2019 TCPD Summer School Handbook

Welcome!

It is with great pleasure that we are organizing the 3rd Annual TCPD Summer School from June 30 to July 6, 2019 at Ashoka University. The handbook provides a guide to the TCPD Summer School. It contains the schedule and a detailed day by day agenda. We have also tried to provide lists of supplementary resources which could be looked into should you want to study a topic in greater depth.

The goal of the summer school is to disseminate at large what we, TCPD, does and more importantly how we do i.e., the methods used to collect, clean and analyze data. In addition to sharing our methodology, we have also invited speakers who will be discussing their research albeit in slightly different but relevant areas.

We hope you have a good experience at the TCPD Summer School. Looking forward to seeing you!

Sincerely,

TCPD Team

Contents

Title   **Page**

1. Introduction

Please make sure you read this section very carefully.

i. Logistics

Shared Google Drive folder: Each of you will have access to a shared Google Drive folder which will contain the data that you will be using for your final projects, the slides from the presentations that will be made during the summer school, templates for final projects, programming assignments and their solutions.

Team Google Drive folder: Once the teams (3-4 per group) are made, each team will have its own Google Drive folder. This will be used to upload final reports and final presentations. Please do not email any of this to us as chances are we will not see it.

Google Classroom: All participants will be added to a Google Classroom. We will be posting announcements, assignments and instructions for final projects here.

ii. Requirements

You will be responsible for completing the assignments and final projects (final report and final presentation). We have structured the program such that you have time to work on your assignments (end of everyday during the R workshop) and final projects (Hackathon).

- *Daily assignments:* You will be responsible for 4 assignments which will be posted on Google Classroom. They are short tasks (about 2 questions) to be done in teams. The assignments are designed such that you get enough practice to work on your final projects. Your assignments will be returned one day after submission. Solutions will be shared.

- *Final projects:* There are two parts to the final project. The first is a report and the second is a presentation.The report is due on July 6. Final presentations will be made on the same day. You will be provided with templates for both.

iii. Data & Terms and Conditions

Data: You will have access to the data which you will be using for your assignments and final projects.

Terms and Conditions: Correct citation, no endorsement and no warranty - http://lokdhaba.ashoka.edu.in/LokDhaba-Shiny/June10LokDhabaCodebook.pdf

iv. Completion Certificate

You will be given a completion certificate **<u>only</u>** if you complete all the assignments and the final project (report and presentation). No exceptions.

v. Feedback

At the end of the program, we will be circulating a Google Form for you to evaluate the summer school. This will be anonymous. We value your feedback and we hope you will take a few minutes to fill the form.

vi. Expected behaviors

- While you are permitted to use your computers, please desist from using your phones. They are distracting both for the instructor and your peers.
- Be respectful.
- Come to each session on time.
- Submit your assignments on time.

vii. Contact

Should you have any questions, email us at tcpd-contact@ashoka.edu.in. You will hear from us within 2 working days. If you have an urgent need, contact Hem Nath Mishra at hem.mishra@ashoka.edu.in

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2. 2019 TCPD Summer School Schedule at a Glance*

The table below provides a snapshot of the 2019 TCPD summer school. As you can see, it is a tight schedule, so we will be starting each session on time. Please don't be late.

