

# **Abira Sengupta**

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**Summary:** I am a final-year PhD student working on multi-agent systems for collective action, a joint project between Otago University, NZ and Imperial College, London. I was a Research Assistant (2021) at Otago University's Computer Science department. I am a member of the Centre for Artificial Intelligence and Public Policy (CAIPP) at Otago since I am passionate about fair and transparent AI. Previously, I worked on my pre-PhD research at Indian Statistical Institute in collaboration with Univ. of Technology, Sydney.

## **A. EDUCATIONAL QUALIFICATIONS**

- 1) Doctor of Philosophy (PhD) in Information Science (2019 - 2022, graduate in 2023)
  - University of Otago, New Zealand.
- 2) Master of Technology (MTech) in Computer Science (2011 - 2013)
  - West Bengal University of Technology, India. (GPA: 8.87/10)
- 3) Bachelor of Technology (BTech) in Computer Science (2006 - 2010)
  - West Bengal University of Technology, India. (GPA: 7.43/10)

## **B. RESEARCH EXPERIENCE** (Multi-Agent Systems, Artificial Intelligence, Planning)

- 1) PhD Research at the Information Science Dept, Univ. of Otago, NZ (2019 - now)
  - Computational theory of collective action with expectation event calculus
  - Funding: PhD funded by Marsden Fund, in colab with Imperial College.
  - Research paper accepted in COINE, 2021 (In print) and 2 more in pipeline.

**Project:** My research focused on how generalised representation and logical reasoning about expectations can assist computational agents in solving a variety of collective action problems. Included explanations of the various applications of expectation-related reasoning, including expectation, team reasoning norms, norm, and norm emergence from emotion. The central claim of my research is to construct a generalised computational model in which expectation and norms are input data, and an Expectation Event Calculus is used (Prolog based) to represent how explicit reasoning of expectation is generated and how it is fulfilled or violated, both from the logic and game theoretic perspectives.

- 2) Research Assistant at the Computer Science Dept, Univ. of Otago, NZ (2021).
  - Short project on computational analysis of text data for emotion recognition.
- 3) Pre-doctoral Research at the Indian Statistical Institute (2017 to 2018)
  - Research: machine learning applied to facial image and pin-code detection.
  - 3 papers published in collaboration with Univ. of Technology, Sydney.

**Project:** In my pre-PhD research, I wanted to look into how convolutional networks can be used to detect the pin-code in both structural and unstructured postal documents, plus how they can be used for facial image authentication. My research focused on identifying individuals from degraded face images.

### **C. TEACHING EXPERIENCE** (Medical Image Analysis, Information Engineering)

- 1) Tutor/Demonstrator at the University of Otago, NZ (2019 to 2022: 6 semesters)
  - 2022: INFO 204, machine learning using Python coding.
  - 2022: INFO 301, Software development.
  - 2022: COMP 120, Data Science using R.
  - 2021: INFO 204, machine learning using Python coding.
  - 2021: INFO 310, software and system development using JAVA.
  - 2021: COMP 120, Data Science using R.
  - 2020: INFO 204, machine learning using Python coding.
  - 2019: COMP 101, R and SQL coding.
- 2) Guest Lecturer (part-time) at several universities in Kolkata, India (2013-2018)
  - Jadavpur University - Taught multimedia systems.
  - Kalyani Govt Engg College - Taught Algorithms, Automata, Graphics, Multimedia.
  - Aliah University - Taught Sensor Networking theory.
  - Narula Institute of Technology - Taught C coding, Multimedia, Networking theory.

### **D. FUNDING/GRANTS**

- 57250 NZD: Marsden scholarship (3 years PhD studies).
- 2964 NZD: Pūtea Tautoko - Student Relief Fund.
- 2800 NZD: Departmental award.
- 3500 NZD: Technical Education Quality Improvement Programme

### **E. REFERENCES**

- 1) DR. STEPHEN CRANFIELD (relation: primary PhD supervisor at Otago)  
Affiliation: Professor, Department of Information Science, University of Otago, NZ.  
Email: stephen.cranefield@otago.ac.nz, phone: +64 3 479 8083.
- 2) DR. JEREMY PITT (relation: secondary PhD supervisor at Imperial College).  
Affiliation: Professor, Dept of Electrical Electronic Engg, Imperial College, London.  
Email: j.pitt@imperial.ac.uk, phone: +44 (0)20 7594 6318.

### **F. MEMBERSHIP OF PROFESSIONAL BODIES**

- Member of the Centre for Artificial Intelligence and Public Policy (CAIPP), NZ.
- Member of the Artificial Intelligence Researchers Association (AIRA), NZ.
- Student member of IEEE.

### **F. PUBLICATIONS**

- 1) Abira Sengupta, Stephen Cranefield, Jeremy Pitt, "Solving social dilemmas by reasoning about expectations", (COINE) 2021: 1-18.
- 2) Abira Sengupta, Saurabh Malgaonkar, Nikita Mehrotra, Tejas Hirave, "A Preliminary Investigation of LEACH, TEEN and DEEC Towards Wireless Sensing Application", (ICCICT) 2021: 1-6.
- 3) Abhijit Das, Abira Sengupta, Muhammad Saqib, Umapada Pal, Michael Blumenstein, "More Realistic and Efficient Face-Based Mobile Authentication using CNNs", (IJCNN) 2018:1-8.
- 4) Abhijit Das, Abira Sengupta, Miguel A. Ferrer, Umapada Pal, Michael Blumenstein,

**“Linking face images captured from the optical phenomenon in the wild for forensic science”, (IJCB) 2017: 781-786.**

- 5) Nabin Sharma, Abira Sengupta, Rabi Sharma, Umapada Pal, Michael Blumenstein, “Pincode detection using deep CNN for postal automation”, (IVCNZ) 2017: 1-6.**

**G. POSTER PRESENTATION**

- 1) Abira Sengupta, Stephen Cranefield, “Normative Reasoning Based On Emotions In Multi-Agent System To Solve Social Dilemmas”, (Student Research Symposium of Otago) 2021.**
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