ZAFIR ANSARI

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EDUCATION

Lahore University of Management Sciences *August 2018 - June 2022*
Bachelor of Science in Computer Science *CGPA:3.85/4.00, SCGPA:3.89/4.00*

- Ranked in the top 5% of my batch.
- Relevant Coursework: Topics in Internet Research (graduate level course), Topics in Computer and Network Security(graduate level course), Machine Learning (graduate level course), Operating Systems, Fundamentals of Computer Systems, Network security, Network-Centric Computing, Theory of Automata, Statistics, Databases, Data Structures, Data Science, Advanced Programming, Algorithms, Statistics.

RESEARCH INTERESTS

Computer Systems, Networks, Security and Privacy, Internet of Things.

RESEARCH EXPERIENCE

Correlating host and network logs to accelerate the threat investigation process *June 2021 - Present*
Correlating host and network logs helps causally relate the attack and generate complete contextual history to accelerate threat investigations. This correlation is a challenging task for even the experienced analysts.

- Advisors: Dr Wajih Ul Hassan (PhD, UIUC) and Fareed Zafar (PhD, Duke)
- Addressed the challenge of correlating system and network logs, by designing an open source monitoring framework ”Zeek Agent.”
- Created a novel Visualizer to aid the visualization and exploration of a unified, dynamic force-directed provenance graph generated from the correlated host and network logs, which helps accelerate the threat investigation process.
- Designed The interactive visualizer while keeping in mind the needs of an analyst, and featured several new manipulation functionalities such as real-time filtering, collapsing and merging of facts, and layering to name a few. Some of them significantly reduce the size of the graph without affecting the correctness of the causal analysis.
- Identified and fixed an area to make the framework scalable.
- Evaluated the effectiveness of Zeek Agent in collecting attack logs, and correlating network and system logs by simulating real world attacks and investigating them through the visualizer.
- Contributed in the writing of research paper on the project, intended submission at Usenix Security 2022.

Threat detection service for enterprise security management

- Advisors: Dr Fareed Zafar (PhD, Duke), Dr Rashid Tahir (PhD, UIUC), Vijay Dialani (Apple) and Dr Raffae Bhatti (Mode Analytics). Working with Claritas LLC, a bay-area based startup.
- Designed a threat detection service that aims to discover, classify, and prioritize security events across an enterprise.
- Generated several different alerts from AWS security hub services such as Amazon Macie, Amazon GuardDuty, and Amazon Inspector and stored them in an interactive Kibana dashboard.
- Analyzed Amazon Macie, and found several limitations of the service and proposed solutions.
- Created a Client-Server architecture via gRPC, the Client is responsible for sending alerts generated from the Amazon services. The server is linked with a modeling service which generates risk scores based on the type and severity of the alert.
- Exploring funding opportunities for the Minimum Viable Product.

When to do server side rendering and when to do client side rendering *January 2021 - June 2021*
The Average page load times of web pages have increased significantly over the past years. Low-end devices experience this performance issue the most because of the limited resources. The type of rendering is one factor that can influence this problem.

- Supervisors: Dr Ihsan Ayyub Qazi, Dr Zafar Ayyub Qazi, Dr Zartash Uzmi
- Designed and Conducted series of experiments in this measurement study to empirically compare the two types of rendering-server-side rendering and client-side rendering under the influence of different factors such as network strength, device resources, and web components in a page, using WebPageTest and Chrome Developer tools.
- Designed and built a hybrid model using the best features of both types of rendering techniques- by rendering the first page on server and the subsequent pages at the client.

- Analyzed the factors and their effect on rendering, and evaluated the hybrid model which showed promising results.
- Confirmed the effectiveness of our results through statistical analysis and wrote a paper on it

Tree Specie recognition through leaf characteristics *June 2020 - July 2020*

Although the state of the art model has a high accuracy to recognize tree species through leaf characteristics, however damaged leaves contribute the most to the loss of accuracy.

- Advisor: Dr Mian Awais (National Center of Robotics and Automation)
- Proposed a novel technique to counter the loss of accuracy of tree specie recognition caused by damaged leaves.

TEACHING EXPERIENCE

Teaching Assistant - Operating systems *September 2021 - December 2021*

- Responsible for making and grading quizzes, assignments, keeping office hours of a class of 140 students.

Teaching Assistant - Introduction to Programming (CS 200) *September 2020 - December 2020*

- Made several assignments, programming labs, and quizzes alongside conducting vivas to test student's understanding of the concepts. In the absence of the instructor, was responsible to conduct classes and teach core programming concepts to a class of 130 students. Supervised 3 hour long, weekly lab sessions.

Teaching Assistant - Artificial Intelligence *January 2021 - June 2021*

- Responsible for making quizzes and conducting tutorial for assignment as well as keeping office hours and grading different instruments of a class of 190 students.

Teaching Assistant - Computation Problem Solving *January 2022 - June 2022*

AWARDS AND EXTRACURRICULAR

- **Dean's Honour List** *September 2019 - May 2022*
  - Placed in LUMS Dean's honors list consecutively for three years
- **Lawn Tennis**
  - Captain of my high school team
  - Career Best ranking- third in Punjab province (under sixteen category)
  - Bronze Medalist- Punjab Olympics
- **Ace of Spades** *January 2020*
  - Awarded the best Event Leader of Pakistan's biggest Science Olympiad
- **High Achiever's Award in O Levels and A levels with merit scholarship**
- **Dance**
  -Assistant Director-Productions at the Dance Society of LUMS

TECHNICAL SKILLS

- **Programming Languages:** C, C++, Python, R , MATLAB, Haskell, PHP, SQL, Javascript, Gremlin, Zeek Script
- **Libraries:** Pandas, numPy, matplotlib, D3.js

ACADEMIC PROJECTS

Effect of generation on suicide rates *November 2020 - December 2020*

- Researched and Analyzed the effect of the generation that people belong to on the likelihood of them committing suicide using data science techniques-Article link: https://medium.com/swlh/effect-of-generation-on-suicide-253571b81778

P2P file sharing service *April 2020 - May 2020*

- Built a P2P file sharing system that uses Distributed Hash Table, leverages consistent hashing and is resilient to node failures.

My programming language *March 2021 - April 2021*

- Implemented a lexer, parser, and interpreter for a custom made language

Virtual Memory Manager *November 2020 - December 2020*

- Implemented a virtual memory manager with two level paging with page replacement and fault handling as well as binary instruction translation

Chat Application *February 2020 - March 2020*

- Made a client-server application architecture by ensuring reliable communication of files and messages by implementing a reliable protocol on top of UDP in the presence of events like packet loss, delay, corruption, duplication, and re-ordering.