LOCATION: All sessions (including orientation) will take place in AC-02 LT-110

	June 30	July 1	July 2	July 3	July 4	July 5	July 6
	Sunday	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**
9-9:15		Designing and Conducting Field Work (BN)	A Landscape of Political Data in India (GV)	Multi-Method Research (GV)	A Friendly Introduction to Machine Learning with Applications to Visual Analytics (SA)	Understanding Data Generation and Interpretation of Violence Data (PT)	Presentations
9:15-9:30							
9:30-9:45							
9:45-10							
10-10:15							
10:15-10:30							
10:30-10:45		*coffee break*	*coffee break*	*coffee break*	*coffee break*	*coffee break*	*coffee break*
10:45-11		Excel Analysis (SB)	Basics of Data Scraping (SB & MK)	Geographical Information Systems (GIS): Introduction (MK)	Artificial Intelligence for Societally Relevant Problems (AY)	Village in the City: Residential Segregation in Urbanizing India (NB)	Presentations
11-11:15							
11:15-11:30							
11:30-11:45							
11:45-noon		*break*	*break*	*break*	*break*	*break*	*break*
noon-12:15		Visual representation of information (VR)	Designing Social Scientific Inquiry (NS)	Geographical Information Systems (GIS): Lokdhaba application (MK)	Formulating Questions on Indian Politics: 2019 and Beyond (TT)	Isolated by Caste: Neighbourhood-Scale Residential Segregation in Indian Metros (NB)	Presentations
12:15-12:30							
12:30-12:45							
12:45-1							
1-1:15							
1:15-1:30							
1:30-1:45		*lunch*	*lunch*	*lunch*	*lunch*	*lunch*	*lunch*
1:45-2							
2-2:15							
2:15-2:30							
2:30-2:45		Visualization design (VR)	R Workshop (SB & MK)	R Workshop (SB & MK)	R Workshop (SB & MK)	R Workshop (SB & MK)	Presentations
2:45-3							
3-3:15							
3:15-3:30							
3:30-3:45							
3:45-4							
4-4:15		*coffee break*	*coffee break*	*coffee break*	*coffee break*	*coffee break*	*coffee break*
4:15-4:30		Work on assignments/ projects	Work on assignments/ projects	Work on assignments/ projects	Work on assignments/ projects	Work on projects	Presentations
4:30-4:45							
4:45-5							
5-5:15							
5:15-5:30	Arrivals and introduction						
5:30-5:45							Departures

Time							
5:45-6	(tea, coffee and snacks)						
6-6:15							
6:15-6:30							
6:30-6:45							
6:45-7							
7-7:15							
7:15-7:30							
7:30-7:45							
7:45-8					Murthal dinner		
8-8:15							
8:15-8:30							
8:30-8:45							
8:45-9							
9-9:15							
9:15-9:30							
9:30-9:45							
9:45-10						Hackathon	
10-10:15							
10:15-10:30							
10:30-10:45							
10:45-11							
11-11:15							
11:15-11:30							
11:30-11:45							
11:45-midnight							

Initials of instructors are given in brackets. You can read more about them on pages 22-24.

Course Instructors
1. AY: Amulya Yadav
2. BN: Basim-u-Nissa
3. GV: Gilles Verniers
4. MK: Mohit Kumar
5. NB: Naveen Bharathi
6. NS: Neelanjan Sircar
7. PT: Priyamvada Trivedi
8. SA: Saket Anant
9. SB: Saloni Bhogale
10. TT: Tariq Thachil
11. VR: Venkatesh Rajamanickam

3. Before You Arrive

i. We request you download or at least try to download R, RStudio and QGIS before arriving on campus. If you are unable to do so, please make sure this is taken care of during the orientation on June 30.

- Install R (3.5 or above) from https://cran.rstudio.com/
- Install RStudio (frontend to R) from https://www.rstudio.com/products/rstudio/download/
- QGIS: https://qgis.org/en/site/forusers/download.html

ii. We need you to have Microsoft Excel or OpenOffice installed.

iii. Bring your own laptop. You will be given access to WiFi on campus.

4. Agenda for June 30, 2019 (Sunday)

This will be your first day on campus. We are expecting most of you to arrive by late afternoon. **This orientation is mandatory to attend.** We will go over the summer school logistics in order to make the week flow as seamlessly as possible. If you miss this, it is your responsibility to find out what was covered and ensure you have access to everything you will be needing for the summer school. The agenda is as follows.

5:00pm - 5:30pm   **Welcome**
Snacks will be served.

5:30pm - 7:00pm   **Setting up**
(i) Ensure that R, RStudio and QGIS are installed and working on your computer; (ii) Google Drive folder setup; (iii) Google Classroom set-up

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5. Agenda for July 1, 2019 (Monday)

9:00am - 10:30am   **Designing and Conducting Field Work (BN)**
Description: Scientific research in social sciences, major components of research design, navigating fieldwork, field research at TCPD.

