

MUGHEES UR REHMAN

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EDUCATION

Virginia Tech

Master in Computer Science and Applications | CGPA: 4.00/4.00

- Coursework: Topics in Data & Information, System & Software Security, Large Scale Distributed Systems, Machine Learning, Network Architecture & Protocols

Blacksburg, VA

August 2024 – May 2026

Lahore University of Management Sciences (LUMS)

Bachelor of Science in Computer Science | CGPA: 3.97/4.00

- Coursework: Distributed Systems, Deep Learning, Computer Vision, Network Security, Software Engineering

Lahore, Pakistan

September 2020 – May 2024

EXPERIENCE

Data Security & Privacy Lab, Virginia Tech

Research Associate

Blacksburg, VA

August 2024 – Present

- Designed an Agentic AI framework for network intrusion detection, where an LLM autonomously generates, validates, and refines **Suricata NIDS** rules through an adaptive feedback loop.
- Created a labeled malicious network traffic dataset through sandboxed malware execution and suricata alert correlation, enabling training and evaluation of the anomaly detection model.
- Built an anomaly detection model that flags malicious network flows and feeds them to the LLM agent for rule generation, achieving up to **100%** precision and **70%** recall across multiple network protocols.

Analytics 4 Everyone

Pittsburgh, PA

Software Engineering Intern

June 2025 – August 2025

- Implemented full-stack features using **React** and **Django**, with **PostgreSQL** as the database backend, for an AI-powered education platform designed to scale for **10,000+** concurrent users and **1M+** total users.
- Redesigned front-end routing and navigation state management, reducing state inconsistencies and improving session stability, reflected in improved SonarQube maintainability and reliability assessments.
- Built a data pipeline with Celery task scheduling and **GCP Cloud Storage** integration for scalable data ingestion and storage.

EPFL

Lausanne, Switzerland

Research Intern

May 2024 – August 2024

- Worked at **Network Architecture Lab**, developed Selenium-based **Python** crawlers on **AWS EC2** to measure cache hit rates and latency across **25+** streaming platforms from **8** global distributed vantage points.
- Analyzed video streaming data to evaluate edge caching's impact on QoE, revealing hit rate disparities of **100%** vs. **30%** across platforms sharing the same CDN infrastructure.
- Demonstrated that cache hit-rate disparities cause **2–5s** differences in video startup delay and reduced delivered bitrates among streaming services sharing the same CDN.
- Co-authored **Edge Caching as Differentiation**, published at **ACM SIGCOMM 2025**, awarded the **Best Student Paper Award**.

PROJECTS

Towards Fairer AI: Multi-Agent Debiasing of LLMs with Online Evidence Retrieval | *Python, LLMs, RAG*

- Designed a multi-agent framework that detects and mitigates social bias in LLM reasoning, using GPT-4, Claude-3 Haiku, and DeepSeek-R1 backbones.
- Reduced GPT-4's reasoning bias score from **-0.29** to **-0.04** and boosted accuracy from **71%** to **96%** on the BBQ-Hard benchmark by integrating a search agent for evidence retrieval, surpassing baselines.
- Published findings at the **AAAI Fall Symposium 2025** conference.

Source Code Hotspots: A Diagnostic Method for Quality Issues | *Python*

- Developed a fine-grained code churn analysis method evaluated on **90+** large software repositories, identifying repeated sub-file changes and improving maintainability diagnostics over file-level metrics.
- Found a substantial portion of maintenance effort stems from systematic, avoidable causes often amplified by automated bots.
- Published findings at the **Mining Software Repositories (MSR) 2026** conference.

EnergyMonitor | *JavaScript, React Native, MongoDB, Expo*

- Developed a mobile app for real-time household electricity monitoring with dashboards, analytics, and device-level usage tracking.
- Promoted eco-friendly energy management & lowered overall consumption by **35%** across **500+** appliances.

TECHNICAL SKILLS

Languages: Python, JavaScript, TypeScript, Java, C++, C, C#, Go

AI/ML: PyTorch, LangChain, RAG, LLM Prompt Engineering, Codex, Claude Code

Cloud Infrastructure: Google Cloud Platform, AWS, Azure

Frontend Frameworks: React, React Native, Angular

Backend Frameworks: Node.js, Django, FastAPI, Flask, Spark

Databases: MySQL, MongoDB, Postgres, Firebase

DevOps (CI/CD): Git, Docker, Kubernetes, Ansible, Metaflow, Jira