of the Zoological Society*, pp. 1-16. Springer India, 2021, Electronic ISSN: 0974-6919, Print ISSN: 0373-5893.
4. Bachchu Paul, **Tanushree Dey**, Debashri Das Adhikary, Sanchita Guchhai, and Somnath Bera. "A novel approach of audio-visual color recognition using KNN." In *Computational Intelligence in Pattern Recognition: Proceedings of CIPR 2021*, pp. 231-244. Springer Singapore, 2022, [https://doi.org/10.1007/978-981-16-2543-5\\_20](https://doi.org/10.1007/978-981-16-2543-5_20), Print ISBN: 978-981-16-2542-8, Online ISBN: 978-981-16-2543-5.
5. Bachchu Paul, Sanchita Guchhait, **Tanushree Dey**, Debashri Das Adhikary, and Somnath Bera. "A comparative study on sentiment analysis influencing word embedding using SVM and KNN." In *Cyber Intelligence and Information Retrieval: Proceedings of CIIR 2021*, pp. 199-211. Springer Singapore, 2022, [https://doi.org/10.1007/978-981-16-4284-5\\_18](https://doi.org/10.1007/978-981-16-4284-5_18), Print ISBN: 978-981-16-4283-8, Online ISBN: 978-981-16-4284-5.
6. Bachchu Paul, Debashri Das Adhikary, **Tanushree Dey**, Sanchita Guchhait, and Somnath Bera. "Bangla Spoken Numerals Recognition by Using HMM." In *Computational Intelligence in Pattern Recognition: Proceedings of CIPR 2021*, pp. 85-97. Springer Singapore, 2022, [https://doi.org/10.1007/978-981-16-2543-5\\_8](https://doi.org/10.1007/978-981-16-2543-5_8), Print ISBN: 978-981-16-2542-8, Online ISBN: 978-981-16-2543-5.

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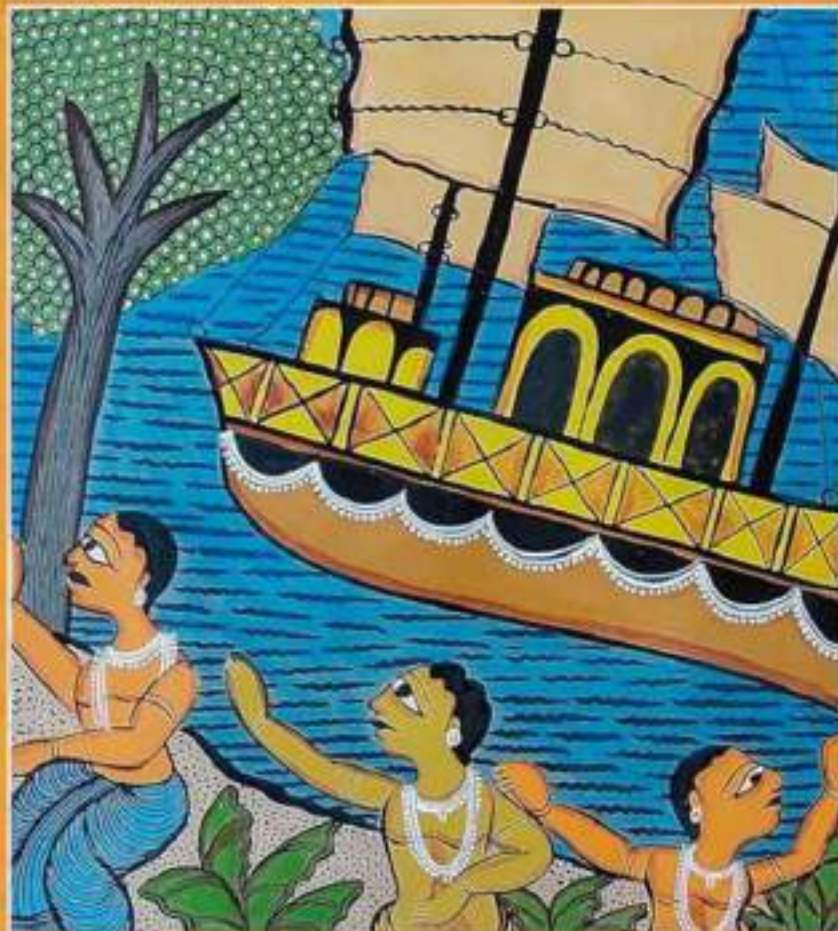
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# Amitav Ghosh's Culture Chromosome

Anthropology, Epistemology, Ethics, Space



Edited by  
Asis De and Alessandro Vescovi

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# Amitav Ghosh's Culture Chromosome

*Anthropology, Epistemology, Ethics, Space*

*Edited by*

Asis De and Alessandro Vescovi



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## Introduction: The Culture Chromosome

*Asis De and Alessandro Vescovi*

This volume, needless to say, owes its title to Amitav Ghosh's fourth novel, *The Calcutta Chromosome* (1995), which is his only book foregrounding the name of a real city, the city of his birth. It may be worthwhile to consider whether the Calcutta mentioned in the title is an actual or a fictional place. While readers are often in search of a sense of place, Ghosh has subtracted reality to his settings, deterritorializing his narrative, as it were. The novelist himself, in a reflection upon his readings, wrote that "it is the very loss of a lived sense of place that makes [fictional] representation possible."<sup>1</sup> Certainly, Amitav Ghosh has a partiality, a chromosomal connection, towards the city of his birth. Both Calcutta and individuals with a connection to this city and its culture loom large in most of his works. Yet he is in no way a regional writer. A social anthropologist by academic training, with a deep interest in history, in his literary works Amitav Ghosh has covered a broad spectrum of interdisciplinary topics like Pasteurian science, phrenology, malaria research, cetology, refugee influx, colonial history of South Asia, village life in medieval Egypt, movements for independence in Burma, the Indian Partition, the opium trade in nineteenth-century Canton, and the global ecological crisis. Amitav Ghosh does not focus on any particular place, but on the history and culture of people from different places in the world. His works contain an amalgam of cultural, historical, moral, and cosmopolitan consciousness. Thus to Ghosh, the idea of the "chromosome" is not related to genetics, but rather to history and culture, as it is "not transmitted from generation to generation by sexual reproduction" but "develops out of a process of recombination," and essentially remains "particular to every individual."<sup>2</sup> This "process of recombination" accelerates the "chromosomal" mutation of individuals and results in the transformation of cultural identities. Just as every individual is the product of generations of diverse chromosomal combinations, so each culture is in fact an inter-culture or a trans-culture, the product of generations of diverse cultural heritages.

Ghosh's personal conduct reflects his poetics. Twenty years ago he made a sensation by withdrawing the nomination of his novel *The Glass Palace* (2000) from the 2001 Commonwealth Writers' Prize, even after the novel had won

1 Amitav Ghosh, *Incendiary Circumstances* (Boston: Houghton Mifflin Company, 2005): 119.

2 Amitav Ghosh, *The Calcutta Chromosome: A Story of Fever, Delirium, and Discovery* (London: Picador, 1996): 250.



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Anwasha Mukherjee  
Debashis De · Soumya K. Ghosh  
Rajkumar Buyya *Editors*

# Mobile Edge Computing

 Springer



*Editors*

Anwasha Mukherjee  
Department of Computer Science  
Mahishadal Raj College  
Mahishadal, West Bengal, India

Soumya K. Ghosh  
Department of Computer Science  
and Engineering  
Indian Institute of Technology  
(IIT) Kharagpur  
Kharagpur, West Bengal, India

Debashis De  
Centre of Mobile Cloud Computing  
Department of Computer Science  
and Engineering  
Maulana Abul Kalam Azad  
University of Technology  
Kolkata, West Bengal, India

Rajkumar Buyya  
Cloud Computing and Distributed Systems  
(CLOUDS) Laboratory, School of  
Computing and Information Systems  
The University of Melbourne  
Melbourne, VIC, Australia

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established and next-generation blockchain architectures have been discussed, and from that the authors have evaluated the most suitable solutions for managing MEC services and discussed the benefits and drawbacks of the available alternatives. In chapter “[Evaluation of Collaborative Intrusion Detection System Architectures in Mobile Edge Computing](#)”, the authors have outlined some of the characteristics relevant for evaluating collaborative intrusion detection systems (CIDS) deployment models and surveyed existing CIDS architectures in the context of MEC.

**Part III** contains seven chapters illustrating various applications of MEC. In chapter “[Edge Computing based Conceptual Framework for Smart Health Care Applications Using Z-Wave and Homebased Wireless Sensor Network](#)”, the authors have studied the concepts of wireless biomedical image monitoring systems along with their features. The use of MEC in the field of agriculture has been discussed in chapter “[Mobile Edge Computing Based Internet of Agricultural Things: A Systematic Review and Future Directions](#)”. In chapter “[Deep learning in Computer Vision Through Mobile Edge Computing for IoT](#)”, the authors have described how deep convolutional neural network (CNN) through MEC can be a potential technique for IoT-based solutions. In chapter “[Mobile Edge Computing for Content Distribution and Mobility Support in Smart Cities](#)”, the authors have discussed the aspects of distributed multi-tiered mobile edge computing (MEC) architectures, which offer data storage and processing capabilities closer to data sources and data consumers, taking into account how mobility impacts the management of such infrastructure. Chapter “[Complex Event Processing in Sensor-Based Environments: Edge Computing Frameworks and Techniques](#)” has focused on an edge computing framework that partitions the processing of sensor data at a mobile node placed at the edge and backend computations at a powerful server. The primary application of the framework is in the area of processing of complex events, each of which may correspond to the simultaneous occurrence of multiple raw events generated by sensors that are monitoring the phenomena of interest. Application of such complex event processing techniques spans smart buildings, smart machinery as well as smart healthcare systems. Chapter “[Complex Event Processing in Sensor-Based Environments: Edge Computing Frameworks and Techniques](#)” has focused on using the framework and techniques to a smartphone-based remote patient monitoring system and by using prototyping and measurement presents a rigorous performance analysis of the system. The application design and service provisioning for multi-access edge cloud has been discussed in chapter “[Application Design and Service Provisioning for Multi-Access Edge Cloud \(MEC\)](#)”. Finally, in chapter “[Simulating Fog Computing Applications Using iFogSim Toolkit](#)” the simulation of fog computing applications has been demonstrated.

Mahishadal, West Bengal, India

Kolkata, West Bengal, India

Kharagpur, West Bengal, India

Melbourne, VIC, Australia

Anwasha Mukherjee

Debashis De

Soumya K. Ghosh

Rajkumar Buyya



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# Amitav Ghosh's Culture Chromosome

*Anthropology, Epistemology, Ethics, Space*

*Edited by*

Asis De and Alessandro Vescovi



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## Introduction: The Culture Chromosome

*Asis De and Alessandro Vescovi*

This volume, needless to say, owes its title to Amitav Ghosh's fourth novel, *The Calcutta Chromosome* (1995), which is his only book foregrounding the name of a real city, the city of his birth. It may be worthwhile to consider whether the Calcutta mentioned in the title is an actual or a fictional place. While readers are often in search of a sense of place, Ghosh has subtracted reality to his settings, deterritorializing his narrative, as it were. The novelist himself, in a reflection upon his readings, wrote that "it is the very loss of a lived sense of place that makes [fictional] representation possible."<sup>1</sup> Certainly, Amitav Ghosh has a partiality, a chromosomal connection, towards the city of his birth. Both Calcutta and individuals with a connection to this city and its culture loom large in most of his works. Yet he is in no way a regional writer. A social anthropologist by academic training, with a deep interest in history, in his literary works Amitav Ghosh has covered a broad spectrum of interdisciplinary topics like Pasteurian science, phrenology, malaria research, cetology, refugee influx, colonial history of South Asia, village life in medieval Egypt, movements for independence in Burma, the Indian Partition, the opium trade in nineteenth-century Canton, and the global ecological crisis. Amitav Ghosh does not focus on any particular place, but on the history and culture of people from different places in the world. His works contain an amalgam of cultural, historical, moral, and cosmopolitan consciousness. Thus to Ghosh, the idea of the "chromosome" is not related to genetics, but rather to history and culture, as it is "not transmitted from generation to generation by sexual reproduction" but "develops out of a process of recombination," and essentially remains "particular to every individual."<sup>2</sup> This "process of recombination" accelerates the "chromosomal" mutation of individuals and results in the transformation of cultural identities. Just as every individual is the product of generations of diverse chromosomal combinations, so each culture is in fact an inter-culture or a trans-culture, the product of generations of diverse cultural heritages.

Ghosh's personal conduct reflects his poetics. Twenty years ago he made a sensation by withdrawing the nomination of his novel *The Glass Palace* (2000) from the 2001 Commonwealth Writers' Prize, even after the novel had won

1 Amitav Ghosh, *Incendiary Circumstances* (Boston: Houghton Mifflin Company, 2005): 119.

2 Amitav Ghosh, *The Calcutta Chromosome: A Story of Fever, Delirium, and Discovery* (London: Picador, 1996): 250.

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## “A Few words from Amitav Ghosh on *Gun Island*”

What follows is a brief e-mail interview with Amitav Ghosh by the editors of this volume after the publication of his latest work of fiction *Gun Island* (2019), which was published when the manuscript of this volume was being finalized. Upon our request, the author has generously found some time to pen answers to a few queries.

ASIS DE

The time of your ceremonial reception of the Bharatiya Jnanpith Award (June 12, 2019)<sup>1</sup> in New Delhi coincides with the publication of your latest novel *Gun Island*. You are the first-ever anglophone Indian writer to be awarded this highly prestigious literary award of India. Though an exceptional achievement for an Indian author writing in English, don't you think that the ideas you deal with in your recent novels—for example, climate change, the transnational mobility of refugees and human trafficking—are equally relevant to your accomplishments as a global literary commentator of the twenty-first century?

AMITAV GHOSH

I had really never imagined that the Jnanpith was even a possibility for a writer like myself, especially in these times of ultra-nationalism and ever-greater suspicion of cosmopolitanism. But needless to add I was delighted to receive it because the Jnanpith prize has a very special place within the Indian literary world. And I think the jury were themselves making a statement by giving it to a writer who writes in English. As for the second part of your question, it certainly seems to be the case that *The Great Derangement* appeared at a particularly apposite time. The year 2018 was a turning point in the public awareness of climate change; after that people became very hungry to read about these issues, and there are actually not many books that approach the subject from the point of view of literature and the arts.

1 The prestigious Jnanpith Prize is awarded annually by the Bharatiya Jnanpith, a cultural association based in Delhi. Prizes have been awarded to Indian writers in almost all major Indian languages, who make an outstanding contribution to literature. Amitav Ghosh is the first author writing in English to win the prize. The present editors have guest edited the Jnanipith Souvenir on the occasion of the Award Ceremony, on 12 June 2019.

we cannot turn away from it. The curious thing is that the multilingualism that is now becoming a global norm, has existed in India since antiquity. In that sense, Indian writers have had to deal with multilingualism for a long time.

ALESSANDRO VESCOVI

In *The Great Derangement* you cite Franco Moretti to criticise the dependence of serious fiction not so much on the real, but on the probable. I am under the impression that with *Gun Island* you are deliberately trying to free the "serious novel" from the constraints of probability. Was it difficult to write against such an inveterate tradition? Your readers are accustomed to find actual historical or anthropological facts in your novels; don't you have any fear that they may be disoriented?

AMITAV GHOSH

On this matter again, I think we have to find new ways of telling stories. For myself, the question is not so much of "seriousness" or "realism"—I feel that in order to represent the contemporary world we have to be willing to include its strange and uncanny aspects.



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## Transcultural Identity and Cosmopolitanism in *The Glass Palace*

*Asis De*

### Abstract

Amitav Ghosh's *The Glass Palace* (2000) investigates the issue of transcultural identity both in the colonial and post-colonial periods. This article argues that despite Ghosh's penchant for a pan-Asian participation in the tumultuous historical period spanning from colonization to globalization in one corner of Asia, the novel displays an inclusive spirit of cosmopolitanism. The novel is not an "Orientalist" attempt to assert ethnic identity in the face of aggressive colonial history, but a chronicling of cultural hybridity during and after the colonial period in a part of South Asia, a dismantling of borders between communities and their cultures resulting in the formation of transcultural identity and cosmopolitanism. Ghosh conceives identity as rooted in culture and history and as a reaction to colonialism. The novel celebrates transnational identities rather than ethnic ones, as most of his characters travel extensively across geopolitical borders appreciating a multicultural *mélange*. Ghosh has not shown any profound scepticism about the importance of specific ethno-cultural attachment in this novel and he adopts the notion of an ever transforming cultural and moral cosmopolitanism.

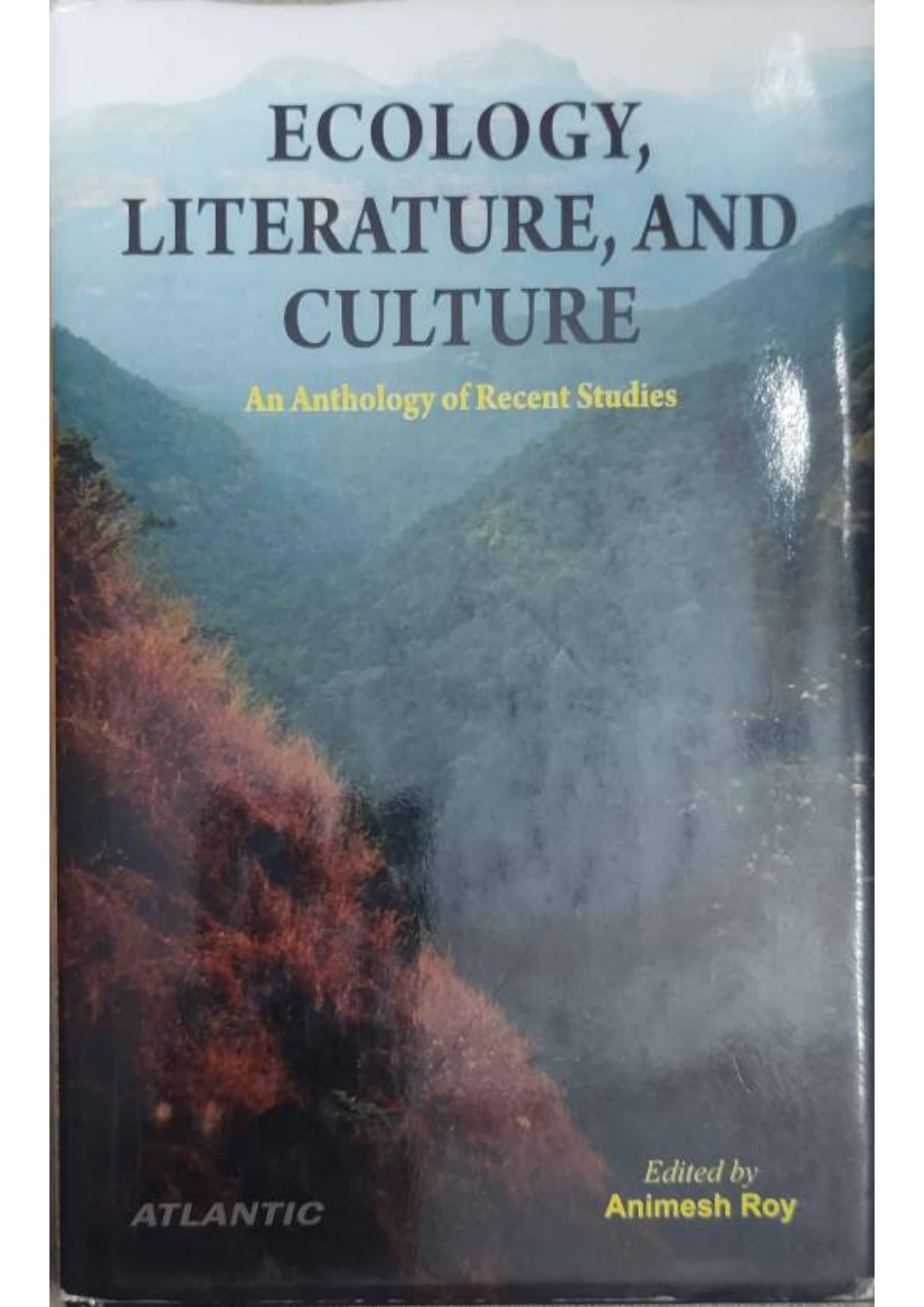
We have entered an anxious age of identity, in which the attempt to memorialize lost time, and to reclaim lost territories, creates a culture of disparate "interest groups" or social movements. Here affiliation may be antagonistic and ambivalent; solidarity may be only situational and strategic: commonality is often negotiated through the "contingency" of social interests and political claims.<sup>1</sup>

Like cosmopolitans, transnationals are also cultural hybrids, but their hybridity is unconscious, organic and collectively negotiated

1 Homi K. Bhabha, "Culture's in-Between," in *Questions of Cultural Identity*, ed. Stuart Hall and Paul Du Gay (1996; London: Sage Publications, 2003): 59.

- Raychaudhuri, Tapan. *Europe Reconsidered: Perceptions of the West in Nineteenth Century Bengal* (Delhi: Oxford University Press, 1988): viii, quoted in Vasant Kaiwar, *The Postcolonial Orient: The Politics of Difference and the Project of Provincializing Europe* (Leiden and Boston: Brill, 2014).
- Lévi-Strauss, Claude. *The Savage Mind* (Chicago: The University of Chicago Press, 1966).
- Lévi-Strauss, Claude. *Tristes Tropiques*, tr. John Russell (1955; London: Hutchinson and Co. Ltd., 1961).
- Mondal, Anshuman A. *Amitav Ghosh* (Manchester and New York: Manchester University Press, 2007).
- Pollock, Sheldon, et al. "Cosmopolitanisms," *Public Culture* 12, 3 (2000): 577–589.
- Prusse, Michael C. "Imaginary Pasts: Colonisation, Migration and Loss in J.G. Farrell's *The Singapore Grip* and Amitav Ghosh's *The Glass Palace*," *Transnational Literature* 2, 1 (2009): 1–14.
- Rilke, Rainer Maria. "The Seventh Elegy," in *Duino Elegies and the Sonnets to Orpheus*, tr. A. Poulin Jr. (1975; Boston: Houghton Mifflin Company, 1977): 47–54.
- Rollason, Christopher. "Empire, Sense of Place and Cultures in Contact—George Orwell's *Burmese Days* and Amitav Ghosh's *The Glass Palace*" (2009): 7, <http://yatrarollason.info/files/GhoshandOrwellJan09.pdf> (accessed 2 May 2018).
- Sankaran, Chitra. "Diasporic Predicaments: An Interview with Amitav Ghosh," in *History, Narrative, and Testimony in Amitav Ghosh's Fiction*, ed. Chitra Sankaran (Albany: SUNY, 2012): 1–15.
- Sauer, Carl O. "The Morphology of Landscape," in *Foundation Papers in Landscape Ecology*, ed. John A. Wiens et al. (New York: Columbia University Press, 2007): 36–70.
- Sen, Amartya. *Identity and Violence: The Illusion of Destiny* (2006; London: Penguin, 2007).
- Vertovec, Steven and Robin Cohen. *Conceiving Cosmopolitanism: Theory, Context, and Practice* (Oxford and New York: Oxford University Press, 2002).
- Werbner, Pnina. "The Dialectics of Cultural Hybridity," in *Debating Cultural Hybridity: Multicultural Identities and the Politics of Anti-Racism*, ed. Pnina Werbner and Tariq Modood (1997; London: Zed Books, 2015): 1–25.



The background of the book cover is a scenic landscape photograph. It shows a deep valley with a river winding through it. The mountains in the distance are hazy and blue. In the foreground, there are hillsides with trees in shades of red, orange, and brown, suggesting an autumn setting. The overall tone is natural and serene.

# ECOLOGY, LITERATURE, AND CULTURE

*An Anthology of Recent Studies*

**ATLANTIC**

*Edited by*  
**Animesh Roy**

**Ecology, Literature, and Culture**  
**An Anthology of Recent Studies**

*Edited by*  
**Animesh Roy**

*Foreword by*  
**Murali Sivaramakrishnan**  
Retired Professor of English  
Pondicherry University

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# 1

## Urbanity and Transformation of Island Life: Jail, Jungle, and the Jarawa in Pankaj Sekhsaria's *The Last Wave: An Island Novel*

*Asis De and Nirmalendu Maiti*

In this twenty-first century, when the world is being increasingly borderless and global, the underlying conflict between economy and ecology is becoming explicit as the man-made power structures are damaging the eco-system nearly everywhere on the planet. The fast-deteriorating relation between urbanisation and environmental sustainability is visible in everyday life, and it is now an urgent demand of time for an ecologically responsible urban development, which would simultaneously respect the issues of cultural and environmental sustainability. Centuries before, even millennium before, environmental disasters had taken place on earth for other reasons like cyclones, volcanic eruptions, wildfires, and alterations of geo-tectonic plates due to earthquakes, and therefore, thousands of animal species and millions of human beings have been wiped out. However, the fundamental difference between those environmental disasters ages ago, and the threat of environmental disasters in the twenty-first century lies in the primary issue of climate change due to human-made modernisation and rampant urbanisation inspired by economic globalisation. Darko Radovic's observation in his book *Eco-Urbanity: Towards Well-Mannered Built Environments* seems pertinent in this context: "The only way towards truly sustainable development is integrative, which does not separate

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# ইতিহাস চর্চা

## সাম্প্রতিক গবেষণা

সম্পাদনা

সমীরকুমার পাত্র

শেখর ভৌমিক

অরিন্দম চক্রবর্তী





নীহাররঞ্জন রায় একদা লিখেছিলেন সমাজবদ্ধ মানুষের  
যাবতীয় চিন্তা ও কর্ম, জ্ঞান ও বিজ্ঞান, কলা ও কৌশল,  
অর্থচর্চা, কামচর্চা, ধর্মচর্চা—সবকিছুরই পৃথক-পৃথক  
ইতিহাস আছে। নূতন ইতিহাস রচিতও হতে পারে।  
হওয়াই হয়তো স্বাভাবিক। ইদানীং হচ্ছেও, যেমন  
শিল্পের ইতিহাস, ধর্মের ইতিহাস, বিজ্ঞানের ইতিহাস,  
চিকিৎসাবিদ্যার ইতিহাস, অর্থনৈতিক ইতিহাস। এসব  
ইতিহাসের নিজস্ব একটা ইতিহাস নিশ্চয়ই আছে।  
ইতিহাসের সাম্প্রতিককালের সেই বহুমাত্রিক রূপটি  
তুলে ধরার এক সামান্য প্রয়াস এই বই।



# ইতিহাসচর্চা

## সাম্প্রতিক পবেষণা

ইতিহাসচর্চা : সাম্প্রতিক পবেষণা

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কলকাতা ৭০০ ০০৯ থেকে প্রকাশিত, অক্ষর বিন্যাসে রোজ ডট কম,  
৪৪/১এ বেনিয়াটোলা লেন, কলকাতা ৭০০ ০০৯ এবং অয়তী প্রেস  
১১/১নি বৈষ্ণবনা রোড কলকাতা ৭০০ ০০৯ থেকে মুদ্রিত।

৬০০ টাকা

সঙ্গীতা মিত্র

## ভূপেন্দ্রনাথের ইতিহাসচেতনা

উনিশ শতক ছিল বাঙালির সাংস্কৃতিক এবং সামাজিক পটপরিবর্তনের যুগ। তৎকালীন জাতীয়তাবাদী আন্দোলন বাংলার চেতনাজগতে এনেছিল এক মৌলিক পরিবর্তন। পাশ্চাত্য শিক্ষার আলোকে আলোকিত বাঙালি সমাজ সম্পর্কে নতুনভাবে ভাবতে শিখেছিল। পাশ্চাত্য ও প্রাচ্য উভয় ভাবধারার সমন্বয়ে সৃষ্টি নতুন চিন্তার সংস্পর্শে সমাজ ও ধর্মসম্পর্কিত ভাবনাক্ষেত্রে এক বিপ্লবাত্মক পরিবর্তনের সূচনা হয়েছিল। বাঙালি জীবনের এরকম সাংস্কৃতিক ও সামাজিক পট পরিবর্তনের যুগে ঐক্যবন্ধ মত ও পথে পরিচালনার অভাবে ভারতবর্ষের স্বাধীনতা আন্দোলন যখন বিবিধ ধারায় বহুধাবিভক্ত হয়ে পড়েছিল সেই বিক্ষিপ্ত পরিস্থিতিতে পরাধীন ভারতবর্ষে ভূপেন্দ্রনাথ দস্তের জন্ম (১৮৮০-১৯৬১)। সেই পরাধীনতার যুগে ভারতবর্ষ থেকে ব্রিটিশ শাসনের অবসান এবং সম্ভব হলে আত্মবলিদানই ছিল তৎকালীন জাতীয়তাবাদী বিপ্লবীদের প্রধান লক্ষ্য। ব্রিটিশ বিরোধী আন্দোলনে সামিল হওয়ার অনুপ্রেরণা ভূপেন্দ্রনাথ লাভ করেছিলেন মূলত তাঁর পারিবারিক উদারনৈতিক ঘরানা, শিক্ষা ও সাংস্কৃতি বিষয়ক প্রগতিশীল চিন্তা, অগ্রজ বিবেকানন্দের মানবতাবাদী আদর্শ ও সমাজবিষয়ক প্রগতিশীল দৃষ্টিভঙ্গি, সমকালীন জাতীয়তাবাদী ভাবধারা এবং ম্যাথসিনী ও গ্যারিবল্ডির আদর্শ থেকে। তাই তরুণ বয়সেই সমাজ পরিবর্তনের প্রবল আকাঙ্ক্ষা নিবৃত্তির তাড়নায় ব্রিটিশবিরোধী সশস্ত্র বিপ্লবে যোগদান করেছিলেন এবং বিপ্লববাদের আদর্শে নিজেকে নিয়োজিত করেছিলেন। শুধু স্বদেশেই নয়, দেশের বাইরেও বিপ্লবী কার্যকলাপে তিনি সক্রিয়রূপে অংশগ্রহণ করেছিলেন। সমাজ পরিবর্তনের আকুল আকাঙ্ক্ষা ভূপেন্দ্রনাথকে আজীবন বিপ্লবী করে তুলেছিল ঠিকই তবে তিনি শুধুমাত্র একজন কর্মীই ছিলেন না। ১৯১৮-র পরে জাতীয়তাবাদী পর্বের অভিজ্ঞতাকে জারিত করে যখন ভূপেন্দ্রনাথ মার্ক্সবাদী বিশ্ববীক্ষায় অংশগ্রহণ করেন তখন তিনি একইসঙ্গে একজন কর্মী ও চিন্তাবিদ।

চিন্তাক্ষেত্রে ভূপেন্দ্রনাথ এক অনন্য ইতিহাসবোধের দ্বারা পরিচালিত হয়েছেন। তাঁর ইতিহাসচেতনা কখনোই ইতিহাসচর্চার চিরাচরিত ধারাকে অনুসরণ করেনি। তিনি ইতিহাসচর্চায় ব্রিটিশ সাম্রাজ্যবাদী দৃষ্টিভঙ্গি এবং হিন্দু জাতীয়তাবাদী দৃষ্টিভঙ্গি থেকে সরে এসে মার্ক্সীয় সমাজতাত্ত্বিক দৃষ্টিভঙ্গির প্রয়োগ ঘটিয়েছেন। অতীতে



- ৪। দত্ত, ভূপেন্দ্রনাথ, সার্বভৌম প্রযুক্তি, পূর্ববঙ্গ পাবলিশার্স, কলকাতা, প্রথম সংস্করণ : মার্চ ১৯৪৫, পৃ: ২।
- ৫। তদেব, পৃ: ৯।
- ৬। দত্ত, ভূপেন্দ্রনাথ, ভারতীয় সমাজপদ্ধতি, প্রথম খণ্ড, পৃ: ৩০-৩১।
- ৭। দত্ত, ভূপেন্দ্রনাথ, ভারতীয় সমাজপদ্ধতি, দ্বিতীয় খণ্ড, বর্ধমান পাবলিশিং হাউস, কলকাতা, জুন ১৯৫৩, পৃ: ৪০৭।
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- ৯। তদেব, পৃ: ৪।
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- ১৭। দত্ত, ভূপেন্দ্রনাথ, বাংলার ইতিহাস (সামাজিক বিবর্তন), নবভারত পাবলিশার্স, ৭২ মহেন্দ্র গান্ধি রোড, কলকাতা-৯, প্রথম সংস্করণ : আঘাট ১৩৭০, দ্বিতীয় সংস্করণ : ফাল্গুন ১৩৮৩, পৃ: ২৬।
- ১৮। দত্ত, ভূপেন্দ্রনাথ, ভারতীয় সমাজপদ্ধতি, দ্বিতীয় খণ্ড, পৃ: ২৮১-২৮২।
- ১৯। তদেব, পৃ: ১৩৯।
- ২০। তদেব, পৃ: ২৮২।
- ২১। তদেব, পৃ: ৫৮-৫৯।
- ২২। Dana, Bhupendranath, *Dialectics of Hindu Ritualism*, Gupta Press, Kolkata, 1950. P. (i) (Preface).
- ২৩। দত্ত, ভূপেন্দ্রনাথ, জাতিসংগঠন, পৃ: ৮৩।
- ২৪। দত্ত, ভূপেন্দ্রনাথ, স্বামী বিবেকানন্দ, নবভারত পাবলিশার্স, কলকাতা-৯, তৃতীয় সংস্করণ : অশ্বিন ১৪০০, পৃ: ১৮৬।
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# न्यायबैशेषिकदर्शननिबन्धावली

सम्पादक

ईशानी चक्रवर्ती

सहकारी अध्यापिका, संस्कृत विभाग, लालबाबा कलेज

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डः भूतनाथ जाना

सहकारी अध्यापक ७ विभागीय प्रधान,

संस्कृत विभाग, लालबाबा कलेज



**SANSKRIT PUSTAK BHANDAR**

38, Bidhan Sarani, Kolkata-700 006



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10. বৌদ্ধগতে গনের অনিত্যতা নিয়ে সমস্যা; ন্যায়-বৈশিষ্টিক সিদ্ধান্ত ডঃ দিবাকর মান্না	৮৯



