MD NAHID HASAN

PhD Applicant in Computer Science

Oxford, OH, USA • hasanm13@miamioh.edu • +1 (513) 807-5111
nahid-hasan-raju.github.io • github.com/nahid-hasan-raju

RESEARCH INTERESTS

Artificial Intelligence, Machine Learning, Multi-Agent Systems, Reinforcement Learning, Quantum Computing Applications, Computer Vision, Optimization Systems, Interdisciplinary Computing

EDUCATION

Miami University — Oxford, OH, USA
M.S. in Computer Science — Aug 2024 – May 2026 (Expected)
GPA: 4.00/4.00 • Graduate Teaching Assistantship (Full Funding)
Thesis: "A Scalable Hierarchical Multi-Agent System for Urban Delivery Using Q-Learning"
Coursework: Machine Learning, AI, Deep Learning, Advanced ML, Cryptography, Remote Sensing

Rajshahi University — Rajshahi, Bangladesh
B.S. in Computer Science & Engineering — Jan 2017 – Apr 2022
GPA: 3.78/4.00 • Dean's List (2018–2020)
Thesis: "Neural Processing of Emotional Musical and Nonmusical Stimuli in Major Depressive Disorder"
Coursework: Data Structures, Algorithms, Linear Algebra, Software Engineering, Database Systems

RESEARCH EXPERIENCE

MS Thesis — Aug 2024 – Present
Miami University — Oxford, OH, USA

- Designed a scalable **multi-agent urban delivery framework (QuikDel)** using **Q-Reinforcement Learning** for real-time path planning and dispatching.
- Achieved a **25% reduction in travel distance** while sustaining throughput of **13,866+ requests/hour** in large-scale simulations.
- Integrated **GIS-based routing, hierarchical reinforcement learning**, and environment modeling for robust optimization of urban logistics. *[Details]*

Research Intern — May 2025 – Aug 2025
University of Dayton Research Institute (UDRI) — Dayton, OH, USA

- Conducted research on **DNA as a computational model for quantum systems**, focusing on electron dynamics and charge transfer mechanisms.
- Applied **real-time time-dependent density functional theory (RT-TDDFT)** and **DFT** to simulate molecular excitation and analyze energy redistribution across nucleobases.
- Developed reproducible **Python-based pipelines (PySCF)** for molecular orbital analysis, natural transition orbital (NTO) extraction, and 3D electron density visualization.

PUBLICATIONS AND MANUSCRIPTS

- "A Novel & Scalable Distributed Approach for Efficient Long-haul Delivery," *ACM TIST*, 2025. **(Under Review)**
- Survey on online delivery optimization techniques. **(In Progress)**

TEACHING EXPERIENCE

Graduate Teaching Assistant — Aug 2024 – Present
Miami University — Oxford, OH

- Assisted instruction in **Machine Learning, Artificial Intelligence, and Systems Engineering** courses at the graduate and undergraduate level.

- Mentored **60+ students** through assignments, coding labs, and semester-long projects, emphasizing problem-solving and research practices.
- Guided **capstone teams and class project groups**, providing feedback on experimental design, implementation, and reporting.

PROFESSIONAL EXPERIENCE

Software Engineer / Senior Software Engineer Jul 2022 – Jul 2024
Samsung Research & Development Institute Dhaka, Bangladesh

- Developed and maintained multiple features for Galaxy Watch 6/7 and Fit3 plugins, serving 10M+ users worldwide.
- Implemented critical functionalities, i.e. Sound Settings, Display Settings, Band Rotate, About Band
- Collaborated with cross-functional teams, mentored junior developers, and contributed to technical architecture and design decisions.

OTHER RESEARCH PROJECTS

- **Human Activity Recognition** Compared 10 machine learning models (Logistic Regression, Random Forest, Neural Networks, etc.) for activity classification with preprocessing and evaluation. *[Code]*
- **Analysis of Urban Sprawl using Remote Sensing** Investigated Dhaka City's urban expansion (2013–2023) using Landsat 8 imagery. Applied indices (NDBI, SAVI, MNDWI, IBI) revealing 63.02% urbanization in a 691.51 sq km area. *[Code]*
- **Neural Processing of Emotional Musical Stimuli** Analyzed fMRI data of depressive vs non-depressive subjects under emotional musical stimuli. Applied PCA + SVM on BOLD signals, achieving best accuracy with Occipital Pole ROI. *[Code]*
- **Deep Learning-Based Road Skeletonization** Designed U-Net based model for extracting one-pixel road skeletons from noisy imagery. Achieved Dice = 0.87 and IoU = 0.79 with BCE+Dice loss on OpenStreetMap data. *[Code]*
- **Feistel-Based Cryptographic Algorithm** Implemented custom Feistel cipher with 32-bit key, LFSR-based key scheduling, S-Box transformation, and P-Box permutation. *[Code]*

AWARDS AND HONORS

- Graduate Teaching Assistant, Miami University – fully funded scholarship
- Excellence Awards (2×), Samsung R&D Institute – for outstanding product contributions
- Dean's List (3×), Rajshahi University; Perfect GPA 4.00/4.00, Miami University
- Professional Software Certification, Samsung R&D Institute
- Competitive Programming – 1100+ problems solved; Codeforces rating 1544; ICPC Regional rank 74th

LEADERSHIP AND SERVICE

- **Social Chair**, Chess Club, Miami University – Organized chess tournaments and events
- **IEEE Events** – Participated in and co-organized technical workshops and outreach
- **Graduate Mentor** – Mentored student teams on project design, implementation, and reporting

TECHNICAL SKILLS

- **Programming & Scripting:** Python, C, C++, Java, Kotlin, JavaScript, Bash
- **Machine Learning & AI:** TensorFlow, PyTorch, Scikit-learn, Reinforcement Learning, Deep Learning, Computer Vision, Natural Language Processing
- **Quantum & Computational Chemistry:** PySCF, RT-TDDFT, DFT, Molecular Simulation, Quantum Computing Models
- **Data Analysis & Visualization:** NumPy, Pandas, Matplotlib, Remote Sensing, fMRI Data Analysis
- **Tools & Platforms:** Git, Linux, LaTeX, Docker, VS Code, Jupyter
- **Other:** Multi-Agent Systems, Optimization Algorithms, Scientific Computing