Barshan Mondal

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Education

Amrita University, BTech in Electronics And Computer Engineering — Sept 2022 – May 2026

- GPA: 8.2/10
- **Coursework:** Circuit theory, Signal processing , Machine learning

Birla High School, Higher Secondary CBSE GPA: 9.5 — April 2020 – April 2022

Don Bosco School, ICSE GPA: 9.7 — April 2009 – May 2020

Experience

Student Researcher, Digital Forensics And Incident Response, bi0s – Kollam, Kerala — March 2023 – March 2024

- Conducted digital forensics and malware reversing through active CTF engagement.
- Competed in 100+ national and international CTFs, successfully solving over 150 security challenges.
- Enhanced automated instrumentation and tracing tools for efficient analysis of malware and file exploits.

Project Intern, Syanccy Innovations – Pune — April 2024 – June 2024

- Designed and implemented a mobile application capable of identifying leprosy from medical images through binary classification, providing an accessible and efficient diagnostic tool.
- Utilized a pre-trained EfficientNet model from TensorFlow Hub as a robust feature extractor, enhancing the app's accuracy and performance in detecting leprosy.

Cloud Computing Intern, Innovate – Remote — April 2025 – May 2025

- Designed and implemented a comprehensive security framework incorporating IAM, encryption, threat detection, and monitoring, focusing on mitigating risks in serverless environments through native and third-party GCP tools.

Publications

Signal and Image Processing Techniques for Defense, Security, and Healthcare - IGI-GLOBAL — June 2024

Barshan Mondal, Chitransh Chiranjeev, Manikandan A

10.4018/979-8-3693-3731-8

Multi-Modal Graph Neural Networks with Post-Hoc Community Analysis for Robust Fake News Detection - CIS2025 — August 2025

Barshan Mondal, Mahima Remesh Nair, Nandana Praveen

Link to Journal

Advanced Song Recommendation Framework An Integrated MFCC-DTW Approach for Enterprise Music Intelligence - ICCCES-2025 — January 2026

Barshan Mondal, Mahima Remesh Nair, Amal Das, Aditya Rajesh Achary, Gowri Mohan

Link to Journal

End-to-End Behavioral Cloning with Throttle and Speed Fusion - IATMSI-2026 — January 2026

Barshan Mondal, Kartikey Singh, Krishnan V Namboothiri

Link to Journal

Projects

Causal Analysis of Large Language Model Reasoning: Criticality of Layers in Chain-of-Thought Part Of MATS Application 2025

- Designed a systematic analysis pipeline using activation patching and logit-lens inspection to isolate layer-wise contributions to chain-of-thought outputs.
- Identified mid-to-late transformer layers as critical bottlenecks for reasoning fidelity, with targeted interventions improving token-level confidence. Analyzed sub-component behavior (MLP blocks and neuron activations) to quantify their role in constructing meaningful intermediate reasoning representations.

Smart Helmet – Edge AI System using ESP32 2025

- Designed an end-to-end edge AI pipeline integrating sensor data acquisition, preprocessing, ML-based risk inference, and real-time alerting for two-wheeler safety.
- Implemented alcohol detection, rider health monitoring, GPS-based location tracking, and accident detection with ESP32-enabled connectivity. Focused on low-latency inference, embedded deployment constraints, and proactive AI-driven decision making at the edge.

Network Intrusion Detection System (NIDS) 2025

- Built a full-stack ML-powered intrusion detection pipeline covering network traffic collection, feature engineering, supervised threat classification, and alert generation.
- Trained and evaluated machine learning models to detect real-time anomalies and malicious traffic patterns.
- Emphasized model generalization, false-positive reduction, and deployment-ready inference for enterprise-scale networks.

AI-Based Diagnosis of Infectious Skin Disease (Leprosy) 2024

- Implemented an end-to-end computer vision pipeline for medical image classification using convolutional neural networks.
- Utilized a pre-trained EfficientNet model as a feature extractor and fine-tuned it for binary disease classification.
- Covered dataset preprocessing, model training, evaluation, and inference, with emphasis on healthcare-oriented AI reliability.

Ez-Project – Automation Bot for Team Workflows 2023

- Built a task automation pipeline that ingests user commands, processes workflows, and generates structured outputs within Discord.
- Enabled task assignment, progress tracking, and team communication through event-driven logic.
- Focused on system automation, scalability, and user-centric workflow optimization.

Bluetooth Network PCAP Capture Decoder 2023

- Developed a packet-level data processing pipeline for decoding and analyzing Bluetooth PCAP captures.
- Extended a HID payload decoder to reconstruct USB keyboard keystrokes from pcap files, supporting both LinkTypeUsbLinuxMmapped and LinkTypeUsbPcap formats

Dielectric Resonator Antenna 2025

- Designed and evaluated a 3D-printed dielectric resonator antenna with performance optimization at 7.5 GHz.
- Achieved a -25 dB return loss and peak gain of 8.2 dBi using hafnium dioxide (HfO_2) for enhanced resonance.

Certifications

- Deep Neural Networks with PyTorch, authorized by IBM
- Introduction To DevOps, authorized by IBM
- Basic Problem Solving And Python in HackerRank

Technologies

Python, C/C++, Markdown, HTML/CSS, Git, Jupyter, WireShark, AutoCAD, TensorFlow, PyTorch, scikit-learn, OpenCV, MediaPipe, BERT, GANs, GNNS, Machine Learning, Deep Learning, Computer Vision, NLP, Data Analysis, Network Forensics, Healthcare AI, Embedded Systems, Computer Networks

Achievements

Digital Forensics Challenge, South Korea 2023

- Secured First Place with Team bi0s (India's No.1 CTF team for 5+ years), which secured first place and ₩3,000,000 prize at the International Digital Forensic Challenge 2023 organized by KIISC in Seoul, South Korea.

FOSS United Hackathon (Team DaDevs) Mark.it - Bookmark Management 2025

- Won among 5000+ participants at FOSS Hack 2025, India's premier FOSS hackathon, by developing mARK.it, a hybrid bookmark management system using Supabase, to deliver an innovative solution.

Extra Curricular Activities

SUPW - Socially Useful Productive Work 2018

- Led a community outreach effort to identify the needs of an underprivileged family and coordinate the provision of essential rations.

SSR - Student Social Responsibility 2024

- Collaborated in a student-led social responsibility initiative, "Life Through a Different Lens," to conduct interactive sessions and activities that encouraged school students to explore new perspectives on life.