## ন্যায়বৈশেষিকদর্শনে জ্ঞান ও জ্ঞানতত্ত্ববিচার বিভাগস মিত্রী,

সহকারী অধ্যাপক, সংস্কৃত বিভাগ, মহিষাদল রাজ কলেজ

জ্ঞান ও জ্ঞানের বৈশিষ্ট্য:

ন্যায়বৈশেষিক মতে জ্ঞান আত্মার একটি বিশেষ গুণ। কোনটি গ্রহণীয় বস্তু, কোনটি ত্যাজ্য বস্তু, কোনটি উপেক্ষনীয় বস্তু - ইত্যাদি শব্দের প্রয়োগের কারণ হ'ল জ্ঞান। ন্যায়মতে জ্ঞানের মাধ্যমে পদার্থের বিষয় আমাদের কাছে প্রকাশিত হয়। জ্ঞানের উদ্দেশ্য হ'ল বিষয়েররূপ আমাদের কাছে প্রকাশ করা। এদীপের আলো যেমন তার সম্মুখে অবস্থিত সমস্ত বস্তুকে (ঘটপটাদি) প্রকাশিত করে, তেমনি জ্ঞানও তার সম্মুখেঅবস্থিত সমস্তবিষয়কে আমাদের কাছে প্রকাশ করে। এই জ্ঞান হ'ল আত্মার গুণ। ন্যায়দর্শনে জ্ঞান ও বুদ্ধি সমার্থক শব্দ। জ্ঞানের লক্ষণ প্রকাশার্থে মহর্ষি গৌতম বলেছেন- বুদ্ধিরূপল ক্বির্জ্ঞানমিত্যনর্থান্তরম।<sup>১</sup> অর্থাৎ বুদ্ধি, উপলব্ধি, জ্ঞান অর্থান্তর বা ভিন্ন পদার্থ নয়, তারা একই পদার্থকে বোঝায়। আবার অন্নংভট্ট 'তর্কসংগ্রহ' গ্রন্থে জ্ঞান বা বুদ্ধির লক্ষণ দিতে গিয়ে বলেছেন- সর্বব্যবহারহেতুর্গণেবুদ্ধির্জ্ঞানম।<sup>২</sup> অর্থাৎ যে পদার্থটি সকল ব্যবহারের প্রতি হেতু বা কারণ, সেই গুণস্বরূপ পদার্থই জ্ঞান। এই জ্ঞান বুদ্ধির নামান্তর, যা বুদ্ধি তাই জ্ঞান।

গ্রন্থকার অন্নংভট্ট দীপিকা টীকায় লক্ষণস্থ পদগুলির প্রয়োজন ব্যাখ্যা করেছেন। তিনি বলেছেন- লক্ষণে যদি 'গুণ' শব্দটি না থাকত তাহলে কালাদিতে এই লক্ষণের অতিব্যাপ্তি হত- কালাদৌ অতিব্যাপ্তিবারণায় গুণ ইতি<sup>৩</sup> কাল, দিক, দিক, দিক প্রভৃতি ন্যায়মতে সর্বকার্যেরই হেতু বা কারণ। 'সর্বব্যবহারহেতুঃ' এটুকুই যদি লক্ষণ বলা হয় তাহলে কালাদিতে লক্ষণ সময় হয় যেত। গুণ শব্দের দ্বারা এই অতিব্যাপ্তি বারণ করা হয়েছে। তিনি



আরো বলেছেন রূপাদি গুণের অতিব্যাপ্তি ব্যরণের জন্য 'সর্বব্যবহারহেতুঃ' শব্দটি লক্ষণে সন্নিবিষ্ট হয়েছে- রূপাদৌ অতিব্যাপ্তিবারণায় সর্বব্যবহার ইতি<sup>১</sup> রূপ, রস, গন্ধ, স্পর্শ প্রভৃতিও জ্ঞানেরন্যায় গুণ পদার্থ। কিন্তু রূপাদি গুণ সর্ব ব্যবহারের হেতু নয়। তাই যে গুণ পদার্থ সর্বব্যবহারের হেতু, তাকেই জ্ঞান বলা যেতে পারে। সর্বব্যবহারে হেতুরূপ গুণ পদার্থকে জ্ঞান বলা হলে রূপাদিতে আর ঐ লক্ষণের অতিব্যাপ্তি হয় না।

এছকার দীপিকা টিকায় বুদ্ধির একটি বিকল্প লক্ষণ দিয়েছেন- জানামি ইতি অনুব্যবসায়গম্য জ্ঞানত্বকং লক্ষণমিত্যর্থঃ।<sup>২</sup> অর্থাৎ অনুব্যবসায়গম্য যে জ্ঞানই জ্ঞানি সেই জ্ঞানত্ব জ্ঞানমান পদার্থই হল জ্ঞান। অনুব্যবসায় একপ্রকার মানস প্রত্যক্ষ জ্ঞান। জ্ঞান যেমন বিষয়কে প্রকাশ করে, তেমনি আবার অপর একটি জ্ঞানের সাহায্যে সে নিজেও প্রকাশিত হয়। জ্ঞান যখন বিষয়কে প্রকাশ করে তখন তাকে বলা হয় ব্যবসায়। আর যখন নিজে অন্য জ্ঞানের দ্বারা প্রকাশিত হয় তখন তাকে বলা হয় অনুব্যবসায়। একটি ঘট দেখে কারো জ্ঞান হল 'অয়ং ঘটঃ' এই জ্ঞানটি ঘটকে প্রকাশ করলেও নিজেকে প্রকাশ করেনি। 'ইদং ঘটজ্ঞানম্' এই দ্বিতীয় জ্ঞানটি প্রথম ঘটজ্ঞানকে প্রকাশ করে ঘটজ্ঞান যেহেতু ব্যবসায় জ্ঞান, সেহেতু ঘটজ্ঞানের জ্ঞানটিকে বলা হয় অনুব্যবসায়। আমাদের যখন ঘটজ্ঞানের অনুব্যবসায় হয়, তখন ঐ ঘটজ্ঞানে যে জ্ঞানত্ব জ্ঞানি থাকে, তারও জ্ঞান হয়। অনুব্যবসায়গম্য এই যে জ্ঞানত্ব জ্ঞানি, সেই জ্ঞানত্ব জ্ঞানমান পদার্থই হল জ্ঞান।

ন্যায়বৈশেষিক মতে জ্ঞান আত্মার গুণ। আত্মায় সে সমবায় সম্বন্ধে থাকে। জ্ঞাতা যখন পদার্থকে জানে তখন সেই পদার্থ জ্ঞাতার জ্ঞানের বিষয় হয়। জ্ঞানের প্রসঙ্গে আত্মা 'জ্ঞাতা' রূপে, পদার্থ 'বিষয়' রূপে, মন ও ইন্দ্রিয়াদি 'করণ' রূপে জ্ঞাত হয়। ন্যায়মতে জ্ঞান ত্রিঙ্গণবর্তী। প্রথমলক্ষণে জ্ঞান উৎপন্ন হয়, দ্বিতীয় ক্ষণে স্থিতিলাভ করে এবং তৃতীয়ক্ষণে তার বিনাশ হয়।

জ্ঞানেরপ্রকারভেদ:

জ্ঞানের স্বরূপ বলার পর অন্নংভট্ট জ্ঞানের প্রকারভেদ বলতে গিয়ে



বলেছেন-সাধ্বিবিধা-স্মৃতিরনুভবশ্চ।<sup>১</sup> অর্থাৎ যুদ্ধি বা জ্ঞান দুইপ্রকার- স্মৃতি ও অনুভব। কেবলমাত্র সংস্কার থেকে যে জ্ঞান উৎপন্ন হয় তা হল স্মৃতি-সংস্কারমাত্রাজ্ঞান্যং জ্ঞানং স্মৃতিঃ।<sup>১</sup> ন্যায়দর্শনে 'সংস্কার' শব্দের দ্বারা বেগ, স্থিতিস্থাপক এবং ভাবনা এই তিনটিকে বোঝানো হয়েছে। এই তিনটির মধ্যে বেগ থাকে পৃথিবী, জল, তেজ, বায়ু এবং মনে। স্থিতিস্থাপক থাকে কেবল পৃথিবীতে এবং ভাবনা থাকে আত্মাতে। এই ভাবনাখ্য সংস্কারই এখানে লক্ষ্য। তাই তর্কদীপিকায় অন্তঃভূত বলেছেন ভাবনাখ্যঃ সংস্কারঃ।<sup>১</sup> এখানে সংস্কার বলতে ভাবনা নামক সংস্কার বুঝতে হবে। ভাবনা হতেই স্মৃতির উদয় হয়। লক্ষণে মাত্র শব্দের দ্বারা চক্ষুরাদি বহিরিন্দ্রিয় যে জ্ঞানের উৎপত্তিতে কারণ হয় না, কেবল সংস্কারই কারণ হয় সেই জ্ঞানই স্মৃতি, এইরূপ বুঝতে হবে। স্মৃতিজ্ঞানে ইন্দ্রিয়াদির কোন ভূমিকা থাকে না।

এরপর অন্তঃভূত অনুভবের লক্ষণ দিতে গিয়ে বলেছেন- তচ্ছিন্নং জ্ঞানং অনুভবঃ।<sup>১</sup> অর্থাৎ অনুভব হল স্মৃতিভিন্ন জ্ঞান। এখানে 'তদ্' অর্থাৎ স্মৃতি ভিন্ন যে জ্ঞান। ন্যায়মতে সমস্তপ্রকার জ্ঞান (তা অনুভবই হোক বা স্মৃতি হোক) যেমন সত্য বা যথার্থ হতে পারে, তেমনি আবার মিথ্যা বা অযথার্থও হতে পারে। পদার্থের অনুভব যখন যথার্থ হয়, কেবলমাত্র তখনই তাকে প্রমাণ বলা হয়। অযথার্থ অনুভবকে বলা হয় অপ্রমাণ। তাই যথার্থ স্মৃতিও ন্যায়মতে প্রমাণ নয়, অনুভবই কেবল প্রমাণ হতে পারে। সংশয়, ভ্রম, তর্ক প্রভৃতি ন্যায়মতে বিভিন্ন প্রকার অপ্রমাণ।

**স্মৃতি প্রমাণ নয় কেন?**

প্রমাণ শব্দটির ব্যুৎপত্তি করে আমরা পাই 'প্র' উপসর্গের অর্থ প্রকৃষ্ট এবং 'মা' ধাতুর অর্থ জ্ঞান। অর্থাৎ প্রকৃষ্টজ্ঞান বা যথার্থ অনুভব। স্মৃতি এবং প্রমাণ এক নয়। কেননা তাদের কারণ ভিন্ন ভিন্ন। প্রমাণজন্য যেযথার্থ অনুভব তাকে প্রমাণ বলে। প্রমাণ হচ্ছে প্রমাণ করণ ইন্দ্রিয়াদি অর্থাৎ চক্ষুরাদি ইন্দ্রিয় প্রভৃতি প্রমাণ হতে যে অনুভব জন্মে তাকে প্রমাণ বলে। আর সংস্কারমাত্রজন্য যে জ্ঞান তাহল স্মৃতি। অনুভব হতে সংস্কার জন্মে এবং সংস্কার হতে স্মৃতি হয়।



প্রমার বৈশিষ্ট্য দুটি- যথার্থ ও অনুভবত্ব। স্মৃতিতে অনুভবত্ব নেই। কারণ স্মৃতিভিন্ন জ্ঞানকেই অনুভব বলা হয়। স্মৃতি যোহেতু অনুভব নয়, সেহেতু তা প্রমা হবে না। এই জ্ঞান বা অনুভব প্রধানতঃ দুইপ্রকার। যথার্থ জ্ঞান বা প্রমা এবং অযথার্থ জ্ঞান বা অপ্রমা।

প্রমা: প্রমা হচ্ছে বিষয়ের অসন্ধিঞ্চ ও যথার্থ অনুভব- যথার্থানুভবঃপ্রমা। অর্থাৎ যে জ্ঞানে আমাদের কোনরকম সন্দেহ বা সংশয় নেই এবং যে জ্ঞান বিষয়ের অনুরূপ, সেই জ্ঞানই হল প্রমা বা যথার্থ জ্ঞান। বিষয়বস্তু যেমন তেমন জ্ঞান, অর্থাৎ বস্তুর স্বরূপ সম্পর্কে যথায়থ জ্ঞান হচ্ছে যথার্থ জ্ঞান বা প্রমা। প্রমা বলতে বিষয়ের যথার্থ অনুভবকে বোঝায়। তাই অগ্নংভট্ট বলেছেন- তদ্ব্যতিরংপ্রকারকঃঅনুভবঃযথার্থঃ।<sup>১০</sup>‘তৎ’ শব্দের অর্থ প্রকার বা বিশেষণ। ‘বৎ’ প্রত্যয়ের অর্থ অধিকরণ বা আধার। ‘তদ্ব্যতি’ অর্থাৎ প্রকার বিশিষ্ট বস্তুতে তৎপ্রকারক প্রকারপ্রকারক যে জ্ঞান জন্মে তাকেই যথার্থ জ্ঞান বা অনুভব বলে। অর্থাৎ অনুভব যখন বিষয়ের অনুরূপ হয়, তখন সেই অনুভবকে বলা হয় যথার্থ। যেমন একটি ঘট দেখে কারো জ্ঞান হল- ‘অয়ং ঘটঃ’ বা এটি ঘট। এই জ্ঞানে বিষয় হচ্ছে তিনটি জিনিস- ঘট, ঘটত্ব এবং ঘট ও ঘটত্বের সম্বন্ধ। ন্যায়বৈশেষিকদের পরিভাষা অনুসারে এখানে ঘট হল বিশেষ্য, এটি জ্ঞানের বিষয়ীভূত মূল পদার্থ এবং ঘটত্ব হল ‘প্রকার’ বা বিশেষণ। সেই ঘটত্ববিশিষ্টে ঘটে তৎপ্রকারক অর্থাৎ ঘটত্ব প্রকারক ‘অয়ং ঘটঃ’ এই অনুভব হওয়ায় জ্ঞানটি হবে যথার্থ অনুভব বা প্রমা।

দীপিকা টীকায় অগ্নংভট্ট প্রমার উক্ত লক্ষণে অব্যাপ্তি দোষের আশঙ্কা করে তা নিরসন করতে গিয়ে বলেছেন- ‘তদ্ব্যতি’ শব্দস্থিত ‘বৎ’ শব্দ অধিকরণবোধক নয়, সম্বন্ধীবোধক। তদ্ব্যতি বলতে বোঝায় তৎ সম্বন্ধী। যে স্থলে যে সম্বন্ধ থাকে সেই স্থলে সেই সম্বন্ধই বোঝায়। ঘট যেমন ঘটত্ব সম্বন্ধী, ঘটত্বও তেমনি ঘট সম্বন্ধী। ঘটত্ব, ঘট সম্বন্ধী হওয়ায় ঘটত্বেরপক্ষে তদ্ব্যতি হতে কোন বাধা থাকে না।অতএব তদ্ব্যতিরংপ্রকারঃঅনুভবঃ প্রমার এই লক্ষণের ‘ঘটে ঘটত্বের স্থল সময় হয় এবং কোন অব্যাপ্তি দোষ থাকে না। ন্যায়মতে এই যথার্থ জ্ঞান বা প্রমা চারপ্রকার- প্রত্যক্ষ, অনুমিতি, উপমিতি



ও শাকবোধ।

বিশ্বনাথন্যায়পঞ্চানন যুক্তাবলী টীকায় প্রমা লক্ষণের সুস্পষ্ট ব্যাখ্যা দিতে গিয়ে বলেছেন- তৎস্বৈবিশেষ্যকণ্ঠে সতি তৎপ্রেকারকং জ্ঞানং প্রমাণা<sup>১৩</sup> একটি জ্ঞানের ক্ষেত্রে যে বিষয়ের জ্ঞান হয় তাকে বলা হয় বিশেষ্য এবং এই বিশেষ্যে যে প্রকারের জ্ঞান হয় তাকে বলা হয় প্রকার বা বিশেষণ। যেমন- ঘটজ্ঞানের ক্ষেত্রে ঘট হল বিশেষ্য এবং ঘটই হল প্রকার বা বিশেষণ। বিশেষ্যকে বোঝানোর জন্য 'তৎস্বৈব' শব্দটি ব্যবহৃত হয়েছে। 'তৎস্বৈব' বলাতে তৎপ্রেকারবৎ বুঝতে হবে। অর্থাৎ যে প্রকারে বিশেষ্যের জ্ঞান হয়, বিশেষ্য যদি সেই প্রকারবান হয় তাহলে অনুভবত্বাক জ্ঞানটি হবে প্রমা।

অপ্রমা: অপ্রমা হৃদেছ অযথার্থ জ্ঞান। যে জ্ঞান অসাক্ষিক নয় তাই অপ্রমা। অন্তঃভটু তর্কসংগ্রহ গ্রন্থে অপ্রমার লক্ষণ করতে গিয়ে বলেছেন- তত্ত্বাবতি তৎপ্রেকারকশ্চ অযথার্থঃ।<sup>১২</sup> অনুভব যখন বিষয়ের অনুরূপ হয় না, তখন সেই অনুভবকে বলা হয় অযথার্থ বা অপ্রমা। অর্থাৎ কোনবস্তুতে যে গুণ আছে বলে আমরা জানি, সেই গুণ সেই বস্তুতে প্রকৃতপক্ষে নেই, এই ধরনের জ্ঞানকে বলা হয় অযথার্থ বা অপ্রমা। যেমন, রজ্জুতে সর্পের জ্ঞান হল অপ্রমা। রজ্জুতে আছে 'রজ্জুত্ব' ধর্ম। সর্পে আছে 'সর্পত্ব' ধর্ম। রজ্জুতে সর্পত্ব ধর্ম নেই, রজ্জুকে সর্পরূপে অনুভব করা হয় যখন, তখন সেই অনুভবকে বলা হয় অযথার্থ অনুভব বা অপ্রমা।

ন্যায়মতে জ্ঞানের বিভাগ:

ন্যায়মতে জ্ঞান প্রথমতঃ দুইভাগে বিভক্ত- অনিত্যজ্ঞান (জীবের জ্ঞান) ও নিত্যজ্ঞান (ঈশ্বরের জ্ঞান)। অনিত্যজ্ঞান আবার দুইপ্রকার- অনুভব ও স্মৃতি। স্মৃতির দুইভাগ- যথার্থ স্মৃতি ও অযথার্থ স্মৃতি। অনুভবও দুইপ্রকার- যথার্থ অনুভব (প্রমা) ও অযথার্থ অনুভব (অপ্রমা)। প্রমা বা যথার্থ অনুভবের উৎস হল- যথার্থ প্রত্যক্ষ, যথার্থ অনুমিতি, যথার্থ উপমিতি এবং যথার্থ শাকবোধ। অপ্রমা বা অযথার্থ অনুভবের উৎস হল- অযথার্থ প্রত্যক্ষ, অযথার্থ অনুমিতি, অযথার্থ উপমিতি এবং অযথার্থ শাকবোধ।



বৈশেষিকদর্শনে জ্ঞানের স্বরূপ:

বৈশেষিক সূত্রকার আত্মপ্রিয়ার্থসম্বন্ধিকর্ষাৎযম্বিষ্মাদ্যতে তদন্যৎ।<sup>১০</sup> এবং আত্মপ্রিয়ার্থসম্বন্ধিকর্ষে জ্ঞানস্য ভাবোহ্ভাবশ্চ মনসো লিঙ্গম্।<sup>১১</sup> এই দুটি বৈশেষিকি সূত্রে আত্মা ও মন সাধনের উদ্দেশ্যে জ্ঞানের নির্দেশ করেছেন সূত্রকার। বৈশেষিকমতেও জ্ঞান, বুদ্ধি ও উপলব্ধি পর্যায়বর্তী শব্দ। উক্ত প্রথম সূত্রে বলা হয়েছে আত্মা ইন্দ্রিয়ের সঙ্গে ও ইন্দ্রিয় বিষয়ের সঙ্গে সম্বন্ধ হলে যেটি উৎপন্ন হয় সেটি জ্ঞান। বৈশেষিকগণ বলেন আত্মা ও মনের সংযোগে জ্ঞানসামান্যের হেতু। নব্যনৈয়াকিগণও ত্বগেগ্গিইয়ের সঙ্গে মনের সংযোগকে জ্ঞানসামান্যের কারণ বলেন। বৈশেষিক সূত্রকার কণাদ বৈশেষিক দর্শনের তৃতীয় অধ্যায়ে যেমন জ্ঞানসামান্যের কারণ বিশ্লেষণ করেছেন, তেমনি অষ্টম অধ্যায়ে জ্ঞান বিশেষের কারণ প্রদর্শন করেছেন- তত্রাত্মানশ্চাপ্রত্যক্ষে।<sup>১২</sup> এই বৈশেষিক সূত্রে সূত্রকার আত্মা ও মনকে প্রত্যক্ষ বলেছেন। এখানে প্রত্যক্ষ শব্দের অর্থ প্রত্যক্ষ জ্ঞানের বিষয়। সূত্রে আত্মা বলতে পরকীয় আত্মা বিবক্ষিত। পরকীয় আত্মা ও মন অননুমোয়।

বৈশেষিক দর্শনে প্রমাণ ও প্রত্যক্ষকে যথাক্রমে বিদ্যা ও অবিদ্যা এই দুই শব্দের দ্বারা উল্লেখ করা হয়েছে- বিদ্যাহবিদ্যাতশ্চসংশয়ঃ।<sup>১৩</sup> টীকাকারা এখানে বিদ্যা বলতে প্রমাণ এবং অবিদ্যা বলতে প্রত্যক্ষকে বুঝিয়েছেন। যে বস্তু যা, তাকে তা বলে নিশ্চয় করার নাম বিদ্যা। যে বস্তু যা নয়, তাকে তা বলে জানার নাম অবিদ্যা। সূত্রকার কণাদ নবম অধ্যায়ের শেষে এই দুইশব্দের জ্ঞানের স্বরূপ সম্পর্কে কিছু আলোচনা করেছেন। যেমন তিনি বলেছেন, ইন্দ্রিয়ের দোষ থেকে এবং সংস্কারের দোষ থেকে অবিদ্যা উৎপন্ন হয়- ইন্দ্রিয়দোষাৎসংস্কারদোষাচ্চাবিদ্যা।<sup>১৪</sup> ‘ইন্দ্রিয়দোষ’ অর্থাৎ যে ব্যক্তির চক্ষু পিত্তরোগে দুষ্ট সে শুভ্র বস্তুকেও পীত বলে বোধ করে। ‘সংস্কারদোষ’ অর্থাৎ অসৎ গ্রন্থ পাঠ করলে দুষ্ট সংস্কার জন্মে এবং তার ফলে বিপরীত বুদ্ধি জন্মায়। টীকাকার শঙ্করমিশ্রের মতে- কণাদ প্রত্যক্ষ লক্ষণ নির্দেশ করেছেন নবম অধ্যায়ের তদুদুষ্টজ্ঞানম্।<sup>১৫</sup> এই সূত্রে। অবিদ্যা বা প্রত্যক্ষকেও চার ভাগে



ভাগ করা হয়- স্মৃতি, সংশয়, ভ্রম ও তর্ক।

সংশয় হল কোন এক ধর্মিতে পরস্পর বিরুদ্ধে নানা ধর্মের বৈশিষ্ট্যাবগাহী জ্ঞান। সংশয়ে একাধিক কোটি থাকে, একাধিক কোটির মধ্যে মন যেন দোলুন্ময়মান হতে থাকে। সংশয়াত্মক পরস্পর বিরুদ্ধ ধর্মগুলিকে কোটি বলে। যেমন- অয়ং স্থাণুঃ বা পুরুষঃ বা এই দৃষ্টান্তে 'স্থাণু' একটি কোটি এবং 'পুরুষ' একটি কোটি। বিপর্যয় বা ভ্রম হল মিথ্যা জ্ঞান- মিথ্যাজ্ঞানং বিপর্যয়ঃ। যেমন- রজ্জুতে সর্প জ্ঞান। রজ্জুতে সর্পত্ব ধর্ম আরোপ করে মিথ্যাজ্ঞান। অস্পষ্ট আলোক, সাদৃশ্য, অনবধানতা ইত্যাদি দোষবশতঃ রজ্জুতে সর্প বলে বোধ হয়। এটি হল ভ্রম বা মিথ্যা জ্ঞান। তর্কও একপ্রকার অযথার্থ জ্ঞান। অন্নংভট্ট বলেছেন- ব্যাপারোপেণ ব্যাপকরোপঃ তর্কঃ । ব্যাপ্যর আরোপপূর্বক ব্যাপকের আরোপ হচ্ছে তর্ক'।

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১৪. তদেব, ৩/২/১

১৫. ভদ্রেশ্বর, ৮/১/২  
 ১৬. ভদ্রেশ্বর, ২/২/২০  
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 ১৮. ভদ্রেশ্বর, ৯/২/১১

### সহায়ক গ্রন্থ :

- অন্নভট্ট. তর্কসংগ্রহ. (সম্পাদা.). নারায়ণচন্দ্র গোস্বামী. কলকাতা: সংস্কৃত পুস্তক ভাণ্ডার, ১৪১০ বঙ্গাব্দ.  
 অন্নভট্ট. তর্কসংগ্রহ. (সম্পাদা.). শর্বাণী গাঙ্গুলী. কলকাতা: ভারতীয় কেন্দ্র যাদবপুর বিশ্ববিদ্যালয়, ২০১৩.  
 গৌতম. ন্যায়দর্শন. (সম্পাদা.). ফণীভূষণ তর্কবাগীশ. কলিকাতা: পশ্চিমবঙ্গ রাজ্য পুস্তক পর্ষদ, ১৯৮১ (প্রথম সংস্করণ).  
 কণাদ, বৈশেষিকদর্শন, (সম্পাদা.). ভট্টাচার্য অমিত, সংস্কৃত বুক ডিপো, কলিকাতা, ২০১২  
 কণাদ. বৈশেষিকদর্শন. (উপস্ফার টীকাসহ) (সম্পাদা.). নারায়ণ মিশ্র, চৌখদা সংস্কৃত সিরিজ, বালীগঙ্গী ১৯৬৯.  
 বিশ্বনাথনাথ্যাপঞ্জলন. ভাষাপরিচ্ছেদ. (মুক্তাবলী টীকাসহ) (সম্পাদা.). শ্রীগোপাল মুখোপাধ্যায়. বর্ধমান: বর্ধমান বিশ্ববিদ্যালয়, ১৯৯৮.  
 Annambhatta, Tarkasainigraha Dīpikā on Tarkasainigraha, (ed.).  
 Gopinath Bhattacharya. Kolkata: Progressive Publishers, 2003.

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**GENDER (IN)EQUALITY OF FEMALE DETECTIVES: RETHINKING  
SAMAR SHAIKH'S BOBBY JASOOS (2014) AND ARINDAM SHIL'S  
MITIN MASI (2019)**

Shyamal Mondal, Assistant Professor  
Mahishadal Raj College affiliated to Vidyasagar University, West Bengal  
M- 8697667690 Email- [mondalshyamal336@gmail.com](mailto:mondalshyamal336@gmail.com)

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**ABSTRACT:**

Feminist is a person who believes in the social, political and economic equality of the sexes. Although feminism is definitely a part of human rights in general, men and women are reluctant to talk about gender and the problems of gender because the idea of changing status quo is not always welcome. In this patriarchal society it is difficult for women to pursue professions that are considered traditionally male preserves. The profession of detective obviously indicates that all the established detectives of the world literature and films like Sherlock Holmes, Hercule Poirot, Tintin, Feluda and Bomkesh are basically male created by mostly male writers with conventional ideology. To challenge this hegemonic norm of male detectives, a host of Female Detectives appear to make a space and create their identity with the intelligence, creativity and performance in the world of male supremacy. My objective is to reflect the inequality of Female detective in Indian Cinema with the theoretical perspectives of Simon de Beauvoir and Performative theory of Judith Butler. Bobby Jasoos and Mitin Masi, the two distinguished female detectives of Indian Cinema resist the narrow binary gender system of stereotypical society and prove that intelligence has no gender.

**KEYWORDS:** Status quo, Hegemony, Patriarchy and Ideology, Freedom

\*\*\*\*

Literature and film are the two most significant and creative platforms to convey a hybrid of the local and global reality and fiction. Interestingly, literature was a popular form of expression during the 18<sup>th</sup> and 19<sup>th</sup> century but Cinema and its adaptations have appeared as a meaningful audio-visual mode of representation in the 20<sup>th</sup> and 21<sup>st</sup> century. There have been several filmmakers who with fidelity and infidelity have adapted different forms of literature like novels, dramas and short stories into films. It tempts me to mention Homer's *Iliad* and *Odyssey*, Jane Austen's *Pride and Prejudice*, and Sarat Chandra Chattopadhyaya's *Devdas* and so on. The



Suchitra Bhattacharya is one of the most prominent Indian novelists focusing on the contemporary social issues which are predominantly represented in the adaptation, *Mitin Masi*.

This hypothesis is tested by applying the theoretical perspectives of Simone de Beauvoir and performative theory of Judith Butler to a close reading of Suchitra Bhattacharya's detective novel, *Mitin Masi*. Mitin Masi as a housewife is supposed to be fit in the domestic household of patriarchy but she breaks this stereotype and moves forward to solve various crimes which indicates that gender is a socially and historically constructed. Another French feminist, philosopher, linguist and cultural theorist, Luce Irigaray in her landmark work, *This Sex Which is Not One* (1985) rightly says,

*"Be what you are becoming without clinging to what you might have been, what you might yet be." (P-214)*

She challenges conventional notions of gender and develops the idea of 'becoming'. Here she tries to uproot the concept of phallogocentrism. The status of women like Bobby Jassos and Mitin Masi has been reduced to an object or commodity. She posits that culture, language and social rituals supported by institutional power, create gender as a social performance. They both have created a transgressive self to be recognized as female detectives with equality to the male detective in the social process of a distinctive individual identity.

To conclude, I would like to mention a great Nigerian writer Chimamanda Ngozi Adichie who in her seminal work, *We should All Be Feminists*, rightly says,

*"We say to girls, 'You can have ambition, but not too much. You should aim to be successful but not too successful, otherwise you will threaten the man. If you are the breadwinner in your relationship with a man, pretend that you are not, especially in public, otherwise you will emasculate him'." (P-27-28)*

So, the ambition of women like Bilquees and Pragya Paromita should have a limit, otherwise they will emasculate the male detectives of the present generation. Drawing extensively on their experiences and deep understanding of the masked realities of gender politics, they make an exploration of what it means to be a woman detective in modern cinema of 21<sup>st</sup> century.

#### **BIO NOTE:**

Shyamal Mondal is an assistant professor of English at Mahishdal Raj College where he teaches courses. His research interests focus on the postcolonial writings and literary theory. He teaches courses in undergraduate and postgraduate composition and literary studies.

## REFERENCES

- Butler, Judith, *Gender Trouble, Feminism and the Subversion of Identity*. New York; Routledge, 1990.
- Beauvoir, Simone. *The Second Sex*. New York; Vintage Books, 1989.
- Battacharya, Suchitra, *Mitin Masf Somogro*. Kolkata; Ananda Publishers; 1014.
- Adichie Ngozi Chimamanda, *We Should All Be Feminists*. London; Fourth Estate, 2014.
- Dix, Andrew, *Beginning Film Studies*; Manchester University Press, 2008.
- Irigaray, Luce. *This Sex Is Not One*; New York, Cornell University Press, 1981.

# Introduction to Mobile Edge Computing

1

Anwasha Mukherjee, Debashis De, Soumya K. Ghosh, and Rajkumar Buyya

2

**Abstract** Fifth generation mobile networks aim to use multi-tier heterogeneous cellular networks integrated with cloud computing to provide users with low latency and energy-aware service. However, for high bandwidth and low latency services, edge/fog computing comes into the scenario. In edge/fog computing, the intermediate devices between end users and cloud participate in processing and storage of data as well as execution of applications. Mobile edge computing provides cloud computing services at the edge of mobile network, which facilitates the developers, service providers as well as the users. Internet of Things (IoT) has become a principle component to design smart technological solutions for our daily life. For low latency and high bandwidth services, edge computing assisted IoT has become the pillar for the development of smart home, smart health etc. This chapter will discuss the overview of mobile edge computing along with its real time applications.

