ABRAR HOSSAIN

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Education

The University of Toledo — Toledo, Ohio
Master's, Computer Science, GPA 3.90/4.00 — August 2023 – May 2025

Chittagong University of Engineering and Technology — Chittagong, Bangladesh
Bachelors, Electrical Engineering, GPA 3.23/4.00 — March 2015 – September 2019

Experience

Intern — June 2025 – August 2025
National Center for Supercomputing Applications — Urbana, IL

- Built parser for eBPF maps for 80+ VLANs and ports with configurable polling intervals via REST API
- Integrated with InfluxDB v3 for efficient storage and Grafana for real-time visualization
- Added configurable logging, reducing manual reconfiguration time by 40%

Visitor — August 2024 – December 2024
NSF National Center for Atmospheric Research — Remote

- Set up CouchDB, Chords, and Streampipes on ACCESS Jetstreams for community weather data storage.
- Built data orchestrator for efficient data routing, achieving 39% transmission efficiency gain
- Reduced deployment costs by 22% for communities implementing the project

Intern — May 2024 – August 2024
NSF National Center for Atmospheric Research — Boulder, CO

- Designed private LoRa network for 6+ data types with Raspberry Pi gateways and central server.
- Improved wind forecasting with edge-ML, achieving 26% accuracy gain on Raspberry Pi
- Image analysis with TensorFlow, 23% accuracy gain, 3x faster training, and 93% precision on 10,000+ images

Graduate Research Assistant — August 2023 – Present
The University of Toledo — Toledo, OH

- Contributed to an NSF-funded project to design HPEE, a new auto-tuning algorithm for optimizing HPC applications on edge devices
- Achieved 2.5X more efficiency with HPEE than benchmark methods
- Improve High-performance computing (HPC) systems through stochastic modeling and optimization.

Projects

Fantasy Premier League points prediction using LSTM — March 2020 – April 2020

- Scraped understat.com for player data to train an LSTM model.
- Developed and deployed XGBoost and Decision Trees for performance comparison.
- Optimized weekly team selections using linear programming, adhering to fantasy game rules and budget limits.
- Frameworks used: Scikit-optimize, LSTM, XGBoost, Random Forest, Pandas, Scipy, Numpy.

RAG-Based LLM Chatbot with Multimodal Capabilities — October 2024 – December 2024

- Developed a Generative AI application using Azure OpenAI for question answering and text-to-image generation.
- Designed a custom chatbot API integrated with Azure OpenAI and multimodal capabilities for conversational AI.
- Built an interactive web interface with Next.js and React, including an admin panel for embedding management.
- Frameworks used: Next.js, FastAPI, Azure OpenAI, Pinecone, TailwindCSS, LangChain, TypeScript.

Technical Skills

Programming Languages: Python, Bash, PowerShell, C, SQL, R, HTML/CSS
Libraries & Frameworks: NumPy, Pandas, Matplotlib, TensorFlow, PyTorch, BoTorch, Scikit-learn, PuLP, CBC
Optimization & Modeling Tools: Pyomo, GAMS, MATLAB
Developer Tools: Git, Linux, Docker, Kubernetes, Podman
Cloud Platforms: Google Cloud Platform (GCP), Amazon Web Services (AWS), Microsoft Azure