

Muhammad Taha

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Education

Purdue University, West Lafayette, IN

Expected Graduation: Dec 2025

Master of Science in Computer Science

Related Coursework: Compilers and Programming Languages, Algorithms, Distributed Systems, Computer Networks, Fault Tolerant Computer System Design, Information Security, Deep Learning for Time Series Forecasting, Statistical Machine Learning

Lahore University of Management Sciences, Lahore, PK

August 2019 - May 2023

Bachelor of Science in Computer Science

Related Coursework: Software Engineering, Functional and Asynchronous Programming, Databases, Operating Systems, Networks, Deep Learning, Statistics, Probability, Linear Algebra

Skills

- **Languages/Frameworks**: Python, JavaScript, C++, C, , Go, SQL
- **Tools/Technologies**: Docker, Kubernetes, JSON, XML, YAML, HTTP, MVC, AWS, MongoDB, DynamoDB, PostgreSQL, Visual Studio, RabbitMQ, Agile, Debugging, Testing, Pandas, NumPy, Scikit Learn, Seaborn, Matplotlib, Jupyter, R Studio, PyTorch, Tensorflow, gRPC, Firebase, Ansible, Trello, Langchain, RAG
- **Technical/Web**: GitHub, Git, HTML, CSS, JUnit, Node.js, React.js, React native, Next.js, Apache, Anaconda, Postman, MERN, JWT, npm, Tailwind CSS, Bootstrap, Full Stack, back end, front end, web design, software engineer, quality assurance (QA)
- **Operating Systems/Behaviour**: Linux/Unix, Windows, MacOS, Android, iOS, Documentation, Technical Writing, Analytical, Teamwork, Initiative, web architecture and design, prototyping

Experience

Research Assistant | Cisco Research & Purdue Engineering | West Lafayette, IN

September 2023 - August 2024

- Built a **high-rate data analytics pipeline** using audio, vibration, and power sensors to perform anomaly detection using transformer encoders on Nvidia Tegra TX2 mobile-GPU devices
- Increased data throughput at sensor nodes by up to **100%**, using multithreading in C to improve performance and scalability
- Reduced **mean-squared error (MSE) by 40%** for appliance use prediction, by using an MLP-based multivariate forecasting model
- Developed a novel time-series forecasting model for long-term prediction over multivariate data using **Kolmogorov Arnold Networks**

Software Research Intern | IBM Research & University of Illinois Urbana-Champaign | Champaign, IL

May 2022 - August 2022

- Developed an end-to-end testing software in Python for Kubernetes(K8s) operators that found **50+ bugs in 11 K8s operators** (including Knative, RabbitMQ, Zookeeper, etc) and GoLang Runtime
- Increased tool precision by reducing false positive rate from **72% to 13%** by performing root cause analysis for false alarms using system state objects, container logs, and debugging controller source code

Machine Learning Software Engineer | Center for Speech and Language Technologies | Lahore, PK

May 2021 - August 2022

- Developed android app in Kotlin for **50+ users** to test on-device ML model training framework on low-end devices
- Improved error rate for Google's Tesseract Engine for Urdu language by **80%** using transfer learning across various fonts and styles
- Improved OCR performance by building a custom masking engine using n-gram, bi-gram and BERT language models

Projects

Open-Source Contributions to MongoDB

- Prevented costly system downtime by identifying and fixing **5 confirmed bugs** in official MongoDB Operator code
- Prevented cluster deployment failure due to configuration errors, resource leaks, inconsistent resource specifications

Multi-Room Chatbot Application

- Created chatbot application using a React + Redux frontend and Fluent UI for responsive design, with Nodejs and Express backend
- Leveraged Microsoft cognitive services and Azure communications UI for advanced speech-to-text capabilities
- Integrated chatbot model using langchain, containerized app using docker, and deployed on Azure VM for performance and reliability

Learning Management System for QPS High School Network

- Designed web application frontend in React, RESTful backend in Node and Express, and relational database SQL server for storage of learning resources and student details, real-time assessment, and feedback

Distributed Key-Value Storage using RAFT Distributed Consensus Algorithm

- Implemented leader election, log replication, and fault tolerance using persistent storage for a key-value storage system