**Keywords** Mobile edge computing · IoT · Power · Latency

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A. Mukherjee (✉)

Department of Computer Science, Mahishadal Raj College, Mahishadal, West Bengal, India

D. De (✉)

Centre of Mobile Cloud Computing, Department of Computer Science and Engineering, Maulana Abul Kalam Azad University of Technology, Kolkata, West Bengal, India

e-mail: [dr.debashis.de@ieee.org](mailto:dr.debashis.de@ieee.org)

S. K. Ghosh

Department of Computer Science and Engineering, Indian Institute of Technology (IIT) Kharagpur, Kharagpur, West Bengal, India

e-mail: [skg@cse.iitkgp.ac.in](mailto:skg@cse.iitkgp.ac.in)

R. Buyya

Cloud Computing and Distributed Systems (CLOUDS) Laboratory, School of Computing and Information Systems, The University of Melbourne, Melbourne, VIC, Australia

e-mail: [rbuyya@unimelb.edu.au](mailto:rbuyya@unimelb.edu.au)

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69. Peng, Kai, and Binbin Huang. "The invulnerability studies on data center network." *International Journal of Security and Its Applications* 9, no. 11 (2015): 167–186. 559 560
70. Peng, Kai, Victor Leung, Lixin Zheng, Shanguang Wang, Chao Huang, and Tao Lin. "Intrusion detection system based on decision tree over big data in fog environment." *Wireless Communications and Mobile Computing* 2018 (2018). 561 562 563
71. Ghosh, Shreya, and Soumya K. Ghosh. "Thump: Semantic analysis on trajectory traces to explore human movement pattern." *Proceedings of the 25th International Conference Companion on World Wide Web*. 2016. 564 565 566
72. Gabrielli, Lorenzo, Salvatore Rinzivillo, Francesco Ronzano, and Daniel Villatoro. "From tweets to semantic trajectories: mining anomalous urban mobility patterns." In *International Workshop on Citizen in Sensor Networks*, pp. 26–35. Springer, Cham, 2013. 567 568 569
73. Siła-Nowicka, Katarzyna, Jan Vandrol, Taylor Oshan, Jed A. Long, Urška Demšar, and A. Stewart Fotheringham. "Analysis of human mobility patterns from GPS trajectories and contextual information." *International Journal of Geographical Information Science* 30, no. 5 (2016): 881–906. 570 571 572 573
74. Wagner, Ricardo, José Antonio Fernandes de Macedo, Alessandra Raffaetà, Chiara Renso, Alessandro Roncato, and Roberto Trasarti. "Mob-warehouse: A semantic approach for mobility analysis with a trajectory data warehouse." In *International Conference on Conceptual Modeling*, pp. 127–136. Springer, Cham, 2013. 574 575 576 577
75. Zheng, Zhong, Soora Rasouli, and Harry Timmermans. "Two-regime Pattern in Human Mobility: Evidence from GPS Taxi Trajectory Data." *Geographical Analysis* 48, no. 2 (2016): 157–175. 578 579 580
76. Li, T., T. Pei, Y. C. Yuan, C. Song, W. Wang, and G. Yang. "A review on the classification, patterns and applied research of human mobility trajectory." *Progress in Geography* 33, no. 7 (2014): 938–948. 581 582 583
77. Ghosh, Shreya, and Soumya K. Ghosh. "Exploring the association between mobility behaviours and academic performances of students: a context-aware traj-graph (CTG) analysis." *Progress in Artificial Intelligence* 7, no. 4 (2018): 307–326. 584 585 586
78. Guo, Yan, Shanguang Wang, Ao Zhou, Jinliang Xu, Jie Yuan, and Ching-Hsien Hsu. "User allocation-aware edge cloud placement in mobile edge computing." *Software: Practice and Experience* 50, no. 5 (2020): 489–502. 587 588 589
79. Rui, Lanlan, Yabin Qin, Biyao Li, Ying Wang, and Haoqiu Huang. "SEWMS: An edge-based smart wearable maintenance system in communication network." *Software: Practice and Experience* 50, no. 5 (2020): 611–629. 590 591 592
80. Buyya, Rajkumar, Rajiv Ranjan, and Rodrigo N. Calheiros. "Modeling and simulation of scalable Cloud computing environments and the CloudSim toolkit: Challenges and opportunities." *2009 International Conference on High Performance Computing and Simulation*. IEEE, 2009. 593 594 595
81. Calheiros, Rodrigo N., Rajiv Ranjan, Anton Beloglazov, Cesar A. F. De Rose, and Rajkumar Buyya. "CloudSim: a toolkit for modeling and simulation of cloud computing environments and evaluation of resource provisioning algorithms." *Software: Practice and experience* 41, no. 1 (2011): 23–50. 596 597 598 599
82. Sonmez, Cagatay, Atay Ozgovde, and Cem Ersoy. "Edgecloudsim: An environment for performance evaluation of edge computing systems." *Transactions on Emerging Telecommunications Technologies* 29, no. 11 (2018): e3493. 600 601 602
83. Gupta, Harshit, Amir Vahid Dastjerdi, Soumya K. Ghosh, and Rajkumar Buyya. "iFogSim: A toolkit for modeling and simulation of resource management techniques in the Internet of Things, Edge and Fog computing environments." *Software: Practice and Experience* 47, no. 9 (2017): 1275–1296. 603 604 605 606
84. Mahmud, Redowan, and Rajkumar Buyya. "Modelling and simulation of fog and edge computing environments using iFogSim toolkit." *Fog and edge computing: Principles and paradigms* (2019): 1–35. 607 608 609
85. Lopes, Márcio Moraes, Wilson A. Higashino, Miriam AM Capretz, and Luiz Fernando Bittencourt. "Myifogsim: A simulator for virtual machine migration in fog computing." In *Companion Proceedings of the 10th International Conference on Utility and Cloud Computing*, pp. 47–52. 2017. 610 611 612 613

# SMEC: Sensor Mobile Edge Computing

1

Anindita Raychaudhuri, Anwasha Mukherjee, and Debashis De

2

**Abstract** The development of mobile user equipment progresses cooperatively with the advancement of the latest mobile applications. Still, the limited battery capacity prevents users from running computationally intensive applications on their gadgets. This one stimulated the evolution of Mobile cloud computing (MCC). Instead of its ample data storage and processing capability, MCC suffers from high latency. To deal with the latency problem a novel promising concept known as mobile edge computing has been introduced. Mobile edge computing (MEC) and wireless sensor networks (WSN) are two ever-promising research domains of the wireless network. The integration of MEC with WSN has given birth to Sensor Mobile Edge Computing (SMEC). However, sensor mobile edge computing is an emerging field, and energy-efficiency is one of the major challenges of this field. In MEC, services are provided at the edge of the mobile network for reducing the latency that in turn can improve the quality of user experience. Previously MEC focused on the use of base stations for offloading computations from mobile devices. However, after the arrival of fog computing, the definition of edge devices becomes broader. SMEC is a fusion of mobile edge computing and wireless sensor network. SMEC is an architecture where the sensor nodes capture the status of environmental objects and the collected data are sent to the cloud through the edge devices which participate in data processing also. This chapter discusses sensor mobile edge computing, its architecture, and its applications. The future scopes and challenges of SMEC are also addressed in this chapter.

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A. Raychaudhuri (✉)

Department of Computer Science, Sarojini Naidu College for Women, Kolkata,  
West Bengal, India

A. Mukherjee

Department of Computer Science, Mahishadal Raj College, Mahishadal, West Bengal, India

D. De

Centre of Mobile Cloud Computing, Department of Computer Science and Engineering,  
MaulanaAbulKalam Azad University of Technology, West Bengal, Kolkata, West Bengal, India

Department of Physics, University of Western Australia, Crawley, WA, Australia

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- Technologies, Embedded and Multimedia for Human-Centric Computing (pp. 311–318). Springer, Dordrecht. 655
102. Kong, L., Pan, J.S., Tsai, P.W., Vaclav, S. and Ho, J.H., 2015. A balanced power consumption algorithm based on enhanced parallel cat swarm optimization for wireless sensor network. *International Journal of Distributed Sensor Networks*, 11(3), p. 729680. 657
103. Li, X., Keegan, B. and Mtenzi, F., 2018. Energy Efficient Hybrid Routing Protocol Based on the Artificial Fish Swarm Algorithm and Ant Colony Optimisation for WSNs. *Sensors*, 18(10), p. 3351. 658
104. Khan, M.F., Aadil, F., Maqsood, M., Bukhari, S.H.R., Hussain, M. and Nam, Y., 2019. Moth Flame Clustering Algorithm for Internet of Vehicle (MFCa-IoV). *IEEE Access*, 7, pp. 11613–11629. 659
105. Ray, A. and De, D., 2016. Energy efficient clustering protocol based on K-means (EECPK-means)-midpoint algorithm for enhanced network lifetime in wireless sensor network. *IET Wireless Sensor Systems*, 6(6), pp. 181–191. 660
106. Raychaudhuri, A. and De, D., 2020. Bio-inspired Algorithm for Multi-objective Optimization in Wireless Sensor Network. In *Nature Inspired Computing for Wireless Sensor Networks* (pp. 279–301). Springer, Singapore. 661
107. Hamrioui, S. and Lorenz, P., 2017. Bio inspired routing algorithm and efficient communications within IoT. *IEEE Network*, 31(5), pp. 74–79. 662
108. He, Y., Yu, F. R., Zhao, N., Leung, V. C., & Yin, H. (2017). Software-defined networks with mobile edge computing and caching for smart cities: A big data deep reinforcement learning approach. *IEEE Communications Magazine*, 55(12), 31–37. 663
109. Hosseini, M. P., Tran, T. X., Pompili, D., Elisevich, K., & Soltanian-Zadeh, H. (2017, July). Deep learning with edge computing for localization of epileptogenicity using multimodal rs-fMRI and EEG big data. In *2017 IEEE International Conference on Autonomic Computing (ICAC)* (pp. 83–92). IEEE. 664
110. Cao, Y., Song, H., Kaiwartya, O., Zhou, B., Zhuang, Y., Cao, Y., & Zhang, X. (2018). Mobile edge computing for big-data-enabled electric vehicle charging. *IEEE Communications Magazine*, 56(3), 150–156. 665
111. Roman, R., Lopez, J., & Mambo, M. (2018). Mobile edge computing, fog et al.: A survey and analysis of security threats and challenges. *Future Generation Computer Systems*, 78, 680–698. 666
112. Wang, T., Zhou, J., Huang, M., Bhuiyan, M. Z. A., Liu, A., Xu, W., & Xie, M. (2018). Fog-based storage technology to fight with cyber threat. *Future Generation Computer Systems*, 83, 208–218. 667
113. Peng, K., Lin, R., Huang, B., Zou, H., & Yang, F. (2013). Node importance of data center network based on contribution matrix of information entropy. *Journal of Networks*, 8(6), 1248. 668
114. Peng, K., & Huang, B. (2015). The invulnerability studies on data center network. *International Journal of Security and Its Applications*, 9(11), 167–186. 669
115. Peng, K., Leung, V., Zheng, L., Wang, S., Huang, C., & Lin, T. (2018). Intrusion detection system based on decision tree over big data in fog environment. *Wireless Communications and Mobile Computing*, 2018. 670
116. Du, M., Wang, K., Chen, Y., Wang, X. and Sun, Y., 2018. Big data privacy preserving in multi-access edge computing for heterogeneous Internet of Things. *IEEE Communications Magazine*, 56(8), pp. 62–67. 671
117. Ray, P.P., Dash, D. and De, D., 2019. Internet of things-based real-time model study on e-healthcare: Device, message service and dew computing. *Computer Networks*, 149, pp. 226–239. 672
118. Roy, S., Sarkar, D. and De, D., 2020. DewMusic: crowdsourcing-based internet of music things in dew computing paradigm. *Journal of Ambient Intelligence and Humanized Computing*, pp. 1–17. 673
119. De, Debashis. *Mobile cloud computing: architectures, algorithms and applications*. CRC Press, 2016. 674



C H A P T E R

21

Q1  
Mobile health monitoring for  
senior citizens using  
femtolet-based fog network

tte0001

Q2  
*Priti Deb<sup>a</sup>, Anwesha Mukherjee<sup>b</sup> and Debashis De<sup>a</sup>*

<sup>a</sup>Department of Computer Science and Engineering, Maulana Abul Kalam Azad University of Technology, Kolkata, West Bengal, India <sup>b</sup>Department of Computer Science, Mahishadal Raj College, Mahishadal, West Bengal, India

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21.1 Introduction

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Nowadays electronic health monitoring is a popular research domain. In electronic health monitoring system users upload their health data to the server side and get advices from the health centers [1–2]. Today most of the users access internet through their smart phones. Thus, in this paper we focus on mobile health monitoring system [3–4]. In a mobile health monitoring (M-health) system the users upload their health data and get advices from the health center through their mobile phones. But the smart phones are resource hungry. Hence execution of heavy applications and storage of high volume of data may not possible. To overcome the difficulties mobile cloud computing has introduced [5–6]. Provisioning of health care services on time is important. Use of cloud servers might fail to provide the health care services on time due to enhancement in propagation and communication delays. To solve this problem fog computing comes [7–9], where the intermediate devices between end node and cloud participate in data processing to decrease the delay and energy consumption. Health care services using fog computing have been proposed in [10–12]. The indoor region suffers from poor signal strength, which affects the use of internet services. Femtocell has solved this problem. Femtocell is small cell base station which is specially allocated at indoor region. Femtocell- and mobile cloud computing-based m-health monitoring have been discussed in [3–4]. Communication while computing we have proposed femtolet in [13]. Femtolet is a fifth generation (5G) indoor base station that has storage and can perform computation that can be used in healthcare, retail, etc. [14–16].

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## References

- [1] A. Mukherjee, D. De, Femtocell based green health monitoring strategy. In 2014 XXXIth URSI General Assembly and Scientific Symposium (URSI GASS) (2014) pp. 1–4. IEEE.
- [2] S.J. Brown, U.S. Patent No. 6,101,478. Washington, DC: U.S. Patent and Trademark Office (2000).
- [3] D. De, A. Mukherjee, A. Sau, I. Bhakta, Design of smart neonatal health monitoring system using SMCC. *Healthcare Technol. Lett.* 4(1) (2017) 13.
- [4] D. De, A. Mukherjee, Femto-cloud based secure and economic distributed diagnosis and home health care system. *J. Med. Imaging Health Informatics* 5(3) (2015) 435–447.
- [5] N. Fernando, S.W. Loke, W. Rahayu, Mobile cloud computing: a survey. *Future Gener. Comput. Syst.* 29(1) (2013) 84–106.
- [6] M.R. Rahimi, J. Ren, C.H. Liu, A.V. Vasilakos, N. Venkatasubramanian, Mobile cloud computing: a survey, state of art and future directions. *Mobile Netw. Applic.* 19(2) (2014) 133–143.
- [7] L.M. Vaquero, L. Rodero-Merino, Finding your way in the fog: towards a comprehensive definition of fog computing. *ACM SIGCOMM Comput. Commun. Rev.* 44(5) (2014) 27–32.
- [8] S. Yi, C. Li, Q. Li, A survey of fog computing: concepts, applications and issues. In *Proceedings of the 2015 Workshop on Mobile Big Data* (2015) pp. 37–42. ACM.
- [9] A. Mukherjee, P. Deb, D. De, R. Buyya, C2OF2N: a low power cooperative code offloading method for femtolet-based fog network. *J. Supercomput.* (2018) 1–37.
- [10] Y. Cao, S. Chen, P. Hou, D. Brown, FAST: a fog computing assisted distributed analytics system to monitor fall for stroke mitigation. In *2015 IEEE International Conference on Networking, Architecture and Storage (NAS)* (2015) pp. 2–11. IEEE.
- [11] M. Ahmad, M.B. Amin, S. Hussain, B.H. Kang, T. Cheong, S. Lee, Health fog: a novel framework for health and wellness applications. *J. Supercomput.* 72(10) (2016) 3677–3695.
- [12] A.M. Rahmani, T.N. Gia, B. Negash, A. Anzanpour, I. Azimi, M. Jiang, P. Liljeberg, Exploiting smart e-health gateways at the edge of healthcare internet-of-things: a fog computing approach. *Future Gener. Comput. Syst.* 78 (2018) 641–658.
- [13] A. Mukherjee, D. De, Femtolet: a novel fifth generation network device for green mobile cloud computing. *Simul. Modell. Pract. Theory* 62 (2016) 68–87.
- [14] A. Mukherjee, D. De, S.K. Ghosh, FogIoHT: a weighted majority game theory based energy-efficient delay-sensitive fog network for internet of health things. *Internet Things* 11 (2020) 100181.
- [15] A. Mukherjee, D. De, R. Buyya, E2R-F2N: energy-efficient retailing using a femtolet-based fog network. *Softw.: Pract. Exp.* 49(3) (2019) 498–523.
- [16] A. Mukherjee, S. Ghosh, A. Behere, S.K. Ghosh, R. Buyya, Internet of health things (IoHT) for personalized health care using integrated edge-fog-cloud network. *J. Ambient Intell. Humanized Comput.* 12 (2021) 943–959.

## Non-Print Items

cesectitle0009

### Abstract

spara005

This paper proposes a mobile health monitoring model for senior citizens using fog computing. Important health data of a person are collected and transmitted to his or her mobile device using body sensor network. Along with the location information mobile device transmits the health data to the connected femtolet which is a fog device. The femtolet is a home base station having computation ability. The femtolet and gateway are used for health data processing in this approach. From the femtolet the data are sent to the health center. Depending on the results of health data processing, the disease is detected and initiatives are taken to cure the patient by the health center. The simulation analyses demonstrate that the proposed health monitoring model decreases the delay and the power respectively by  $\sim 62\%$  and  $\sim 58\%$  than the existing fog-assisted health care system.

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### Keywords

M-health; Femtolet; Gateway; Fog computing





# Strategies for Improving the Efficiency of Nanomaterials

# 2

Sukhendu Maity, Madhuchhanda Adhikari, Rajkumar Guchhait, Ankit Chatterjee, Ajishnu Roy, and Kousik Pramanick

## Abstract

The complexities associated with spatiotemporal delivery of drugs in disease therapy from the biomedical viewpoint, gradual increase in pollution level in the mother environment, and the quest for renewable energy sources as an alternative to the use of fossil fuels make it highly anticipated the development of technologies averting the therapeutic complexities and providing a better way of environmental remediation and energy production. The advent of nanotechnologies and its recent progress could provide opportunities for dwindling the aforementioned problem. In this chapter, we tried to summarize different technological advancements for improving the efficiency of nanoparticles, especially in the field of nanomedicine. The crucial points to be emerged from this study are the physicochemical parameters, most importantly the size, shape, crystallinity, and surface chemistry which would be manipulated for qualitative functional improvement of nanoparticles; and also modifying the nanoparticles surface with molecules (peptide, antibody, protein, lipid, surfactant, small molecules, ligands, polyethylene glycol, etc.) tackling a particular therapeutic concern like cellular internalization, stability, solubility, immune clearance, drug targeting, etc. would be of immense therapeutic values.

## Keywords

Nanoparticles · Nanomedicine · Physicochemical parameters · Therapeutics · Qualitative improvements

S. Maity · M. Adhikari · R. Guchhait · A. Chatterjee · A. Roy · K. Pramanick (✉)  
Integrative Biology Research Unit (IBRU), Department of Life Sciences, Presidency University,  
Kolkata, India  
e-mail: [kousik.dbs@presiuniv.ac.in](mailto:kousik.dbs@presiuniv.ac.in)

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- Sawant RM, Hurley JP, Salmaso S et al (2006) SMART drug delivery systems: double targeted pH-responsive pharmaceutical nanocarriers. *Bioconjug Chem* 17(4):943–949
- Schottler S, Becker G, Winzen S, Steinbach T et al (2016) Protein adsorption is required for stealth effect of poly(ethylene glycol)- and poly(phosphoester)-coated nanocarriers. *Nat Nanotechnol* 11:372–377
- Schrier RW (2002) Cancer therapy and renal injury. *J Clin Invest* 110:743–745
- Schwarz C, Mehnert W, Lucks JS, Muller RH (1994) Solid lipid nanoparticles (SLN) for controlled drug-delivery. 1. Production, characterization and sterilization. *J Control Release* 30(1):83–96
- Stylianopoulos T, Jain RK (2015) Design considerations for nanotherapeutics in oncology. *Nanomedicine* 11(8):1893–1907
- Takizawa H, Manz MG (2007) Macrophage tolerance: CD47–SIRP- $\alpha$ -mediated signals matter. *Nat Immunol* 8:287–289
- Tammam SN, Azzazy HME, Lamprecht A (2016) How successful is nuclear targeting by nanocarriers? *J Control Release* 229:140–153
- Tong R, Kohane DS (2016) New strategies in cancer nanomedicine. *Annu Rev Pharmacol Toxicol* 56:41–57
- Torchilin VP, Khaw BA, Smirnov VN, Haber E (1979) Preservation of antimyosin antibody activity after covalent coupling to liposomes. *Biochem Biophys Res Commun* 89(4):1114–1119
- Villaverde G, Baeza A (2019) Targeting strategies for improving the efficacy of nanomedicine in oncology. *Beilstein J Nanotechnol* 10:168–181
- Von Roemeling C, Jiang W, Chan CK, Weissman IL, Kim BYS (2017) Breaking down the barriers to precision cancer nanomedicine. *Trends Biotechnol* 35(2):159–171
- Wang L, Tabor R, Eastoe J, Li X, Heenan RK, Dong J (2009) Formation and stability of nanoemulsions with mixed ionic-nonionic surfactants. *Phys Chem Chem Phys* 11(42):9772–9778
- Wicki A, Witzigmann D, Balasubramanian V, Huwyler J (2015) Nanomedicine in cancer therapy: challenges, opportunities, and clinical applications. *J Control Release* 200:138–157
- Wissing SA, Kayser O, Muller RH (2004) Solid lipid nanoparticles for parenteral drug delivery. *Adv Drug Deliv Rev* 56(9):1257–1272
- Wong HL, Bendayan R, Rauth AM, Xue HY, Babakhanian K, Wu XY (2006a) A mechanistic study of enhanced doxorubicin uptake and retention in multidrug resistant breast cancer cells using a polymer-lipid hybrid nanoparticle system. *J Pharmacol Exp Ther* 317(3):1372–1381
- Wong HL, Rauth AM, Bendayan R et al (2006b) A new polymer–lipid hybrid nanoparticle system increases cytotoxicity of doxorubicin against multidrug-resistant human breast cancer cells. *Pharm Res* 23(7):1574–1585
- Woodle MC, Matthey KK, Newman MS, Hidayat JE, Collins LR, Redemann C, Martin FJ, Papahadjopoulos D (1992) Versatility in lipid compositions showing prolonged circulation with sterically stabilized liposomes. *Biochim Biophys Acta* 1105(2):193–200
- Wu J, Lu Y, Lee A et al (2007) Reversal of multidrug resistance by transferrin-conjugated liposomes co-encapsulating doxorubicin and verapamil. *J Pharm Pharm Sci* 10(3):350–357
- Xu X, Ho W, Zhang X, Bertrand N, Farokhzad O (2015) Cancer nanomedicine: from targeted delivery to combination therapy. *Trends Mol Med* 21(4):223–232
- Yang L, Jiang X, Yang M (2011) Improvement of surface enhanced Raman scattering performance for broad band gap semiconductor nanomaterial (TiO<sub>2</sub>): strategy of metal doping. *Appl Phys Lett* 99:111114
- Yang Y, Niu S, Han D, Liu T et al (2017) Progress in developing metal oxide nanomaterials for photoelectrochemical water splitting. *Adv Energy Mater* 7:1700555



## A Partial Computation Offloading Strategy for Microcell-femtolet based Future Generation Edge-Cloud Network

Anwasha Mukherjee<sup>\*(1)</sup>

(1) Department of Computer Science, Mahishadal Raj College,  
Mahishadal, Purba Medinipur, West Bengal, PIN - 721628, India

### Abstract

Fast and low power offloading is an emerging area of interest for future generation mobile network. This paper proposes a partial computation offloading strategy for microcell-femtolet based edge-cloud network. In the microcell-femtolet network microcells contain femtolets inside their coverage area to provide good communication and computation facilities to the user devices at indoor region. An indoor user is connected with the femtolet and an outdoor user is connected with the microcell base station in the microcell-femtolet network scenario. When a computation has to be partially offloaded, the task is partitioned into two segments, one is locally executed and the other one is offloaded to the femtolet or edge server according to the user's presence at indoor or outdoor region. The theoretical and experimental results illustrate that the proposed partial offloading scheme reduces the latency and power consumption of the mobile device than the cloud based approach.

### 1 Introduction

The smart phone users desire computation and communication services simultaneously at low power and low latency. For faster service provisioning edge computing comes into the scenario for future generation cellular network and Internet of Things (IoT), by bringing the storage and computational resources at the edge of the network [1, 2]. Usually the edge servers are placed along with the base stations [1]. In a fifth generation (5G) small cell network, due to poor signal strength at indoor regions, small cell base stations such as femtocell base stations (FBSs) and picocell base stations (PBSs) are used inside the coverage area of the large cell base stations i.e. macrocell base stations (MBSs) or microcell base stations (MiBSs) [3]. For joint computational and communication services, small cell with computation and storage abilities such as Small cell cloud enhanced eNodeB (SCcNB) and femtolet, has been discussed in [4]. The remote cloud based offloading [5, 6] increases the latency [7, 8], which the use of edge/fog computing [1, 9] can resolve. In this paper, a partial computation offloading strategy is proposed for microcell-femtolet based network, where femtolets [4] are used inside the microcell to provide good coverage at indoor region. The objectives of the proposed work are summarized as:

- A task containing a number of jobs will be offloaded. Therefore, in partial offloading the decision making regarding which job will be offloaded and which one will be locally executed, is a major concern.
- As the user device is a mobile device, the user will be at indoor or outdoor region. Therefore, it is another challenge to provide the user partial computation offloading at minimal latency and power consumption despite its presence at indoor or outdoor region.

To attain the objectives, the contributions of this paper are:

- A partial computation offloading strategy is proposed for microcell-femtolet based edge-cloud network. When a computation has to be partially offloaded, the task is decomposed into two segments: one containing the jobs to be locally executed and another segment containing the jobs to be offloaded. Based on the deadline, amount of computation to be performed, and inter-dependency among the jobs, it is decided whether to locally execute or offload a job.
- If the requesting device is registered under a femtolet at indoor region, the computation is partially offloaded to the femtolet. Otherwise, if the user is under the MiBS, the computation is partially offloaded to the edge server. If the user is disconnected before delivering the result, the edge server/femtolet sends the result to the cloud along with the device ID. The cloud sends the result to the mobile device via a push notification message. Theoretical and experimental results show that the proposed method provides partial computation offloading at low latency and low power consumption of the mobile device than the existing schemes.

Rest of this paper is organized as: Section 2 discusses the proposed partial computation offloading method, in Section 3 the calculation of offloading latency and power consumption of the user device are illustrated, Section 4 discusses the theoretical and experimental results, and finally Section 5 concludes the paper.



ysis.

*Theoretical analysis:* For theoretical analysis MATLAB2015 is used. In Fig.1 the average latency in partial computation offloading using the proposed and existing strategies are presented. In Fig.2 the average power consumption of the mobile device during offloading using the proposed and existing strategies are presented. In the proposed scheme partial computation offloading is performed either to the femtolet or edge server. It is considered that for half of the requests, offloading takes place to the femtolet, and for the rest half of the requests, offloading takes place to the edge server. The average offloading latency for the proposed scheme is calculated using equation (3) and the average power consumption of the mobile device during offloading is calculated using equation (4). To compare with the proposed approach, the latency in case of partial offloading to the cloud [5, 6] is also calculated. This is observed that the offloading to the femtolet using the proposed scheme reduces the latency by approximately 40-50% than offloading to the cloud. This is also observed that the offloading to the edge server using the proposed scheme reduces the latency by approximately 30-40% than offloading to the cloud. This is also observed from the offloading to the femtolet/edge server (considering equal number of requests) using the proposed scheme reduces the latency by approximately 35-45% than offloading to the cloud respectively. This is observed that the offloading to the femtolet using the proposed scheme reduces the power consumption of the mobile device by approximately 20% than offloading to the cloud. This is also observed that the offloading to the edge server using the proposed scheme reduces the power consumption of the mobile device by approximately 2-10% than offloading to the cloud. This is also observed that the offloading to the femtolet/edge server (considering equal number of requests) using the proposed scheme reduces the power consumption of the mobile device by approximately 10-15% than offloading to the cloud.

*Experimental analysis:* In experimental analysis a mobile phone with 2GB RAM is used as the user device and the device is connected to an edge device having 4 GB RAM and 250 GB HDD. To compare the proposed scheme with the cloud based scheme a VM instance of 3.75 GB RAM and 250 GB HDD has been taken in Google Cloud Platform. For experimental analysis, three codes are partially offloaded. Each of the three codes are divided into two segments, which execute separately. However, to get the final result the output of one segment has to be provided as input to another segment. Here, the codes of binary search, finding adjoint of a matrix, and copy and encrypt the content of a file, are considered. The latency in local execution and offloading while using the proposed scheme and cloud based scheme are presented in Table 1. The power consumption of the mobile device during the total period is presented in Table 2. From the experimental results this is observed that partial offloading to the edge device reduces the latency and power consumption of the user device by approximately 25-31% than the cloud based partial offloading scheme.

The theoretical and experimental results show that partial offloading to the edge device using the proposed scheme reduces the latency and power consumption of the user device. Thus, the proposed approach can be referred as a fast and green offloading scheme.

## 5 Conclusion

In this paper a partial computation offloading strategy is proposed for microcell-femtolet based future generation edge-cloud network. This is assumed that a mobile device is either connected with a femtolet if the user is at indoor region or the MiBS if the user is at outdoor region. When a computation has to be partially offloaded, the task is partitioned into two segments, each containing jobs. Based on the deadline, computation intensity and inter-dependency among the jobs it is decided whether to locally execute or offload a segment. For offloading a segment either the femtolet or the edge server attached with the MiBS is used, based on the user's presence at indoor or outdoor region. This is observed from the theoretical and experimental results that partial offloading to edge device using the proposed scheme reduces the latency and power consumption of the user device with respect to the cloud based partial offloading scheme.

## References

- [1] K. Peng, V. Leung, X. Xu, L. Zheng, J. Wang, and Q. Huang, "A survey on mobile edge computing: focusing on service adoption and provision," *Wireless Communications and Mobile Computing*, vol. 2018, 2018.
- [2] Y. Liu, C. Yang, L. Jiang, S. Xie, and Y. Zhang, "Intelligent edge computing for iot-based energy management in smart cities," *IEEE Network*, vol. 33, no. 2, pp. 111–117, 2019.
- [3] P. Deb, A. Mukherjee, and D. De, "A study of densification management using energy efficient femto-cloud based 5g mobile network," *Wireless Personal Communications*, vol. 101, no. 4, pp. 2173–2191, 2018.
- [4] A. Mukherjee and D. De, "Femtolet: A novel fifth generation network device for green mobile cloud computing," *Simulation Modelling Practice and Theory*, vol. 62, pp. 68–87, 2016.
- [5] L. Jiao, R. Friedman, X. Fu, S. Secci, Z. Smoreda, and H. Tschofenig, "Cloud-based computation offloading for mobile devices: State of the art, challenges and opportunities," in *2013 Future Network & Mobile Summit*. IEEE, 2013, pp. 1–11.
- [6] A. Mukherjee and D. De, "Low power offloading strategy for femto-cloud mobile network," *Engineering Science and Technology, an International Journal*, vol. 19, no. 1, pp. 260–270, 2016.
- [7] A. Mukherjee, D. De, and S. K. Ghosh, "Power-efficient and latency-aware offloading in energy-harvested cloud-enabled small cell network," in *2020 XXXIIIrd General Assembly and Scientific Symposium of the International Union of Radio Science*. IEEE, pp. 1–4.
- [8] D. De, A. Mukherjee, and D. G. Roy, "Power and delay efficient multilevel offloading strategies for mobile cloud computing," *Wireless Personal Communications*, pp. 1–28, 2020.
- [9] J. Das, A. Mukherjee, S. K. Ghosh, and R. Buyya, "Spatio-fog: A green and timeliness-oriented fog computing model for geospatial query resolution," *Simulation Modelling Practice and Theory*, vol. 100, p. 102043, 2020.

# Cloud–Fog–Edge Computing Framework for Combating COVID-19 Pandemic



Shreya Ghosh and Anwasha Mukherjee

**Abstract** In the past few decades, Internet of things (IoT)-based devices and applications have shown a rapid growth in various sectors including healthcare. The ability of low-cost connected sensors to cover large areas makes it a potent weapon in the fight against pandemics such as COVID-19. The huge amount of data generated by these sensors in a cloud architecture has led to challenges in terms of network bandwidth usage, latency, computation cost, etc. In this paper, we have proposed a cloud–fog–edge-based healthcare model that can not only help in preliminary diagnosis but can also monitor patients while they are in quarantine or home based treatment. The fog architecture ensures that the model is suited for real-time scenarios while keeping the bandwidth requirements low. Edge architecture ensures that the application is capable to collect and accumulate several contextual information from varied sensors. The proposed framework yields encouraging results in taking decisions based on the COVID-19 context and assisting users effectively.

**Keywords** Health service provisioning · Health data analysis · Cloud–fog–edge framework · COVID-19

## 1 Introduction

The COVID-19 pandemic has created an unprecedented challenge to the healthcare systems across the world. This is much more critical for the developing and under-developed countries, which often have very high population densities and limited healthcare infrastructure. Further, a large number of citizens are often needed to be quarantined or to be provided home-based treatment. Thus, there is a need of a

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S. Ghosh (✉)

Department of Computer Science and Engineering, Indian Institute of Technology Kharagpur, Kharagpur, India

A. Mukherjee

Department of Computer Science, Mahishadal Raj College, Mahishadal, Purba Medinipur, West Bengal, India

employs GPS sensor, it may be utilized for identifying disease patterns and their endemic nature. Once such patterns are identified, medical supply chains can be automated much more efficiently.

## References

1. Eldrandaly, K.A., Abdel-Basset, M., Shawky, L.A.: Internet of spatial things: a new reference model with insight analysis. *IEEE Access* **7**, 19653–19669 (2019)
2. Ghosh, S., Ghosh, S.K., Traj-cloud: a trajectory cloud for enabling efficient mobility services. In: 2019 11th International Conference on Communication Systems & Networks (COM-SNETS), 7 Jan 2019, pp. 765–770 IEEE
3. Ghosh, S., Ghosh, S.K., Buyya, R.: MARIO: a spatio-temporal data mining framework on Google Cloud to explore mobility dynamics from taxi trajectories. *J. Netw. Comput. Appl.* **15**(164), 102692
4. Ghosh, S., Ghosh, S.K., Buyya, R.: Movcloud: a cloud-enabled framework to analyse movement behaviors. In: IEEE International Conference on Cloud Computing Technology and Science (CloudCom) Dec 2019, pp. 239–246. IEEE Computer Society
5. Ghosh, S., Mukherjee, A., Ghosh, S.K., Buyya, R.: Mobi-iot: mobility-aware cloud-fog-edge-IoT collaborative framework for time-critical applications. *IEEE Trans. Netw. Sci. Eng.* (2019)
6. Mukherjee, A., Ghosh, S., Behere, A., Ghosh, S.K., Buyya, R.: Internet of health things (IoHT) for personalized health care using integrated edge-fog-cloud network. *J. Ambient Intell. Hum. Comput.* **8**, 1–7 (2020)
7. He, H., Li, R., Wang, R., Bao, J., Zheng, Y., Li, T.: Efficient suspected infected crowds detection based on spatio-temporal trajectories. [arXiv:2004.06653](https://arxiv.org/abs/2004.06653) (2020)
8. Tuli, S., Tuli, S., Tuli, R., Gill, S.S.: Predicting the Growth and Trend of COVID-19 pandemic using machine learning and cloud computing. *Internet of Things* **12**, 100222 (2020)
9. Whaiduzzaman, M., Hossain, M.R., Shovon, A.R., Roy, S., Laszka, A., Buyya, R., Barros, A.: A privacy-preserving mobile and fog computing framework to trace and prevent covid-19 community transmission. *IEEE J. Biomed. Health Inf.* **24**(12), 3564–75 (2020)
10. Ghosh, S., Ghosh, S.K.: Modeling individual's movement patterns to infer next location from sparse trajectory traces. In: 2018 IEEE International Conference on Systems, Man, and Cybernetics (SMC), 7 Oct 2018 Oct, pp. 693–698. IEEE
11. Mukherjee, A., De, D.: Femtolet: a novel fifth generation network device for green mobile cloud computing. *Simul. Modell. Practice Theory* **62**, 68–87 (2016)



# Pharmaceuticals in the Aquatic Environment and Their Endocrine Disruptive Effects in Fish

Chayan Biswas<sup>1</sup> · Sukhendu Maity<sup>1</sup> · Madhuchhanda Adhikari<sup>1</sup> · Ankit Chatterjee<sup>1</sup> · Rajkumar Guchhait<sup>2</sup> · Kousik Pramanick<sup>1</sup> 

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**Abstract** Pharmaceutical chemicals represent one of the major contaminants in the aquatic environment. Several studies have revealed their negative effects on non-target organisms. Pharmaceutical chemicals are constantly released into the environments and their chronic exposure at lower concentrations may impose a threat to the aquatic environment and human health. Pharmaceuticals have been reported in surface water as well as in groundwater which is the ultimate source of drinking water. Mostly antibiotics, anti-depressant,  $\beta$ -blocker, synthetic hormones, non-steroidal anti-inflammatory drugs, and analgesics have been detected in aquatic environments. Major sources of pharmaceuticals in the aquatic environment are sewage and WWTPs effluents, hospital discharge, and the effluents of pharmaceutical industries. Pharmaceuticals and their metabolites have been detected in fishes collected from different aquatic environments. Pharmaceutical chemicals disrupt the thyroid, reproductive, and neuroendocrine systems of fishes. The present study reviews the concentrations of pharmaceuticals in the aquatic environment and bioaccumulation in the fish body, and their toxicological impacts on the endocrine system to identify the knowledge gaps. This study suggests more extensive case studies for controlling pharmaceutical release into the environment and evaluating the ecological risks of emerging EDCs.