10:30am -10:45am   **Coffee break**
Coffee/tea and cookies will be provided

10:45am - 11:45am   **Excel Analysis (SB)**
Description: Basics of Excel data analysis: formulae, filters, pivot tables, lookups

11:45am - noon   **Break**

Noon - 1:30pm   **Visual Representation of Information (VR)**
Description: Information graphics reveal the hidden, explain the complex and illuminate the obscure. Constructing visual representation of information is not mere translation of what can be read to what can be seen. It entails filtering the information, establishing relationships, discerning patterns and representing them in a manner that enables a consumer of that information construct meaningful knowledge. This lecture will deal with the design fundamentals and representation techniques for creating effective visualizations based on principles from graphic design, visual art, perceptual psychology, and cognitive science.

1:30pm - 2:30pm   **Lunch**

2:30pm - 4:00pm   **Visualization Design (VR)**
Description: Working with a dataset, participants will create a data-based story through charts, maps, and diagrams to gain practical understanding of the key techniques and theory used in visualization design, including data models, graphical perception and techniques for visual encoding.

4:00pm - 4:15pm

Coffee break

Coffee/tea and cookies will be provided

4:15pm - 6:00pm

Work on assignments/projects

Description: The projects will be introduced, you will be divided into teams and assigned the state you will be working on.

6. Agenda for July 2, 2019 (Tuesday)

9:00am - 10:30am   **A Landscape of Political Data in India (GV)**
Description: Social scientists must often build their own datasets rather than rely on existing public data. However, this exercise is never done entirely from scratch. This session will review the state of affairs of publicly-available public data in India and will review the main challenges that occur while handling that data.

10:30am - 10:45am   **Coffee break**
Coffee/tea and cookies will be provided

10:45am - 11:45am   **Basics of Data Scraping (SB & MK)**
Description: Using copytables, tabula, curl-O, simple Programs in R/Python for scraping

11:45am - noon   **Break**

Noon - 1:30pm   **Designing Social Scientific Inquiry (NS)**
Description: First, we will cover how to ask a proper empirical research question and write down proper hypotheses. Second, we will discuss the kind of evidence one should muster to test these hypotheses.

1:30pm - 2:30pm   **Lunch**

2:30pm - 4:00pm   **R Workshop (SB & MK)**
Description: R basics, using data.table, simple functions

4:00pm - 4:15pm   **Coffee break**
Coffee/tea and cookies will be provided

4:15pm - 6:00pm   **Work on assignments/projects**
Description: Time to work on your assignments/projects.

7. Agenda for July 3, 2019 (Wednesday)

9:00am - 10:30am   **Multi-Method Research (GV)**
Description: Data helps asking relevant questions but is usually silent on their answers. To seek answers, one must go beyond the data and see how those questions connect to both theory and empirical observations. In this session, we will see a few examples of research projects that combine quantitative and qualitative methods, and reflect on the way to connect data to real-life observations.

10:30am - 10:45am   **Coffee break**
Coffee/tea and cookies will be provided

10:45am - 11:45am   **Geographical Information Systems I: Introduction (MK)**
Description: This session will cover theory and basics of GIS: maps, projections, types(Vector/Raster) and other GIS terminologies. This session will enable participants to create their own spatial data using google maps and QGIS.

11:45am - noon   **Break**

Noon - 1:30pm   **Geographical Information Systems II: Lok Dhaba Application (MK)**
Description: In this session we will make maps identical to Lok Dhaba. The participants will learn how to design and publish maps.

1:30pm - 2:30pm   **Lunch**

2:30pm - 4:00pm   **R Workshop (SB & MK)**
Description: More functions, pivot tables with R

4:00pm - 4:15pm   **Coffee break**
Coffee/tea and cookies will be provided

4:15pm - 6:00pm   **Work on assignments/projects**
Description: Time to work on your assignments/projects.

