MD MAHINUR ALAM

Baltimore, MD, USA | +1 (912) 541-1255 | malam4@umbc.edu | Portfolio | Google Scholar | LinkedIn | GitHub

EDUCATION

University of Maryland, Baltimore County (UMBC) — Jun 2026 – Present
Ph.D. in Information Systems (AI/ML) | Advisor: Dr. Sanjay Purushotham — *Baltimore, MD, USA*

Kumoh National Institute of Technology (KIT) — Mar 2024 – Dec 2025
M.Eng. in IT Convergence Engineering | GPA: 4.44/4.50 | Advisor: Dr. Taesoo Jun — *Gumi, South Korea*

International University of Business Agriculture and Technology (IUBAT) — Jan 2019 – Dec 2022
B.Sc. in Computer Science and Engineering | GPA: 3.79/4.00 — *Dhaka, Bangladesh*

EXPERIENCE

Graduate Research Assistant, UMBC, *Baltimore, MD* — Jun 2026 – Present
- Developing a federated learning framework to improve domain-grounded reasoning of LLMs (Qwen3.5, Llama-2).
- Identifying reasoning collapse in federated fine-tuning of LLMs under extreme heterogeneous (non-IID) data distributions.

Graduate Research Assistant, ARMOR Lab, Georgia Southern University, *Statesboro, GA* — Jan 2026 – May 2026
- Developed **FAR-TOD**, an adaptive reconstruction-guided framework for tiny-object detection in UAV imagery.
- Achieved **33.1 AP_{vt}**, exceeding full-grid reconstruction while using **83%** fewer tiles and **61.6%** fewer GFLOPs.

Graduate Research Assistant, PIC Lab, KIT, *Gumi, South Korea* — Mar 2024 – Dec 2025
- Built a **multimodal** (speed, vision, sound) driving-hazard detection pipeline fusing a lightweight regression model for driver-state detection with a **vision-language model** for visual hazards. [GitHub]
- Developed a warehouse **digital twin** in NVIDIA Omniverse Isaac Sim and FlexSim to generate synthetic data, and a DQN agent that cut average picking time by **30.83%** and travel distance by **13.15%**. [GitHub]
- Designed an attention-enhanced **Multi-CNN–Transformer fusion** model with **98%** accuracy on industrial defect data; built **VARSDiffusion** to synthesize defect images for class imbalance, lifting the baseline by **4.64%**. [GitHub]
- Trained a transformer face-recognition model on MTCNN embeddings (**98%** accuracy) and a BiLSTM action-recognition model on MoveNet pose features (**97%**); curated a Korean children's face and action dataset. [GitHub]

Data Scientist, AIMS Lab, United International University, *Dhaka, Bangladesh* — Oct 2023 – Dec 2023
- Analyzed CIMED data on heart failure, kidney disease, and stroke in rural Bangladesh to identify high-impact regions.

Software Engineer (Python), Divine IT Ltd., *Dhaka, Bangladesh* — Sep 2022 – Sep 2023
- Shipped **three new modules**, plus features and bug fixes, for the PrismERP and PrismATS enterprise suites.
- Improved system performance through **parallel processing**, process rewrites, and **database-query optimization**.

PUBLICATIONS

• first author ○ second author ★ best paper award 32+ peer-reviewd publications Full list on Google Scholar

- Stable Diffusion-Augmented Industrial Anomaly Detection Using Attention-Enhanced Multi-CNN Transformer Fusion. **IEEE Access**
- TMNet: Transformer-Fused Multimodal Framework for Emotion Recognition via EEG and Speech. **ICT Express**
- FMACNN: Federated Multi-Attention CNN Framework for Artificial Image Detection. **Journal of Info. Security and Application**
- AI-Enhanced Digital Twin Systems for Warehouse Logistics Optimization: A Review of Challenges, Solutions and Future Directions. **ICT Express**
- Adaptive Reconstruction and Deformable Attention for UAV Small-Object Detection. **IEEE ICMIC 2026** ★
- AI-Driven Digital Twin Framework for Warehouse Logistics Automation Optimization. **IEEE ICRA 2026 Workshop**
- Digital Twin-Driven Semi-Supervised Knowledge Distillation for HMI Monitoring on Edge Device. **IEEE ICTC 2025**
- ○ BLIND-Twin: Blockchain-Assisted LLM-Based CDS for Digital Twin-Enhanced Industrial AIoT. **IEEE ICC 2025**
- ○ Detecting Threats in Edge IoT Networks Using Federated Learning and Digital Twin. **KICS Summer 2025** ★
- Federated Semi-Supervised Digital Twin for Enhanced Human-Machine Interaction in Industry 5.0. **IEEE ICTC 2024**
- DCFL-Chain: Digital-Twin-Based Collaborative FL-Integrated Energy Consumption Prediction for Smart Factory. **KICS Fall 2024** ★

Under Review

- FAR-TOD: Failure-Prior Adaptive Reconstruction Guided Tiny Object Detection in UAV Imagery. **WACV 2027 @ RWS**
- ○ Hierarchical Multi-Target Planning and Control for Autonomous Forklift Navigation with Quantum-Inspired Optimization and Reinforcement Learning. **International Journal of Control, Automation, and Systems (IJCAS)**
- ○ Deep Q-Network Agent-Driven Dynamic Slotting Optimization in Digital Twin-Based Smart Warehouse Logistics. **IJCAS**
- ○ HybridQuantumNet: A Hybrid Quantum–Classical Federated Learning Framework for IoMT Intrusion Detection. **J. Netw. Syst. Manag.**

TECHNICAL SKILLS

ML & LLMs: PyTorch, TensorFlow, Hugging Face, LoRA fine-tuning, PEFT, RAG, Pandas, NumPy, Transformers, VLMs, MLLMs, PPO
Vision & Simulation: Faster R-CNN, Diffusion, OpenCV, SAHI, torchvision, DenseNet, MTCNN, MoveNet, NVIDIA Isaac Sim,
Software: Python, FastAPI, Docker, SQL, CUDA, AWS, Linux, Postman

HONORS & SERVICE

- **Outstanding Research Achievement Award**, KIT (Spring 2026)
- **Best Paper Awards:** IEEE ICMIC 2026; KICS Fall Conference 2024 (2×); KICS Summer Conference 2025 [Certificates]
- **Competitive Programming:** ACM ICPC Dhaka Regional Finalist (2021); 4× medalist at IUBAT IUPC (Champion 2021 & 2022, 1st Runner-up 2020, Best Fresher 2019); 2nd Runner-up, UITS IUPC 2022; 1,600+ DSA problems solved [Certificates]
- **Peer Reviewer:** IEEE Access, ICT Express, Future Generation Computer Systems