**Keywords** Pharmaceuticals · Endocrine disruptive chemicals · Teleost · Endocrine dysfunctions · Wastewater treatment plants

## Introduction

The aquatic pollution due to anthropogenic activities causes harmful effects to the aquatic environment and human beings as well. Industrial and hospitals effluents, sewage and wastewater treatment plants (WWTPs) effluents, agricultural pesticides and fertilizers are the major sources of various kinds of water pollutants. These pollutants in the aquatic environment enter the body of different non-target organisms interfering with their normal physiological and endocrine functions. Exogenous chemicals or pollutants can interfere with hormone-receptor interaction and disrupt their functions which affect the growth, reproduction, metabolism, and energy balance of the body. The exogenous agents that alter the synthesis, secretion and function of normal hormones of the body are collectively termed endocrine disruptive chemicals (EDCs). For different structural and functional similarities, EDCs can mimic the body's hormonal activity and exert actions through different hormone receptors like thyroid receptors, estrogen receptors, retinoid receptors and many others. It can also interfere with the pathway involved in hormonal biosynthesis. Wide ranges of EDC have been detected in aquatic environments like micro/nano plastics, heavy metals, pesticides, and pharmaceutical chemicals (Ebrahimi and Teherianfrad 2011; Rochman et al. 2014; Martyniuk et al. 2020; Schmitz et al. 2018).

With the rapid increase in the human population and advancement in the health sector, every year many new and valuable pharmaceutical drugs are coming into the market

✉ Kousik Pramanick  
kousik.dbs@presiuniv.ac.in

<sup>1</sup> Integrative Biology Research Unit (IBRU), Department of Life Sciences, Presidency University, 86/1 College Street, Kolkata 700073, India

<sup>2</sup> Department of Zoology, Mahishadal Raj College, Mahishadal, Purba Medinipur, India

- performance liquid chromatography-tandem mass spectrometry. *Chinese Journal of Oceanology and Limnology* 29 (5): 1093. <https://doi.org/10.1007/s00343-011-0225-1>.
- Nash, J.P., D.E. Kime, L.T. Van der Ven, P.W. Wester, F. Brion, G. Maack, P. Stahlschmidt-Allner, and C.R. Tyler. 2004. Long-term exposure to environmental concentrations of the pharmaceutical ethynylestradiol causes reproductive failure in fish. *Environmental Health Perspectives* 112 (17): 1725–1733. <https://doi.org/10.1289/ehp.7209>.
- Peter, M.S., and V.S. Peter. 2009. Action of thyroid inhibitor propyl thiouracil on thyroid and interrenal axes in the freshwater tilapia, *Oreochromis Mossambicus* Peters. *Journal of Endocrinology and Reproduction* 13: 37–44.
- Petitti, D.B. 2003. Combination estrogen–progesterin oral contraceptives. *New England Journal of Medicine* 349 (15): 1443–1450. <https://doi.org/10.1056/NEJMcp030751>.
- Prasad, P., S. Ogawa, and I.S. Parhar. 2015. Role of serotonin in fish reproduction. *Frontiers in Neuroscience* 9: 195. <https://doi.org/10.3389/fnins.2015.00195>.
- Praveena, S.M., M.Z.M. Rashid, F.A.M. Nasir, S.Y. Wee, and A.Z. Aris. 2021. Occurrence, human health risks, and public awareness level of pharmaceuticals in tap water from Putrajaya (Malaysia). *Exposure and Health* 13 (1): 93–104. <https://doi.org/10.1007/s12403-020-00364-7>.
- Ramirez, A.J., M.A. Mottaleb, B.W. Brooks, and C.K. Chambliss. 2007. Analysis of pharmaceuticals in fish using liquid chromatography-tandem mass spectrometry. *Analytical Chemistry* 79 (8): 3155–3163. <https://doi.org/10.1021/ac062215i>.
- Rena, G., D.G. Hardie, and E.R. Pearson. 2017. The mechanisms of action of metformin. *Diabetologia* 60 (9): 1577–1585. <https://doi.org/10.1007/s00125-017-4342-z>.
- Ricciotti, E., and G.A. FitzGerald. 2011. Prostaglandins and inflammation. *Arteriosclerosis, Thrombosis, and Vascular Biology* 31 (5): 986–1000. <https://doi.org/10.1161/ATVBAHA.110.207449>.
- Richards, L.A., R. Kumari, D. White, N. Parashar, A. Kumar, A. Ghosh, S. Kumar, B. Chakravorty, C. Lu, W. Civil, and D.J. Lapworth. 2021. Emerging organic contaminants in groundwater under a rapidly developing city (Patna) in northern India dominated by high concentrations of lifestyle chemicals. *Environmental Pollution* 268: 115765. <https://doi.org/10.1016/j.envpol.2020.115765>.
- Rochman, C.M., T. Kurobe, I. Flores, and S.J. Teh. 2014. Early warning signs of endocrine disruption in adult fish from the ingestion of polyethylene with and without sorbed chemical pollutants from the marine environment. *Science of the Total Environment* 493: 656–661. <https://doi.org/10.1016/j.scitotenv.2014.06.051>.
- Runnalls, T.J., D.N. Hala, and J.P. Sumpter. 2007. Preliminary studies into the effects of the human pharmaceutical Clofibrac acid on sperm parameters in adult Fathead minnow. *Aquatic Toxicology* 84 (1): 111–118. <https://doi.org/10.1016/j.aquatox.2007.06.005>.
- Santos, E.M., G.C. Paull, K.J. Van Look, V.L. Workman, W.V. Holt, R. Van Aerle, P. Kille, and C.R. Tyler. 2007. Gonadal transcriptome responses and physiological consequences of exposure to oestrogen in breeding zebrafish (*Danio rerio*). *Aquatic Toxicology* 83 (2): 134–142. <https://doi.org/10.1016/j.aquatox.2007.03.019>.
- Santos, L.H., M. Gros, S. Rodriguez-Mozaz, C. Delerue-Matos, A. Pena, D. Barceló, and M.C.B. Montenegro. 2013. Contribution of hospital effluents to the load of pharmaceuticals in urban wastewaters: Identification of ecologically relevant pharmaceuticals. *Science of the Total Environment* 461: 302–316. <https://doi.org/10.1016/j.scitotenv.2013.04.077>.
- Schmitz, M., M. Beghin, S.N. Mandiki, K. Nott, M. Gillet, S. Ronkart, C. Robert, S. Baekelandt, and P. Kestemont. 2018. Environmentally-relevant mixture of pharmaceutical drugs stimulates sex-steroid hormone production and modulates the expression of candidate genes in the ovary of juvenile female rainbow trout. *Aquatic Toxicology* 205: 89–99. <https://doi.org/10.1016/j.aquatox.2018.10.006>.
- Singh, V., and S. Suthar. 2021. Occurrence, seasonal variations, and ecological risk of pharmaceuticals and personal care products in River Ganges at two holy cities of India. *Chemosphere* 268: 129331. <https://doi.org/10.1016/j.chemosphere.2020.129331>.
- Subedi, B., B. Du, C.K. Chambliss, J. Koschorreck, H. Rüdell, M. Quack, B.W. Brooks, and S. Usenko. 2012. Occurrence of pharmaceuticals and personal care products in German fish tissue: A national study. *Environmental Science & Technology* 46 (16): 9047–9054. <https://doi.org/10.1021/es301359t>.
- Sun, L., F. Liu, H. Chen, S. Wang, X. Lin, J. Chi, Q. Zhu, and Z. Fu. 2015. Transcriptional responses in adult zebrafish (*Danio rerio*) exposed to propranolol and metoprolol. *Ecotoxicology* 24 (6): 1352–1361. <https://doi.org/10.1007/s10646-015-1510-0>.
- Tanoue, R., K. Nomiyama, H. Nakamura, T. Hayashi, J.W. Kim, T. Isobe, R. Shinohara, and S. Tanabe. 2014. Simultaneous determination of polar pharmaceuticals and personal care products in biological organs and tissues. *Journal of Chromatography A* 1355: 193–205. <https://doi.org/10.1016/j.chroma.2014.06.016>.
- Uddin, M., B. Dashgupta, M. Chowdhury, S. Rahman, M. Ahsan, M.I. Uddin, M.Y.E. Chowdhury. 2021. Evaluation of rational and irrational use of veterinary drugs in rural areas of Sylhet. *International Journal of Natural Sciences* 11 (1).
- Underwood, J.C., R.W. Harvey, D.W. Metge, D.A. Repert, L.K. Baumgartner, R.L. Smith, T.M. Roane, and L.B. Barber. 2011. Effects of the antimicrobial sulfamethoxazole on groundwater bacterial enrichment. *Environmental Science & Technology* 45 (7): 3096–3101. <https://doi.org/10.1021/es103605e>.
- Van Anholt, R.D., T. Spanings, W. Koven, and S.E.W. Bonga. 2003. Effects of acetylsalicylic acid treatment on thyroid hormones, prolactins, and the stress response of tilapia (*Oreochromis mossambicus*). *American Journal of Physiology-Regulatory, Integrative and Comparative Physiology* 285 (5): R1098–R1106. <https://doi.org/10.1152/ajpregu.00731.2002>.
- van Vuuren, R.J., M.H. Visagie, A.E. Theron, and A.M. Joubert. 2015. Antimitotic drugs in the treatment of cancer. *Cancer Chemotherapy and Pharmacology* 76 (6): 1101–1112. [www.grandviewresearch.com/industry-analysis/pharmaceutical-manufacturing-market](http://www.grandviewresearch.com/industry-analysis/pharmaceutical-manufacturing-market). Report ID: GVR-4-68039-014-2.
- Wyett, G., Y. Gibert, M. Ellis, H.A. Castillo, J. Kaslin, and K. Aston-Mourney. 2018. Metformin, beta-cell development, and novel processes following beta-cell ablation in zebrafish. *Endocrine* 59 (2): 419–425. <https://doi.org/10.1007/s12020-017-1502-3>.
- Yu, K., X. Li, Y. Qiu, X. Zeng, X. Yu, W. Wang, X. Yi, and L. Huang. 2020. Low-dose effects on thyroid disruption in zebrafish by long-term exposure to oxytetracycline. *Aquatic Toxicology* 227: 105608. <https://doi.org/10.1016/j.aquatox.2020.105608>.

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# A Novel Approach of Audio-Visual Color Recognition Using KNN



Bachchu Paul, Tanushree Dey, Debashri Das Adhikary, Sanchita Guchhai, and Somnath Bera

**Abstract** Speech is one of the attractive areas of the scientists to research in the field of machine learning and they got maximum success in Automatic Speech Recognition system. ASR system gradually enters its footsteps into space exploration to home automation, education sectors to commercial sector, and various public sectors in our daily life to make it more manageable and comfortable. In our proposed work, we aimed to build a model on isolated Bengali word recognition system based on different colors pronounced in Bengali dialects that provides an audio-visual presentation of the recognized color. In this research work, LPC is used for extracting speech features based on pitch and fundamental frequency and KNN classifier for recognition. The proposed system achieved 94% testing accuracy for the dataset of 1500 audio samples for 15 classes where each class represents a specific color pronounced in Bengali dialect.

**Keywords** ASR · LPC · KNN

## 1 Introduction

Enhancement of technological development becomes a blessings in account of human perspective. This advancement of technology build up a communication system between the man and machines. Speech plays the role of a communicator for ASR system. Day by day ASR system gets popularity as the system ensures the removal of language barrier for effective communication. Communication among the human is influenced by spoken language, therefore, it is quite natural for people to expect speech interface with the digital devices by which human can speak in native language. In this research work, Bangla words are used to develop our system. In Our proposed system, fifteen colors are pronounced in Bengali dialects, which are uttered by ten speakers, and finally the output is given in the form of recognized audio-visual representation. Any audio-visual system provides an opportunity for

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B. Paul (✉) · T. Dey · D. Das Adhikary · S. Guchhai · S. Bera  
Department of Computer Science, Vidyasagar University, Midnapore 721102, West Bengal, India



12. Sanjaya, W.M., Anggraeni, D., Santika, I.P.: Speech recognition using linear predictive coding (LPC) and adaptive neuro-fuzzy (ANFIS) to control 5 DoF arm robot. *J. Phys.: Conf. Ser.* **1090**(1), 012046. IOP Publishing (2018)
13. Harisha, S.B., Amarappa, S., Sathyanarayana, S.V.: Kannada speech recognition using MFCC and KNN classifier for banking applications. *IJIRCCE 2017-Int. J. Innov. Res. Comput. Commun. Eng.* **5**(1) (2017)
14. Education, P.: *Machine Learning*, 1e. Pearson Education India
15. Cunningham, P., Delany, S.J.: *k-Nearest Neighbour Classifiers* (2020). [arXiv:2004.04523](https://arxiv.org/abs/2004.04523)

# A Comparative Study on Sentiment Analysis Influencing Word Embedding Using SVM and KNN



Bachchu Paul, Sanchita Guchhait, Tanushree Dey, Debashri Das Adhikary, and Somnath Bera

**Abstract** Development of sentiment analysis is one of the most active research areas that relates natural language and social networks. In our proposed work, we have done sentiment analysis on an annotated list of positive and negative sentiment words from dataset opinion-lexicon-English. Here to perform our task, we used pretrained word embedding that converts words into numeric vectors and forms the basis for a classifier. Word2vec, a commonly used algorithm, includes CBOW and Skip-gram model in learning word embedding which is basically used for calculating the word vector. Finally, feature vectors are used to train SVM and KNN classifier. Here, we got testing accuracy of 96.2% for SVM classifier and 93.4% for KNN classifier.

**Keywords** NLP · Sentiment analysis · Word embedding · Word2vec · SVM · KNN

## 1 Introduction

Sentiment is a thought influenced by feelings and emotions. The thought or feeling intended to be conveyed by words, acts, and gestures. With increasing popularities of various social networking sites, the way of expressing views, ideas have changed [1]. In recent trends, sentiment analysis is becoming a necessary tool to monitor and recognize the sentiment to upgrade customer's satisfaction and decision making. Sentiment analysis is essential to understand different opinions of the customers in business purpose which helps to take correct decisions [2]. Sentiment analysis is the interpretation and classification of emotions within text data using word embedding techniques. Sentiment analysis or opinion mining is a type of natural language processing for tracking the writer's feelings, and its aim to examine the opinions of the writer about specific entities is in positive and negative view [3].

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B. Paul (✉) · S. Guchhait · T. Dey · D. Das Adhikary · S. Bera  
Department of Computer Science, Vidyasagar University, Midnapore, West Bengal 721102, India

## 6 Conclusion

In this research work, our experiment achieved 96.2% accuracy by SVM classifier and 93.4% accuracy by KNN classifier. Our proposed work is based on CBOW and skip-gram model which is better than other word embedding techniques as both of them are probabilistic in nature. Here also, we used two simple machine learning algorithms which can get better accuracy and make our research work more flexible. But after analyzing the result, we can conclude that SVM gives better sentiment polarity than KNN. The drawback of our proposed technique is sentiment analysis which is not possible for sentence vector and predict only two polarities (positive and negative). In future, in order to use efficiency and flexibility of our methodology, we will apply sentiment analysis on Bengali words. Further, we will focus for multiple polarity and work on sentence level. We will apply our methodology for large datasets of various popular social network like chat, tweets of twitter, comments used in e-commerce sites, etc.

## References

1. Suchdev R, Kotkar P, Ravindran R, Swamy S (2014) Twitter sentiment analysis using machine learning and knowledge-based approach. *Int J Comput Appl* 103(4)
2. Preeti SD, Dahiya S (2015) Sentiment analysis using SVM and Naive Bayes algorithm. *Int J Comput Sci Mob Comput* 4(9):212–219
3. Patil G, Galande V, Kekan V, Dange K (2014) Sentiment analysis using support vector machine. *Int J Innov Res Comput Commun Eng* 2(1):2607–2612
4. Giatsoglou M, Vozalis MG, Diamantaras K, Vakali A, Sarigiannidis G, Chatzisavvas KC (2017) Sentiment analysis leveraging emotions and word embeddings. *Expert Syst Appl* 69:214–224
5. Gautam G, Yadav D (2014) Sentiment analysis of twitter data using machine learning approaches and semantic analysis. In: 2014 seventh international conference on contemporary computing (IC3) August, IEEE, pp 437–442
6. Hayashi T, Fujita H (2019) Word embeddings-based sentence-level sentiment analysis considering word importance. *Acta Polytechnica Hungarica* 16(7):152–252
7. <https://www.cs.uic.edu/~liub/FBS/sentiment-analysis.html#lexicon>
8. Deho BO, Agangiba AW, Aryeh LF, Ansah AJ (2018) Sentiment analysis with word embedding. In: 2018 IEEE 7th International conference on adaptive science and technology (ICAST) August, IEEE, pp 1–4
9. Mikolov T, Chen K, Corrado G, Dean J (2013) Efficient estimation of word representations in vector space. arXiv preprint [arXiv:1301.3781](https://arxiv.org/abs/1301.3781)
10. Rong X (2014) word2vec parameter learning explained. arXiv preprint [arXiv:1411.2738](https://arxiv.org/abs/1411.2738)
11. Mikolov T, Sutskever I, Chen K, Corrado G, Dean J (2013) Distributed representations of words and phrases and their compositionality. arXiv preprint [arXiv:1310.4546](https://arxiv.org/abs/1310.4546)
12. Kaji N, Kobayashi H (2017) Incremental skip-gram model with negative sampling. *P. Machine Learning, 1e*. Pearson Education India. arXiv preprint [arXiv:1704.03956.Education](https://arxiv.org/abs/1704.03956)
13. Huq MR, Ali A, Rahman A (2017) Sentiment analysis on Twitter data using KNN and SVM. (IJACSA) *Int J Adv Comput Sci Appl* 8(6):19–25



# Bangla Spoken Numerals Recognition by Using HMM



**Bachchu Paul, Debashri Das Adhikary, Tanushree Dey, Sanchita Guchhait,  
and Somnath Bera**

**Abstract** Speech is one of the most natural forms of vocalized communication media. Nowadays with the advancement of machine learning, different doors are opened to us for finding several standard ways to step out in the real world. ASR is just like the door to explore the concept of communication through speech between human and digital devices that can recognize speech. In this paper, we have designed a Hidden Markov Model-based isolated Bangla numerals recognition system where the Short-Term Fourier Transform is used for collecting the feature vectors. The defined system achieved 91.50% accuracy for our own dataset of 2000 uttered samples for 10 classes, which gives a satisfied result for this Bangla numerals recognition.

**Keywords** ASR · HMM · STFT · WSS

## 1 Introduction

Standard communication is always done successfully through speech. Speech helps us to complete a smooth communication among us. Those who are not computer professionals can communicate through speech because of its easiness and coziness in communication purposes. As the people of India live in a semi-illiterate country, so with the help of the application which supports speech recognition they will be more benifitable and can take the advantage of modern science. Speech recognition is the way that helps people to communicate with computer through speech. In speech recognition, isolated words are recognized and after converting it to text format, finally, it is prepared to a machine-readable format. Speech recognition performs a major role in medical unit, home automation, for growing the development of real-world market-based applications, which is used basically for commercial purposes. The application of speech recognition will become more useful in that field where the keyboard operation is not suitable. Speech is really needful to the users who mainly use hands and eyes for their work, like mail-sorter, aircraft pilot, cartographer, etc. as

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B. Paul (✉) · D. D. Adhikary · T. Dey · S. Guchhait · S. Bera  
Department of Computer Science, Vidyasagar University, Midnapore, West Bengal 721102, India

3. Hammami, N., Bedda, M., Farah, N.: Spoken Arabic digits recognition using MFCC based on GMM. In: 2012 IEEE Conference on Sustainable Utilization and Development in Engineering and Technology (STUDENT), pp. 160–163. IEEE (2012)
4. Chauhan, V., Dwivedi, S., Karale, P., Potdar, S.M.: Speech to text converter using Gaussian mixture model (GMM). *Int Res J Eng Technol* **3**(5), 160–164 (2016)
5. Rosdi, F., Ainon, R.N.: Isolated Malay speech recognition using Hidden Markov Models. In: 2008 International Conference on Computer and Communication Engineering, pp. 721–725. IEEE (2008)
6. Ali, M.A., Hossain, M., Bhuiyan, M.N.: Automatic speech recognition technique for Bangla words. *Int. J. Adv. Sci. Technol.* **50** (2013)
7. Najkar, N., Razzazi, F., Sameti, H.: A novel approach to HMM-based speech recognition systems using particle swarm optimization. *Math Comput Model* **52**(11–12), 1910–1920 (2010)
8. Paul, B., Bera, S., Paul, R., Phadikar, S.: Bengali spoken numerals recognition by MFCC and GMM technique. In: International Conference on Emerging Trends and Advances in Electrical Engineering and Renewable Energy (ETAERE-2020) (2020)
9. <https://kevinsprojects.wordpress.com/2014/12/13/short-time-fourier-transform-using-python-and-numpy/>
10. Bansal, P., Kant, A., Kumar, S., Sharda, A., Gupta, S.: Improved hybrid model of HMM/GMM for speech recognition. (2008)
11. Chavan, R.S., Sable, G.S.: An overview of speech recognition using HMM. *Int J Comput Sci Mob Comput* **2**(6), 233–238 (2013)

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**Number of books published: 03**

## Books

1. **Prakash Bisui**. Manabadhikar, Janajati O Besarkari Sangathan: Ekti Samikhya, (Bengali), Camp Publication, Kolkata, 2022, ISBN-81 86883 84 3.
2. **Deblina Hazra** (Eds.) “**Henry Fielding’s Joseph Andrews**” published by **Worldview Publications** in 2022 (ISBN: 978-93-82267-87-4).
3. Debashis De, **Anwasha Mukherjee**, and Rajkumar Buyya (Eds.). “Green Mobile Cloud Computing.” Springer Cham, 2022, eBook ISBN: 978-3-031-08038-8, Hardcover ISBN: 978-3-031-08037-1, DOI: 10.1007/978-3-031-08038-8, <https://link.springer.com/book/10.1007/978-3-031-08038-8> (Indexed in SCOPUS).

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## Book chapters

1. **Asis De**. “Refugees to Worker-migrants: Transformation of Cross-border Migration in Amitav Ghosh’s Novels” in *The Routledge International Handbook of Refugee Narratives* edited by Eryn Lê Espiritu Gandhi and Vinh Nguyen, New York: **Routledge** (e-ISBN: 9781003131458), DOI: <https://doi.org/10.4324/9781003131458>, 2023, pp. 100-111 (Forthcoming).
2. **Asis De**. ‘Mainstreaming the Marginal: Cultural Extermination and Tribal Resistance in Ranendra’s *Lords of the Global Village*’ in *Literature from the Peripheries: Refrigerated Culture and Pluralism* edited by Anjum Khan and Shubhanku Kochar, Lanham/Boulder/New York/London: **Lexington Books** (ISBN: 978-1-66692-753-5), 2023, pp. 127-141.
3. **Asis De**. ‘Becoming “more Bhutanese”’: Transnational Dislocation and Cultural Identity in Lingchen Dorji’s *Home Shangrila: A Novel from Bhutan*’ in *Collisions of Cultures: Frictions and Re-Shapings* edited by Lily Rose Tope and Wolfgang Zach, Hamburg: Verlag Dr. Kovač (ISBN: 978-3-339-13200-0), 2022, pp. 313-327.
4. Rituparna Mondal, Prasenjit Pramanik, Ranjan Kumar Jana, **Manas Kumar Maiti**, and Manoranjan Maiti. "An EOQ Model for Deteriorating Items under Trade Credit Policy with Unfaithfulness Nature of Customers." In *Engineering Mathematics and Computing*, pp. 247-273. Singapore: Springer Nature Singapore, 2022, [https://doi.org/10.1007/978-981-19-2300-5\\_17](https://doi.org/10.1007/978-981-19-2300-5_17), Print ISBN: 978-981-19-2299-2, Online ISBN: 978-981-19-2300-5.
5. Rituparna Mondal, Ranjan Kumar Jana, Prasenjit Pramanik, and **Manas Kumar Maiti**. "A Fuzzy EOQ Model for Deteriorating Items Under Trade Credit Policy with Unfaithfulness Nature of Customers." In *Real Life Applications of Multiple Criteria Decision Making Techniques in Fuzzy Domain*, pp. 453-482. Singapore: Springer Nature Singapore, 2022, [https://doi.org/10.1007/978-981-19-4929-6\\_21](https://doi.org/10.1007/978-981-19-4929-6_21), Hardcover ISBN: 978-981-19-4928-9, Softcover ISBN: 978-981-19-4931-9, eBook ISBN: 978-981-19-4929-6, Series ISSN: 1434-9922, Series E-ISSN: 1860-0808.
6. **Subhabrata Mahai**. “ASYMMETRIC SYNTHESIS,” In *Futuristic Trends in Chemical, Material Sciences & Nano Technology*, Volume 2, Book 13, Part 4, Chapter 4, IIP Proceedings, (2022): 260-270, ISSN/ISBN: 978-93-95632-67-6, <https://www.rsquare1.org/assets/docupload/rsl2023B651CA14D29DAD9.pdf>.



7. **Shyamal Mondal**. ‘Voice for the Voiceless: Reflections on Mahasweta Devi’s *Draupadi* and Toni Morrison’s *Beloved*’ in *Decoding Gender Through Literature* edited by Dr. Samrat Bisai and Raj Mukhopadhaya, **Atlantic Publishers & Distributors (P) LTD** New Delhi, 2023. ISBN-978-81-269-3603-8.
8. Anirbit Sengupta, Sayantani Ghosh, **Anwasha Mukherjee**, Abhijit Das, and Debashis De. “Quad sensor-based soil-moisture prediction using machine learning.” In *Hybrid Computational Intelligent Systems*, CRC Press, pp. 31-42, 2023, <http://dx.doi.org/10.1201/9781003381167-3>, eBook ISBN: 9781003381167.
9. **Anwasha Mukherjee**, Debashis De, and Rajkumar Buyya. “Green Mobile Cloud Computing for Industry 5.0.” In *Green Mobile Cloud Computing*, Springer Cham, pp. 3-20, 2022, [https://doi.org/10.1007/978-3-031-08038-8\\_1](https://doi.org/10.1007/978-3-031-08038-8_1), Print ISBN: 978-3-031-08037-1, Online ISBN: 978-3-031-08038-8 (Indexed in SCOPUS).
10. **Anwasha Mukherjee**, Debashis De, and Rajkumar Buyya. “New Research Directions for Green Mobile Cloud Computing.” In *Green Mobile Cloud Computing*, Springer Cham, pp. 309-320, 2022, [https://doi.org/10.1007/978-3-031-08038-8\\_16](https://doi.org/10.1007/978-3-031-08038-8_16), Print ISBN: 978-3-031-08037-1, Online ISBN: 978-3-031-08038-8 (Indexed in SCOPUS).
11. Avishek Chakraborty, **Anwasha Mukherjee**, Soumya Bhattacharyya, Sumit Kumar Singh, and Debashis De. “Multi-criterial Offloading Decision Making in Green Mobile Cloud Computing.” In *Green Mobile Cloud Computing*, Springer Cham, pp. 71-105, 2022, [https://doi.org/10.1007/978-3-031-08038-8\\_4](https://doi.org/10.1007/978-3-031-08038-8_4), Print ISBN: 978-3-031-08037-1, Online ISBN: 978-3-031-08038-8 (Indexed in SCOPUS).
12. Anindita Ray Chaudhuri, **Anwasha Mukherjee**, Debashis De, and Sukhpal Singh Gill. “Green Internet of Things Using Mobile Cloud Computing: Architecture, Applications, and Future Directions.” In *Green Mobile Cloud Computing*, Springer Cham, pp. 213-229, 2022, [https://doi.org/10.1007/978-3-031-08038-8\\_11](https://doi.org/10.1007/978-3-031-08038-8_11), Print ISBN: 978-3-031-08037-1, Online ISBN: 978-3-031-08038-8 (Indexed in SCOPUS).
13. Anshumi Banerjee, Madhuchhanda Adhikari, Chayan Biswas, Sukhendu Maity, Ankit Chatterjee, **Rajkumar Guchhait**, and Kousik Pramanick. "Contribution of Zebrafish in Cancer Research: Tiny but Not Trivial." *Handbook of Animal Models and its Uses in Cancer Research* (2023): 191, <https://doi.org/10.1007/978-981-19-3824-5>, Springer Singapore, Print ISBN: 978-981-19-3823-8, Online ISBN: 978-981-19-3823-5.
14. Madhuchhanda Adhikari, Chayan Biswas, Sukhendu Maity, Ankit Chatterjee, **Rajkumar Guchhait**, and Kousik Pramanick. "Mammalian Cells: Reliability as Model System in the Ecotoxicological Evaluation of Environmental Stressors." *Practical Approach to Mammalian Cell and Organ Culture* (2023): 1177-1204, Springer Singapore, [https://doi.org/10.1007/978-981-19-1731-8\\_22-2](https://doi.org/10.1007/978-981-19-1731-8_22-2), Print ISBN: 978-981-19-1730-1, Online ISBN: 978-981-19-1731-8.

## Patents (Published)

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# মানবাধিকার

জনজাতি ও  
বেসরকারি সংগঠন:  
একটি সমীক্ষা

প্রকাশ বিশুই



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HENRY FIELDING  
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Debashis De  
Anwasha Mukherjee  
Rajkumar Buyya *Editors*

# Green Mobile Cloud Computing

 Springer

*Editors*

Debashis De   
Department of Computer Science and  
Engineering, Centre of Mobile Cloud  
Computing  
Maulana Abul Kalam Azad University  
of Technology  
West Bengal, Nadia, India

Anwasha Mukherjee  
Department of Computer Science  
Mahishadal Raj College  
Mahishadal, Purba Medinipur  
West Bengal, India

Rajkumar Buyya  
Cloud Computing and Distributed Systems  
(CLOUDS) Laboratory  
School of Computing and Information  
Systems  
The University of Melbourne  
Parkville, VIC, Australia

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57. Soeparno, H., Perbangsa, A.S.: Cloud quantum computing concept and development: a systematic literature review. *Procedia Comput. Sci.* **179**, 944–954 (2021) 387  
388
58. Liu, L., Dou, X.: QuCloud: a new qubit mapping mechanism for multi-programming quantum computing in cloud environment. In: 2021 IEEE International Symposium on High-Performance Computer Architecture (HPCA), pp. 167–178. IEEE, Piscataway, NJ (2021) 390  
391
59. Deb, P., Mukherjee, A., De, D.: A study of densification management using energy efficient femto-cloud based 5G mobile network. *Wirel. Pers. Commun.* **101**(4), 2173–2191 (2018) 392  
393
60. Valenzuela-Valdés, J.F., Palomares, A., González-Macías, J.C., Valenzuela-Valdés, A., Padilla, P., Luna-Valero, F.: On the ultra-dense small cell deployment for 5G networks. In: 2018 IEEE 5G World Forum (5GWF), pp. 369–372. IEEE, Piscataway, NJ (2018) 394  
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## 8

# REFUGEES TO WORKER-MIGRANTS

## Transformations of Cross-Border Migration in Amitav Ghosh's Novels

*Asis De*

In *The Great Derangement*, Amitav Ghosh writes, “My ancestors were ecological refugees long before the term was invented.”<sup>1</sup> This is one of the reasons Ghosh is particularly sensitive to the unwillingly displaced populations and refugees in almost all his fictional narratives. Ghosh’s use of the term “ecological refugees” for his ancestors migrating away from the British Indian province of Bengal to Bihar in the nineteenth century due to a massive flood emphasizes that human migration due to environmental disaster is no less significant than the dislocation of millions after the turbulent politico-historical events in the post-Partition Indian subcontinent. Historically, it is a truism that the word “refugee” started permeating the Indian literary imagination mainly after the Partition of British India in 1947, and the Indian conception of “refugee” is essentially validated by a sense of the border between the two nascent nations of India and Pakistan. However, the refugee in Ghosh’s creative imagination is, more broadly, a destitute figure who witnesses the loss of almost every materiality of their past in the whirlwind of situational disasters, like Ghosh’s “ancestors sitting huddled on an outcrop, looking on as their dwellings were washed away.”<sup>2</sup> Ghosh’s refugee, fundamentally, lacks a home: either they lose it or they leave it behind. This chapter, organized into five sections, explores the evolving trajectory of Amitav Ghosh’s representation of refugees over his five major novels set in the South Asian context and beyond: *The Circle of Reason* (1986), *The Shadow Lines* (1988), *The Glass Palace* (2000), *The Hungry Tide* (2004), and *Gun Island* (2019). The first section overviews the historical and other situational contexts of cross-border migration and multiplicity of the refugee condition across Ghosh’s literary canvas. The three following sections track the transformation of Ghosh’s ethical engagement with a variety of refugees as storyteller, pinpointing the shift in his depictions of destitute twentieth-century refugees to twenty-first-century cyber-educated undocumented worker-migrants to Europe. The concluding fifth section sums up the evolution of Ghosh’s representation of refugees and their shared identity. For Ghosh, the identity of a refugee or cross-border migrant is hardly a permanent condition of exile in distress. Rather, it retains a hopeful, resilient spirit that transforms the refugee into a resident.