8. Agenda for July 4, 2019 (Thursday)

9:00am - 10:30am

A Friendly Introduction to Machine Learning with Applications to Visual Analytics (SA)

Description: In this talk, we will start our discussion with a brief review of the impact of machine learning (ML), followed by a high level view of how machine learning problems are modeled. We will then develop an intuitive understanding of various popular techniques like linear and logistic regression, decision trees and random forests, support vector machines and the now ubiquitous neural networks, which have become the primary drivers of Artificial Intelligence. Towards the end, we will see some applications of ML and computer vision to real-world problems like wildlife monitoring for conservation and conflict management.

10:30am -10:45am

Coffee break

Coffee/tea and cookies will be provided

10:45am - 11:45am

Artificial Intelligence for Socially Relevant Problems (AY)

Description: The potential of Artificial Intelligence to tackle challenging problems that afflict society is enormous, particularly in the areas of healthcare, conservation and public safety and security. Many problems in these domains involve harnessing social networks of under-served communities to enable positive change, e.g., using social networks of homeless youth to raise awareness about HIV (and other STDs). Unfortunately, most of these real-world problems are characterized by uncertainties about social network structure and influence models, and previous research in AI fails to sufficiently address these uncertainties, as they make several unrealistic simplifying assumptions for these domains. In this talk, I will describe my research on algorithmic interventions in social networks.

11:45am - noon	**Break**
Noon - 1:30pm	**Formulating Questions on Indian Politics: 2019 and Beyond (TT)**
	Description: Following any Indian election, many popular interpretations of the mandate are based on arguments about voter psychology and political preferences. Yet these assertions are often made without efforts to actually rigorously identify political preferences or psychological mechanisms. Survey-based experiments are an increasingly common tool used for the study of political behavior. In this session, we will briefly discuss certain popular survey experimental techniques, along with their advantages and limitations within the context of India.
1:30pm - 2:30pm	**Lunch**
2:30pm - 4:00pm	**R Workshop (SB & MK)**
	Description: Joins
4:00pm - 4:15pm	**Coffee break**
	Coffee/tea and cookies will be provided
4:15pm - 6:00pm	**Work on assignments/projects**
	Description: Time to work on your assignments/projects.
6:30pm - 9:30pm	**Haryanvi dinner**
	We will be going out for dinner to Murthal.

9. Agenda for July 5, 2019 (Friday)

9:00am - 10:30am　　　**Understanding Data Generation and Interpretation of Violence Data (PT)**
Description: The session is dedicated to thinking about where data on violence comes from (i.e., their sources such as the government, NGOs, newspapers), their potential biases and how they might affect our inferences about patterns (if any) of violence. Existing global databases will be used as illustrations.

10:30am -10:45am　　　**Coffee break**
Coffee/tea and cookies will be provided

10:45am - 11:45am　　　**Village in the City: Residential Segregation in Urbanizing India (NB)**
Description: Caste is the principal axis of social stratification and segregation in India. One of the normative promises of Indian urbanization is the potential breaking down of the rigidities that characterize traditional caste hierarchies in an agrarian regime. In particular, urbanization holds the promise of breaking down spatial barriers between traditional caste groups. Using a unique census-scale dataset from urban Karnataka containing detailed caste data, we present a comprehensive portrait of the relationship between urbanization and patterns of spatial clustering. We provide the first census-scale evidence in independent India that corroborates anecdotal accounts of urban ghettoization.

11:45am - noon　　　**Break**

Noon - 1:30pm　　　**Isolated by Caste: Neighbourhood-Scale Residential Segregation in Indian Metros (NB)**
Description: We present the first ever neighbourhood-scale portrait of caste-based residential segregation in Indian cities. Residential segregation studies in Indian cities have relied on ward-level data. We demonstrate in this paper that wards cannot approximate an urban neighborhood, and that they are heterogeneous. For a typical ward, the

neighbourhood-ward dissimilarity index is greater than the ward-city dissimilarity index. Using 2011 enumeration block (EB) level census data for five major cities in India – Bengaluru, Chennai, Delhi, Kolkata, and Mumbai – we show how patterns of caste-based urban residential segregation operate in contemporary India. We also present the first visual snapshot of caste-based residential segregation in an Indian city using georeferenced EB level data for Bengaluru.

