

Muhammad Faraz Karim

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EDUCATION

Georgia Institute of Technology

January 2023 - Present

Ph.D. in Cybersecurity

- Admitted and currently pursuing a Ph.D. in Georgia institute of technology (Atlanta) College of computing (department of cyber security and privacy).
- My Ph.D. revolves around the analysis and implementation of cybersecurity in cyber-physical systems.
- Another major project includes the use of machine learning in identifying malware footprints for cyber threat detection
- gt-id: 903816585

Lahore University of Management Sciences

August 2018 – August 2022

Bachelors in Computer Science

- Graduated with a CS CGPA of 3.77
- Held 12th position in my batch (top 9%)
- Relevant Courses: Artificial Intelligence, Data Science, Machine learning, Data mining, Statistics, Probability, Topics in Computer and Network Security, Network Security, Advanced programming and Discrete Mathematics

PROJECTS

Debloating tools comparison and Benchmarking Platform

June 2021 – July 2022

Worked on a paper proposing a novel and extensible Bench-marking Platform for debloating tools (Debloating is an emerging branch of computer science); also gave an in depth comparison of the difference between the approaches to debloating by the tools CHISEL, OCCAM, RAZOR, and PIECEWISE and integrating them into ProdeBench.

- * Project advisor was Dr.Fareed Zaffar (PhD Duke) and we worked in collaboration with Dr.Ashish Gehani (Principal Computer Scientist at SRI) and Dr.Sazzadur Rehman (Professor at University of Arizona)
- * Wrote scripts to calculate/generate different metrics for each debloated application for comparison
- * Automated the debloating and metric generation process for the tool OCCAM
- * Analyzed results of the metric generation and selected metrics that best highlighted the debloating capacity of our tools.
- * Added correctness tests for the newly included applications and automated the correctness checking process
- * Paper to be submitted to Usenix Security

BERT for optimizing TRIMMER

October 2021 – July 2022

This project aimed to optimize the specialization policy selection process of the tool TRIMMER by replacing it with a BERT model(an AI language model). This model is trained on LLVM and further fine-tuned to identify code worthy of specialization (debloating)

- * My advisor for the project was Dr.Fareed Zaffar (Professor at LUMS) in collaboration with Dr. Ashish Gehani (Principal Computer Scientist at SRI) and Dr.Hashim Sharif (PhD UIUC)
- * Worked to understand the code of the debloating tool TRIMMER and so learned the very basics of LLVM
- * Edited TRIMMER's LLVM passes to produce application binaries that only specialize in the sub-callgraph of a certain function
- * Creating a dataset for our BERT model to be trained on
- * BERT model has been successfully pre-trained on llvm and we are about to move to our fine-tuning phase

Khaaba.me

Created a fully functional and industry-standard web application for selling and buying homemade foods

- * Used MongoDB Mongoose, NodeJS, React JS, React-Redux, Bootstrap v5, AWS)
- * <https://github.com/sameer-nadeem/khaaba>

Vehicle identification and tracking in video

May 2022 – June 2022

Trained an ML model to track and label vehicles in a video taken from a campus security camera

- * Project advisor was Dr. Zubair Khalid (PhD Australian National University)
- * Used a variety of techniques including SVM, Neural Network, logistic regression and Naive Bayes. Later chose the one with the greatest accuracy on the test set.
- * Employed preprocessing techniques including HOG, PCA, SIFT, Spacial Binning, and color histograms to increase accuracy and decrease run time.
- * https://github.com/faraz-karim/Projects/blob/main/vehicle_identification_and_tracking_in_video.ipynb

Frequent patterns in Crime in Los Angeles

April 2022 – May 2022

Used frequent pattern mining techniques and clustering to find interesting patterns and relations in the crimes committed in the city of Los Angeles

- * Used an apriori algorithm as well as fp growth for pattern mining and 2d and 3d clustering to detect common patterns.
- * <https://github.com/faraz-karim/Projects/blob/main/Datamining.ipynb>

Effect of Generation on suicide rates

September 2021 – November 2021

Analyzed the effect of the generation that people belong to on the likelihood of them committing suicide

- * Project advisor was Dr. Ihsaan Ayyub Qazi (PhD University of Pittsburgh and professor at LUMS)
- * Worked as team lead for the whole project
- * Used extensive EDA and hypothesis testing techniques including p-value testing, AB testing, and logistical regression using a compilation of suicide data set from the WHO for the years 1985 to 2016
- * We found some interesting trends and published our findings along with our analysis in an article on medium: <https://medium.com/swlh/effect-of-generation-on-suicide-253571b81778>

OTHER WORKS

Labeling Un-indicative blocking using traceroutes

March 2021 – April 2021

Worked with Dr. Mobin Javed (PhD from UC Berkeley) on her research paper for finding the source of un-indicative blockings on the internet. This research work dealt with intentional blocking, specifically seeking to identify at what step (DNS, TCP HTTP) and at what location is the blocking taking place.

Hand written Number Classifier

March 2020

Analyzed the effect of the generation that people belong to on the likelihood of them committing suicide

AWARDS AND HONORS

Deans Honor list

December 2019 - August 2022

Placed in the Deans Honor List of academic excellence in all eight semesters

Merit Scholarship

December 2019

Awarded merit scholarship for placing in the top 10 Sophomore students in the science school at LUMS

EXPERIENCES AND POSITIONS

Member of JZT Pakistan

September 2016 – Present

Active member of JZT Pakistan, an organization working to eliminate Thalassemia in Pakistan. Responsible for hosting awareness campaigns and helping meet blood requirements of Thalassemia patients

Treasurer INDEX

September 2021 – June 2022

Served as the Treasurer for INDEX (a design thinking society at LUMS)

Convener CodinGuru

September 2021 – February 2022

Convened and executed one of Pakistan's Largest domestic coding science Competitions

Vice President IEEE LUMS

September 2020 – June 2021

Served as the vice president of IEEE LUMS a society that holds events and competitions to promote technology in society. Was responsible for a general body of 80 students and over 15 events

LUMS Badminton team vice captain

September 2020 – September 2021

Served as the vice captain for the LUMS' official Badminton team. Responsibilities involved holding training sessions/camps and managing tournaments.

TECHNICAL SKILLS

Languages: C, C++, Python, R , Haskell, PHP, SQL, Javascript, latex

Frameworks: React, Node.js, Redux, WordPress, Express.js

Management & Collaboration Tools: Git, Docker, Trello, slack, Mural, Figma

Libraries: Numpy, Scipy, Scikit-learn, Pandas, Matplotlib, Seaborn, Pandas, NumPy, Matplotlib, Bootstrap v5