At its simplest, the refugee is a figure who is forced to migrate to a safer place after losing home in a conflict—be it political, ethno-religious, societal, economic, or even environmental. The statutory definition of the “refugee” in *Convention and Protocol Relating to the Status of Refugees* (1951), finally agreed upon by the United Nations in 1967, is a fair product of well-thought-out jurisprudence which justifies the logic behind the refugee’s cross-border migration and stateless condition.<sup>3</sup> However, the ground realities of refugees’ plight across the globe are very different from one instance to the other. The scenario of refugee rehabilitation and support systems for asylum seekers and illegal worker-migrants in developed countries is substantially different from that of India, Pakistan, or Bangladesh. Therefore, the narratives accommodating refugees’ experiences in these South Asian countries focus primarily on



issues like pre-migration community conflicts, the plight, and dehumanization of refugees in camps as well as in places such as railway stations and terminuses, individual memories of exploitation and injustice, the negligence of the state in rehabilitation, the use of the refugee population as vote banks by the political parties, and state-sponsored atrocities inflicted upon groups of refugees. Issues like the rights of refugees, civilian movements to broaden resource supports, and legal aids for both refugees and economic migrants—which often find place in Euro-American refugee narratives—are rarely visible in South Asian Anglophone refugee narratives. Unlike his earlier novels, Ghosh's latest novel *Gun Island* addresses these latter issues to some degree, as some of the characters enter European countries as refugees. However, Amitav Ghosh does not depict refugees as never-ending crises but as something fundamental to the human condition of the Indian subcontinent in the twentieth and twenty-first centuries. The vast tapestry of stories over time and space delineated in Ghosh's novels accommodates refugees and economic migrants as they “‘dwell in travel’ in cultural spaces that flow across borders” and contribute to the novelist's invocation of the “syncretic elements in culture(s) as a possible solution to intercultural conflict.”<sup>4</sup> Most interesting is the variety of refugee figures in his narratives. From political (the Indian Partition) refugees in *The Circle of Reason* and *The Shadow Lines*, to war refugees and ethno-religious refugees in *The Glass Palace* and *The Hungry Tide*, to ecological refugees and worker-migrants entering Europe through illegal trafficking in *Gun Island*, Ghosh's representation of border crossers evidences a wide range of ideas and ethical values.

In his book *Amitav Ghosh* (2007), Anshuman Mondal observes that “the figure of the ‘refugee’ is one that has continued to inform [Ghosh's] fiction throughout his career.”<sup>5</sup> Mondal's scholarly statement, which was made fifteen years ago, understands the “refugee” only as post-Partition destitute peasants crossing the border to seek refuge in India. To Mondal, Ghosh positions the refugee primarily as the subaltern, unwelcomed “other” to the urban “*bhadralok*, the upper and middle sections of Bengali society,” in novels like *The Circle of Reason*, *The Shadow Lines*, and *The Hungry Tide*.<sup>6</sup> Ghosh showcases the post-Partition refugees in his first two novels, *The Circle of Reason* and *The Shadow Lines*, primarily *en masse*—as a wave of faceless, destitute subjects with whom the novelist finds an ethical engagement as a storyteller. Ghosh recognizes the group identity of refugees in these novels as a reality of the time and records their destitution from the point of view of a detached empathetic observer. It is in *The Glass Palace* that Ghosh first shows a deep interest in individual stories of migration and destitution, as he tells Aldama in an interview after its publication: “And in the end my real interest is in the predicament of individuals.”<sup>7</sup> In both *The Glass Palace* and *The Hungry Tide*, Ghosh's representation of refugees becomes more intimate as he delineates a comprehensive matrix straddling both the past and the present of refugees, as the “refugee's self-identity is anchored more to who she or he was than what she or he has become.”<sup>8</sup> For example, the intimate conversation of one of the Bangladeshi refugees with Kusum, a character in *The Hungry Tide*, accommodates both the past and present of the peasant refugees:

“Once we lived in Bangladesh, in Khulna jila (district): we're tide country people, from the Sundarbans' edge. When the war broke out, our village was burned to ash; we crossed the border ... We were met by the police and taken away; in buses they drove us to a settlement camp.”<sup>9</sup>

The speaker is one of the low-caste Hindu peasants who had left their homes in Bangladesh as war victims and ethno-religious refugees and who identify themselves as the “Bastuhara” or destitute people without any home. From these “Bastuhara” (homeless) refugees rowing their boat in *The Hungry Tide* to the economic migrants on the Blue Boat stranded in the Mediterranean on its way to Italy in *Gun Island*, Ghosh's treatment of the refugee has accommodated multiplicity of vision over time.

Ghosh's representation of refugees and worker-migrants appearing as “refugees” has altered courses interestingly throughout his oeuvre: from the post-Partition ethno-religious refugees pouring in India from East Pakistan/Bangladesh in *The Circle of Reason* and *The Shadow Lines* to the state-sponsored genocide of the similar type of low-caste Hindu refugees in 1979 in *The Hungry Tide*; from the 1941 exodus of the Indian refugees from Burmese cities and towns in *The Glass Palace* to the young worker-migrants

from the twenty-first-century Indian subcontinent reaching Italy as “refugees” with the support of organized human trafficking in *Gun Island*. Amitav Ghosh’s evolving migration vocabulary clarifies why many of his major fictional characters are textually identified as migrants and not refugees, as the term “refugee” has its exclusive politico-historical dimensions in the postcolonial cultural context of the Indian subcontinent. Claire Gallien’s assessment of the term “refugee” as “an historical construction that privileged political and ideological considerations over economic and ecological ones” is, therefore, reasonably applicable to Ghosh’s ethno-religious refugees in the spatio-temporal context of twentieth-century India.<sup>10</sup> Interestingly, in *The Calcutta Chromosome* (1995) and the three novels commonly known as the *Ibis* trilogy—*Sea of Poppies* (2008), *River of Smoke* (2011), and *Flood of Fire* (2015)—Ghosh does not use the word “refugee” even once but the word “migrants” with ease. Gallien reads “migrant” as an inclusive “double-edged term” which is broadly used “to avoid discriminating between people because of their reasons for migration.”<sup>11</sup> In Ghosh’s literary imagination, the “refugee” identity stands for people migrating with surviving members of the family, whereas the economic migrants usually do not move with family but with a few close friends. However, what is common between these two categories is their ability to stand firm against situational hostilities and their resilient spirit for survival.

### “Refugees from the East”: *The Circle of Reason* and *The Shadow Lines*

While looking at post-Partition Indian Anglophone literatures, one may notice a huge concentration of authors and media pundits on the western border between India and West Pakistan and the corridor of population exchange between Delhi and Lahore, in comparison with the less visible literary attention across the border between India and East Pakistan/Bangladesh. Indian novelists like Khushwant Singh, Anita Desai, Manohar Malgonkar, and Vikram Seth have all composed narratives on the violently turbulent post-Partition days, cross-border migration, and the destitute refugees, mostly set in north-western India and Delhi. Amitav Ghosh remains the only eminent Anglophone Indian writer to focus exclusively on the refugee scenario across the borderline between India and East Pakistan. It is remarkable to note that the exact phrase “refugees from the east” appears in Ghosh’s first two novels—*The Circle of Reason* and *The Shadow Lines*, when he first mentions the refugees in those narratives.

Amitav Ghosh’s debut narrative, *The Circle of Reason*, “suggests that its author feels very deeply indeed, about history’s victims ... who are forced into exile by events beyond their control.”<sup>12</sup> The Indian locale in the first part of the narrative is “a village called Lalpukur, about a hundred miles north of Calcutta, near the border,” where “most of the villagers were refugees from the east.”<sup>13</sup> Ghosh’s treatment of the refugee issue is both spatial and temporal, as he specifies the positionality of the Indian village “near the border” between India and East Pakistan, where post-Partition political refugees find shelter as “history’s victims.”<sup>14</sup> The majority of refugees who pay the price of Partition have been “vomited out of their native soil years ago ... and dumped hundreds of miles away” in Lalpukur, which serves as nothing but “a dumping-ground for the refuse from tyrants’ frenzies.”<sup>15</sup> In this narrative, the refugees have been delineated as human waste expelled from their homes as part of the ethnic cleansing of the poor Hindus from East Pakistan. The specific use of the word “vomit” in Ghosh’s narrative recalls Zygmunt Bauman’s idea of the stranger, the political and ideological “other,” as does his conception of exclusion as the process of “vomiting the strangers, banishing them from the limits of the orderly world”: “cleansing—expelling the strangers beyond the frontiers of the managed and manageable territory.”<sup>16</sup>

Ghosh insists further on the historicity of exclusion as a process of expulsion of the ethno-religious “other” from the territoriality of East Pakistan, which continues for decades and reaches its zenith during the civil war and “genocide in Bangladesh”: “borders dissolved under the weight of millions of people in panic-stricken flight from an army of animals.”<sup>17</sup> The “panic-stricken flight” of millions of refugees from Bangladesh in fear of violence and persecution ends in Lalpukur, the place that offers the much sought-for “consolation of a sort—refuge.”<sup>18</sup> Ghosh uses the word “refuge” thrice and the word “refugee” twice in *The Circle of Reason* but remarkably uses the plural form “refugees” five times to emphasize his preference for the representation of their group condition—a portrayal of the refugees

as a faceless collectivity. The representation of the refugee habitus cropping up like make-shift ghettos at Lalpukur in *The Circle of Reason* implies camaraderie among the destitute migrants, and a sense of refugee solidarity while settling down in a new country.

In *The Circle of Reason*, Ghosh implies that the refugees should be considered more than a regional issue with limited impact on the social life of the host nation. Poverty and destitution make the refugees so vulnerable that people with evil intentions often take advantage of them, as Jyoti Das, the police officer in the narrative, apprehends: “there were so many refugees in those border areas and they were *good clay for anyone’s hands*.”<sup>19</sup> The probability of the misrecognition of the refugees as criminals, prostitutes, and half-paid laborers, is evoked in the phrase “good clay for anyone’s hands.” Ghosh addresses this issue prominently in *The Hungry Tide*, discussed in the next section. In the second part of *The Circle of Reason*, it appears that Ghosh shifts his attention from the ethno-religious refugees as he does not use the word “refugee” even once and concentrates on the story of Alu’s migration to al-Ghazira. However, Robbie B. H. Goh reads Alu’s immigrant positionality “as a refugee in al-Ghazira,”<sup>20</sup> although Alu is neither a post-Partition refugee nor an ethno-religious victim fitting into Ghosh’s usual pattern of political refugee-hood in the novel. Moreover, Alu is not an economic migrant who reaches al-Ghazira chasing the dream of an affluent future but a suspect of crime being chased by the police. In sum, in his literary debut, Ghosh responds to the refugee issue from an immediate sense of ethical responsibility, as it was an unavoidable reality during the 1970–80s.

*The Shadow Lines*, Ghosh’s second novel, is a more concentrated literary meditation on the ideas of nation, freedom and borders, communal violence and migration, and the moral and ethical responsibilities of a writer whose “life had been affected by civil violence,” alongside “the effects of fear on memory and one’s engagement with the world.”<sup>21</sup> The portrayal of refugees as group identity is more vivid than the previous novel, and it becomes evident from Ghosh’s preference for the plural: the word “refugee” appears once, but “refugees” ten times. However, the first sentence on the refugees in *The Shadow Lines* appears identical with *The Circle of Reason*: “There were only a few scattered shacks on Gariahat Road then, put up by the earliest *refugees from the east*.”<sup>22</sup> The location of the “few scattered shacks” on a particular road in south Calcutta makes it clear that the refugees are no longer confined to “some far-flung refugee camp on the border.”<sup>23</sup> The landscape in the southern fringe of Calcutta appears “filthy” to Tha’mma, a major character in *The Shadow Lines*, “all because of the refugees, flooding in like that”: “Rows of shacks appeared on both sides of the road [now], small ramshackle structures, some of them built on low stilts, with walls of plaited bamboo, and roofs that had been patched together somehow out of sheets of corrugated iron.”<sup>24</sup> The considerable refugee influx, consequent transformation of landscape and the attitude of the residents of Calcutta to refugees in [part two](#) of the novel could be seen as “evidence of how refugees were deeply unwelcome in capital cities in the immediate aftermath of partition.”<sup>25</sup> Ghosh’s distinction between the pre-Partition migrants settled in Calcutta and the post-Partition East Pakistani refugees pouring into the city finds fictional expression in the snapping remark of Tha’mma: “We’re not refugees. . . . We came long before Partition.”<sup>26</sup> Tha’mma and her family came from Dhaka and settled in Calcutta “long before Partition,” so how could she be a refugee? The temporal distinction between the “pre-” and the “post-” Partition appears more significant in constructing refugee identity in the Indian mindset than the spatial difference between Dhaka and Calcutta.

Ghosh’s depiction of both post-Partition Hindu and Muslim refugees in *The Shadow Lines* appears impartial, as to him, it is destitution and *not* religion that shapes the identity of a refugee. As he mentions the illegal squatting of the Hindu refugees in Calcutta, so he describes the forced occupation of Tha’mma’s ancestral house in Dhaka by Muslim refugees “who had gone across from Bihar.”<sup>27</sup> Some readers may find the forced occupation of minority households an act of violence, but it is historically a truism that both “India and Pakistan responded with a series of legislation around ‘evacuee’ property that effectively legalised this de facto transfer of property from minorities to refugees as part of the solution to the crisis of accommodation.”<sup>28</sup> While referring to the Khulna riots of 1964, the narratorial voice resonates with empathy: “Hindu refugees began to pour over the border into India . . . towns and cities of East Pakistan were now in the grip of a ‘frenzy’ of looting, killing and burning.”<sup>29</sup> An identical

feeling overpowers the narrator as he witnesses a similar “frenzy” in Calcutta: “Mobs went rampaging through the city, killing Muslims and burning and looting their shops and houses.”<sup>30</sup> Ghosh’s sardonic humor comes ablaze as the narrator talks about the “printed pictures of weeping, stranded Hindu refugees” on the pages of a few Calcutta dailies alongside the apathetic indifference of elite visitors of Moulin Rouge, the luxurious bar on Park Street in Calcutta: “it was business as usual, with a tea dance from 5 to 7 p.m. and a Dinner Dance with Delilah accompanied by the ‘popular Moulin Rouge quintette.’”<sup>31</sup> *The Shadow Lines* also critiques the forgetting of the historical contribution of ordinary people in alleviating the frenzies across shadowy borders between the nations: “there were innumerable cases of Muslims in East Pakistan giving shelter to Hindus ... and equally, in India, of Hindus sheltering Muslims. But they were ordinary people, soon forgotten.”<sup>32</sup> The reference to “ordinary people” emphasizes Ghosh’s ethical responsibility to humanity in general and his moral acknowledgment of common people who saved the lives of refugees.

### Refugees and Forgotten History: *The Glass Palace* and *The Hungry Tide*

As *The Circle of Reason* and *The Shadow Lines* contextualize refugee movements in the political historicity of Indian Partition and the Liberation War of Bangladesh, *The Glass Palace* depicts the marginalized history of forced displacement during the anti-Indian riots in Burma, which resulted in an exodus of Indians from colonial Burma in 1941. Due to this shift in spatio-temporal context, Ghosh does not apparently consider the Indian immigrants as refugees since most of the narrative covers the historical time of British colonial rule in the Indian subcontinent, making the ideas of a stable Indian nation and its international border invalid. To Ghosh, as the resident Indians are not the ethno-nationals of Burma but successful economic migrants there, the Burmese people wanted to free their economic space in the name of ethnic cleansing. The anti-Indian riots may be seen as a totalitarian act of violent repatriation of the Indian economic migrants, who finally leave the country like refugees. However, in this grand narrative consisting of 48 chapters, Ghosh uses the word “refugee” only twice and “refugees” just 5 times within the final 15 chapters. The readers come across the word “refugee” first in [chapter 33](#), when the Indian lawyer Mr. Khan visits Rajkumar’s house in Rangoon and informs him about the decision taken in “a meeting of some of the city’s most prominent Indians” to form “a Refugee Evacuation Committee” in “fears of a coming catastrophe,” as “the committee’s intentions were to get as many Indians out of Burma as possible.”<sup>33</sup> Rajkumar refutes any possibility of migration initially, but as the situation grows hostile fast and his eldest son Neel dies during the chaos of a Japanese air raid, he agrees to move to India. As the air was heavy with mutual distrust and escalating ethnic conflict between the Indians and the Burmese, thousands of Indians started heading toward a safer destination: “towards the northern, landward passage to India—a distance of more than a thousand miles ... their possessions bundled on their heads; they were carrying children on their backs; wheeling elderly people in carts and barrows.”<sup>34</sup> The spectacle that Rajkumar and his family witness on their way to Calcutta is unnerving: “some thirty thousand refugees were squatting along the river-bank, waiting to move on. ... Great numbers of refugees were still arriving, every day.”<sup>35</sup> The city of Rangoon certainly did not have such a huge Indian population, but as Hugh Tinker finds it, “spectacle of the Rangoon Indians fleeing in terror inevitably produced a reaction among the Indian population in all the up-country towns,” who also joined in the exodus.<sup>36</sup>

Ghosh’s narrator describes the details of the migratory flight of refugees in poignant language that finally reaches its climax with Manju’s death by drowning while ferrying across a river. Rajkumar and his wife Dolly reach Calcutta with their infant granddaughter Jaya like “starving migrants from the countryside” and approach Uma for shelter. The narrator sums up the situation of Rajkumar: once a business tycoon of Rangoon, now a dependent, “Uma was a benevolent benefactress; he a near-destitute refugee.”<sup>37</sup> In Ghosh’s fictional representation of refugees, destitution is the crucial feature. However, what makes Rajkumar stand out is his resilient spirit, and his resourcefulness which holds him strong even in the face of acute distress. In *The Glass Palace*, Ghosh represents a unique refugee-responsive



*imaginary* in a different historical and humane matrix than the other novels. Was Rajkumar a war refugee or a victim of ethnic conflict? How could Rajkumar be a refugee in Calcutta, as his ancestral origin was in British-occupied India? The issues of rootedness and territoriality are so complex in the case of Rajkumar that the reader feels no surprise when he recollects the glory of Burma in his refugee condition in Calcutta: “Ah, Burma—now, Burma was a golden land,” or his fascination for Burmese cuisine, the “mohingya” noodles in particular. In the remaining twenty years of his “new life” as a dependent refugee at Uma’s house in Calcutta, Rajkumar remembers neither the distress he and his family members endured during the exodus nor does he recount the loss of his son and daughter-in-law, as if it was a chapter forgotten forever.<sup>38</sup> These simultaneous processes of selective remembering and forgetting improve his access to rights in the context of the host society and may be seen as a constitutive part of the refugee experience.

Ghosh’s next novel, *The Hungry Tide*, also grapples with refugees’ forgotten history. It returns to the settlement of refugees from Bangladesh in the Indian part of Sundarbans and their forced evacuation from the island of Morichjhāpi by the state, resulting in a genocide which lapses soon into collective forgetting. Here Ghosh treats refugees as a collective entity of poor and low-caste people who flee the communal violence of Bangladesh and enter the Indian part of Sundarbans for survival “in successive waves, some after the partition of the subcontinent in 1947 and some after the Bangladesh war of 1971.”<sup>39</sup> The novelist uses the word “refugees” 16 times, though his center of attention is the Morichjhāpi massacre of 1979, which Mondal describes as “a marginalized episode in the coercive history of the modern postcolonial Indian state.”<sup>40</sup> Ghosh uses the word “refugees” first in relation to the Morichjhāpi incident in chapter four amid a conversation between Nilima and Kanai:

“It was around the time of the *Morichjhāpi* incident, so I was beside myself with worry.”

“Oh?” said Kanai. “What was that? I don’t recall it exactly.”

“Some refugees had occupied one of the islands in the forest,” Nilima said. “The government wanted to force the refugees to return to their resettlement camp in central India.”<sup>41</sup>

Kanai’s reaction after listening to the reference of “the Morichjhāpi incident” and his failure to “recall it exactly” emphasize the public amnesia of this marginalized history. The literary reconstruction of the Morichjhāpi incident finds exposure through Nilima’s memory and the diary Nirmal had written before his death in 1979. Nilima retrieves from her memory all the relevant information in a journalistic manner, whereas Nirmal’s diary is an intimate documentation spirited with revolutionary idealism. The novelist “has enlivened the *fabula* of Morichjhāpi eviction into a beautiful *syuzhet*” that perfectly describes “the essential conflict arising between the human struggle for survival and the interdependency with nature.”<sup>42</sup> As *The Hungry Tide* displays cross-border migration of refugees on political and ethno-religious grounds, so it accommodates intra-national counter-migration of the refugees from the resettlement camp in central India to Sundarbans for familiar environment, as they “*have always lived—by fishing, by clearing land, and by planting the soil.*”<sup>43</sup>

Chapter 19 of *The Hungry Tide*, with its historically significant title “Morichjhāpi,” contextualizes the refugees as “the poorest of rural people, oppressed and exploited both by Muslim communalists and by Hindus of the upper castes.”<sup>44</sup> Nilima identifies these peasants as low-caste “Dalits” who came to Morichjhāpi not from Bangladesh directly but “from a government resettlement camp in central India” situated at “a place called Dandakaranya ... hundreds of miles from Bengal.”<sup>45</sup> After enduring the hostile people and environment of Dandakaranya for a decade, as Nilima tells Kanai, many refugees “*organized themselves* and broke out of the camp” and “moved eastward in the hope of settling in the Sundarbans.”<sup>46</sup> The reader may notice refugee solidarity in their “organized” resistance and counter-migration to the familiar riverine environment of Sundarbans. One of the refugees confesses before Kusum—“*we love our tide country mud ... rivers ran in our heads, the tides were in our blood.*”<sup>47</sup> The use of first person collectives, “we” and “our,” emphasizes the warmth of the bond between the refugees and their familiar riverine environment. The idea of refugee solidarity finds an intimate involvement in

this narrative, as Kusum reflects: “*these were my people, how could I stand apart? We shared the same tongue, we were joined in our bones; the dreams they had dreamt were no different from my own.*”<sup>48</sup>

Nirmal’s diary in *The Hungry Tide* could be seen as an “apology” of a left-wing idealist who laments the “anti-human” stand of the then Left Front government of West Bengal that prioritized the project of wildlife conservation over refugee rehabilitation. Nirmal’s concern for refugees appears identical to Kusum’s anxiety, as Nirmal’s diary chronicles Kusum’s words on the face of eviction—“Who are these people, I wondered, who love animals so much that *they* are willing to kill *us* for them?”<sup>49</sup> An amazing reversal of the binary between “they/us” takes place as Nirmal, despite being an Indian citizen, stands in solidarity with the dispossessed refugees. The description of the refugee-boat in Nirmal’s diary, defiantly moving against a speedboat of the police deployed for eviction, upholds the spectacle of refugee solidarity: “*the people in the boat joined together their voices and began to shout, in unison, ‘Amra kara? Bastuhara. Who are we? We are the dispossessed.’*”<sup>50</sup> Nirmal’s leftist ideology of privileging the rights of the dispossessed leads him to a philosophical reflection, which could be considered as Ghosh’s statement on belonging and identity: “*Where else could you belong, except in the place you refused to leave.*”<sup>51</sup> Shameem Black convincingly demonstrates how Ghosh’s narrative “uncovers a past in which refugees compete for legitimacy on tideland islands with endangered tigers.”<sup>52</sup> Black’s idea of the refugees’ competition “for legitimacy” on the rights of the tideland with “endangered tigers” points out the fountainhead of existential conflict between the humankind in destitution and the *other* non-human species on the face of extinction. Ghosh’s treatment of the refugees finds a significant transformation in *The Hungry Tide*, as he introduces the conflict between social and environmental justice: the already rehabilitated refugees’ yearning for the riverine ecology and settling down in the island of Morichjhāpi and the eventual state-sponsored eviction and genocide of refugees on the ecological grounds of tiger conservation.

### **Ecological Refugees and Worker-Migrants across the Mediterranean: *Gun Island***

*Gun Island*, Ghosh’s latest novel as of the time of writing, may appear like a sequel to *The Hungry Tide* as some of its characters and themes reappear. The idea of environmental migration introduced in *The Hungry Tide* 15 years earlier and the notion of “ecological refugees” showcased in *The Great Derangement* in 2016 find more space in this narrative, as Ghosh accommodates an ecological dimension alongside the politico-cultural context of ethno-religious refugees from East Pakistan/Bangladesh. The “steady flow of refugees from East Pakistan” and the fresh arrival of “many more hungry mouths” after an environmental disaster “known as the Bhola cyclone” in mid-November 1970 sets the spatio-temporal context of both the political refugees and the ecological migrants in *Gun Island*.<sup>53</sup> Whereas the narrator-protagonist Dinanath is a descendant of Partition-refugees—“my parents and grandparents had crossed over to India when the subcontinent was partitioned,” Ghosh’s shocking metaphor of “hungry mouths” emphasizes the severe destitution of ecological refugees.<sup>54</sup> The character of Lubna Alam recounts to Dinanath how a climate catastrophe destroyed their ancestral house in Bangladesh before they arrived in Europe: “Everything’s gone now; the house, the people—the water’s taken it all.”<sup>55</sup> The narrator also refers to the evacuations before “Cyclone Aila, which hit the Sundarbans in 2009,” and its “long-term consequences” as “communities had been destroyed and families dispersed”: “the young had drifted to cities, swelling already-swollen slums,” and the elderly “had taken to begging on the streets.”<sup>56</sup> Devastating climate events like storms and floods often compel the people of Sundarbans to migrate to far-off places as refugees.

In *Gun Island*, Ghosh uses a transcontinental spatiality as his characters move between Asia, the United States, Europe, and Northern Africa. The novelist’s treatment of the refugees and cross-border migrants takes a giant leap as he includes the twenty-first-century European “refugee crisis” (2015–16) alongside the economic migration of young South Asians with the support of international trafficking networks. In *Gun Island*, Ghosh uses the word “refugees” 35 times and its Italian equivalent “rifugiati” 8 times, alongside the word “migrants” 18 times and its Italian form “immigrati” twice—a pervasive coverage never found in any of his earlier narratives. As most of the characters move across the borders

of multiple cultural spaces, Ghosh takes the freedom of using an expansive multilingual vocabulary, even accommodating words from the register of cyber technology and social media. Moreover, some of the women characters appear remarkably active in ameliorating the plight of refugees: Gisella and Imma adopting “two orphaned refugees—a six-year-old girl from Syria and a boy of seven from Eritrea”; the Bangladeshi lady Lubna, an environmental refugee and now a travel agent in Venice, supporting young worker-migrants as a benefactress by making them aware of “rights under the law and things like that”; and Piya, reappearing after *The Hungry Tide*, participating in an expedition to rescue the stranded refugees “on the Blue Boat.”<sup>57</sup>

Bilal and Palash, the two Bangladeshi migrants, working as Lubna’s assistants in Venice, are literary representations of South Asian economic migrants who populate the working class in the service industry of several European cities. In *Gun Island*, Ghosh puts forward the tricky difference between the politico-legal status of “refugees” and that of the “worker-migrants,” which constitutes the core of global debates over the “European Refugee Crisis” (2015–16). As per the European Agenda on Migration<sup>58</sup> and the norms on the status and rights of refugees set by the UN in the 1951 Convention and 1967 Protocol, illegal economic migrants entering Europe through trafficking are not eligible for legal protection and the status of “refugees.” However, in reality, some pro-refugee political organizations and liberal activists advocate for equal rights and legal status for every migrant and asylum seeker on par with refugees on humanitarian grounds. Unlike Ghosh’s earlier narratives which showcase the political and ethno-religious refugees in India in the last century, *Gun Island* focuses on the increasing complications of undocumented cross-border migrations in this age of economic globalization.

The young worker-migrants from South Asia, particularly from Bangladesh, constitute a large population of “the *rifugiati* and *immigrati*”<sup>59</sup> in Italy. Gisella, alias Gisa, who has been “commissioned by a consortium of television channels” to make a documentary on refugees, informs Dinanath: “last month Bangladeshis were the second largest group coming into Italy.”<sup>60</sup> Gisa also informs Deen about the news of “a boatload of refugees” which has been “spotted in the eastern Mediterranean.”<sup>61</sup> She further illustrates how worker-migrants from Bangladesh take advantage of entering Europe with a motley group of refugees dispatched by traffickers from Egypt: “a *gruppo misto* with Eritreans, Egyptians, Ethiopians, Sudanese, and maybe some Bengalese as well. That’s been the pattern with boats from Egypt.”<sup>62</sup> The description of Rafi’s overland cross-border migration from Turkey to Bulgaria with a group of refugees of mixed ethno-nationalities appears identical to Gisa’s statement: “there were a few Bengalis among them, but the others were from Iraq, Syria, Afghanistan, Somalia, Pakistan and some other countries, too.”<sup>63</sup> The young Bangladeshi worker-migrants who reach the European coastline as “refugees” are not destitute war refugees or asylum seekers but belong to middle-class families. They can afford the cost of illegal cross-border migration through an organized human trafficking system “with tentacles that reach into all regions and most countries in the world.”<sup>64</sup> Cheap smartphones and easily available Internet facilitate undocumented transnational movements of worker-migrants, as Ghosh points out in an authorial meet: “Every migrant, basically their movements are made possible through cell phones: the payments to the traffickers, the destinations where they are going—all of it is completely tied to this technology.”<sup>65</sup> In this age of advanced cyber technology and social media, cell phones act as agents to dismantle ties with the familiar local and provoke the young minds of the Global South for the distant Global North, where life appears glamorous. Moreover, the desire for social prestige in the homeland and the dream of sending home hefty remittances entice the young Bangladeshi worker-migrants so thoroughly that they risk the Mediterranean in leaky boats or rubber rafts and land ultimately upon a system of disguised slavery in the hands of labor recruiters. From his conversation with a Bangladeshi youth selling bottled water near Rialto Bridge in Venice, Dinanath learns that even during the fearsome cross-Mediterranean journey “in a *gommone*,” the migrant witnessed a kind of community solidarity, as he “was in a group and they crossed over together, giving hope and courage to each other.”<sup>66</sup> The worker-migrants’ travel experiences, camaraderie with people of other ethno-nationalities, and the patient “listening to the trauma of another [can] contribute to cross-cultural solidarity and to the creation of new forms of community.”<sup>67</sup>

However, apart from the fear of being capsized in the Mediterranean, Ghosh depicts in *Gun Island* the other troubles worker-migrants face during their journey: the inhumanity of the traffickers,<sup>68</sup> the risks of being victim to “the trade in human organs”<sup>69</sup> in Egypt, the anxiety of being stopped by the coastguards upon reaching the European shoreline and even the threats of “planned attacks on migrants”<sup>70</sup> in Europe. In the final chapter, Ghosh describes “the clamorous confrontation” between the “right-wing, anti-immigrant groups” and the pro-refugee activists including some major fictional characters.<sup>71</sup> In the face of the right-wing opposition to accommodating refugees and economic immigrants in Europe, activists take a significant role in organizing solidarity movements for the refugees, as Palash tells Deen how “human rights activists across Italy had decided to take up the cause of the boatload of refugees.”<sup>72</sup> Lorenzo Zamponi observes how Italy, particularly in “the last few decades, has seen a significant presence of migrants’ and migration-related political activism, both in the institutional realm and in street politics.”<sup>73</sup> However, upon locating the “refugees on the deck of the Blue Boat,” as the activists greet them with a “cheer of welcome,” the slogans from the vessels of the anti-immigrant groups—“*Go back where you came from ... Europe for Europeans,*” expound their desperate attempt “to preserve the whiteness of their own metropolitan territories in Europe.”<sup>74</sup> In the name of overseas trade and economy, the colonial guilt of “repopulating other continents” with “slaves and coolies” is historically countervailed by the migratory flow of people from the erstwhile Empires.<sup>75</sup>

## Conclusion

The transformation of refugees and cross-border migrants is visible on many levels across Ghosh’s narratives—throughout the literary representation, in the author’s thinking over time, and also in the characters’ subjectivity. From the post-Partition destitute ethno-religious refugee families flocking to India as “history’s victims” in the early novels to the ecological refugees in *The Hungry Tide* and *Gun Island*, from forced displacement to seemingly voluntary cross-border migration, Ghosh’s treatment of “refugees,” understood broadly, evidences a steady transformation.<sup>76</sup> While the narrators of the first two novels witness the refugee influx and eventual transformation of respective socio-cultural spaces like detached observers, the narrators in *The Glass Palace* and *The Hungry Tide* emphasize the transformation of destitute refugees into resilient individuals struggling to remake the new country as their home. Though ontologically distinct from refugees, young worker-migrants flocking to Europe from the Indian subcontinent as “refugees” through organized global “trafficking in human beings” in *Gun Island* is the latest phase in the evolution of the refugee figure in Ghosh’s narratives.<sup>77</sup> Whereas the twentieth-century ethno-religious and ecological refugees in Ghosh’s novels seek socio-cultural assimilation in the host nations as they have no ancestral homes to return to at their places of origin, the worker-migrants in *Gun Island* prefer dual citizenship as their politico-national identity.