1:30pm - 2:30pm   **Lunch**

2:30pm - 4:00pm   **R Workshop (SB & MK)**
Description: Advance analysis: SP-BSP alliance

4:00pm - 4:15pm   **Coffee break**
Coffee/tea and cookies will be provided

4:15pm - 6:00pm   **Work on final projects**
Description: Time to work on your final reports and presentations.

8:00pm - midnight   **Hackathon**
Description: The purpose of the Hackthon is to finish working on your final projects (both the final report and final presentation).

10. Agenda for July 6, 2019 (Saturday)

The length of each presentation is going to be 15 minutes. Depending on the number of teams, we could get done sooner than planned.

9:00am - 10:30am   Presentations

10:30am - 10:45am   **Coffee break**
Coffee/tea and cookies will be provided

10:45am - 11:45am   Presentations

11:45am - noon   **Break**

Noon - 1:30pm   Presentations

1:30pm - 2:30pm   **Lunch**

2:30pm - 4:00pm   Presentations

4:00pm - 4:15pm   **Coffee break**
Coffee/tea and cookies will be provided

4:15pm - 6:00pm   Presentations

11. Resources

Data Visualization
  I. https://trinachi.github.io/data-design-builds/part04.html

Data Scraping
  I. Copy Tables Extension:
      https://chrome.google.com/webstore/detail/copytables/ekdpkppgmlalfkphpibadldikjimijon?hl=en
  II. Tabula (for extracting data from PDFs): https://tabula.technology/
  III. Beautiful Soup (Python):
      https://www.dataquest.io/blog/web-scraping-beautifulsoup/
  IV. Selenium (Python):
      https://towardsdatascience.com/web-scraping-using-selenium-python-8a60f4cf40ab

Excel
  I. Web Resources:
      A. On Bad Data: https://github.com/Quartz/bad-data-guide
      B. YouTube has some really good tutorials to brush up on the concepts:
          - Formulas, including fixed referencing:
             https://www.youtube.com/watch?v=FRu48zy-Djk
          - Validation with dropdowns:
             https://www.youtube.com/watch?v=FRiFfKb_B_A
          - Filters: https://www.youtube.com/watch?v=wMITDXPEjag
          - Advanced filters:
             https://www.youtube.com/watch?v=VqQACB_69SQ
      C. New York Times Repository for Training
          https://open.nytimes.com/how-we-helped-our-reporters-learn-to-love-spreadsheets-adc43a93b919

R
  I. Web Resources:
      - https://rstudio.cloud/learn/primers
      - https://r4ds.had.co.nz/introduction.html
      - https://datacarpentry.org/r-socialsci/
      - https://www.datacamp.com/

Residential Segregation in India

- Bharathi, N., Malghan, D.,; Rahman, A. (2019). Village in the City: Residential Segregation in Urbanizing India. Cornell University Dyson Working Paper, 19(04).
- Bharathi, N., Malghan, D.,; Rahman, A. (2018). Isolated by Caste: Neighbourhood-Scale Residential Segregation in Indian Metros. Cornell University Dyson Working Paper, 18(08).
- Denis, E.,; Zérah, M. H. (2018). Subaltern Urbanization in India: An Introduction to the Dynamics of Ordinary Towns. Springer: New Delhi
- Dupont, V. (2004). Socio-spatial differentiation and residential segregation in Delhi: a question of scale? Geoforum, 35(2), 157–175.
- Gayer, L.,; Jaffrelot, C. (2012). Muslims in Indian Cities: Trajectories of Marginalisation. Columbia University Press.
- Jamil, G. (2017). Accumulation by segregation: Muslim localities in Delhi. Oxford University Press.
- Mehta, S. K. (1969). Patterns of residence in Poona, India, by caste and religion: 1822–1965. Demography, 6(4), 473–491.
- Sidhwani, P. (2015). Spatial inequalities in big Indian cities. Economic & Political Weekly, 50(22), 55.
- Singh, G., Vithayathil, T.; Pradhan, K. C. (2019). Recasting inequality: residential segregation by caste over time in urban India. Environment and Urbanization,
- Susewind, R. (2017). Muslims in Indian cities: Degrees of segregation and the elusive ghetto. Environment and Planning A, 49(6), 1286-1307.
- Thorat, S.; Neuman, K. S. (2012a). Blocked by caste: economic discrimination in modern India. Oxford University Press.
- Thorat, S., Banerjee, A., Mishra, V. K., & Rizvi, F. (2015). Urban Rental Housing Market. Economic & Political Weekly, 27, 47–53.
- Vithayathil, T.,; Singh, G. (2012). Spaces of Discrimination. Economic & Political Weekly, 47(37), 60–66.

