Tusher Karmakar

Ph.D. Student, Electrical and Computer Engineering, Iowa State University

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Research Interests: Matrix Factorization, Machine Learning, Signal Processing, Data Privacy

Education

Iowa State University (ISU), Ames, Iowa, USA **Aug 2025 – Present**
Ph.D. in Electrical and Computer Engineering (ECpE)
Advisor: Prof. Namrata Vaswani

Bangladesh University of Engineering and Technology (BUET), Dhaka, Bangladesh **2019 – 2024**
B.Sc. in Electrical and Electronic Engineering
Major: Communication and Signal Processing; CGPA: 3.63/4.00
Undergraduate Thesis: *Privacy-Preserving Non-negative Matrix Factorization for Decentralized Data Using Correlated Noise*
Supervisor: Prof. Hafiz Imtiaz

Experience

Graduate Teaching Assistant, Iowa State University **Aug 2025 – Present**
Department of Electrical and Computer Engineering (ECpE)

- Courses Assisted: EE 4420 (Introduction to Circuits and Systems), EE 2010 (Electric Circuits), EE 4480 (Introduction to AC Circuits and Motors)
- Responsibilities: grading, office-hour tutoring, laboratory instruction, and review-session support

Tutor (Mathematics Educator), Cymath **Aug 2025 – Present**

Undergraduate Research Assistant, BUET **Jan 2023 – Apr 2024**
Department of Electrical and Electronic Engineering
Supervisor: Prof. Hafiz Imtiaz
Worked on privacy-preserving data analysis and matrix factorization methods for decentralized data systems.

Selected Publications

1. Hafiz Imtiaz, **Tusher Karmakar**, Protoye Kumar Mohanata,
"Privacy-Preserving Non-negative Matrix Factorization for Decentralized Data Using Correlated Noise,"
Signal, Image and Video Processing, 2024.

2. Sandipa Chowdhury, Mohtasim Billah, Sudipto Pramanik, Shaikh Anowarul Fattah, **Tusher Karmakar**,
"Bidirectional Cross-Dataset Transfer Learning for Human Activity Recognition with Dataset-Specific Adapters and EWC,"
11th IEEE International Women in Engineering (WIE) Conference on Electrical and Computer Engineering, accepted, 2025.

Technical Skills

Programming: Python, MATLAB, C/C++, Verilog, PyTorch, TensorFlow
Hardware: Arduino, STM32, FPGA
Simulation Tools: HFSS, PSPICE, Proteus, Quartus
Documentation: LaTeX, MS Office

Selected Projects

Software-Based Projects

- Frequency Division Multiplexing (FDM) Analysis: time- and frequency-domain analysis using MATLAB
- Power System State Estimation: developed weighted least squares estimator in MATLAB
- Voice-Controlled Cafeteria Billing System: designed MATLAB-based voice ordering and billing platform
- Microstrip Patch Antenna for 5G Applications: designed and simulated antenna model using HFSS

Hardware-Based Projects

- Rewinding of Three-Phase Squirrel Cage Induction Motor
- Remote Patient Health Monitoring System using Arduino and biomedical sensors
- Green Vigilance System: IoT-based drought monitoring and plant communication prototype
- Variable DC Battery Charger with auto cutoff and deep discharge control
- Floating Garbage Cleaning Robot
- Water Level Indicator using 74-series ICs and 7-segment display

Extracurricular Activities

- Member, BUET Football Team (2019–2024)
- Runner-up, BUET EEE Faculty Football Tournament (2021)
- High School Debating Club Member