Muhammad Abdullah

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Education

Massachusetts Institute of Technology
Candidate for B.S. Computer Science and Engineering Class of 2024
- Relevant Coursework: Performance Engineering, Distributed Computing, Operating Systems, Security

Candidate for B.S. Mathematics Class of 2024
- Relevant Coursework: Advanced Algorithms, Theory of Computation, Linear Algebra, Probability

Work Experience and Research

- **MIT Computer Architecture and Security Lab** Jan. 2022 - present
  Morais and Rosenblum Undergraduate Research Scholar

  Implemented a modified KVM module in the Linux kernel to support Trusted Execution Environments (TEEs).
  Developed implementation using C, RISC-V, and hardware primitives for sub-OS layer support.
  Examined the provision of OS/hardware level cryptographic security assurance for VMs on cloud servers.

- **Rescale, Inc.** Jun. 2022 - Aug. 2022
  SW Intern

  Implemented a High-Performance Data Analysis pipeline to showcase cloud management systems.
  Developed a dynamic process management solution using Message Passing Interface for distributed systems.
  Conducted platform reviews and offered optimization recommendations to company teams.

- **MIT Kavli Institute** Jun. 2021 - Jan. 2022
  Undergraduate Researcher

  Developed a Machine Learning classification system in Python for analyzing TESS space telescope's data.
  Built an AI-driven ensemble of three ML models incorporating techniques such as HDBSCAN clustering, Isolation Forest anomaly detection, and t-SNE dimensionality reduction.
  Achieved efficient data management with an x8 size reduction, preserving accuracy at 95%.

Projects

OneChan: An FPGA-based Chess Engine supplemented with a custom TPU. link

U2F: An open source, homemade 2-factor authentication security key based on the FIDO alliance's U2F specification link

Profemon: A dynamic, pvp, in-person, turn-based fighting game similar to Pokemon Go. Implemented on an ESP32 link

Depolarizer: React app that suggests news articles and sources to promote exposure to opposing viewpoints. link

MIT 6.854 Final Project: Reviewed and simplified several recent keystone papers in Data structures and Algorithms. link

Skills Summary

Languages: Extensive experience in C, C++, Python, Typescript, Assembly, System Verilog

Tools: Git, Linux, React, Angular, gdb, Valgrind

Interests: Performance Engineering, Security and Computer Architecture

Awards

International Mathematical Olympiad 2020 (IMO) - Honorable Mention
6.172 (Performace Engineering) Leiserchess Tournament 2022 - Final Winner