

Shabbir Hussain

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EDUCATION

University of Michigan, Ann Arbor

Aug. 2025 – Present

PhD in Computer Science & Engineering

Lahore University of Management Sciences

Sep. 2020 – May 2024

Bachelor of Science in Computer Science

CGPA: 3.91/4.0

EXPERIENCE

Security & AI Researcher (Remote)

Sep. 2024 – March 2025

Systopia Lab

University of British Columbia

- Informally working with Dr. Aastha Mehta to mitigate mis-configurations and human errors in serverless cloud applications using policies defined in a custom developed formal language similar to Prolog.
- Improved on previously developed system, Growlithe (IEEE S&P 2025), to generate directed acyclic graphs (ADG) to better capture the dataflow in serverless applications written in Python and JavaScript.
- Developed a pipeline to run *multiple* Large Language Models (LLMs) within limited resources (24GB VRAM) to process large github repositories and improve dataflow policy generation via zero-shot prompting.

Trainee Software Engineer

June 2024 – Aug. 2024

Commerce Runtime Team

Illumina Technology Solutions

- Completed a three-month training program focused on the .NET Core framework, Dynamics 365 architecture, and Commerce Runtime (CRT), gaining expertise in enterprise software development.
- Developed custom operations and views, added new functionalities, and overrode existing features within Modern Point of Sales (MPOS) in Microsoft Dynamics 365 for retail, to improve user experience.
- Automated file transfers between Azure Blob Storage and FTP servers upon file uploads for data synchronization.

Undergraduate Research Assistant

June 2023 – May 2024

Internet Security & Privacy Lab

LUMS

- Conducted a large-scale measurement study of HTTP meta-data as a web tracking mechanism with researchers from University of Washington which exposed a cookie exfiltration channel carrying **700+ identifiers** to trackers.
- Implemented multiple ant-tracking strategies using heuristics and unsupervised machine learning models to protect user data. We also monitored the effects of our methodologies on website's UI and functionality.

Undergraduate Research Assistant

June 2022 – May 2023

Center for Speech & Language Technology

LUMS

- Worked to improve Optical Character Recognition (OCR) models for low-resource languages by instrumenting the PyTorch implementation of CRAFT (Character Region Awareness for Text detection).
- Established a pipeline for dataset generation for languages using Arabic and Perso-Arabic script. The dataset was then used to improve the performance of models such as Google's Tesseract Engine and EasyOCR.
- Contributed to building a new (Phonetically-rich) Urdu Corpus for DeepFake audio detection research.

Teaching Assistant

Lahore University of Management Sciences

Computational Problem Solving (Fall 2022): Assisted a class with almost 100 students, managed assignments, exams, and conducted tutorials to enhance student understanding.

Machine Learning for Social Scientists (Spring 2024): Assisted in developing course materials, conducted weekly office hours, and guided approximately 50 students through various ML projects.

PROJECTS

Censored Planet Website | *ReactJS, JavaScript, Figma*

April 2025 – Jun 2025

- Designed, developed, and deployed the Censored Planet Lab's official website (censoredplanet.org)

Research Assistant Chatbot | *Python, Pinecone, GPT-3.5-turbo, HuggingFace, Streamlit*

April 2024 – May 2024

- Designed and developed an AI-powered chatbot to assist users in exploring AI/ML research by answering queries, interacting with specific research papers, and recommending related literature.
- Implemented an intuitive user interface using Streamlit and integrated Pinecone Canopy, GPT-3.5-turbo, and various embedding models to enable natural language understanding and retrieval

Wildlife Image Captioning | *Python, PyTorch, Inception V3, LSTM*

April 2023 – May 2023

- Developed an image captioning model for camera trap images and studied the application of language models for image classification, facilitating automated wildlife monitoring and documentation.
- Implemented Inception V3 for feature extraction and LSTM networks for generating descriptive captions, enhancing the interpretability of visual data. The model achieved BLEU score of 0.93 (on a scale of 0-1) without the high memory and computational demands of recent transformer-based models.

MindCap | *JavaScript, Node.js, React, Material UI, MongoDB, JWT*

March 2023 – May 2023

- Worked on a full-stack web application to streamline the appointment booking process between college students and counselors with a responsive interface developed in React.
- Implemented secure user authentication using JSON Web Tokens (JWT). Managed backend data storage and retrieval with MongoDB, ensuring scalable and reliable data management.

Other Projects | *Software Engineering, Computer Networks, Operating Systems, Machine Learning*

- **Real-Time Item Trading App:** Developed a real-time trading platform using Socket.io for seamless bidirectional communication and Redux for efficient state management, enabling users to trade items instantly.
- **Command-Line Chat Application:** Created a CLI-based chat application supporting real-time messaging and file sharing, facilitating lightweight and secure communication.
- **Peer-to-Peer File-Sharing System:** Implemented a decentralized file-sharing system leveraging Distributed Hash Tables (DHT) to enable efficient and scalable data distribution.
- **Command-Line Interpreter (Shell):** Built a basic shell that mimics UNIX shell functionalities, including command execution, chaining, and process creation and management.
- **File System:** Developed a file system inspired by Linux's ext4, handling file operations and storage management.
- **Author Attribution:** Conducted authorship attribution studies using machine learning models such as K-Nearest Neighbors, Neural Networks, and Ensemble methods to accurately identify authors based on writing style.

TECHNICAL SKILLS

Languages: JavaScript, Typescript, C, C++, Python, Ruby, Haskell, Solidity, HTML/CSS, LaTeX

Libraries & Frameworks: LangChain, PyTorch, NumPy, Pandas, Scikit-Learn, Seaborn, Selenium, .NET Core, Express, Node.js, React, Ruby on Rails, Socket.IO, Redux, Material UI, Bootstrap5

Developer Tools: Git, Visual Studio, VS Code, PyCharm, Docker, Wireshark, SSH

Databases: Pinecone, MongoDB, MySQL

HONORS & AWARDS

Dean's Honor List: Placed on the Dean's Honor List at LUMS for four consecutive years from 2020-2024

Merit Scholarship: Received 50% merit scholarship for my undergraduate degree.

High Distinction: Received Award of High Distinction from the LUMS on graduation.

EXTRACURRICULARS

Science Fuse Volunteer: Acted as the main liaison between Science Fuse and teachers to promote education for young girls in underprivileged communities, supported by the Malala Fund.

NOP Peer Mentor: Supported students from underrepresented and rural areas through mentorship programs, fostering a sense of community and addressing their unique challenges at Lahore University of Management Sciences.

Head of Design and Promotions, IEEE LUMS: Designed and promoted society events across Facebook, Instagram, and LinkedIn. Collaborated with other societies to generate ideas that expanded the reach of IEEE LUMS initiatives.