The sea-change in Amitav Ghosh’s representation of refugees finds expression also in the use of language: unlike the victim groups of refugees in the earlier novels, the young worker-migrants in *Gun Island* appear skilled in multilingual conversation, another form of cross-border extraterritoriality which interrogates the supposedly default monolingual imaginary along national borders and simultaneously attempts to establish new literary geographies more cosmopolitan in nature. Worker-migrants in Ghosh’s latest novel hardly lament the loss of roots like the destitute, anxious refugees of the earlier narratives but instead accommodate the realities of transcontinental routes to live their dreams. The element that puts the twentieth-century transnational refugees in a common frame of solidarity with the twenty-first-century cyber-literate, transcontinental worker-migrants is, as Tipu tells Dinanath in *Gun Island*, “their stories”: “story of persecution if you want them to listen to you.”<sup>78</sup> In sum, the figure of the refugee in Ghosh’s narratives has transformed over time, even as he consistently attends to the socio-economic and cultural specificity of South Asian migrants via the strong ethical engagement of a storyteller.



## Notes

- 1 Ghosh, *The Great Derangement*, 4.
- 2 Ghosh, *The Great Derangement*, 5.
- 3 UN General Assembly, "Convention Relating to the Status of Refugees," 153.
- 4 Dixon, "'Travelling in the West,'" 10; Hoydis, "*Tackling the Morality of History*," 25.
- 5 Mondal, *Amitav Ghosh*, 2.
- 6 Mondal, *Amitav Ghosh*, 3 (original emphasis).
- 7 Ghosh, "An Interview with Amitav Ghosh," interview by Aldama, 86–87.
- 8 Daniel and Knudsen, "Introduction," in *Mistrusting Refugees*, 5.
- 9 Ghosh, *The Hungry Tide*, 164–5 (original emphasis).
- 10 Gallien, "'Refugee Literature,'" 723.
- 11 Gallien, "Forcing Displacement," 738.
- 12 Hawley, *Amitav Ghosh*, 53.
- 13 Ghosh, *The Circle of Reason*, 20 (emphasis added).
- 14 Ghosh, *The Circle of Reason*, 20; Hawley, *Amitav Ghosh*, 53.
- 15 Ghosh, *The Circle of Reason*, 64 (emphasis added).
- 16 Bauman, *Postmodernity and Its Discontents*, 18 (original emphasis).
- 17 Ghosh, *The Circle of Reason*, 64.
- 18 Ghosh, *The Circle of Reason*, 64.
- 19 Ghosh, *The Circle of Reason*, 137 (emphasis added).
- 20 Goh, "Inner Circles and the Voice of the Shuttle," 208.
- 21 Ghosh, *Incendiary Circumstances*, 46; Hawley, *Amitav Ghosh*, 64.
- 22 Amitav Ghosh, *The Shadow Lines*, 8 (emphasis added).
- 23 Ghosh, *The Shadow Lines*, 8.
- 24 Ghosh, *The Shadow Lines*, 144–5.
- 25 Sen, *Citizen Refugee*, 162.
- 26 Ghosh, *The Shadow Lines*, 145.
- 27 Ghosh, *The Shadow Lines*, 149.
- 28 Sen, *Citizen Refugee*, 163.
- 29 Ghosh, *The Shadow Lines*, 252.
- 30 Ghosh, *The Shadow Lines*, 252.
- 31 Ghosh, *The Shadow Lines*, 252–3.
- 32 Ghosh, *The Shadow Lines*, 253.
- 33 Ghosh, *The Glass Palace*, 392–3.
- 34 Ghosh, *The Glass Palace*, 467.
- 35 Ghosh, *The Glass Palace*, 468.
- 36 Tinker, "A Forgotten Long March," 6.
- 37 Ghosh, *The Glass Palace*, 477; Ghosh, *The Glass Palace*, 545.
- 38 Ghosh, *The Glass Palace*, 494; Ghosh, *The Glass Palace*, 495.
- 39 Ghosh, *The Hungry Tide*, 59.
- 40 Mondal, *Amitav Ghosh*, 133.
- 41 Ghosh, *The Hungry Tide*, 26 (emphasis added).
- 42 Asis De, "Remapping the 'Bhatir Desh,'" 16; Hoydis, "*Tackling the Morality of History*," 293.
- 43 Ghosh, *The Hungry Tide*, 262 (original emphasis).
- 44 Ghosh, *The Hungry Tide*, 118.
- 45 Ghosh, *The Hungry Tide*, 118.
- 46 Ghosh, *The Hungry Tide*, 118 (emphasis added).
- 47 Ghosh, *The Hungry Tide*, 118 (emphasis added).
- 48 Ghosh, *The Hungry Tide*, 165 (original emphasis).
- 49 Ghosh, *The Hungry Tide*, 261–2 (emphasis added).
- 50 Ghosh, *The Hungry Tide*, 254 (original emphasis).
- 51 Ghosh, *The Hungry Tide*, 254 (original emphasis).
- 52 Black, "Post-Humanitarianism and the Indian Novel in English," 302.
- 53 Ghosh, *Gun Island*, 14; Ghosh, *Gun Island*, 13.
- 54 Ghosh, *Gun Island*, 22.
- 55 Ghosh, *Gun Island*, 160.
- 56 Ghosh, *Gun Island*, 48–49.
- 57 Ghosh, *Gun Island*, 128; Ghosh, *Gun Island*, 157; Ghosh, *Gun Island*, 244.

- 58 The “European Agenda on Migration,” launched by the European Commission in May 2015, prioritizes its fight against human trafficking and is structured along “four pillars: reducing the incentives for irregular migration; border management—saving lives and securing external borders; emphasizing Europe’s duty to protect implemented through a strong common asylum policy; and introducing a new policy on legal migration.” Agustín and Jørgensen, *Solidarity and the “Refugee Crisis” in Europe*, 10–11.
- 59 Ghosh, *Gun Island*, 145.
- 60 Ghosh, *Gun Island*, 146.
- 61 Ghosh, *Gun Island*, 172.
- 62 Ghosh, *Gun Island*, 173.
- 63 Ghosh, *Gun Island*, 241.
- 64 Farr, “Human Trafficking,” 124.
- 65 In a post-publication discussion of *Gun Island* on October 27, 2019 (Chicago Humanities Festival), Ghosh admits that many ideas in *Gun Island* have roots in his personal experiences of interviewing refugees in 2015–2016.
- 66 Ghosh, *Gun Island*, 219.
- 67 Craps, *Postcolonial Witnessing*, 2.
- 68 Ghosh, *Gun Island*, 236–40.
- 69 Ghosh, *Gun Island*, 262.
- 70 Ghosh, *Gun Island*, 189.
- 71 Ghosh, *Gun Island*, 274; Ghosh, *Gun Island*, 272.
- 72 Ghosh, *Gun Island*, 198.
- 73 Zamponi, “From Border to Border,” 104.
- 74 Ghosh, *Gun Island*, 276; Ghosh, *Gun Island*, 279.
- 75 Ghosh, *Gun Island*, 279.
- 76 Hawley, *Amitav Ghosh*, 53.
- 77 Ghosh, *Gun Island*, 278.
- 78 Ghosh, *Gun Island*, 62.

## Bibliography

- Agustín, Óscar García, and Martin Bak Jørgensen. *Solidarity and the “Refugee Crisis” in Europe*. Cham: Palgrave Macmillan, 2019.
- Aldama, Frederick Luis. “An Interview with Amitav Ghosh.” *World Literature Today* 76, no. 2 (2002): 84–91.
- Bauman, Zygmunt. *Postmodernity and Its Discontents*. New York: New York University Press, 1997.
- Black, Shameem. “Post-Humanitarianism and the Indian Novel in English.” In *A History of the Indian Novel in English*, edited by Ulka Anjaria, 296–309. Delhi: Cambridge University Press, First South Asian Edition, 2016.
- Craps, Stef. *Postcolonial Witnessing: Trauma Out of Bounds*. Basingstoke and New York: Palgrave Macmillan, 2013.
- Daniel, E. Valentine, and John Chr. Knudsen. “Introduction.” In *Mistrusting Refugees*, edited by E. Valentine Daniel and John Chr. Knudsen, 1–12. Berkeley, CA; Los Angeles: University of California Press, 1995.
- De, Asis. “Remapping the ‘Bhatir Dosh’: Reflections on Amitav Ghosh’s *The Hungry Tide*.” *Journal of the Department of English, Vidyasagar University* 10 (2014): 11–21.
- Dixon, Robert. “‘Travelling in the West’: The Writing of Amitav Ghosh.” In *Amitav Ghosh: A Critical Companion*, edited by Tabish Khair, 9–35. Delhi: Permanent Black, 2005.
- Farr, Kathryn. “Human Trafficking.” In *Routledge International Handbook of Migration Studies*, edited by Steven J. Gold and Stephanie J. Nawyn, 118–28. London; New York: Routledge, 2013.
- Gallien, Claire. “Forcing Displacement: The Postcolonial Interventions of Refugee Literature and Arts.” *Journal of Postcolonial Writing* 54, no. 6 (2018): 735–50.
- Gallien, Claire. “‘Refugee Literature’: What Postcolonial Theory Has to Say.” *Journal of Postcolonial Writing* 54, no. 6 (2018): 721–26.
- Ghosh, Amitav. *Gun Island: A Novel*. Gurgaon: Hamish Hamilton, Penguin, 2019.
- Ghosh, Amitav. *Incendiary Circumstances: A Chronicle of the Turmoil of Our Times*. Boston, MA; New York: Houghton Mifflin Company, 2005.
- Ghosh, Amitav. *The Circle of Reason*. Gurgaon: Penguin Books, 2009.
- Ghosh, Amitav. *The Glass Palace*. New Delhi: Harper Collins India, 2009.
- Ghosh, Amitav. *The Great Derangement: Climate Change and the Unthinkable*. Gurgaon: Allen Lane, Penguin Books, 2016.
- Ghosh, Amitav. *The Hungry Tide*. Delhi: Ravi Dayal, 2005.
- Ghosh, Amitav. *The Shadow Lines*. New Delhi: Penguin Books, 2009.

- Goh, Robbie B. H. "Inner Circles and the Voice of the Shuttle: Native Forms and Narrative Structure in Amitav Ghosh's *The Circle of Reason*." In *History, Narrative, and Testimony in Amitav Ghosh's Fiction*, edited by Chitra Sankaran, 205–17. Albany, NY: SUNY Press, 2012.
- Hawley, John C. *Amitav Ghosh*. Delhi: Foundation Books, 2005.
- Hoydis, Julia. "*Tackling the Morality of History*": *Ethics and Storytelling in the Works of Amitav Ghosh*. Heidelberg: Winter Universitätsverlag, 2011.
- Mondal, Anshuman A. *Amitav Ghosh*. Manchester; New York: Manchester University Press, 2007.
- Sen, Udit. *Citizen Refugee: Forging the Indian Nation after Partition*. Cambridge; New York: Cambridge University Press, 2018.
- Tinker, Hugh. "A Forgotten Long March: The Indian Exodus from Burma, 1942." *Journal of Southeast Asian Studies* 6, no. 1 (1975): 1–15.
- UN General Assembly. "Convention Relating to the Status of Refugees." *United Nations, Treaty Series* 189 (1951): 153. <https://www.refworld.org/docid/3be01b964.html>.
- Zamponi, Lorenzo. "From Border to Border: Refugee Solidarity Activism in Italy across Space, Time, and Practices." In *Solidarity Mobilizations in the "Refugee Crisis": Contentious Moves*, edited by Donatella della Porta, 99–123. Cham: Palgrave Macmillan, 2018.



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LITERATURE  
FROM THE  
PERIPHERIES

REFRIGERATED CULTURE AND PLURALISM

EDITED BY ANJUM KHAN  
AND SHUBHANKU KOCHAR

# Literature from the Peripheries

Refrigerated Culture and Pluralism

Edited by  
Anjum Khan and Shubhanku Kochar

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## Chapter 9

# Mainstreaming the Marginal

## *Cultural Extermination and Tribal Resistance in Ranendra's Lords of the Global Village*

Asis De

It is a truism that the academic discipline of cultural studies in the twenty-first century has been permeated with the notion of globalization<sup>1</sup> and its cognate ideas. The eminent American sociologist George Ritzer, in *The Blackwell Companion to Globalization* (2007), offers a composite definition of globalization as “an accelerating set of processes involving flows that encompass ever-greater numbers of the world’s spaces and that lead to increasing integration and interconnectivity among those spaces” (1). As the all-pervasive spatiality of the term “globalization” is apparent both in the cultural and the extra-cultural (political, historical, economic, and even the emotional) domains and debates so the geography and the counter-geography of globalization find precise exposure in ideas like “global village” (McLuhan 1962) or “global city” (Sassen 2005). In her article “The Global City: Introducing a Concept” (2005), Saskia Sassen observes that the spatiality of globalization is not just confined within the cultural models of international corporations but engages broader geography of places and people: “Recapturing the geography of places involved in globalization allows us to recapture people, workers, communities, and more specifically, the many *different work cultures*, besides the corporate culture” (32; emphasis mine). By “different work cultures,” Sassen probably refers to the plurality of cultures, a nexus of economic, political, cultural, and subjective factors shaping both the individual and community live alongside the shrinking regulatory role of the state as per one of the agenda of globalization. Unlike the concept of “global city” which mostly stands for the “localized” urban spatiality of globalization, the idea of the “global village,” first coined by Marshall McLuhan,<sup>2</sup> implies an absence

of boundary, and therefore, an infinite space. Ranendra (February 10, 1960–), multiple award-winning Hindi writer and the director of Dr Ram Dayal Munda Tribal Welfare Research Institute in Ranchi of Jharkhand, talks about a different “global village” in his novel *Lords of the Global Village* (2017), which has been translated into English from its original Hindi version<sup>7</sup> by Rajesh Kumar for publication by Speaking Tiger Books in 2017. Ranendra’s idea of the “global village,” as depicted in the novel, is quite unlike McLuhan’s notion, and very much a finite space, with a specific border including some tribal villages in the remote region of Jharkhand in India. Ranendra’s idea of the “global village,” in a rather exciting way, goes close to Sassen’s idea of the “global city,” both of which could be seen as “localized” spatial contexts upholding several cultural and extra-cultural agenda of globalization: the power of corporate economy in mainstreaming the “different work cultures” and cultural diversity of people; the extermination of the identity of the marginal tribal people in the name of modernity and development.

In his *Modernity at Large: Cultural Dimensions of Globalization* (1996), the eminent scholar of cultural studies and anthropology Arjun Appadurai offers a reasonably acceptable idea of culture: “Culture is not usefully regarded as a substance but is better regarded as a dimension of phenomena, a dimension that attends to *situated and embodied difference*” (12–13; emphasis mine). The phenomenological dimension of culture, emphasizing “situated and embodied difference,” is the crucial factor in interpreting the binary of the center and the periphery, the urban and the rural, and the mainstream and the marginal. In a notable essay entitled, “The Local and the Global: Globalization and Ethnicity,” Stuart Hall offers his clear proposition that “in our world, marginality has become a powerful space” (34). Though Hall puts his idea of “marginality” in the context of the globalized postmodern world while clarifying the position of the minority culture/s there, his notion of cultural empowerment of the local/marginal appears quite fitting in the Indian context of tribal culture/s: “Discourses of power in our society, *the discourses of the dominant regimes*, have been certainly threatened by [this] *de-centered cultural empowerment of the marginal and the local*” (34; emphasis mine). What Hall means by “the discourse of the dominant regimes” can be paralleled with the doctrine of cultural mainstreaming of the tribal communities<sup>8</sup> in postindependence India. With an inclusive vision to modernize India, the first Indian prime minister Jawaharlal Nehru emphasized industrialization and prioritized national unity<sup>9</sup> along with adopting a pro-*Adivasi* developmental policy. Nehru noticed that the British administrators “purposefully segregated the tribes from Indian society and projected them as different from mainstream civilization” (Rath 2006, 67), and he considered this as a hurdle toward an organic development of the *Adivasi* people or tribal communities. To formulate his tribal policy, Nehru sought the support of the



British missionary-turned-anthropologist Verrier Elwin and urged him to model an inclusive framework for the gradual integration of the *Adivasis* into the Indian mainstream population. After extensive field research, Verrier Elwin observed that the tribal scenario in different parts of India is not at all homogeneous and the "tribal history is rather a story of economic exploitation and cultural destruction" (Rath 2006, 67). Elwin suggested a "selective and voluntary accommodation" of industry, scientific education, and culture with the *Adivasi* culture and formulated an approach popularly known as the "leave them alone" or "national park" approach (Vaditya 148). Nehru was not happy with such isolationist formula that may leave the *Adivasi* people as an anthropological specimen in a "national park," and his idea of the *Panchsheel*<sup>6</sup> came out to be very effective in helping Elwin revising his stand: "Elwin, in fact, found much similarity between the contents of his isolationist-turned-integrationist approach and the principles of *Panchsheel*" (Rath 2006, 77). The Elwin-Nehru formula is considered the first decisive national policy for tribal development in India since its political independence from the British Raj. From a liberal-humanist perspective, this inclusive approach of cultural mainstreaming of the tribal marginal people may appear substantially positive for national unity, but simultaneously it paved the way for the extermination of unique tribal cultural identities in the face of an aggressive industrial economy.

In the Indian context of the rural and agrarian economy, the political economy of globalization and industrialization with its rhetoric of modernization and development has relatively obscured the lines between the "marginal," which have an immediate attachment with the local, and the "mainstream" having an imaginary attachment with the idea of the center/national. The spatiality of the "village" is contextual of the locality, which is theoretically opposed to the idea of the urban global and is primarily relational with the immediate annexations of the economic and the sociocultural contexts of rural community lives. The material transformation of everyday subjectivities in the lives of the marginal people is more than something one may call cultural modernization. In reality, the lure of easy life and material development is rooted in the politics of power, creating new avenues in which the interests and aspirations of the individual or community crisscross those of the nation-state. The activity of "mainstreaming" or cultural homogenization is not exclusive to this age of economic globalization but has its history in different spatiotemporal contexts across the world. Be it the case of European colonization or even the earlier imperial expansions in different continents on this planet, cultural homogenization has been conducted mostly successfully after the instructions of the ruler or the state. However, an essential difference between the earlier forms of state-sponsored cultural homogenizations (in many cases, ethno-religious homogenization) and the sort of cultural



mainstreaming in this present age of globalization is that the regulatory role of the state finds a partial replacement with the corporate agencies. In the names of socioeconomic development and easy life, corporate agencies invest and engage in rapid urbanization and ruthless industrialization under lucrative catchphrases like "Special Economic Zone."<sup>7</sup> These areas marked as "special" economic zones are basically the localized counter-geographical sites of the global cities, where cultural politics responds only in relation to economic power and in favor of cultural extermination. Without any regard to the history of the place and ethnocultural identity of the people inhabiting there, the corporate agencies attempt to alter the demography by intervening in the autonomy of cultural activities at the local level. The intervention aiming at the erasure of unique cultural identity and diversity often rises to conflicts and resistance, resulting in violence. The literary case study used in this article, Ranendra's novel *Lords of the Global Village*, tells a tale of tribal resistance against the cultural politics of totalitarianism which is enormously absorptive and located in the increasingly powerful grip of the capitalist economy. The novel upholds how corporate industrial expansionism subsumes the ways of life and the cultural identity of the tribal Asur<sup>8</sup> community in a part of the bauxite-rich Chotanagpur Plateau<sup>9</sup> in rural Jharkhand.

Ranendra's *Lords of the Global Village* straddles the aggressive march of the capitalist economy of industrialization and the eventual marginalization of the Asur people leading to cultural extermination. The locale of the narrative is a cluster of forest-clad tribal villages like Sakhuapaat, Bhaunrapaat, Ambatoli, or Koelbigha inhabited by the *Adivasi* people of the Asur community, and there is hardly any regular transport connectivity with the urban towns of Jharkhand or Odisha. The novel is divided into 26 chapters, of which the very first one contextualizes the narrator—a non-tribal young man in his twenties, who comes to join a residential tribal girls' school "in some damned miserable place called Bhaunrapaat in the Koelbigha block" (*Lords of the Global Village* [LGV] 1):

I came to Bhaunrapaat . . . clumps of forest now and then and fallow, barren fields stretching in all directions, dotted with open-cast bauxite mines. . . . Not a single civilized soul was in view. Silence reigned supreme at the onset of dusk. (LGV 3-4)

This god-forsaken hinterland becomes the "global village" of the title of Ranendra's novel, as the global corporate agencies and multinational companies are interested in the bauxite reserve under its soil. The "Lords" of this "global village" are not the *Deora*<sup>10</sup> of the Asur people nor any religious deities of the tribal people inhabiting the plateau but the mining companies and industrial groups looking aggressively for "abundant ore, most of the land, profuse forests, the resources of water and electricity, plenty of

factories, a plethora of products and full profits" (LGV 153). However, the newly appointed teacher's initial mood of dejection is gradually replaced by curiosity, and the comparatively urban, university-educated young teacher—already popular by the name of Master Sahib—himself finds drawn toward the place, the *Adivasi* people, their unique history, and cultural identity: "My yearning to find out about the Asurs had now grown stronger" (LGV 15). From the second chapter to the end of the narrative, the focus is centered on the *Adivasi* cultural space of the Asur tribe—their cultural history, the gradual decline of their legendary status from an ancient community of iron-smelters to petty landholders and laborers, their socioeconomic plight and exploitation, and finally their resistance against the aggression of cultural mainstreaming, though meek and almost mute. As the narrator is a middle-class, non-tribal Hindu youth by birth, the mystifying name of the "Asur" being portrayed in ancient Hindu scriptures and myths as demons and enemies of gods immediately draws his attention. Master Sahib recounts his initial conception of the Asur people as demonic and his subsequent disillusionment in the second chapter:

I had already heard that the region was inhabited by Asurs, but had always thought they would be *dark-skinned giants with protruding teeth and horns growing out of their heads* . . . *Lalchan's looks dispelled that myth.* (LGV 8; emphases mine)

The demystification of the appearance of real-life Asur people as not something like the mythical "dark-skinned giants with protruding teeth and horns growing out of [their] heads" enchants the narrator, and he becomes involved with these people with a deep interest in their culture. On meeting Rumjhum Asur, a university-educated youth having "an Honours degree in Sanskrit" (LGV 13) and the son of a schoolteacher, as Master Sahib asks him about his ethno-cultural identity—"The second name of your people is really astonishing, Rumjhum Bhai" (LGV 17), Rumjhum offers him two options:

*One is the stories of giants, demons and fiends heard during one's childhood. . . . The other is the photographs of loin-cloth-wearing Asur men and bare-breasted women in the 1926, 1946 and 1966 anthropology books.* (LGV 17–18; emphases mine)

The first option is the mythical representation of the Asur people in the childhood storybooks, while the other is a quasi-mythical tribal identity as primitive and declining hunter-gatherers. Both these identities appear subtly different from what Master Sahib finds as precisely real. The narrator-protagonist of Ranendra's novel understands that both these sub-human identities have been ascribed to these *Adivasi* people—the demonic identity imposed

by the non-tribal caste Hindus and the vulnerable primitive identity observed by the anthropologists. The mainstream non-tribal society has successfully made the Asur people marginal but to remember that these "ascribed" identities essentially lack any cultural orientation of the real-life Asur people. The rich cultural legacy of these *Adivasi* Asur people earning a livelihood from small agricultural resources and the jungle has been made a forgotten history.

Ranendra's *Lords of the Global Village* critiques the sociocultural discrimination of the Asur people by emphasizing the rich cultural heritage of this marginal, vulnerable tribal population. The fictional character of Rumjhum Asur—an honors graduate in Sanskrit—is useful in shedding light on the "complex riddle" in relation to the mythical "struggle between the Surs (gods) and the Asurs (demons)" (*LGV* 19) found in Hindu scriptures. Rumjhum delves deep into the religio-historical and cultural connections of the "Asur" people with ancient civilizations:

In the ancient Assyrian-Babylonian civilization, "Asur" meant a "strong man" . . . Sayanacharya has called the Asurs mighty, enlightened foe-slayers and protectors. Around 150 shlokas in the *Rigveda* treat the Asurs as gods. (*LGV* 18)

The historical annexing of the religio-cultural legacy of the Asur community with both the "ancient Assyrian-Babylonian civilization" and the Indic civilization by a Sanskrit graduate is convincing, and at the same time, it unravels the process of gradual marginalization, which probably started with an age-old conflict of interests and power politics of possession. As Rumjhum further explains quite authoritatively by applying his knowledge of Sanskrit Linguistics that the "stem 'Su' means 'production,' and is included in 'Sur'" (*LGV* 19), it becomes evident that the Sanskrit word "Sur" also stands for the producer/cultivator and "Asur" for the hunter-gatherer: "Therefore, was it a fight between the forest-razing, cultivator-producers on the one hand, and the iron smelters dependent on the charcoal made from sakhua trees on the other?" (*LGV* 19). Apart from the mythical battle between the "Sur" and the "Asur" represented in the Hindu scriptures, here is a hint which insists on a more rational community-conflict between the forest-dwelling tribal and the mainstream non-tribal "cultivator-producer" people dependant on agriculture. This is also the point from where the process of marginalization starts. If the reader takes this religio-historical exploration of the Asur people's cultural identity as a simple elaboration of a specific tribal cultural heritage, it may lead to confusion. In fact, the novelist Ranendra appears tactful in treating the central issue of power politics, the conflict between the mainstream Indians and the *Adivasi* tribal people, the encroachment of the tribal space by the rather powerful non-tribal agencies which finds its religio-cultural root in the age-old mythical battle: "The battle that had commenced in the Vedic Age,



the same battle that thousands of Indras had not been able to end, had now been won by the deities of the Global Village" (LGV 156).

In *Lords of the Global Village*, Ranendra's choice of the Asur community is exclusive as these Adivasi people do not belong to any simple hunter-gatherer tribal community without any art of their own: they are historically credited with being the first tribal community of iron-smelters in India. In an article entitled, "The Asur Adivasis, India's first metallurgists, now struggle for daily wages in Jharkhand's Mines," Anumeha Yadav finds the Asur people as "one of the smallest Adivasi groups in Jharkhand"<sup>11</sup> (n.p.) and laments the dwindling status of this Adivasi iron-smelting community: "Asur inventors, the kings of the forest kingdom, have become daily-wage workers in their ancestral land" (n.p.). He further points out: "New mining technologies and forest laws that restrict the forest-dwelling Asur from burning wood to produce the charcoal used in their smelting work have slowly made their traditional means of livelihood redundant" (n.p.). It is interesting to note after Yadav's information in the article that since "the last eight years" (n.p.), the Asur Adivasi families living in the villages of Ghorapahad, Sekuapani, and Amtipani in Gumla district of Jharkhand are working at Hindalco's bauxite mines. The names of the villages and the mining company mentioned in this real-life, report-based article show striking similarity with the names of the villages in Ranendra's narrative: Sakhuapaat and Ambatoli (resembling Sekuapani and Amtipani) and the fictional name of the mining company of "Shindalco"! However, it becomes evident from this "real" newspaper article that the Asur people are experiencing stampeding poverty in this age of global economy, which Ranendra has clearly represented in the fictional depiction of their economic condition: "The families whose men went to work in the mines somehow managed two square meals a day, but in less fortunate homes, the members had to scour the jungle to make ends meet" (LGV 29). Ranendra's narrator-protagonist Master Sahib feels enchanted as he notices that these wretchedly marginal Adivasi Asur people are not indifferent to their cultural practices of singing and dancing even within severe poverty.

However, one may remember Jawaharlal Nehru's words on the importance of "a receptive attitude to the tribal people" (578) as he finds some Adivasi communities as "people who sing and dance and try to enjoy life; not people who sit in stock exchanges, shout at one another and think themselves civilized" (578). Ranendra's narrator-protagonist in *Lords of the Global Village* applauds the Asur people's way of life and their close attachment to nature during cultural celebrations. How the tribal festivities of the Asur community connect humankind with nature and enliven the forest, the hillocks, and the rivers has been represented in the novel with exquisitely poetic ambiance.



Master Sahib's observation of tribal festivals, the magic, and music of the Asur people's cultural practices finds expression in an enticing language:

On the festival days of Sartul, Hariyari and Sohrai,<sup>12</sup> the maandar would beat there the whole night. . . . The moon would skip to the tunes of Jhoomar and Jadura . . . kaner and the amaltas would dance a waltz. The rivers, cataracts and hills would dance. (LGV 32)

The cultural performances of the Adivasi Asur people are so enlivening that the entire nature surrounding their villages contributes to the mood of festivity. Trees like "sakhua" and "palash," flowers like "kaner" and "amaltas," and natural forms like "rivers, cataracts, and hills" all exclusive to tribal space in the Chotanagpur plateau join in harmonizing the unique cultural identity of the Asur people. The references to "ballet" and "waltz" certainly add a "global" dimension alongside the typically "local" beating of the tribal drum "maandar" and the rhythm of tribal dances like "Jhoomar and Jadura." With their religious faith grounded in animism, the Asur Adivasi people relate themselves to nature through cultural performances. As these performances continue through "the whole night," Master Sahib feels surprised by their intense passion and level of energy: "Like its deity, Sing-Bonga, the primitive Asur community never tired" (LGV 36). It is not just the Asur men who are exceptionally strong and powerful, but the women of the Asur community are also exclusively dignified. In a reflective observation, the narrator Master Sahib compares the social honor of an Asur woman with another from the Hindu caste society:

In this community, women were called *siyani*—worldly-wise—not *janani*. The word "janani" was parochial, binding them to the role of begetters of progeny; on the other hand, "*siyani*" symbolized their vast experience and wisdom. (LGV 28)

This type of exclusive cultural practice in this tribal community glorifies its women and honors the entire society with a certain level of dignity. The claim of sociocultural superiority often made by the mainstream caste society sounds hollow and insubstantial.

However, the incident of the murder of Lalchan Asur's uncle, presumably in the hands of a powerful non-tribal clan of the "Singh," provokes the narrator to ponder over the question of "otherness" inside the geopolitical border of the same single country: "What was it that had changed a community into the 'other,' made them 'different,' an enemy?" (LGV 44). It is not particularly a case of personal enmity, but the murder is organized after racial strife between the tribal and the non-tribal clans over the rights of a piece of land. Master Sahib questions this practice of exercising ruthless violence over the

marginal tribal community of iron-smelters and finds that there is nothing but "bad spirit" which motivates the non-tribal people in organizing such acts of butchery: "Why did some of us take the discovery of fire and metals, and the art of smelting ores in such a bad spirit that this race of artisans had had to face continual assaults and retreats?" (LGV 44). He finds certain similarities between this Indian practice of racial killing of the tribal people and the well-known instances of genocide from Western historiography, as he relates this "local" and "marginal" case of violence with the erasure of civilizations in other spatiotemporal frames across the world:

I was reminded of the Incas, Mayans, Aztecs and the hundreds of Native Americans from Western history. . . . Like them, only a handful of the Asurs survived, leading a wretched life sans culture, sans language, sans literature, sans religion. (LGV 44)

Nonetheless, Master Sahib strangely notices a rather "liberal" difference between the Western and the Indian way of approaching the history of racial violence, cultural annihilation, and erasure of civilization:

The Americans were generous enough to preserve the literatures and ruins of the Incas, the Mayans, the Aztecs and the Native Americans. . . . the liberal and tolerant Indian culture had spared not even that much space for the Asurs. (LGV 44)

This eye-opening comparison between the American and the Indian way of responding to the histories of massacres and preserving the cultures of exterminated communities subtly insists on the temperament of the concerned mainstream civilizations in power. Arguably, the presence of cultural artifacts or historical demographic data of already vanquished communities in any museum or archive may not be much helpful as the people themselves do not exist. However, the gesture of honoring a bygone civilization inside the museum or the cared maintenance of "the literatures and ruins" of an indigeneous community's cultural life in an archive only emphasizes the spirit of generosity in commemorating the devastation. The "national" indifference in preserving the cultural life of communities, who erstwhile used to inhabit the geopolitical territory of the nation, is itself an act of cultural violence. The narrator keeps on apprehending an impending annihilation of the Asurs in the course of time and history: "I heard the sobs of a vanquished race jolting the portals of time, beyond the pages of history" (LGV 45).

Indeed, the nature of violence exerted on the people of the Asur community appears not so severe when compared to the historical massacre and racial genocide of the indigeneous people in the West. However, history per se, gradual cultural annihilation has already led to the extermination of

tribal minority communities. Devastations take place not only with genocide but also with the deterioration of values and cultural codes. In *Lords of the Global Village*, Master Sahib observes that the "lifestyle of the Asur girls who worked in the houses of the mine mates, munshis, clerks and officers" (LGV 53) alter with time, as they often earn money indulging in sexual relationships with those people: "Their prettiness had become their nemesis" (LGV 71). The narrator-protagonist finds a well-known folk song of the Asur community, which cautions the Asur girls with an alarming note: "*The Asurin has gone to sell wood! . . . / She is coy with the Munshi/ For lucre's sake she has ruined her family/ For money's sake she has stained her caste*" (LGV 53; emphasis original). While reviewing Ranendra's novel, Hansda Sowvendra Shekhar, himself an eminent tribal writer hailing from Jharkhand, observes that "not every Asur woman surrendered to her circumstances" (n.p.), but the indigenous women do not have a choice for sure: "The author presents this reality in a matter-of-fact, yet poignant, manner in the novel when he shows how *Asur* women, driven by poverty, are letting themselves be exploited by men of dominant groups" (n.p.). Resistance against this gradual contamination of the community is almost impossible as the *Asur* people are both socially and economically marginal. But as the mainstream socioeconomic and political culture further constricts their social and economic space, the tribal people move to united resistance, which is an exclusive mark of their cultural identity.