Understanding Data Generation and Interpretation of Conflict & Violence Data

I. Blogs lead by scholars
- Political Violence at a Glance
- Mobilizing Ideas
II. Interesting blog entries
- Patrick Ball: Why Raw Data Doesn't Support Analysis Of Violence
- Amelia Hoover Green: Violence data: what practitioners need to know
- Will H. Moore: Quantitative data in human rights: what do the numbers really mean?

- Megan Price and Anita Gohdes: Searching for Trends: Analyzing Patterns in Conflict Violence Data
- Jay Ulfelder: The Fog of War Is Patchy

III. Existing conflict databases
  - Armed Conflict Location and Event Data Project (ACLED)
  - Cingranelli and Richards Human Rights Dataset (CIRI)
  - Empirical Studies of Conflict (ESOC)
  - European Protest and Coercion Data
  - Freedom House
  - Global Terrorism Database (GTD)
  - Human Rights Data Analysis Group
  - Political Terror Scale (PTS)
  - Political Instability Task Force (PITF)
  - South Asia Terror Portal (SATP)
  - The Ill-Treatment & Torture (ITT) Data Project
  - Uppsala Conflict Data Program
  - V-Dem

12. Instructor Bios

Course Instructors

Amulya Yadav (Pennsylvania State University) is an Assistant Professor in the College of Information Sciences and Technology at Penn State University. He also has an affiliate faculty appointment with the USC Center for Artificial Intelligence in Society. His research interests include Artificial Intelligence, Multi-Agent Systems, Computational Game-Theory and Applied Machine Learning. His work in the field of Artificial Intelligence for Social Good focuses on developing theoretically grounded approaches to real-world problems that can have an impact in the field. His algorithms have been deployed in the real-world, particularly in the field of public health and wildlife protection. Amulya is a recipient of the AAMAS 2016 Best Student Paper Award, the AAAI 2017 Best Video and Best Student Video Award, the IDEAS 2016 Most Visionary Paper Award, and the AAMAS 2017 Best Paper Award nomination. His work has also been highlighted by Mashable.com as one of 26 incredible innovations that improved the world in 2015. Amulya holds a Ph.D. in Computer Science from the University of Southern California, and a B. Tech. in Computer Science & Engineering from Indian Institute of Technology (IIT), Patna. Email: amulya@psu.edu

Basim-u-Nissa (Ashoka University) is a Research Fellow at the Trivedi Centre for Political Data, Ashoka University where she coordinates the project - Sociological Profiling of Indian Legislators and Parliamentarians. She has previously written for the Indian Express, Economic and Political Weekly, Hindustan Times and Scroll.in. Her research interests are the politics of violence and state repression. Email: basim.nissa@ashoka.edu.in

Gilles Verniers (Ashoka University) is an Assistant Professor of political science at Ashoka University, and co-director of the Trivedi center for political data. His interests span a range of issues in the politics of South Asia, and he has published several research and press articles about these topics. Email: gilles.verniers@ashoka.edu.in

Mohit Kumar (Ashoka University) is a research engineer and data scientist at the Trivedi Center for Political Data. He has a master's degree in computer science and has been a developer for open source for Geospatial Foundation (OSGeo). Email: mohit.kumar@ashoka.edu.in

