

Amartya Basu

MS Research scholar, Dept. of CSE, IIT Madras

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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 Institute Research (IR) Award for outstanding work in MS (**sole recipient in IIT Madras for Jul-Nov'24**).
- Qualified the first round of IIT Madras Nirmaan Pre-Incubation Startup Challenge for UBIQMAP.
- 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 systems, 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, 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**, Amartya Basu and Ayon Chakraborty.
[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 REST-NET, INCEPTIONNET, GOOGLNET) 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

- ACM SenSys 2024
Artifact Evaluation Committee member in ACM SenSys'24.
- ICDCN 2025
Web chair of SOCIETY@ICDCN'25 workshop to be held at IIT Hyderabad, India.
- Reviewer
IEEE Transactions on Mobile Computing, 2024.
- ICDCN 2024
Volunteer for the ICDCN'24 conference held at IIT Madras, India.
- CSE Bits, 2023
Organizer of CSE Bits monthly event in the department of CSE, IIT Madras.
- GATE CS NPTEL, 2022
Worked as the subject matter expert for GATE CS NPTEL. ▶
Subjects : Operating system, computer networks, computer organization and architecture.