However, as represented by Ranendra in *Lords of the Global Village*, the multinational companies and corporate agency people visit the tribal villages only when there is any event of resistance or when they attempt to snatch some land from the illiterate *Asur* people for illegal mining. A long-standing demand of the tribal people of Bhaunrapaat is "related to the filling of the abandoned open mines" (LGV 91) to avoid the dangers of landslide and even cerebral malaria, for these mines were breeding places of mosquitos after each rainy season. As a meeting is arranged to solve this issue along with another demand of setting up a small hospital in the village, the corporate authorities of the mining companies temporarily agree to the demands but ultimately do nothing after the spirit of public resistance subsides: "The fact of the matter was that they did not consider the paat people (tribal people) human beings. . . . They were only concerned with their profits" (LGV 92). It is not the fact that the profit-harvesting corporate houses do not make any development anywhere, but as the tribal villages are concerned, the corporate agencies remain indifferent to the basic needs of public health and hygiene of the *Adivasi* people. The global economy does not bother about the site of production. Naturally, the mining regions stay in darkness, whereas the capital finds its social investment somewhere outside the mining region. The experience of deprivation reaches its apex as, alongside the multinational corporate



houses, the nation-state also takes part in alienating the tribal people from their land, their forest, and even from their culture. Things go worst, as the Forest Department serves the notice of establishing a sanctuary for wolves in an area of 37 tribal villages rooting out the people. The narrator-protagonist has subtly pointed out the irony of the situation in unequivocal language:

The Forest Department had always considered the Asurs and other tribals encroachers on its land . . . the fact that people had been living in the forest villages for hundreds of years, and that the Forest Department is the real encroacher. (*LGV* 119)

Moreover, behind this conflict between the Forest Department—a state agency—and the dispossessed tribal people of the Asur community, there is another story in the guise of a “national” project: “The contract for providing the barbed wire fencing of the proposed sanctuary had been bagged by a multinational company called Vedang . . . The company was actually a foreign one, but it had taken up a very Indian name” (*LGV* 119–120).

In the name of heightening the standard of the lifestyle of the impoverished Asur community, the multinational business corporations intervene in the sociocultural and economic life of the tribal people. The state remains indifferent to the marginalization of the peasant tribals and even adds to their plight by deciding over a sanctuary for the wolves, vacating nearly 30 tribal villages. As a mark of protest and simultaneously to gain the attention of the most powerful personality in the Indian Democratic system, the young tribal named Rumjhum Asur plans to write a letter to the Prime Minister’s Office that describes the plight of the Asur community in the face of the corporate aggression:

Sir, . . . there are hardly eight to nine thousand Asurs left alive now. We are scared. We don’t want to become extinct. The wolf sanctuary will save the rare wolves, Sir, but it will wipe out our race. (*LGV* 126)

Though this letter ultimately remains undelivered, the message it carries stands as proof of the tribal people’s fundamental rights to life and existence as citizens of India. Amid a steaming tension around the tribal villages, when the people decide over peaceful picketing in the nearby police station, the police unleash fire on the unarmed assembly of tribal people and kill six young men, including Balchan, Bhima, and Rumjhum, the leaders behind the tribal resistance.

As the tribal “concept of territory is generally holistic and constitutes the hills, the rivers, the natural resources, the mineral resources,” they “treat their non-human surroundings, especially their land, water and forest . . . as an extension of themselves” (Bodhi & Raile 2019, 15–16). This holistic



vision of the society and surrounding nature comes in a sharp conflict of interests with the mainstream people who attempt to erase the unique cultural identity of the tribal people. With all its state power and agencies, the nation encroaches on the tribal space without any regard to their cultural and territorial identity. The final three chapters of the novel show successive deaths of tribal people of the Asur community, all planned and implemented after the desire of the "lords of the Global Village," the people controlling the economy of any place on earth, any nation-state:

They know well that . . . resources belong only to them. Naturally, when they see the loin-clothed Asur-Birjia, Oraon and Munda tribals, Dalits and Sadaans around the mineral resources and the jungles, they get irritated. (LGV 142)

A final, planned explosion of landmines leads the remaining few Asur people to attempt a negotiation on the issues of compensation and rehabilitation to complete annihilation and "Absolute Death," leaving their land in the aggressive hands of the "lords." The legacy of the age-old war between the tribal Asurs and the deities of the "Global Village" has been left for Sunil Asur, who staying miles away in his university hostel, could only witness the inevitable repetition of history in wiping out the weak, the marginal: "The Asurs of the forest villages, Kherwar-Sadaan—everyone was on the edge" (LGV 154). The chilling conclusion of the novel foregrounds the strength of the Asur Adivasi people, whose never-to-perish identity is grounded on their culture and their indomitable history. The liminal subject position of the tribal Asur people is not their vulnerability but adds to the glorious past of tribal cultural identity in relation to their emancipatory struggle for freedom.

## NOTES

1. The first known usage of the term "globalization" can be traced back to the publication of Oliver Leslie Reiser and Blodwen Davies's book *Planetary Democracy: An Introduction to Scientific Humanism and Applied Semantics* (1944), where the authors coin terms like "globalize" and "globalism" to envision the new economic and political world order. In academic literature, Roland Robertson's essay "Interpreting Globality" (1983) is the first notable attempt to emphasize modernization on the global scale. However, the specific term "globalization" was used quite occasionally before the 1980s [one notable example is Theodore Levitt's essay "The Globalization of Markets" (1983)].

2. In his book *The Gutenberg Galaxy: The Making of Typographic Man* (1962), the Canadian media theorist Marshall McLuhan attempts to foreground the idea of "global village" by exploring the issue of human connectivity across the globe with

the help of the new media: "The new electronic interdependence recreates the world in the image of a global village" (31).

3. The original Hindi version of Ranendra's novel *Lords of the Global Village* is *Global Gaon Ke Devta*, published in 2010 by Bhartiya Gyanpeeth. Remarkably, Ranendra allows the English word "Global" in the original Hindi title.

4. Tribal communities are anthropologically considered the autochthonous population of India, who have been distinguished from the native Hindu population quite systematically (though the British colonial administrators and European missionaries differentiated tribal population from the caste Hindus from the end of the nineteenth century) in the postindependence period by the Anthropological Survey of India under the "People of India Project." Though the term "indigenous" has gained certain impetus in the Indian academia after 1993 (the year 1993 had been declared the International Year of the Indigenous People), the use of the word "tribe" is more effective in the identification of the *Adivasi* people and their minority culture. In one of his articles entitled "Tribes as Indigenous People of India" (1999), the eminent sociologist and tribal studies expert Virginius Xaxa opines that the "tribal identity now gives the marginalized peoples self-esteem and pride" (3589).

5. Bhikhu Parekh identifies "seven national goals" which Nehru wanted to include as policies of "national philosophy" in modernizing India. This seven-point Nehruvian agenda includes—"national unity, parliamentary democracy, industrialization, socialism, scientific temper, secularism and non-alignment." (For further details, please see Parekh, Bhikhu: 1991.)

6. The Nehruvian idea of the *Panchsheel* stands for the five principles of peaceful coexistence, which promote national unity. (For details, please see Gaha, Ramchandra: 2001, 268.)

7. The economic policy of SEZ or "Special Economic Zone" came into existence in India on April 1, 2000, with the prime objective to attract and enhance foreign direct investment. As a geographical site of foreign capital investment, the SEZ has economic laws different from the national economic laws. The SEZ sites are enclaves for regional capitalist alliances where there is hardly any role of the state as the regulatory authority.

8. Thirty-two tribal communities inhabit the Indian state of Jharkhand, including nine primitive tribes scheduled as the Particularly Vulnerable Tribal Groups (PVTG) by the Ministry of Tribal Affairs, Government of India. These nine *Adivasi* communities are known as—Asur, Birjia, Birhor, Hill Kharia, Mal Paharia, Sauria Paharia, Korwa, Parhaiya, and Shavar. The tribal people of the Asur community live in an area known as the Santal Parganas of the Chotanagpur Plateau.

9. Sandwiched between the Indo-Gangetic plain in the north and the Mahanadi Basin in the south, Chotanagpur Plateau is mostly a forested, hillock-clad hinterland with hardly any fertile agricultural belt. It is mainly a mineral-rich reserve of approximately 60,000 square kilometers in size, divided into 5 states—Jharkhand, West Bengal, Bihar, Odisha, and Chhattisgarh in eastern India.

10. The people of the Asur community call their religious guru in the name of *Deora*, who performs the animistic rituals related to their faith.

11. One may find the history of the Asur tribe as the ancient iron-smelting community of India in K. K. Leuva's book entitled *The Asur: A Study of Primitive Iron-smelters* (1963). Anumeha Yadav's article wonderfully captures the present plight of the Asur community in the face of the industrial, corporate economy. Yadav cites the reference of a real-life man known as Pusa Asur who "works at the New Amipani mine" and "still remembers watching his forefathers 'smelt iron out of stone.'" Pusa Asur tells Yadav: "There are still two to three men in Ramdharia hamlet who know how to smelt stone and extract metal. Any tool you can think of, they could make." In his article, Yadav points out the gradual cultural decline of Asur people, as their language also faces cultural extermination: "Asuri, their language, is on the verge of extinction, with less than 8,000 people speaking it." The *Adivasi* people of the Asur community are presently victims of socioeconomic exclusion and experiencing cultural isolation from the mainstream civilization.

12. Sarhul, Hariyari, and Sohrai are tribal festivities followed by the Asur people in their annual cultural calendar. "Sarhul" is their New Year festival, whereas "Hariyari" is the harvest festival and "Sohrai" is another cultural celebration when the outer walls of the tribal cottages are decorated with paintings of natural forms.

## WORKS CITED

- Appadurai, Arjun. 1996. *Modernity at Large: Cultural Dimensions of Globalization*. Minneapolis and London: University of Minnesota Press.
- Bodhi, s.r and Raile r. ziiipao. 2019. "Land, Words and Resilient Cultures: Laying the Context and Frame." In *Land, Words and Resilient Cultures: The Ontological Basis of Tribal Identity*, edited by s.r. Bodhi & Raile r, ziiipao, 1–23. Hyderabad: Tribal Intellectual Collective India.
- Guha, Ramchandra. (1999) 2001. *Savaging the Civilized: Verrier Elwin, His Tribals, and India*, New Delhi: Oxford University Press.
- Hall, Stuart. 1997. "The Local and the Global: Globalization and Ethnicity." In *Culture, Globalization and the World-System: Contemporary Conditions for the Representation of Identity*, edited by Anthony D. King, 19–39. Minneapolis: University of Minnesota Press.
- Hansda Sowvendra Shekhar. "Book Review: A Novel for Our Dark Times." *National Herald* (June 29, 2017), accessed December 16, 2020, <https://www.nationalheraldindia.com/news/book-review-a-novel-for-our-dark-times-a-timely-book>
- Leuva, K. K. 1963. *The Asur: A Study of Primitive Iron-smelters*. New Delhi: Bharatiya Adimjati Sevak Sangh.
- McLuhan, Marshall. (1962) 2011. *The Gutenberg Galaxy: The Making of Typographic Man*. Toronto and London: Toronto University Press.
- Nehru, Jawaharlal. (1963) 2017. *Jawaharlal Nehru's Speeches: Volume Two: 1949–1953*. Publications Division: Ministry Of Information and Broadcasting, Government of India.



- Parekh, Bhikhu. "Nehru and the National Philosophy of India," *Economic and Political Weekly* 26, no. 1/2 (1991): 35–48.
- Ramendra, 2017. *Lords of the Global Village: A Novel*. Translated by Rajesh Kumar. New Delhi: Speaking Tiger.
- Rath, Govinda C, ed. 2006. "Nehru and Elwin on Tribal Development: Contrasting Perspectives." In *Tribal Development in India: The Contemporary Debate*, 65–91. New Delhi, Thousand Oaks, and London: Sage Publications.
- Ritzer, George, ed. 2016. *The Blackwell Companion to Globalization*. Providence, Rhode Island: Wiley Blackwell.
- Sassen, Saskia. "The Global City: Introducing a Concept." *The Brown Journal of World Affairs* 11, no. 2 (2005): 27–43.
- Vaditya, Venkatesh. 2019. "Discourse on Adivasi Development: Nehru and Elwin's Perspectives." In *The Problematics of Tribal Integration: Voices from India's Alternative Centers*, edited by Bodhi s.r. and Bipin jojo, 141–155. Hyderabad: The Shared Mirror.
- Xaxa, Virginius. "Tribes as Indigenous People of India." *Economic and Political Weekly* 34, no. 51 (1999): 3589–3595.
- Yadav, Anumeha. "The Asur Adivasis, India's First Metallurgists. Now Struggle for Daily Wages in Jharkhand's Mines." *Scroll. In* (February 16, 2017), accessed: December 16, 2020, <https://scroll.in/roving/827128/the-asur-adivasis-indias-first-metallurgists-now-struggle-for-daily-wages-in-jharkhands-mines>



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Lily Rose Tope / Wolfgang Zueh (eds.)

# Collisions of Cultures: Frictions and Re-Shapings



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# An EOQ Model for Deteriorating Items under Trade Credit Policy with Unfaithfulness Nature of Customers



Rituparna Mondal, Prasenjit Pramanik, Ranjan Kumar Jana, Manas Kumar Maiti, and Manoranjan Maiti

**Abstract** In this study, an EOQ model has been developed for a deteriorating item with time dependent deterioration with a fixed expiration date under partial trade credit policy considering the unfaithfulness nature of the base customers. The main purpose of this research work is two folds. First, the unethical behaviour of the base customers is considered. On the other hand, a non-trivial flaw has been rectified, considering all the inventory models with deteriorating items under trade credit policy, developed in the last two decades. The proposed model is illustrated with various numerical examples. Some managerial insights are also outlined.

**Keywords** Economic order quantity · Supply chain management · Deterioration · Partial trade credit · Unfaithful customers

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R. Mondal · R. K. Jana (✉)

Department of Mathematics and Humanities (DoMH), Sardar Vallabhbhai National Institute of Technology, Surat, Gujarat, India  
e-mail: [rkjana2003@yahoo.com](mailto:rkjana2003@yahoo.com)

P. Pramanik · M. Maiti

Department of Applied Mathematics with Oceanology and Computer Programming, Vidyasagar University, Paschim Medinipur, Midnapore, West Bengal, India

M. K. Maiti

Department of Mathematics, Mahishadal Raj College, Purba Medinipur, Mahishadal, West Bengal, India



26. Ouyang, L.Y., Teng, J.T., Goyal, S.K., Yang, C.-T.: An economic order quantity model for deteriorating items with partially permissible delay in payments to order quantity. *Europ. J. Oper. Res.* **194**, 418–431 (2009)
27. Pramanik, P., Maiti, M.K., Maiti, M.: An appropriate business strategy for a sale item. *OPSEARCH*. <https://doi.org/10.1007/s12597-017-0310-0> (2017)
28. Pramanik, P., Maiti, M.K., Maiti, M.: A supply chain with variable demand under three level trade credit policy. *Comput. Indus. Eng.* **106**, 205–221 (2017)
29. Pramanik, P., Maiti, M.K., Maiti, M.: Three level partial trade credit with promotional cost sharing. *Appl. Soft Comput.* **58**, 553–575 (2017)
30. Pramanik, P., Maiti, M.K.: An inventory model for deteriorating items with inflation induced variable demand under two level partial trade credit: a hybrid ABC-GA approach. *Eng. Appl. Artif. Intell.* **85**, 194–207 (2019)
31. Pramanik, P., Maiti, M.K.: An inventory model with variable demand incorporating unfaithfulness of customers under two-level trade credit. *Europ. J. Indus. Eng.* **13(4)**, 461–488 (2019)
32. Pramanik, P., Das, S.M., Maiti, M.K.: Note on: Supply chain inventory model for deteriorating items with maximum lifetime and partial trade credit to credit risk customers. *J. Indus. Manag. Optim.* **15(3)**, 1289–1315 (2019)
33. Pramanik, P., Maiti, M.K.: Trade credit policy of an inventory model with imprecise variable demand: an ABC-GA approach. *Soft Comput.* <https://doi.org/10.1007/s00500-019-04502-5> (2019)
34. Tayal, S., Singh, S.R., Sharma, R.: Multi item inventory model for deteriorating items with expiration date and allowable shortages. *Indian J. Sci. Technol.* **7(4)**, 463–471 (2014)
35. Teng, J.T.: Optimal ordering policies for a retailer who offers distinct trade credits to its good and bad customers. *Int. J. Prod. Econ.* **119**, 415–423 (2009)
36. Teng, J.T., Chang, C.T.: Optimal manufacture's replenishment policies in the EPQ model under two level trade credit policy. *Europ. J. Oper. Res.* **195**, 358–363 (2009)
37. Teng, J.T., Cheng, C.T., Chern, M.S., Chan, Y.L.: Retailer's optimal ordering policies with trade credit financing. *Int. J. Syst. Sci.* **38**, 269–278 (2007)
38. Teng, J.T., Yang, H.L., Chern, M.S.: An inventory model for increasing demand under two levels of trade credit linked to order quantity. *Appl. Math. Model.* **37**, 7624–7632 (2013)
39. You, P.S.: Inventory policy for product with price and time-dependent demands. *J. Opera. Res. Soc.* **56**, 870–873 (2005)

# A Fuzzy EOQ Model for Deteriorating Items Under Trade Credit Policy with Unfaithfulness Nature of Customers



Rituparna Mondal, Ranjan Kumar Jana , Prasenjit Pramanik, and Manas Kumar Maiti

**Abstract** In this study, a fuzzy EOQ model has been developed for deteriorating product with time-dependent deterioration and fixed expiration date under partial trade credit policy, considering unfaithfulness nature of the base customers. This model is a mixed-integer profit maximization problem designed in a crisp and imprecise (fuzzy) environment for the uncertainty of different costs and banking interest involving the inventory control system. The decision variables and input parameters affect in the model are fuzzified. This research investigates about optimal replenishing time and selling price to maximize the profit. Also, a particle swarm optimization (PSO) algorithm has been utilized to obtain the best suitable marketing plan for the decision-maker. Numerous numerical examples are also cited.

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## 1 Introduction

In the current competitive, volatile marketing situation, it is crucial to draw the optimal decisions for the decision-maker/store manager/retailer. To enhance the demand for a product, the inventory system/supply chain players adopt various promotional activities. Among those, trade credit policy is the best productive activity. But for this credit policy, there is a possibility of cheating the credit amount, i.e., default credit risk. In a supply chain, this type of risk occurs at the retailer-customers level because there is no such certified bonding between retailer and customers; credit is

R. Mondal · R. K. Jana (✉)

Department of Mathematics and Humanities, Sardar Vallabhbhai National Institute of Technology, Surat, Gujarat, India  
e-mail: [rkjana2003@yahoo.com](mailto:rkjana2003@yahoo.com)

P. Pramanik

Department of Applied Mathematics with Oceanology and Computer Programming, Vidyasagar University, Midnapore, Paschim Medinipur, West Bengal, India

M. K. Maiti

Department of Mathematics, Mahishadal Raj College, Mahishadal, Purba Medinipur, West Bengal, India

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1



- 733 13. Maiti, M.K.: A fuzzy genetic algorithm with varying population size to solve an inventory model  
734 with credit-linked promotional demand in an imprecise planning horizon. *Eur. J. Operat. Res.*  
735 **213**, 96–106 (2011)
- 736 14. Pramanik, P., Maiti, M.K.: An inventory model with variable demand incorporating unfaith-  
737 fulness of customers under two-level trade credit. *Eur. J. Ind. Eng.* **13**(4), 461–488 (2019)
- 738 15. Pramanik, P., Das, S.M., Maiti, M.K.: Note on: Supply chain inventory model for deteriorating  
739 items with maximum lifetime and partial trade credit to credit risk customers. *J. Ind. Manage.*  
740 *Opt.* **15**(3), 1289–1315 (2019)
- 741 16. Pramanik, P., Maiti, M.K.: Trade credit policy of an inventory model with imprecise variable  
742 demand: an ABC-GA approach. *Soft Comput.* **24**(11), 1–18 (2020)
- 743 17. Teng, J.T.: Optimal ordering policies for a retailer who offers distinct trade credits to its good  
744 and bad customers. *Int. J. Prod. Econom.* **119**, 415–423 (2009)
- 745 18. Teng, J.T., Chang, C.T.: Optimal manufacture's replenishment policies in the EPQ model under  
746 two level trade credit policy. *Eur. J. Operat. Res.* **195**, 358–363 (2009)
- 747 19. Teng, J.T., Cheng, C.T., Chern, M.S., Chan, Y.L.: Retailer's optimal ordering policies with  
748 trade credit financing. *Int. J. Syst. Sci.* **38**, 269–278 (2007)
- 749 20. Teng, J.T., Yang, H.L., Chern, M.S.: An inventory model for increasing demand under two  
750 levels of trade credit linked to order quantity. *Appl. Math. Modell.* **37**, 7624–7632 (2013)
- 751 21. Guchhait, P., Maiti, M.K., Maiti, M.: Two storage inventory model of a deteriorating item with  
752 variable demand under partial credit period. *Appl. Soft Comput.* **13**, 428–448 (2013)
- 753 22. Mahata, G.C.: Partial trade credit policy of retailer in economic order quantity models for  
754 deteriorating items with expiration dates and price sensitive demand. *J. Math. Modelling Algor.*  
755 *Operat. Res.* **14**(4), 363–392 (2015)
- 756 23. Mahata, G.C., De, S.K.: Supply chain inventory model for deteriorating items with maximum  
757 lifetime and partial trade credit to credit risk customers. *Int. J. Manage. Sci. Eng. Manage.*  
758 **12**(1), 21–32 (2016)
- 759 24. Pramanik, P., Maiti, M.K., Maiti, M.: A supply chain with variable demand under three level  
760 trade credit policy. *Comput. Ind. Eng.* **106**, 205–221 (2017)
- 761 25. Pramanik, P., Maiti, M.K., Maiti, M.: Three level partial trade credit with promotional cost  
762 sharing. *Appl. Soft Comput.* **58**, 553–575 (2017)
- 763 26. Pramanik, P., Maiti, M.K.: An inventory model for deteriorating items with inflation induced  
764 variable demand under two level partial trade credit: a hybrid ABC-GA approach. *Eng. Appl.*  
765 *Artif. Intell.* **85**, 194–207 (2019)
- 766 27. Ghare, P.M., Schrader, G.H.: A model for exponentially decaying inventory system. *Int. J.*  
767 *Prod. Res.* **21**, 449–460 (1963)
- 768 28. Chung, K.J., Huang, T.S.: The optimal retailer's ordering policies for deteriorating items with  
769 limited storage capacity under trade credit financing. *Int. J. Prod. Econom.* **106**, 127–145 (2007)
- 770 29. Guchhait, P., Maiti, M.K., Maiti, M.: Inventory model of a deteriorating item with price and  
771 credit linked fuzzy demand?: a fuzzy differential equation approach. *OPSEARCH.* **51**, 321–353  
772 (2014)
- 773 30. Min, J., Zhou, Y.W., Zhao, J.: An inventory model for deteriorating items under stock dependent  
774 demand and two-level trade credit. *App. Math. Modelling.* **34**, 3273–3285 (2010)
- 775 31. Chao, X., Gong, X., Zheng, S.: Optimal pricing and inventory policies with reliable and random-  
776 yield suppliers: characterization and comparison. *Ann Operat. Res.* **241**(1), 35–51 (2016)
- 777 32. Das, R.L., Jana, R.K.: Some studies on EPQ model of substitutable products under imprecise  
778 environment, In: Shah N, Mittal M (eds) *Optimization and Inventory Management. Asset*  
779 *Analytics (Performance and Safety Management)*. Springer, Singapore (2020). [https://doi.org/](https://doi.org/10.1007/978-981-13-9698-4_18)  
780 [10.1007/978-981-13-9698-4\\_18](https://doi.org/10.1007/978-981-13-9698-4_18)
- 781 33. Dye, C.Y.: Joint pricing and ordering policy for a deteriorating inventory with partial backlog-  
782 ging. *Omega.* **35**, 184–189 (2007)
- 783 34. Maiti, M.K., Maiti, M.: Two-storage inventory model with lot-size dependent fuzzy lead-time  
784 under possibility constraints via genetic algorithm. *Eur J Operat Res* **179**, 352–371 (2007)
- 785 35. You, P.S.: Inventory policy for product with price and time-dependent demands. *J. Operat. Res.*  
786 *Soc.* **56**, 870–873 (2005)

- 787 36. Zadeh, L.A.: Fuzzy sets. *Inf. Cont.* **8**, 338–356 (1965)
- 788 37. Das, R.L., Jana, R.K., De, M., Maiti, M.: Prices and order quantities of substitutable products  
789 in an EPQ model over different uncertain finite budget constraints. *J Intell Fuzzy Syst* **33**(1),  
790 229–244 (2017)
- 791 38. Engelbrecht, A.P.: *Fundamentals of Computational Swarm Intelligence*. Wiley (2005)

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# ASYMMETRIC SYNTHESIS

## Abstract

The goal of asymmetric synthesis is the chemical conversion of a molecule into a specific stereoisomer (enantiomer). In spite of the fact that asymmetric chemistry can be conducted stoichiometrically, it is most commonly carried out in a catalytic mode, mainly by applying organometallic catalysts or an enzyme (biocatalysis).

**Keywords:** asymmetric synthesis, asymmetric catalysis, chiral pools, chirality, importance of, enantiomeric excess.

## Author

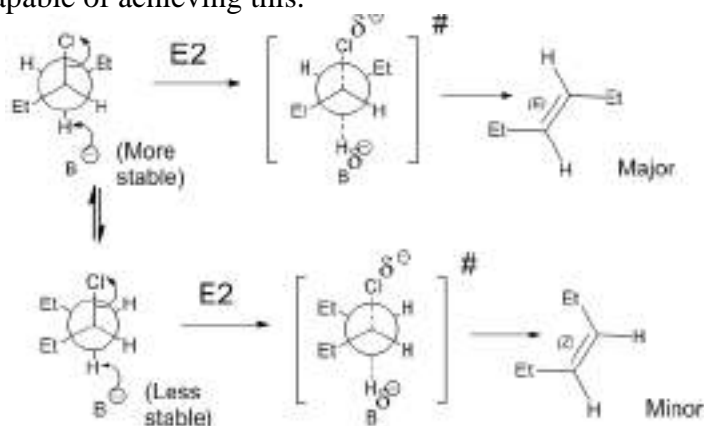
**Subhabrata Mahai**  
Assistant Professor  
Department of Chemistry  
Mahishadal Raj College, East Midnapore  
Mahishadal, West Bengal, India

## I. INTRODUCTION

During asymmetric synthesis, an achiral unit in a substrate is converted into a chiral unit in such a way that different amounts of stereoisomers (enantiomers or diastereomers) are produced.

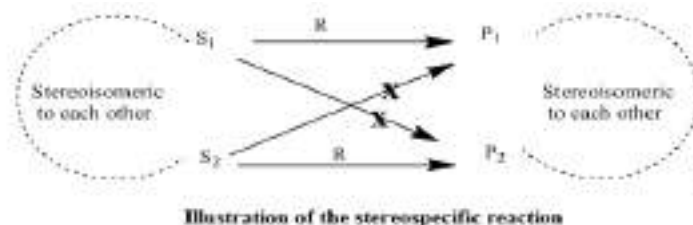
When an achiral compound is converted into a compound with an asymmetric carbon (CHIRAL) using traditional laboratory techniques, the result is a racemic mixture. One optically active isomer will arise preferentially over the other if such a synthesis is carried out under chiral influence.

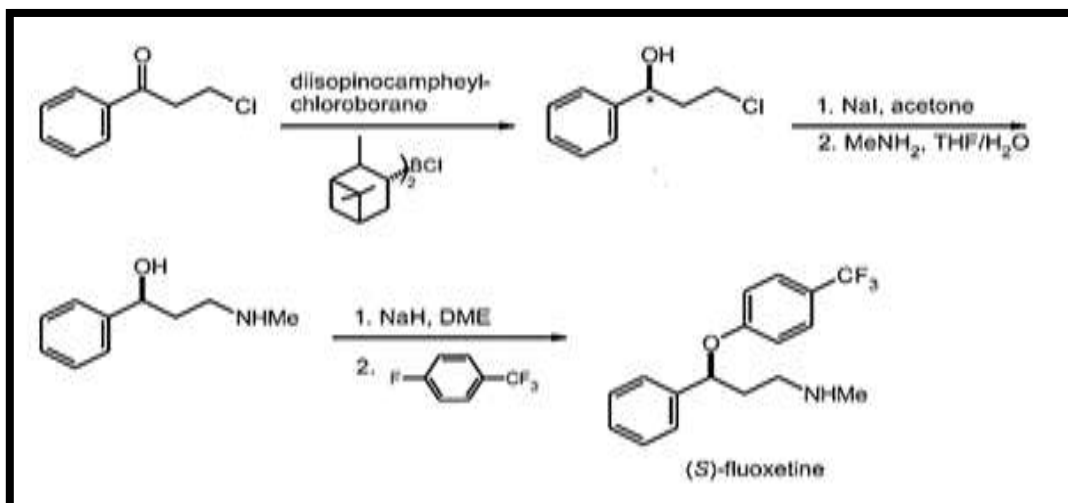
- 1. Stereoselective reaction:** A reaction that produces one stereoisomer of a product preferentially over another. Several stereoisomers can form, but only one predominates in this type of reaction. A mechanism that allows for multiple TS conformations or geometries is capable of achieving this.



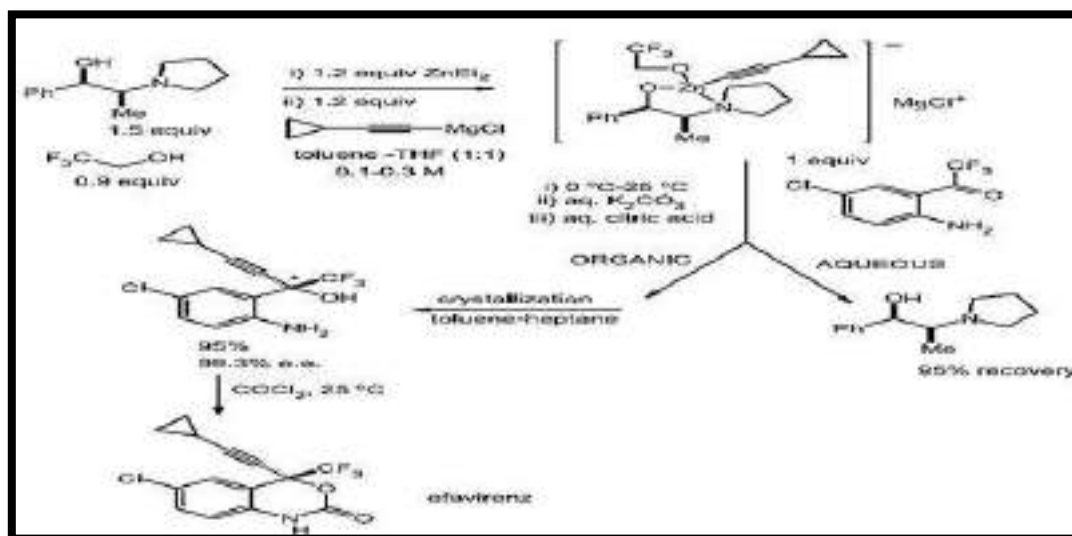
- 2. Stereospecific reaction** Reactions in which stereochemically different starting compounds produce stereochemically different products. These happen only when the mechanistic path requires efficient symmetry to allow orbital overlap. e.g.,  $S_N2$  reactions.

If two stereoisomeric reactants  $S_1$  and  $S_2$ , react with reagent  $R$  separately to yield products  $P_1$  and  $P_2$ , respectively, such that  $P_1$  and  $P_2$  are stereoisomeric to each other, then the reactions are termed stereospecific.





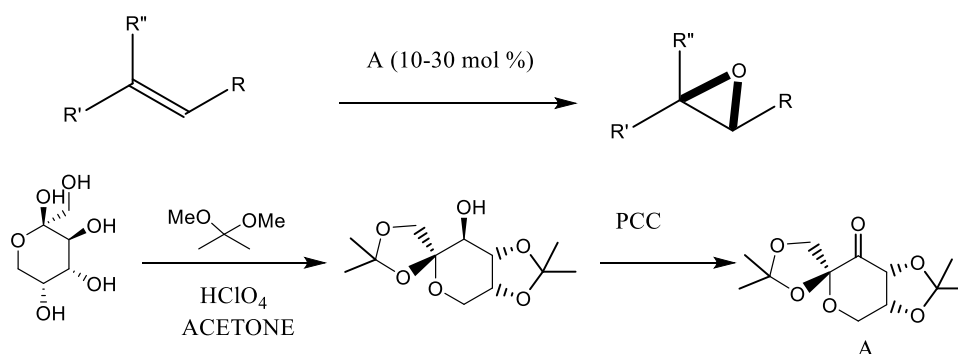
Asymmetric reduction with chiral reagent: synthesis of (*S*)-fluoxetine



Chiral organozinc reagent: efavirenz synthesis.

#### 4. Catalyst Regulated Asymmetric Synthesis (Asymmetric Synthesis of 4th Generation):

An asymmetric synthesis can also be achieved by applying a chiral catalyst. The catalyst can be an enzyme or a synthetic catalyst, usually one such as a chiral transition-metal catalyst.



# **Decoding Gender** **Through Literature**

*Crafting One's Own Canvas*

**Dr. Samrat Bisai**  
**Raj Raj Mukhopadhyay**



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## 6

### Voice for the Voiceless: Reflections on Mahasweta Devi's *Draupadi* and Toni Morrison's *Beloved*

Shyamal Mondal

In *A Midsummer Night's Dream*, Bottom playing the role of Pyramus rightly pronounces this meaningful and significant maxim, "I see a voice" (5.1.189). Actually, it might express the experience of the reader who can see voices on the page. The French writer Pascal Quignard argues that in a literary text the writer tries to present silence and then perceive some lost voice in the socio-economic structure of the society and reflect the lost voice efficiently in their narratives to be a eloquent voice for the community. As Homi K. Bhabha justifiably says in his *The Locations of Culture*, "there is a conspiracy of silence around the colonial truth" (Bhabha, 1994, p. 175). My objective in this article is to illustrate how Draupadi Majhen in Mahasweta's *Draupadi* and Sethe in Toni Morrison's *Beloved* break this shackle of silence of colonial truth and emerges as voice for socially, economically politically exploited and oppressed people in the postcolonial world. These prominent Indian and American fiction writers like Mahasweta Devi and Toni Morrison highlight the activism on behalf of indigenous tribal and black women and lead us to think about the voice for the voiceless tribal and black women's identity, existence and resistance.

Now the question arises whether your identity is given or created. The idea of identity is an interestingly creative process.

voice for the voiceless

village of equality by infusing the spirit of voice in all the people  
all over the world in a transcultural milieu.

