PRASENJIT KARMAKAR

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AREAS OF EXPERTISE

• Pervasive Sensing • Distributed Systems • Applied Machine Learning • Human Computer Interaction

EDUCATION

- **Indian Institute of Technology Kharagpur** — **Kharagpur, India**
  Pursuing Ph.D - Department of Computer Science and Engineering; CGPA: 8.93 — *Jul 2022 – Jul 2027*
  Prime Minister's Research Fellow (since April 2023)
  Broad Research Area: Ubiquitous Computing for Environment Sensing
  Ph.D Advisor: *Dr. Sandip Chakraborty* [UbiNet Lab]
- **Maulana Abul Kalam Azad University of Technology** — **Kolkata, India**
  B.Tech - Department of Computer Science and Engineering; CGPA: 9.13 — *Jul 2016 – Jul 2020*
  Thesis Title: Reinforcement Learning in Continous Multi-joint Environments [Report]
- **West Bengal Council of Higher Secondary Education** — **Bankura, India**
  10^{th}+2 - Science in Ghutgoria High School; Marks: 85.4% — *Jun 2014 – May 2016*
  Subjects: Mathematics, Physics, Chemistry, Computer Sci., English, Bengali
- **West Bengal Board of Secondary Education** — **Bankura, India**
  10^{th} - in Ghutgoria High School; Marks: 88% — *Jan 2013 – May 2014*
  Subjects: Mathematics, Physical and Life Sci., History, Geography, English, Bengali

WORK EXPERIENCE

- **Singapore Management University | Visiting Researcher** — **Singapore**
  Collaborated in Embodied AI and LLM task planning projects — *July 2025 – Jan 2026*
  Skills: LLM/VLM, Finetuning, Eventcam, Embodied AI
- **Tata Consultancy Services | Systems Engineer** — **Bangalore, India**
  Contributed as a Frontend Web Developer in the BFSI Sector — *Nov 2020 – Apr 2022*
  Skills: Lit-Element, React, Flask, Spring Boot
- **National Institute of Technology | Research Intern** — **Durgapur, India**
  Contributed as an ML Researcher to Develop Smart-city Applications — *Sep 2019 – Sep 2020*
  Skills: Embedded System Programming, Python, Data Science, MLOps
  Outcome: Intelligent Bus Transport [BuStop], City-scale Air Quality Monitor [AQuaMoHo]

OPEN SOURCE PROJECTS

- **Stealth-VPN: Enable Open Internet in a Restricted Organization** — **[Codebase]**
  Implements a non-blockable VPN service that hides network traffic with stunnel. — *Sep 2023 – Oct 2023*
  Skills: Docker, Bash, Python, Computer Networking, Operating System
  Highlights: The service is easily deployable and scalable with increasing user demands by setting up local SOCK5 proxies. Compatible proxy clients are available for Linux, MacOS, Andriod, and Windows [Read details ...]
- **Gridworld: Toy Environment Library for Testing RL Algorithms** — **[Codebase]**
  A tool to define custom, interactive, graphical, grid environments for RL-agents. — *May 2023 – Jul 2024*
  Skills: Python, PyGame, Tensorflow, Deep Learning, Reinforcement Learning
  Highlights: The library is easy to install and use. It implements popular classical and deep RL algorithms (e.g., Value Iteration, Monte Carlo, DQN, TRPO, PPO, etc.) as examples for understanding [Read details ...]
- **ShardQ: Distributed Message Queue Broker with Sharding** — **[Codebase]**
  Implements a highly scalable and robust message queuing publisher-subscriber service. — *Jan 2023 – Mar 2023*
  Skills: Docker, Bash, Python, SQL Database, Computer Networking
  Highlights: Supports in-memory and persistent message broker deployment. Segregates costly writes ops from

parallel reads with primary and secondary manager nodes. Implements WAL primitives and shard replication to ensure data consistency in multi-party messaging scenarios [Read details ...]

FILED PATENTS

P1 Prasenjit Karmakar, Sandip Chakraborty: **A System with Framework Architecture for Distributed Air Quality Monitoring in Indoor Spaces**. **India Patent: TEMP/E-1/7417/2025-KOL**, 24th Jan 2025.

P2 Prasenjit Karmakar, Sandip Chakraborty: **A Framework for Monitoring and Ventilating Personal CO_2 Bubbles through a Wrist Wearable and Virtual Reality Application**. **India Patent: TEMP/E-1/1302/2025-KOL**, 6th Jan 2025.

RESEARCH PUBLICATIONS

J1 Prasenjit Karmakar, Swadhin Pradhan, Sandip Chakraborty: **Exploring Indoor Air Quality Dynamics in Developing Nations: A Perspective from India**. ACM Journal on Computing and Sustainable Societies 2024 [Paper][Demo Video]

J2 Argha Sen, Avijit Mandal, Prasenjit Karmakar, Anirban Das, Sandip Chakraborty: **Passive Monitoring of Dangerous Driving Behaviors Using mmWave Radar**. Pervasive and Mobile Computing 2024 [Paper]

J3 Prithviraj Pramanik, Prasenjit Karmakar, Praveen Kumar Sharma, Soumyajit Chatterjee, Subrata Nandi, Sandip Chakraborty, Mousumi Saha, Sujoy Saha: **AQuaMoHo: Localized Low-Cost Outdoor Air Quality Sensing over a Thermo-Hygrometer**. ACM Transactions on Sensor Networks 2023 [Paper][Codebase]

J4 Prasenjit Karmakar, Vijay K Shah, Satyaki Roy, Krishnandu Hazra, Sujoy Saha, Subrata Nandi: **Reliable backhauling in aerial communication networks against UAV failures: A deep reinforcement learning approach**. IEEE Transactions on Network and Service Management 2022 [Paper]

