Tirthajit Baruah

PhD in Cyber Physical Systems, IISc

BS-MS in Electrical Engineering and Computer Science

Minor in Data Science and Engineering, IISER Bhopal

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GitHub   Google Scholar

EDUCATION

Degree/Certificate	Institute/Board	CGPA/Percentage	Year
PhD	Indian Institute of Science, Bangalore	–	2023-Present
Bachelor of Science - Master of Science	Indian Institute of Science Education and Research, Bhopal	8.3/10	2018-2023
Senior Secondary	Army Public School Tezpur (CBSE Board)	90.1%	2018
Higher Secondary	Army Public School Tezpur (CBSE Board)	10/10	2016

KEY PROJECTS

- **Internship Project**   *Jun 2023 - Jul 2023*
  Supervisor: Dr. Punit Rathore   CPS, IISc Bangalore *(Project Page)*
  – Formulated a novel autoencoder (AE) architecture that gives low-rank latent space.
  – This architecture is then used for various downstream tasks like classification, clustering, and generative tasks, and it outperforms the baseline and SOTA autoencoders including generative AE's like VAE and Flow-based AE.

- **Master of Science Thesis Project**   *Aug 2022 - Apr 2023*
  Supervisor: Dr. Prathosh AP   ECE, IISc Bangalore
  – **Parameterized stochastic augmentations for Electronic Healthcare Records**
  – Develop Parametric augmentation techniques for Electronic Healthcare Records
  – Learn time series representations using self-supervised modeling and stochastic augmentation
  – Handling large-scale real-world electronic health record (MIMIC III, Physionet 2012)

- **Bachelor of Science Final Project**   *Dec 2021 - Apr 2022*
  Supervisor: Dr. Haroon R Lone   EECS, IISER Bhopal
  – **Calibrating Attention of Students in Classroom**
  – Studying the already used techniques and sensors (Galvanic, Electroencephalography, Visual)
  – Deploy Raspberry Pi module and camera to collect student data from the classroom
  – Train a real-time attentiveness detection model using the collected data and computer vision techniques

- **Summer Project: Water Rediscover**   *Apr - Jul 2013*
  Project Instructor: Dr. Achintya N. Bezbaruah   North Dakota State University
  – Developing wastewater management model for recycling them into potable water
  – Utilizing locally available techniques and plants (with cleansing property)

PUBLICATIONS

1. A. Mazumder, C. Garg, **T. Baruah**, P. Rathore, *"DIME: Deterministic Information Maximizing Autoencoder"* Accepted at DeLTa @ International Conference on Learning Representations (ICLR), Singapore, 2025.. https://openreview.net/pdf?id=0jdELlT2VI

2. A. Mazumder, **T. Baruah**, B. Kumar, R. Sharma, V. Pattanaik, P. Rathore, *"Learning Low-Rank Latent Spaces with Simple Deterministic Autoencoder: Theoretical and Empirical Insights,"* Accepted @ IEEE/CVF Winter Conference on Applications of Computer Vision (WACV), Hawaii, 2024. https://doi.org/10.48550/arXiv.2310.16194

3. A. Mazumder, **T. Baruah**, A. Singh, P. Krishna, V. Pattanaik, P. Rathore, *"DeepVAT: A Self-Supervised Technique for Cluster Assessment for Image Datasets,"* Accepted at ViPrior @ IEEE/CVF International Conference on Computer Vision (ICCV), Paris, 2023. https://doi.org/10.48550/arXiv.2306.00011

4. H. Wasnik, R. Gandhi, N. Patil, R. Behera, A. Golait, T. Patel, & **T. Baruah**, *"A Comprehensive Review of Molecular Biology and Genetics of Cataract,"* International Journal for Research in Applied Sciences and Biotechnology, 8(2), 11-20. doi.org/10.31033/ijrasb.8.2.2

EXPERIENCE

- **Dept. of Cyber Physical Systems**   *Jan - May 2025*
  Teaching Assistant: DA218o (Probabilistic Machine Learning: Theory and Applications)   IISc Bengaluru
  - Conducting weekly programming tutorials for the topics taught in class
  - Assisting the instructor in formulating and evaluating assignments and exams

- **Dept. of Data Science and Engineering**   *Aug - Dec 2022*
  Teaching Assistant: DSE317/617 (Machine Learning)   IISER Bhopal
  - Delivering lectures on supplementary topics of the course
  - Mentoring and guiding students (Batch 2020/19) throughout the course
  - Assisting the instructor in formulating and evaluating assignments and exams

- **Dept. of Electrical Engineering & Computer Science**   *Apr - May 2022*
  Teaching Assistant: ECS102 (Introduction to Programming)   IISER Bhopal
  - Mentoring and guiding students (Batch 2021) throughout the course
  - Conducting lab sessions for assisting the students with their difficulty in assignments and course

- **Artificial Intelligence and Cyber Physical System for Agriculture @ iHub - AWaDH**   *May - Jul 2021*
  Workshop, Instructor: Dr. Neeraj Goel   IIT Ropar
  - Collecting agricultural data via sensors, deploying them to AI model training
  - Android app development for agricultural purposes
  - Capstone project: **"Real-time Pest Detection using MobileNet-SSD & Farm Monitoring"**

TECHNICAL SKILLS

- **Programming**: Python (PyTorch), Distributed Data Parallel, Linux
- **Hardware Tools**: ESP32, Arduino, Raspberry Pi, IoT sensors

RELEVANT COURSES

- **Mathematics**: Stochastic Modelling & Applications, Linear Algebra, Probability & Statistics, Calculus
- **Biology**: Bio-molecules, Cell Biology, Biostatistics, Bio-informatics
- **Electrical and Electronics**: Signals & Systems, Principles of Communication, Electronic Devices, Electromagnetic Theory, Smart Sensing Technologies
- **Computer Science**: Data Structure & Algorithm, Discrete Maths, Internet of Things
- **Data Science**: Pattern Recognition & Neural Networks, Theory and Applications of Bayesian Learning, AI for Medical Image Analysis, Digital Image Processing

LANGUAGES

- **English**, Full Professional Proficiency (**TOEFL-iBT score: 101/120**)   *Oct 2022*
- **Hindi**, Native/Bilingual Proficiency
- **Assamese**, Native/Bilingual Proficiency

POSITIONS OF RESPONSIBILITY

- **Coordinator**, Karate Club, IISER Bhopal   *2018 - 2021*
- **Prefect**, Students Council, Army Public School, Tezpur   *2016*

EXTRA-CURRICULARS

- **Gold Medal**: Athletics 4*100m relay, Inter IISER Sports Meet, 2022
- **Visharad in Tabla**: 5-years classical training of tabla instrument