Zoha Khan

Email: 23100021@lums.edu.pk | Linkedin: linkedin.com/in/zoha-khan | Github: github.com/khan-zoha | My Website

Education

Lahore University of Management Sciences September 2019 - June 2023

Bachelors of Science in Computer Science

- cGPA: 3.88
- Graduation Date: June 2023
- Relevant courses:
  - Algorithms, Data Structures, Discrete Mathematics, Software Engineering
  - Networks: Topics in Computer and Network, Network Security, Topics in Internet Research, Network-Centric Computing
  - Programming: Advance Programming, Introduction to Programming, Computational Problem Solving
  - Systems: Operating Systems. Fundamentals of Computer System
  - Data Science: Databases, Computer Vision
  - Machine Learning, Introduction to Artificial Intelligence, Mathematical Foundation of Machine Learning
  - Mathematics: Calculus-I & II, Linear Algebra, Introduction to Differential Equation, Operational Research
  - Spring'2023 semester: Principles and Techniques of Data Science, Introduction to Data Mining, Theory of Automata, Internet of Things

Research Experience

Ad Accessibility October 2022 – Present

Advisors: Dr. Umar Iqbal (Postdoc - University of Washington), **Dr. Muhammad Fareed Zaffar** (Ph.D. in Computer Science from Duke University)

Lab: Security and Privacy Research Lab (University of Washington)

Idea: The goal is to measure the ad accessibility systematically to understand the experience of visually impaired users.

- Scraped ads using Puppeteer from 20K websites of the Tranco list via an open-source web crawler.
- Measured the frequency of accessibility tokens (e.g., aria-labels, alt-text, aria-live, and aria-hidden) by using html parser.
- Developed a basic Node-based Web Application to classify ad's labels (aria-label and alt-text) as sufficient, limited, or misinformation (dark pattern) against the ad's screenshots.
- Designed survey to understand perception, understanding, and expectations of visually impaired users from advertisements.

Bias In Media August 2022 – Present

Advisors: Dr. Yasir Zaki (Professor at NYU), **Dr. Talal Rahwan** (Professor at NYU), **Dr. Muhammad Fareed Zaffar** (Ph.D. in Computer Science from Duke University)

Lab: Data Science and AI Lab (NYU)

Idea: We aim to expose biases (e.g., racial, gender) within media channels and compare biases across channels with different polarities in terms of leftist and rightist behavior using Natural Language Processing.

- Ran Word2Vec model on 5000 fox-news articles, observed significant bias against people of color.
- Scraped more than 1 million article content from New York Times and Fox News via Wayback machine, Selenium, and Beautiful Soup Library.
- Optimised text extraction from article links via joblib.parallel.
- Calculated relative percentage difference of cosine similarities of different ethnicities with respect to white for past 10 years.

Fake News June 2021 – May 2022

Advisors: Dr. Ayesha Ali (MA Stanford), **Dr. Ihsan Ayyub Qazi** (Ph.D. in Computer Science from the University of Pittsburgh), **Dr. Agha Ali Raza** (Ph.D. Computer Science at Carnegie Mellon University)

Lab: National Center of Big Data and Cloud Computing (NCBC, Pakistan)

Idea: The research aims to analyze the relationships between digital literacy and truth discernment, sharing intentions, emotional responses, and confirmation bias especially among low- and middle-income users. This can help in determining which social media users are most prone to fake news.

- Worked as team lead for the whole project.
- Conducted extensive literature review and designed the survey on KoboToolbox.
- Conducted a training session for other interviewees.
- Conducted a pilot field study of 200 in-person interviews.
- Performed data analysis and found that older individuals, females, those less educated, and people with lower household expenses are likely to have poor digital literacy

Modelling User Quality of Experience for Live Video Streaming January 2022 – May 2022
Advisors: Dr. Zaffar Ayub Qazi (Postdoc - UC Berkeley)

Idea: Our project's primary goal is to understand optimal user experience when it comes to watching live events within an online setting.

- Developed a MERN-based web application that serves the same stream at three distinct bitrates.
- Collected TV streams and used Open Broadcasting System to serve over RTMP protocol at a fixed bitrate to the server, which then used FFmpeg to convert the video to different bitrates.
- Used a simple HTML video player to show the video to the user.
- Results showed that a stream that facilitated a less frequent rebuffering rate and moderate quality was the most preferred.

Projects

Choka.com (Web Application) January 2022 – May 2022
Github: https://github.com/choka

Idea: My team of five members developed a web application, choka.com, which inspires to revolutionise the tutoring industry by streamlining the matching process between tutors and students. Students can compare and select tutors. Likewise, tutors can have flexibility over their schedules and teach students a specific subjects. We followed agile methodology.

- Conducted students' and teachers' interview to analyse requirements of the user.
- Designed our prototype on Figma. **(link)**
- Developed web app using FERN stack (Google Firebase, Express, React, Node.JS)
- Tested the app and corrected the errors.

Language Recognition Model November 2021 – December 2021

- Collected data by recording 600 hundred sentences (Urdu, English and Mixed Languge) using Praat software.
- Built language recognition models using different techniques such as Kernelized Support Vector and Neural Networks.
- Achieved 91% accuracy.