J5 Ratna Mandal, Prasenjit Karmakar, Soumyajit Chatterjee, Debaleen Das Spandan, Shouvit Pradhan, Sujoy Saha, Sandip Chakraborty, Subrata Nandi: **Exploiting Multi-modal Contextual Sensing for City-bus's Stay Location Characterization: Towards Sub-60 Seconds Accurate Arrival Time Prediction**. ACM Transactions on Internet of Things 2022 [Paper][Codebase][Interactive Demo][Dataset]

C1 Prasenjit Karmakar, Manjeet Yadav, Swayanshu Rout, Swadhin Pradhan, Sandip Chakraborty: **From Invisible to Actionable: Augmented Reality Interactions with Indoor CO2**. ACM CHI conference on Human Factors in Computing Systems (ACM CHI 2026) [Demo Video]

C2 Neeraj Boddeda, Sharvari Wanjari, Shashank Goud Boorgu, Prasenjit Karmakar, Sandip Chakraborty: **On-Device Emotion Recognition from Spoken Language in Embedded Devices**. IEEE PerCom 2025 Work-in-Progress [Demo Video]

C3 Anuj Kakde, Yashwant Krishna Pagoti, Sarthak Nikumbh, Prasenjit Karmakar, Sandip Chakraborty: **Real-time Air Quality Monitoring and Context-aware Alert System**. COMSNETS 2025 Poster[Demo Video]

C4 Prasenjit Karmakar, Swadhin Pradhan, Sandip Chakraborty: **Indoor Air Quality Dataset with Activities of Daily Living in Low to Middle-income Communities**. NeurIPS 2024 D&B [Paper][Dataset]

C5 Prasenjit Karmakar, Swadhin Pradhan, Sandip Chakraborty: **Exploiting Air Quality Monitors to Perform Indoor Surveillance: Academic Setting**. ACM MobileHCI 2024 Adjunct [Paper][Demo Video]

C6 Prasenjit Karmakar, Ajay Kumar Meena, Kushal Natani, Sandip Chakraborty: **Multimodal Sensing for Predicting Real-time Biking Behavior based on Contextual Information**. IEEE PerCom 2024 Work-in-Progress [Paper][Codebase][Demo Video]

C7 Argha Sen, Avijit Mandal, Prasenjit Karmakar, Anirban Das, Sandip Chakraborty: **mmDrive: mmWave Sensing for Live Monitoring and On-Device Inference of Dangerous Driving**. IEEE PerCom 2023 [Paper][Codebase][Demo Video]

C8 Argha Sen, Anirban Das, Prasenjit Karmakar, Sandip Chakraborty: **mmAssist: Passive Monitoring of Driver's Attentiveness Using mmWave Sensors**. COMSNETS 2023 [Paper][Codebase][Demo Video]

C9 Praveen Kumar Sharma, Prasenjit Karmakar, Soumyajit Chatterjee, Abhijit Roy, Santanu Mandal, Sandip Chakraborty, Subrata Nandi, Sujoy Saha: **Can I go for a roof walk today? know your housing's air quality from a thermo-hygrometer**. ACM BuildSys 2021 [Paper][Demo Video]

C10 Ratna Mandal, Prasenjit Karmakar, Abhijit Roy, Arpan Saha, Soumyajit Chatterjee, Sandip Chakraborty, Sujoy Saha, Subrata Nandi: **Ad-hocBusPoI: Context Analysis of Ad-hoc Stay-locations from Intra-city Bus Mobility and Smartphone Crowdsensing**. ACM SIGSPATIAL Poster 2020 [Paper][Demo Video]

HONORS, AWARDS AND VOLUNTEER EXPERIENCE

- Awarded **Prime Minister Research Fellowship** *Mar 2023*
- Supported by **Google's Award for Inclusion Research** on Societal Computing *Oct 2023*
- Supported by **Google's Award for Society Centered AI** *Sept 2025*
- Awarded COMSNETS Travel Grant *Jan 2025*
- Awarded ACM COMPASS Travel Grant *Jul 2024*
- Volunteer at ICDCN, West Bengal, India *Jan 2023*

OTHER PROFESSIONAL ACTIVITIES

- TA: Spring 2025, **NPTEL**, Introduction to Machine Learning, offered by IIT Madras
- TA: Fall 2024, **NPTEL**, The Joy of Computing using Python, offered by IIT Ropar
- TA: Spring 2023, 2024, and 2026 **NPTEL**, Computer Networks and Internet Protocol, offered by IIT KGP
- TA: Spring 2025, IIT Kharagpur, Computer Networks
- TA: Fall 2024, IIT Kharagpur, Ubiquitous Computing
- TA: Spring 2024, IIT Kharagpur, Distributed Systems
- TA: Spring 2023 and Fall 2023, IIT Kharagpur, Programming and Data Structure Lab
- Served as a reviewer in IEEE TMC, PMC, NeurIPS, ACM CHI, ACM CSCW, ACM JCSS, ICDCS.

REFERENCE

- Dr. Sandip Chakraborty (**PhD Advisor**), IIT Kharagpur, India, sandipc@cse.iitkgp.ac.in
- Prof. Archan Misra, Singapore Management University, Singapore, archanm@smu.edu.sg
- Dr. Swadhin Pradhan, Cisco Meraki, United States, swapradh@cisco.com
- Prof. Subrata Nandi, NIT Durgapur, India, subrata.nandi@cse.nitdgp.ac.in
- Dr. Sujoy Saha, NIT Durgapur, India, ssaha.cse@nitdgp.ac.in