Naveen Bharathi is interested in studying the intersection of political sociology and political economy of identity in India. Specifically, his research explores the relationship between ethnic diversity and development, most broadly conceived. He has written about issues ranging from the relationship between ethnic diversity and public goods provisioning to spatial segregation in

contemporary urban India. His research has been covered by many media publications. Naveen recently graduated with a PhD in public policy from Indian Institute of Management Bangalore (IIMB). Prior to joining IIMB, Naveen has worked as an architect and planner in many distinguished architectural and planning firms in India. Email: naveenbharathi@gmail.com

Neelanjan Sircar (Ashoka University) is an Assistant Professor of political science at Ashoka University and a Senior Fellow at the Centre for Policy Research in New Delhi. His research interests include Indian political economy and comparative political behavior with an eye to Bayesian statistics, causal inference, social network analysis, and game theory. Email: neelanjan.sircar@ashoka.edu.in

Priyamvada Trivedi (Ashoka University) is the Associate Director of TCPD. She is interested in understanding the dynamics of political and social change using different forms of evidence such as government and non-government sources along with learning and applying both qualitative and quantitative methods. Email: priyamvada.trivedi@ashoka.edu.in

Saket Anand (IIIT Delhi) is an Assistant Professor at IIIT-Delhi, prior to which he was pursuing his PhD at Rutgers University, NJ, USA in the area of computer vision and machine learning. His primary research interests lie in design of learning-based solutions to computer vision problems. He is currently working on problems in Visual Wildlife Monitoring, Autonomous Driving and Road Safety and Target Tracking in Surveillance Camera Networks. His research is frequently published in reputed conferences and journals including CVPR, ECCV, ITSC, and IEEE TPAMI and he is on the review committee for various conferences. He is a member of the IEEE. Email: anands@iiitd.ac.in

Saloni Bhogale (Ashoka University) is a Research Fellow at TCPD. She is interested in studying and evaluating the performance of public institutions using public datasets, and her work currently focuses on the Indian Parliament. Email: saloni.bhogale@ashoka.edu.in

Tariq Thachil (Vanderbilt University) is an Associate Professor of Political Science at Vanderbilt University. His book, Elite Parties, Poor Voters was published by Cambridge in 2014. It examines the rise of the Bharatiya Janata Party among Dalit and Adivasi voters. His current work looks at the political consequences of urbanization in India. His articles have appeared in numerous journals including American Political Science Review, American Journal of Political Science, Journal of Politics, and Contemporary South Asia. Email: tariq.thachil@vanderbilt.edu

Venkatesh Rajamanickam (IIT Bombay) is a Professor at the IDC School of Design, Indian Institute of Technology Bombay. He obtained his B.Arch from NIT, Trichy and M.Des from the Industrial Design Centre, IIT Bombay. He began his career in 1992 as a User Interface Designer at CMC Ltd., (later acquired by TCS) Hyderabad, where he was involved in designing and

implementing user interfaces for major government software applications, and some of the earliest multimedia-based educational and entertainment programs created in the country. He has worked as a design researcher at the University of British Columbia, Vancouver and at the University of Michigan, Ann Arbor. Prior to joining IIT Bombay, he was the Deputy Director at the School of Design, Singapore Polytechnic, Singapore, where he established a new undergraduate programme in Product & Experience Design. He joined IIT Bombay in 2013 as an Associate Professor and was appointed as a full Professor in 2017. He is an Associate Faculty at the Centre for Policy Studies, IIT Bombay. His information Design Lab at IIT Bombay utilizes graphic design, interactive computer graphics, data-processing algorithms, and emerging technologies to address challenging problems in data, design and art. His recent work (research, projects and teaching) can be found at: http://info-design-lab.github.io/. Email: venkatra@iitb.ac.in

Teaching Assistants

Mohamed Yusuf Sait (Ashoka University) is an undergraduate student in Computer Science. He is TCPD's web developer. Email: mohamedyusuf.sait_ug21@ashoka.edu.in