Mask/Non-Mask Person Detection October 2021 – December 2021

Idea: The project used Multi-Camera System and combined visual recognition and multi-camera geometry and build a application to detect mask and non-mask people.

- Recorded data using a Multi-camera Setup.
- Achieved 87% accuracy for Mask/Non-Mask Person Detection using YOLO object detector.
- Visualise Object Detection on Orthographic Top-View.
- Detected COVID-19 SOP Violation and generated a Heatmap Visualization on the top-view.

Peer-to-peer Communication System 13 February 2021 – 8 March 2021

Idea: Implementing a Chat Application introduced me to some fundamental concepts of socket programming and Computer Networking. I implemented a chat application (like messenger) that will allow users to reliably transfer messages and files using UDP in python.

Teaching Experience

Teaching Assistant for Network Security January 2023 – Present
Teaching Assistant for Computer Vision September 2022 – December 2022

I designed programming assignments, held bi-weekly office hours to assist a class of approximately 80 students. I also graded quizzes, written homework, and programming assignments and held tutorials to assist better learning. I designed semester long project on Lane Analysis for Autonomous Vehicle as well.

Teaching Assistant for Computational Problem Solving July 2022 – August 2022
Teaching Assistant for Data Structures January 2022 – June 2022

I designed and graded assignments on Linked Lists, Stacks, Queues, Trees, Hashing and Sorting algorithms. I held tutorial and office hours twice a week to help a class of approximately 100 students.

Teaching Assistant for Computational Problem Solving September 2021 – December 2021

I assist, grade, and mentore students in groups of up to 11 during weekly labs. Additionally, I support student learning objectives through personalized and small group assistance during weekly office hours and holding weekly tutorials. I also mentore and grade groups of students in their final project.

Leadership and Extracurricular

Chair IEEE Women in Engineering May 2022 – Present

- Held training programs, and career counselling sessions for high school female students to inspire them to join STEM field.
- Held programming classes for women to encourage female participation in CondingGuru (Annual IEEE LUMS Hackathon).
- Collected funds to set up computer labs in underprivileged school.
- Hosted panel talks on Gender Gap in Tech.

Lead Mentor for Girls Coding Camp December 2021 - January 2022
Society: LUMS Women in Computing

I drafted the curriculum and taught python to a class of 30+ aspiring female computer scientists.

Peer Advisor August 2021 - May 2022

Selected for SSE Peer Support System at Syed Babar Ali School of Science and Technology and Office. My role was to ease the transition to university life for incoming first year batch.

Lead for COVID Awareness Campaign July 2020 - August 2020
Theme: Community Service

Idea: The pandemic of COVID-19 revealed the cracks in our systems and strengthened inequalities within society. My friend and I worked to increase awareness about the virus in rural areas.

- Distributed masks and hand sanitizers in a villages and conducted information sessions on general hygiene and COVID SOP.
- Distributed sanitary napkins in the same village, and conducted information sessions on menstrual hygiene and health.

Director Math Gauge August 2020 – May 2021

Leading one of the many departments of LUMS's biggest society, SPADES – (Society of Promotion and Development of Engineering and Sciences).

- Successfully simulated an online version of PsiFi (Science Olympiad) in which more than 300 high-school students participated.
- Designed questions on topics such as challenging math problems, riddle, ciphers, integration, and logic.

Summer Intern at Care Foundation July 2018 - August 2018
Theme: Community Service

Conducted training workshops for teachers working in underprivileged areas to improve their English Language and technical skills. Raised funds to buy school furniture as well.

Student Societies
Student Societies: : IEEE, LUMS Women in Computing (LWIC), Basketball and Badminton Team, Community Service

Awards and Honors

Dean's Honor List
Year: 2019-2020 & 2020-2021 & 2021-2022 (Awarded to students who had cGPA more than 3.6/4.0.)

Merit Scholarship
Year: 2020-2021 & 2022-2023 (Awarded to top 5 students of the batch.)

Successfully completed the Fundamentals of Deep Learning Workshop by NVIDIA September 2021
Successfully completed the Python Data Structures course June 2020

Completed an online non-credit Python Data Structures course authorized by University of Michigan and offered through Coursera.

Gold Medalist in A-levels June 2019
Valedictorian in O-levels June 2017

Technical Skills

Languages: C/C++, Java, Python, SQL (MySQL, Postgres), Haskell, JavaScript, HTML/CSS
Frameworks: React, Node.js, Express.Js
Developer Tools: GitHub, Wireshark, Trello, VS Code, Visual Studio, PyCharm, Amazon Cloud9, Google Colab, Jupyter Notebook, Heroku, Sublime, Firestore, MongoDB, Proteus, Praat
Libraries: Joblib.Parallel, Pandas, NumPy, Matplotlib, PyTorch, TensorFlow, Passport JS, OpenCV, Scitkit-Learn, PIL, re, BeautifulSoup, cv2, Seaborn, Selenium, Psycopg, python_speech_features (Not an exhaustive list)
Operating Systems: MacOS, Linux, Windows