Amartya Basu

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Education

2022-2024 **MS Research in Computer Science and Engineering** , IIT Madras, Chennai, India.
Thesis title: *Mapping Pervasive Environments using Radio Tomography and Neural Radiance Field.*
Advisor: *Dr. Ayon Chakraborty.*

2016-2020 **B.Tech in Computer Science and Engineering,** Government College of Engineering and Leather Technology, Kolkata, India.

Experience

2022-2024 **Research Assistant**, Sensing and Networked Systems Engineering (SENSE) Lab, IIT Madras.

2020-2021 **Assistant System Engineer**, Layer 7 team, Tata Consultancy Services, Kolkata.

2019 **Web development intern**, ITC Infotech, Kolkata.

Awards and Achievements

- Received the Research Excellence Award from IIT Madras.
- Qualified the IIT Madras Nirmaan Pre-Incubation Startup Challenge (Jul-Nov'24 cohort) to prototype UBIQMAP.
- Received the Institute Research (IR) Award **(sole recipient in IIT Madras in MS category for Jul-Nov'24)**.
- Received Travel Grant Award for IITB CSE Research Symposium 2023.
- Received Travel Grant Award for ACM SIGMETRICS/ PERFORMANCE 2022.
- Secured 98.58 percentile out of ≈ 1 lakh candidates.

Skills

Networks	Wireless communication, IoT, 3GPP.
Systems	Computer Organization and Architecture, Operating System, Digital Logic.
AI/ML	Statistical Machine Learning, CNN, RNN, Encoder-Decoder, Transformers, NeRF.
Frameworks	Pytorch, Tensorflow, Scikit, Sionna.
Languages	C, C++, Java, Python, Shell Script.
Web Dev	Html, css, javaScript.

Publications

AIoT **Amartya Basu** and Ayon Chakraborty "SpecNeRF: Neural Radiance Field Driven Wireless Coverage Mapping for 5G Networks" *AIoT in con-junction with ACM MobiHoc, 2024.*

TMC **Amartya Basu**, Ayon Chakraborty, Kush Jajal "Ubiquitous Indoor Mapping using Mobile Radio Tomography" *IEEE Transactions on Mobile Computing, 2024.*

Patents and Inventions

- **A system and method for mapping indoor spaces in real-time**, Ayon Chakraborty and Amartya Basu.
Submitted, Patent (India) 202441040240.

Research projects

MS Thesis

Mapping Pervasive Environments using Radio Tomography and Neural Radiance Field.

My thesis centers on the design and implementation of prototypes for real-time indoor mapping and development of scalable solutions for Radio Environment Map (REM) estimation, aimed at enhancing the 5G connectivity and spectrum sensing. The initial section of the thesis addresses the challenges of indoor mapping using radio tomographic technique. The later section extends the neural radiance field (NeRF) architecture to provide a scalable solution for REM estimation.

AICCTP project

Indoor and outdoor people counting using Channel State Information (CSI).

The project involved utilization of channel state information (CSI) along with machine learning models to count the number of people inside an indoor and outdoor environment. The project addresses the current challenges of occupancy monitoring in places where a camera based infrastructure cannot be deployed.

Course projects

Smart Sensing for Internet of Things	Developed a piezo-electric chip based step counter to monitor user's activity and display them in real time on an android application.
Wireless Communication and Networks	Developed a simulator to show the optimal building height required for maximum network coverage at different transmission frequencies. Worked on the NS-3 simulator to study different wireless path-loss models.
An Introduction to Deep Learning	Implemented a feed forward neural network from scratch along with optimizers like stochastic gradient descent, momentum gradient descent, nesterov accelerated gradient descent, RmsProp, adam, nadam. Implemented convolution neural network (CNN) using tensorflow for multi-class classification task over 10 classes on Nature12K dataset. Applied transfer learning over different pre-trained CNN models (i.e RESTNET, InceptionNET, GoogleNet) for comparison of results. Implemented the transliteration encoder-decoder model using recurrent neural network (RNN). Google Dakshina dataset was used for training the model. Used the wandb.ai tool for tuning hyper-parameters.
Pattern Recognition and Machine Learning	Developed a spam-ham email classifier from scratch that classifies spam/ham emails with an accuracy over 85%.

Teaching Assistantships

Jul-Nov, 2024	**Smart Sensing for Internet of Things** ***(Graduate level).*** Instructor : *Dr. Ayon Chakraborty.*
Jan-May, 2024	**Advanced Data Structures and Algorithm** ***(Graduate level).*** Instructor : *Dr. C Pandu Rangan.*
Jul-Nov, 2022	**Foundation for Computer System Design** ***(Undergraduate level).*** Instructor : *Dr. Ayon Chakraborty.*

Services

Journal Reviewer	IEEE Transactions on Mobile Computing- 2025, 2024. Ad-Hoc Networks (Elsevier)- 2024.
Conference Committee	Artifact Evaluation Committee member in ACM SenSys'24. Web chair of Society@ICDCN'25 workshop to be held at IIT Hyderabad, India. Volunteer for the ICDCN'24 conference held at IIT Madras, India.
Department Organizer	Organizer of CSE Bits monthly event in the Department of CSE, IIT Madras- 2023.
GATE CS NPTEL, 2022	Worked as the subject matter expert for GATE CS NPTEL. *Subjects: Operating system, Computer Networks, Computer Organization and Architecture.*