### Works Cited

- Althusser, Louis. "Ideology and Ideological State Apparatuses." *The Norton Anthology of Theory and Criticism*. Edited by V.B. Leitch, Norton, 2000.
- Aschroft B., Griffiths C. & Tiffin Hellen. *The Empire Writes Back*. Routledge, 2001.
- Bhabha, H.K. *The Location of Culture*. Routledge, 2004.
- Bjork, P.B. *The Novels of Toni Morrison, The Search for Self and Place Within the Community*. New York: Peter Lang, 1996.
- Christian, Barbara. *Black Feminist Criticism: Perspectives on Black Women Writers*. Pergamon Press, 1985.
- Devi, Mahasweta. *Draupadi*. 1981. Translated by Gayatri Spivak, Routledge, 1995.
- . *Breast Stories*. 1970. Translated by Gayatri Spivak, Seagull, 1997.
- Hall, S. *Cultural Identity and Diaspora: Identity, Community, Culture, Difference*. Lawrence and Wishart, 1990.
- Morrison, Toni. *Beloved: A Novel*. New York: Alfred A.S. Knopf Inc., 1987.
- Spivak, Gayatri. 'Draupadi' in *the Other Worlds: Essays in Cultural Politics*. Routledge, 1998.
- . *Can the Subaltern Speak? The Norton Anthology of Theory and Criticism*. W.W. Norton, 2001.
- Shakespeare, William. *A Midsummer Night's Dream*. 1605. Signet Classic, 1998.
- Waghmare, J.M. "Literature of Marginality." *Literature of Marginality, Dalit Literature and African-American Literature*. Edited by N.M. Aston, Oxford University Press, 2000.

## Chapter 3

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# Quad sensor-based soil-moisture prediction using machine learning

*Anirbit Sengupta*

Dr. Sudhir Chandra Sur Institute of  
Technology and Sports Complex

*Sayantani Ghosh*

University of Calcutta, Technology Campus

*Anwasha Mukherjee*

Mahishadal Raj College

*Abhijit Das*

RCC Institute of Information Technology

*Debashis De*

Maulana Abul Kalam Azad University of Technology

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### 3.1 INTRODUCTION

Soil is a rudimentary integrant in gratifying the increasing stipulation for food and further necessities [1]. The health of the soil is correlated with agricultural sustainability, and thus the common people in India are reliant on their sustenance. For growing micronutrients, soils of India are less productive. Thus, the yielding of crops can be enhanced by preserving the fertility of the topsoil. For the cultivation of crops, agriculture requires a decision support system. The water level is lowering every day. Optimization of water usage can be done by soil moisture monitoring. Even soil moisture is one of the most significant factors of climate change. Water and energy are circulated by soil moisture between the atmosphere and the land. It has a distinct correlation with climate change. Along with the climatic factors, heterogeneity in precipitation and temperature directly affects the diversification of soil moisture. Since soil moisture is favorable for crop yield, the procedures involved for their growth can be improved if the content of the soil moisture of any area or location is predicted successfully [2]. This enlightens a farmer to know more about whether adequate watering has been done to the yields for its proper growth or not, the most appropriate time of dispersing and harvesting the yields, soil percolation is suitable or not, etc. Remote sensing technology gathers information regarding ground surface and a basic spatial resolution is provided. Other than the temperature, pH, and turbidity, there are too many factors such as atmospheric association, chemical processes of soil, the crudeness of soil, vegetation, etc.

Soil moisture monitoring is highly significant from the agricultural perspective. The efficient use of water plays an important role in cultivation. Proper water usage can be possible by soil moisture prediction. For better soil moisture content estimation, various parameters have to be considered such as soil moisture, turbidity, pH, temperature, and humidity. The objective of this work is to monitor the soil moisture using these parameters. To accomplish the objective, four different sensors are used in our work, and a comparative analysis between a few machine learning methods is performed for detecting the moisture content in the soil.

### 3.2 RELATED WORKS

There are various soil moisture estimation models such as the SPAW (Soil Plant Atmosphere Water) model [3], USDAHL (U.S. Department of Agriculture Hydrograph Laboratory) model [4], SAC-SMA (Sacramento Soil Moisture Accounting) model [5], etc. Recently, remote sensing methods have also been used for soil moisture estimation, such as microwave remote sensing measurements [6]. Data-driven forecasting tools such as artificial neural networks (ANNs) can also participate in soil moisture estimation [7]. Error Propagation Learning Back Propagation (EPLBP) neural network

10. Hong, Z. (2015). *A Data-Driven Approach to Soil Moisture Collection and Prediction Using a Wireless Sensor Network and Machine Learning Techniques*. Dissertation/thesis of Z. Hong, Electrical & Computer Engineering, University of Illinois at Urbana-Champaign.
11. Kodali, R. K., & Sahu, A. (2016). An IoT based soil moisture monitoring on Losant platform. In *2016 2nd International Conference on Contemporary Computing and Informatics (IC3I)* (pp. 764–768). IEEE.
12. Payero, J. O., Mirzakhani-Nafchi, A., Khalilian, A., Qiao, X., & Davis, R. (2017). Development of a low-cost Internet-of-Things (IoT) system for monitoring soil water potential using Watermark 200SS sensors. *Advances in Internet of Things*, 7(3), 71–86.
13. Payero, J. O., Nafchi, A. M., Davis, R., & Khalilian, A. (2017). An arduino-based wireless sensor network for soil moisture monitoring using Decagon EC-5 sensors. *Open Journal of Soil Science*, 7(10), 288.
14. Mhaiskar, S., Patil, C., Wadhai, P., Patil, A., & Deshmukh, V. (2017). A survey on predicting suitable crops for cultivation using IoT. *International Journal of Innovative Research in Computer and Communication Engineering*, 5, 318–323.
15. Badhe, A., Kharadkar, S., Ware, R., Kamble, P., & Chavan, S. (2018). IOT based smart agriculture and soil nutrient detection system. *International Journal on Future Revolution in Computer Science & Communication Engineering*, 4(4), 774–777.
16. Mukherjee, A., De, D., Ghosh, S. K., & Buyya, R. (2021). *Mobile Edge Computing*. Springer Nature, Switzerland AG.
17. Sengupta, A., Debnath, B., Das, A., & De, D. (2021). FarmFox: A quad-sensor based IoT box for precision agriculture. *IEEE Consumer Electronics Magazine*, 10(4), 63–68.
18. Seber, G. A., & Lee, A. J. (2012). *Linear Regression Analysis* (Vol. 329). John Wiley & Sons, Hoboken, NJ.
19. Awad, M., & Khanna, R. (2015). Support vector regression. In M. Awad & R. Khanna (Eds.), *Efficient Learning Machines* (pp. 67–80). Apress, Berkeley, CA.
20. Xu, M., Watanachaturaporn, P., Varshney, P. K., & Arora, M. K. (2005). Decision tree regression for soft classification of remote sensing data. *Remote Sensing of Environment*, 97(3), 322–336.
21. Pal, M. (2005). Random forest classifier for remote sensing classification. *International journal of remote sensing*, 26(1), 217–222.
22. Meyer, D., Leisch, F., & Hornik, K. (2003). The support vector machine under test. *Neurocomputing*, 55(1–2), 169–186.
23. Selvi, C., & Sivasankar, E. (2019). A novel Adaptive Genetic Neural Network (AGNN) model for recommender systems using modified k-means clustering approach. *Multimedia Tools and Applications*, 78(11), 14303–14330.
24. Uyanik, G. K., & Güler, N. (2013). A study on multiple linear regression analysis. *Procedia-Social and Behavioral Sciences*, 106, 234–240.
25. Medsker, L. R., & Jain, L. C. (2001). Recurrent neural networks. *Design and Applications*, 5, 64–67.

# Green Mobile Cloud Computing for Industry 5.0

Anwasha Mukherjee, Debashis De, and Rajkumar Buyya

## 1 Introduction

Mobile Cloud Computing (MCC) integrates mobile computing and cloud computing, which brings the facilities of using cloud services to the mobile users [1–4]. With the rapid increase in the usage of smartphones, the demand for storage and access to various applications also increases. However, mobile devices face multiple challenges: limited storage, limited battery life, limited computing power, bandwidth, etc. [1]. In such a scenario, MCC has fulfilled the users' demands. Cloud computing provides three types of services: Software as a Service (SaaS), Platform as a Service (PaaS), and Infrastructure as a Service (IaaS). Cloud is a virtualized, shared resource or infrastructure that can compute, analyze, and warehouse large amounts of data. Cloud serves the client on an “on-demand,” “pay as you use” basis. The elastic nature of the cloud helps the client to get the desired service according to the requirements. Various cloud providers such as Amazon EC2, Microsoft Azure, and Google Cloud Platform provide ubiquitous service along with elastic storage and immense processing facilities in an “on-demand” and “pay as you use” fashion.

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A. Mukherjee (✉)

Department of Computer Science, Mahishadal Raj College, Mahishadal, Purba Medinipur, West Bengal, India

e-mail: [anweshamukherjee2011@gmail.com](mailto:anweshamukherjee2011@gmail.com)

D. De

Department of Computer Science and Engineering, Centre of Mobile Cloud Computing, Maulana Abul Kalam Azad University of Technology, West Bengal, Nadia, India

e-mail: [debashis.de@makautwb.ac.in](mailto:debashis.de@makautwb.ac.in)

R. Buyya

Cloud Computing and Distributed Systems (CLOUDS) Laboratory, School of Computing and Information Systems, The University of Melbourne, Parkville, VIC, Australia

e-mail: [rbuyya@unimelb.edu.au](mailto:rbuyya@unimelb.edu.au)

57. Lu, X., ElzaErkip, Y.W., Goodman, D.: Power efficient multimedia communication over wireless channels. *IEEE J. Sel. Areas Commun.* **21**(10), 1738–1751 (2003) 559  
560
58. Nandyala, C.S., Kim, H.-K.: Green IoT agriculture and healthcare application (GAHA). *Int. J. Smart Home.* **10**(4), 289–300 (2016) 561  
562
59. Solanki, A., Nayyar, A.: Green internet of things (G-IoT): ICT technologies, principles, applications, projects, and challenges. In: *Handbook of Research on Big Data and the IoT*, pp. 379–405. IGI Global (2019) 563  
564  
565
60. Arthi, B., Aruna, M., Ananda Kumar, S.: A study on energy-efficient and green IoT for healthcare applications. In: *Green Computing and Predictive Analytics for Healthcare*, pp. 95–114. Chapman and Hall/CRC (2020) 566  
567  
568

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# New Research Directions for Green Mobile Cloud Computing

Anwasha Mukherjee, Debashis De, and Rajkumar Buyya

## 1 Introduction

Whenever, we integrate more than one technological paradigms, then several issues appear. In mobile cloud computing (MCC), we have discussed issues such as mobility, reliability, security, and network connectivity. As we are focusing green mobile cloud computing (GMCC), meeting the criteria of energy-efficiency is a mandate in this case. This chapter discusses the following topics as future research areas in GMCC:

- Energy harvesting in MCC
- Entropy-based GMCC
- Green Vehicular MCC
- Green Mobile Crowd Sensing
- Green Edge and Fog Computing
- GMCC-based Smart applications
- Geographical Location Aware Mobile Recommender System
- Nature Inspired Optimization Algorithms for GMCC

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A. Mukherjee (✉)

Department of Computer Science, Mahishadal Raj College, Mahishadal, Purba Medinipur, West Bengal, India

e-mail: [anweshamukherjee2011@gmail.com](mailto:anweshamukherjee2011@gmail.com)

D. De

Department of Computer Science and Engineering, Centre of Mobile Cloud Computing, Maulana Abul Kalam Azad University of Technology, West Bengal, Nadia, India

e-mail: [debashis.de@makautwb.ac.in](mailto:debashis.de@makautwb.ac.in)

R. Buyya

Cloud Computing and Distributed Systems (CLOUDS) Laboratory, School of Computing and Information Systems, The University of Melbourne, Melbourne, Australia

e-mail: [rbuyya@unimelb.edu.au](mailto:rbuyya@unimelb.edu.au)

57. Soeparno, H., Perbangsa, A.S.: Cloud quantum computing concept and development: a systematic literature review. *Procedia Comput. Sci.* **179**, 944–954 (2021) 387  
388
58. Liu, L., Dou, X.: QuCloud: a new qubit mapping mechanism for multi-programming quantum computing in cloud environment. In: 2021 IEEE International Symposium on High-Performance Computer Architecture (HPCA), pp. 167–178. IEEE, Piscataway, NJ (2021) 390  
391
59. Deb, P., Mukherjee, A., De, D.: A study of densification management using energy efficient femto-cloud based 5G mobile network. *Wirel. Pers. Commun.* **101**(4), 2173–2191 (2018) 392  
393
60. Valenzuela-Valdés, J.F., Palomares, A., González-Macías, J.C., Valenzuela-Valdés, A., Padilla, P., Luna-Valero, F.: On the ultra-dense small cell deployment for 5G networks. In: 2018 IEEE 5G World Forum (5GWF), pp. 369–372. IEEE, Piscataway, NJ (2018) 394  
396

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# Multi-criterial Offloading Decision Making in Green Mobile Cloud Computing

Avishek Chakraborty, Anwesha Mukherjee, Soumya Bhattacharyya, Sumit Kumar Singh, and Debashis De

## 1 Introduction

The rapid growth and advancement in mobile communication and computing has increased the number of mobile users as well as their demand. The users' demands are not only limited to the voice call, message service and surfing Internet, but also access several applications. Many of these applications require high resource configuration of the device as well the execution of exhaustive applications drains the battery life of the handheld mobile devices. Usually, the mobile devices suffer from resource constraints in terms of computation, storage capacity, battery life etc. In such a circumstance, execution of resource-intensive and sophisticated applications such as recognition of speech/face/object, augmented reality, natural language processing etc., inside the mobile device is quite difficult. To resolve this problem as well as to meet the user demand, the concept of Mobile Cloud Computing comes, which offers offloading facilities to the users [1–3]. In mobile

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A. Chakraborty (✉)  
Department of Engineering Science, Academy of Technology, Adisaptagram, West Bengal, India

A. Mukherjee  
Department of Computer Science, Mahishadal Raj College, Purba Medinipur, West Bengal, India

S. Bhattacharyya  
Narula Institute of Technology, Agarpara, West Bengal, India  
e-mail: [soumya.bhattacharyya@nit.ac.in](mailto:soumya.bhattacharyya@nit.ac.in)

S. K. Singh  
University of Essex, Colchester, UK  
e-mail: [ss20727@essex.ac.uk](mailto:ss20727@essex.ac.uk)

D. De  
Department of Computer Science and Engineering, Centre of Mobile Cloud Computing, Maulana Abul Kalam Azad University of Technology, West Bengal, Nadia, India

240. Pramanik, S., Mukhopadhyaya, D.: Grey relational analysis based intuitionistic fuzzy multi criteria group decision making approach for teacher selection in higher education. *Int. J. Comput. Appl.* **34**(10), 21–29 (2011)
241. Wei, G.W.: Grey relational analysis method for intuitionistic fuzzy multiple attribute decision making. *Expert Syst. Appl.* **38**, 11671–11677 (2011)
242. Pramanik, S., Mondal, K.: Interval neutrosophic multi-attribute decision-making based on grey relational analysis. *Neutrosophic Sets Syst.* **9**, 13–22 (2015)
243. Regunathan, R., Murugaiyan, A., Lavanya, K.: A QoS-aware hybrid TOPSIS–plurality method for multi-criteria decision model in mobile cloud service selection. In: *Proceedings of the 2nd International Conference on Data Engineering and Communication Technology*, pp. 499–507. Springer, Singapore (2019)
244. Hao, F., Pei, Z., Park, D.S., Phonexay, V., Seo, H.S.: Mobile cloud services recommendation: a soft set-based approach. *J. Ambient Intell. Humaniz. Comput.* **9**(4), 1235–1243 (2018)
245. Singla, C., Mahajan, N., Kaushal, S., Verma, A., Sangaiah, A.K.: Modelling and analysis of multi-objective service selection scheme in IoT-cloud environment. In: *Cognitive Computing for Big Data Systems Over IoT*, pp. 63–77. Springer, Cham (2018)
246. Nayak, S.C., Parida, S., Tripathy, C., Pati, B., Panigrahi, C.R.: Multicriteria decision-making techniques for avoiding similar task scheduling conflict in cloud computing. *Int. J. Commun. Syst.* **33**(13), e4126 (2020)
247. Chakraborty, A., Banik, B., Mondal, S.P., Alam, S.: Arithmetic and geometric operators of pentagonal neutrosophic number and its application in mobile communication service based MCGDM problem. *Neutrosophic Sets Syst.* **32**, 61–79 (2020)
248. Nawaz, F., Asadabadi, M.R., Janjua, N.K., Hussain, O.K., Chang, E., Saberi, M.: An MCDM method for cloud service selection using a Markov chain and the best-worst method. *Knowl.-Based Syst.* **159**, 120–131 (2018)
249. Ouadah, A., Hadjali, A., Nader, F.: A hybrid MCDM framework for efficient web services selection based on QoS. In: *International Conference on Applied Smart Systems (ICASS)*, IEEE, pp. 1–6 (2018)



# Green Internet of Things Using Mobile Cloud Computing: Architecture, Applications, and Future Directions

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3

Anindita Raychaudhuri, Anwasha Mukherjee, Debashis De,  
and Sukhpal Singh Gill

4  
5

## 1 Introduction

6

In the last few decades, the number of mobile users has increased drastically and the mobile devices have become popular medium for accessing Internet services. Various mobile applications have been introduced for learning purpose, video conferencing, chatting, health monitoring, playing games, listening music, editing photos and videos, accessing social networking sites and professional sites, etc. However, the handheld mobile devices suffer from various drawbacks such as limited storage capacity, limited processing capability, limited battery life, etc. Due to these constraints the execution of exhaustive applications and storage of high-volume data inside the mobile devices may not be possible. In such a scenario, MCC has come that permits to store data and execute applications outside the

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A. Raychaudhuri (✉)

Department of Computer Science, Sarojini Naidu College for Women, Kolkata, West Bengal, India

e-mail: [anindita.raychaudhuri@sncwgs.ac.in](mailto:anindita.raychaudhuri@sncwgs.ac.in)

A. Mukherjee

Department of Computer Science, Mahishadal Raj College, Mahishadal, Purba Medinipur, West Bengal, India

e-mail: [anweshamukherjee2011@gmail.com](mailto:anweshamukherjee2011@gmail.com)

D. De

Department of Computer Science and Engineering, Centre of Mobile Cloud Computing, Maulana Abul Kalam Azad University of Technology, West Bengal, Nadia, India

e-mail: [debashis.de@makautwb.ac.in](mailto:debashis.de@makautwb.ac.in)

S. S. Gill

School of Electronic Engineering and Computer Science, Queen Mary University of London, London, UK

e-mail: [s.s.gill@qmul.ac.uk](mailto:s.s.gill@qmul.ac.uk)

51. Pan, J., Jain, R., Paul, S., Vu, T., Saifullah, A., Sha, M.: An internet of things framework for smart energy in buildings: designs, prototype, and experiments. *IEEE Internet Things J.* **2**(6), 527–537 (2015) 366–368
52. Sangoleye, F., Irtija, N., Tsiropoulou, E.E.: Smart energy harvesting for internet of things networks. *Sensors.* **21**(8), 2755 (2021) 369–370
53. Hans, M.R., Tamhane, M.A.: IoT based hybrid green energy driven street lighting system. In: 2020 Fourth International Conference on I-SMAC (IoT in Social, mobile, Analytics and Cloud)(I-SMAC), pp. 35–41. IEEE (2020) 371–373
54. Said, O., Al-Makhadmeh, Z., Tolba, A.M.R.: EMS: an energy management scheme for green IoT environments. *IEEE Access.* **8**, 44983–44998 (2020) 374–375
55. Yau, C.W., Kwok, T.T.O., Lei, C.U., Kwok, Y.K.: Energy harvesting in internet of things. *Internet of Everything*, 35–79 (2018) 376–377
56. Sanislav, T., Mois, G.D., Zeadally, S., Folea, S.C.: Energy harvesting techniques for internet of things (IoT). *IEEE Access.* **9**, 39530–39549 (2021) 378–379
57. Tahiliani, V., Dizalwar, M.: Green iot systems: an energy efficient perspective. In: 2018 Eleventh International Conference on Contemporary Computing (IC3), pp. 1–6. IEEE (2018, August) 380–382
58. Solanki, A., Nayyar, A.: Green internet of things (G-IoT): ICT technologies, principles, applications, projects, and challenges. In: *Handbook of Research on Big Data and the IoT*, pp. 379–405. IGI Global (2019) 383–385
59. De, D., Mukherjee, A., Ray, A., Roy, D.G., Mukherjee, S.: Architecture of green sensor mobile cloud computing. *IET Wirel. Sens. Syst.* **6**(4), 109–120 (2016) 386–387
60. Sarkar, S., Debnath, A.: Green IoT: design goals, challenges and energy solutions. In: 2021 6th International Conference on Communication and Electronics Systems (ICCES), pp. 637–642. IEEE (2021, July) 388–390
61. Arshad, R., Zahoor, S., Shah, M.A., Wahid, A., Yu, H.: Green IoT: an investigation on energy saving practices for 2020 and beyond. *IEEE Access.* **5**, 15667–15681 (2017) 391–392
62. Poongodi, T., Ramya, S.R., Suresh, P., Balusamy, B.: Application of IoT in green computing. In: *Advances in Greener Energy Technologies*, pp. 295–323. Singapore, Springer (2020) 393–394
63. Ray, A., De, D.: Performance evaluation of tree based data aggregation for real time indoor environment monitoring using wireless sensor network. *Microsyst. Technol.* **23**(9), 4307–4318 (2017) 395–397
64. Sharma, N., Panwar, D.: Green IoT: advancements and sustainability with environment by 2050. In: 2020 8th International Conference on Reliability, Infocom Technologies and Optimization (Trends and Future Directions) (ICRITO), pp. 1127–1132. IEEE (2020) 398–400
65. Medhi, K., Mondal, M.A., Hussain, M.I.: An approach to handle heterogeneous healthcare IoT data using deep convolutional neural network. In: *Emerging Technologies for Smart Cities*, pp. 25–31. Singapore, Springer (2021) 401–403
66. Booij, T.M., Chiscop, I., Meeuwissen, E., Moustafa, N., den Hartog, F.T.: ToN\_IoT: The Role of Heterogeneity and the Need for Standardization of Features and Attack Types in IoT Network Intrusion Datasets. *IEEE Internet of Things J* (2021) 404–406
67. Noura, M., Atiquzzaman, M., Gaedke, M.: Interoperability in internet of things: taxonomies and open challenges. *Mob. Netw. Appl.* **24**(3), 796–809 (2019) 407–408
68. Abbasi, M.A., Memon, Z.A., Durrani, N.M., Haider, W., Laeeq, K., Mallah, G.A.: A multi-layer trust-based middleware framework for handling interoperability issues in heterogeneous IoTs. *Clust. Comput.*, 1–28 (2021) 409–411
69. Ahmad, R., Asim, M.A., Khan, S.Z., Singh, B.: Green IOT—issues and challenges. In: *Proceedings of 2nd International Conference on Advanced Computing and Software Engineering (ICACSE)* (2019) 412–414
70. Raychaudhuri, A., Mukherjee, A., De, D.: SMEC: sensor mobile edge computing. In: *Mobile Edge Computing*, pp. 89–110. Springer, Cham (2021) 415–416
71. Tuysuz, M.F., Trestian, R.: From serendipity to sustainable green IoT: technical, industrial and political perspective. *Comput. Netw.* **182**, 107469 (2020) 417–418
72. Abdul-Qawy, A.S.H., Srinivasulu, T.: SEES: a scalable and energy-efficient scheme for green IoT-based heterogeneous wireless nodes. *J. Ambient. Intell. Humaniz. Comput.* **10**(4), 1571–1596 (2019) 419–421

# Contribution of Zebrafish in Cancer Research: Tiny but Not Trivial

Anshumi Banerjee, Madhuchhanda Adhikari, Chayan Biswas, Sukhendu Maity, Ankit Chatterjee, Rajkumar Guchhait, and Kousik Pramanick

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## Abstract

The zebrafish successfully established as a vertebrate model in the study of developmental biology is nowadays adding immense insights in the field of cancer research in spite of the in vitro cell lines and mammalian animal models. Owing to effortless cancer generation in zebrafish by means of gene-specific mutagenesis to suppress tumor suppressor genes and generation of specific transgene to overexpress oncogenes makes it an appropriate model in the cancer research field. The ease of transplantation of cancer cells in zebrafish via allograft and xenograft from cancer subjects and their resemblance to that of human cancers like T-cell leukemia, prostate and hepatocellular carcinoma, melanoma, and myelomas confers to its reliability as a model in the field of cancer research. Finally, the zebrafish model is paving its path as a trending cancer research model due to the on-site cancer detection, in vivo imaging of cancer in living fish by

A. Banerjee · M. Adhikari · C. Biswas · S. Maity · A. Chatterjee · K. Pramanick (✉)  
Integrative Biology Research Unit, Department of Life Sciences, Presidency University, Kolkata, India  
e-mail: [kousik.dbs@presiuniv.ac.in](mailto:kousik.dbs@presiuniv.ac.in)

R. Guchhait  
P.G. Department of Zoology, Mahishadal Raj College, Mahishadal, India

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- 427 that tumor-initiating cells are abundant in zebrafish T-cell acute lymphoblastic leukemia. *Blood*  
428 115(16):3296–3303
- 429 Spence R, Gerlach G, Lawrence C, Smith C (2008) The behaviour and ecology of the zebrafish,  
430 *Danio rerio*. *Biol Rev* 83(1):13–34
- 431 Stoletov K, Montel V, Lester RD, Gonias SL, Klemke R (2007) High-resolution imaging of the  
432 dynamic tumor cell–vascular interface in transparent zebrafish. *Proc Natl Acad Sci* 104(44):  
433 17406–17411
- 434 Sun L, Nguyen AT, Spitsbergen JM, Gong Z (2015) Myc-induced liver tumors in transgenic  
435 zebrafish can regress in tp53 null mutation. *PLoS One* 10(1):e0117249
- 436 Taylor JS, Braasch I, Frickey T, Meyer A, Van de Peer Y (2003) Genome duplication, a trait shared  
437 by 22,000 species of ray-finned fish. *Genome Res* 13(3):382–390
- 438 Teraoka H, Dong W, Hiraga T (2003) Zebrafish as a novel experimental model for developmental  
439 toxicology. *Congenit Anom* 43(2):123–132
- 440 Tobia C, De Sena G, Presta M (2011) Zebrafish embryo, a tool to study tumor angiogenesis. *Int*  
441 *J DevBiol* 55(4–5):505–509
- 442 Tsoli M, Wadham C, Pinese M, Failes T, Joshi S, Mould E, Yin JX, Gayevskiy V, Kumar A,  
443 Kaplan W, Ekert PG (2018) Integration of genomics, high throughput drug screening, and  
444 personalized xenograft models as a novel precision medicine paradigm for high risk pediatric  
445 cancer. *Cancer Biol Ther* 19(12):1078–1087
- 446 Tulotta C, Stefanescu C, Beletkaia E, Bussmann J, Tarbashevich K, Schmidt T, Snaar-Jagalska BE  
447 (2016) Inhibition of signaling between human CXCR4 and zebrafish ligands by the small  
448 molecule IT1t impairs the formation of triple-negative breast cancer early metastases in a  
449 zebrafish xenograft model. *Dis Model Mech* 9(2):141–153
- 450 van der Weyden L, Patton EE, Wood GA, Foote AK, Brenn T, Arends MJ, Adams DJ (2016) Cross-  
451 species models of human melanoma. *J Pathol* 238(2):152–165
- 452 Wang L, Chen H, Fei F, He X, Sun S, Lv K, Yu B, Long J, Wang X (2019) Patient-derived  
453 heterogeneous xenograft model of pancreatic cancer using zebrafish larvae as hosts for com-  
454 parative drug assessment. *J Vis Exp* 146:e59507
- 455 White RM, Sessa A, Burke C, Bowman T, LeBlanc J, Ceol C, Bourque C, Dovey M, Goessling W,  
456 Burns CE, Zon LI (2008) Transparent adult zebrafish as a tool for in vivo transplantation  
457 analysis. *Cell Stem Cell* 2(2):183–189
- 458 Xu W, Foster BA, Richards M, Bondioli KR, Shah G, Green CC (2018) Characterization of prostate  
459 cancer cell progression in zebrafish xenograft model. *Int J Oncol* 52(1):252–260
- 460 Yao Y, Sun S, Wang J, Fei F, Dong Z, Ke AW, He R, Wang L, Zhang L, Ji MB, Li Q (2018)  
461 Canonical Wnt signaling remodels lipid metabolism in zebrafish hepatocytes following Ras  
462 oncogenic insult. *Cancer Res* 78(19):5548–5560
- 463 Zhao S, Huang J, Ye J (2015) A fresh look at zebrafish from the perspective of cancer research.  
464 *J Exp Clin Cancer Res* 34(1):1–9





# Mammalian Cells: Reliability as Model System in the Ecotoxicological Evaluation of Environmental Stressors

Madhuchhanda Adhikari, Chayan Biswas, Sukhendu Maity, Ankit Chatterjee, Rajkumar Guchhait, and Kousik Pramanick

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M. Adhikari · C. Biswas · S. Maity · A. Chatterjee · R. Guchhait · K. Pramanick (✉)  
Integrative Biology Research Unit, Department of Life Sciences, Presidency University,  
Kolkata, India  
e-mail: [kousik.dbs@presiuniv.ac.in](mailto:kousik.dbs@presiuniv.ac.in)

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## Abstract

Disturbance in ecosystem balance is increasing drastically due to human interferences. Different kinds of toxins are continuously being released into the environment from various sources; few are naturally produced in environment like cyanotoxins, and the rest are released from industries or other human activities. Living organisms, including humans, come in contact with various kinds of toxins during their lifetime. To understand the level of toxicity and mechanism of action, ecotoxicological evaluation of these environmental stressors is necessary. Selecting/creating an ideal model system for toxicity screening is a major concern among scientist. At present, various animal models like mice, rats, fish, etc., and different cell lines are used to understand the toxicological potential of environmental stressors. Mammalian cell lines are widely used to predict the toxic effects on cellular level, especially on human perspective. To understand the mechanism of toxicity at organism level, other models like fish, mice, rats, etc., are used. This chapter reviews the benefits and drawbacks of different model system like teleost, algae, and mammalian animal models over mammalian cell lines. This chapter will also help to understand the vitality of these model systems in toxicity evaluation and choosing the suitable ones for ecotoxicological evaluation of environmental stressors.

## Keywords

Ecotoxicology · Environmental toxicants · Animal models · Mammalian cell lines · Teleost · Algae · Model organisms

## 1 Introduction

Living organisms, including human beings and other organisms, during their lifetime, come in contact with diverse environmental and chemical toxicants, such as, xenobiotics, persistent organic pollutants, drugs and pharmaceuticals, etc. These toxic environmental pollutants not only cause potential cellular, tissue, and organ damage, respiratory and cardiovascular disorders, but also pose serious threat to the viability of the organisms (Kelishadi et al. 2009). These pollutants bear mutagenic, carcinogenic, or even teratogenic effects on the germ cells, embryonic and adult stages of all living organisms, and not only induce embryotoxicity but also developmental deformities of the offsprings and the adults, perinatal disorders, and mortality, thereby indicating trans-generational effects, persisting from one generation to the next.

- Valentini X, Absil L, Laurent G, et al. Toxicity of TiO<sub>2</sub> nanoparticles on the NRK52E renal cell line. *Mol Cell Toxicol.* 2017;13:419–31.
- Van Pomeran M, Brun NR, Peijnenburg WJGM, Vijver MG. Exploring uptake and biodistribution of polystyrene (nano) particles in zebrafish embryos at different developmental stages. *Aquat Toxicol.* 2017;190:40–5.
- Velki M, Di Paolo C, Nelles J, Seiler TB, Hollert H. Diuron and diazinon alter the behavior of zebrafish embryos and larvae in the absence of acute toxicity. *Chemosphere.* 2017;180:65–76.
- Vinken M, Blaauboer BJ. In vitro testing of basal cytotoxicity: establishment of an adverse outcome pathway from chemical insult to cell death. *Toxicol In Vitro.* 2017;39:104–10.
- Wang S, Li Q, Huang S, Zhao W, Zheng Z. Single and combined effects of microplastics and lead on the freshwater algae *Microcystis aeruginosa*. *Ecotoxicol Environ Saf.* 2021;208:111664.
- Wasi S, Tabrez S, Ahmad M. Toxicological effects of major environmental pollutants: an overview. *Environ Monit Assess.* 2013;185(3):2585–93.
- Wu Q, Yan W, Liu C, Li L, Yu L, Zhao S, Li G. Microcystin-LR exposure induces developmental neurotoxicity in zebrafish embryo. *Environ Pollut.* 2016;213:793–800.
- Yamada S, Kubo Y, Yamazaki D, Sekino Y, Kanda Y. Chlorpyrifos inhibits neural induction via Mfn1-mediated mitochondrial dysfunction in human induced pluripotent stem cells. *Sci Rep.* 2017;7:40925.
- Zhang C, Chen X, Wang J, Tan L. Toxic effects of microplastic on marine microalgae *Skeletonema costatum*: interactions between microplastic and algae. *Environ Pollut.* 2017;220:1282–8.
- Zheng H, Wang J, Wei X, Chang L, Liu S. Proinflammatory properties and lipid disturbance of polystyrene microplastics in the livers of mice with acute colitis. *Sci Total Environ.* 2021;750:143085.

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(31) Priority Document No	:NA	<b>2).Abhijit Das</b>
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(57) Abstract :

[000]The present invention discloses an IoT based growth monitoring system for crops and fruits for measuring multiple crops up to 128 different or same crops utilising a single Texas Instrument based 16bit ultra-low power microcontroller (as well as 32 bit with the help of an internal multiplier). The system utilises a flex sensor of 4.5 inches to measure the change of growth of the crop by measuring the circumference of the crop. The bending angle of the flex sensor is converted to voltage and via Analog to Digital Converter (ADC) is fed to the microcontroller in the form of digital signal. The microcontroller with the help of Quectel M95 2G GSM modem sends the signal to the cloud for storage and analysis purposes. The device is categorised as an Internet of Things (IoT) device, thus, different from other non-IoT based devices available in the market. The design of the device allows continuous long term measurement without periodic maintenance

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