Ibrahim Moazzam

CONTACT INFORMATION

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RESEARCH INTERESTS

Human-Computer Interaction, Data Science, ICTD, Applied Machine Learning

EDUCATION

University of Michigan, Ann Arbor, MI, USA **Aug '23 – Present**

Master of Science in Information (MSI)

- Pathway: **UX Research and Design**
- Relevant Courses: *Web Design: Responsiveness and Accessibility, Interaction Design Studio, Fundamentals of Human Behavior, Contextual Inquiry and Consulting Foundations*

Lahore University of Management Sciences (LUMS),
Lahore, Pakistan **Aug '19 – Jun '23**

B.S. Computer Science

- CGPA: **3.90**
- Relevant Courses: *Human-Computer Interaction, Data Science, ICT4D, Machine Learning, Cognition & Computers, Statistics & Data Analysis, Advanced Programming, Software Engineering, Speech Processing, Artificial Intelligence*

RESEARCH EXPERIENCE

Dost: A Gamified Platform for Instilling Computational Thinking in Children through Physical Play, LUMS, Lahore, Pakistan

Professor Maryam Mustafa **Jan '23 – Present**

A project initiated at the Interactive Media Lab (IML), LUMS to foster equitable learning experiences for children in low-resource settings through the introduction of Computational Thinking (CT) in game creation and modification during physical play.

- Performed a comprehensive literature review to gather preliminary knowledge of the problem domain.
- Gained expertise of requirements gathering through 15 semi-structured interviews with secondary school teachers and children.
- Performed open and axial coding for thematic analysis on the interview transcripts.
- Created a high-fidelity prototype of a gamified platform that enables children to create, modify, and share games using CT skills.
- Conducting further research and drafting a paper with the aim of submitting it to CHI 2025.

Ishaara: A Gamified E-learning Sign Language Application for Hearing Children,
LUMS, Lahore, Pakistan

CS466 – Human-Computer Interaction **Aug '22 – Dec '22**

Led a group project in the *Human-Computer Interaction* course to design a gamified e-learning application that teaches Pakistan Sign Language (PSL) to primary school children to bridge the communication divide between the Deaf and hearing communities.

- Performed a comprehensive literature review to gather preliminary knowledge of the problem domain.
- Led 8 semi-structured interviews with expert sign-language educators and parents of deaf children.

- Conducted contextual inquiries with 20 hearing and 12 deaf children to learn about their study patterns and identify content that would foster relatability between the two groups of children.
- Managed 4 brainstorming, storyboarding, and Crazy 8's sessions for the application's design.
- Produced a low-fidelity paper prototype and gained analysis on the efficiency of the app's design through scenario-based tests conducted with 9 hearing children.
- Created a high-fidelity prototype, with 15 out of 18 hearing children managing to complete all of their tasks successfully.

Investigating Digital Interventions for Countering Political Misinformation within Low Digitally Literate Populations, LUMS, Lahore, Pakistan

Professor Ihsan Ayyub Qazi **Dec '22 – May '23**

Analyzing the efficacy of various digital interventions, such as fact-checking portals, for countering political misinformation within individuals that have minimal digital literacy.

- Designed a high-fidelity prototype on Figma for a portal that would fetch fact-checked political articles from Soch Fact Check to display in a clean, minimal user intervention UI.
- Developed a Web App using React and Node for the aforementioned prototype.
- Integrated cookie tracking to track the users' behavior when using the App.
- Developed and integrated a custom user-journey tracking system to measure the long-term behavioral changes of participants when using the Web App.
- Conducted the first pilot test of the App with 40 participants.

Developing an Urdu Library for NLTK, LUMS, Lahore, Pakistan

Research Member - Center for Speech and Language Technologies **Aug '22 – May '23**

Developing a standardized library for the most commonly used NLP features (e.g. tokenization, named-entity recognition, sentiment analysis) for Urdu, with the goal of having it added to NLTK.

- Performed an extensive literature review to identify the most used NLP features globally that have yet to be implemented for Urdu.
- Currently developing standardized solutions for the identified features under the supervision of Professor Agha Ali Raza.

Zong Lab, LUMS, Lahore, Pakistan

Research Assistant Intern - Professor Zafar Ayyub Qazi **Jun '21 – Dec '21**

Worked on exploring and experimenting with the POWDER testbed (a wireless networking facility in the lab environment) under the esteemed supervision of Dr. Zafar Ayyub Qazi.

- Conducted extensive exploratory research to understand the workings of the testbed.
- Successfully emulated an S1 handover with srsRAN, and performed a series of tests to evaluate its performance subsequently.
- Investigated how to create various custom profiles for the testbed as required and deployed them.

Teaching Experience

University of Michigan, Ann Arbor, MI, USA

Graduate Student Instructor **Aug '23 – Present**

I am tasked with completing course assignments to understand the students' experience, leading a discussion section of 30 students, and attending to students' queries on Slack and during regularly-scheduled office hours.

- SI 664 - Database Application Design (Fall '23) for Professor Charles Severance

UMSI Peer Tutor **Sep '23 – Present**

I assist undergraduate and graduate students with their programming-related concepts and problems in the following courses, under the supervision of Professor Anthony Whyte:

- SI 106 - Programs, Information, and People
- SI 206 - Data-Oriented Programming
- SI 506 - Programming I
- SI 507 - Intermediate Programming

Lahore University of Management Sciences, Lahore, Pakistan

Teaching Assistant **Jan '21 – May '23**

Assisted instructors with creating and grading assessments, marking projects. Assisted students, clarified concepts and fielded student queries each week through tutorials and office hours.

- [Head TA] CS 202 - Data Structures (Spring '23) for Professor Ihsan Ayyub Qazi
- CS 370 - Operating Systems (Fall '22) for Professor Hamad Alizai
- CS 202 - Data Structures (Spring '22) for Professor Mobin Javed
- CS 200 - Introduction to Programming (Fall '21) for Professor Mian Muhammad Awais
- CS 100 - Computational Problem Solving (Spring '21) for Professor Hamad Alizai

Projects

Early Stage Diabetes Risk Prediction Classifier

CS334 – Principles and Techniques of Data Science **Aug '22 – Dec '22**

As a project for the course *CS334 – Principles and Techniques of Data Science*, I successfully built a classifier to detect the onset of diabetes given certain physiological features, to tackle its notoriously-long asymptomatic phase of up to 12 years.

- Curated a dataset from secondary data containing the physiological traits of 520 potential- and newly-diabetic patients and their risk of diabetes (as diagnosed by a doctor) in Bangladesh.
- Performed Exploratory Data Analysis (EDA) through a correlation matrix and Pearson's correlation coefficient to identify traits significantly correlated with the outcome.
- Ran the feature-pruned dataset through various machine learning classification models such as Decision Trees and Random Forests
- Used stratified cross-validation to reduce the risk of overfitting and extensive hyperparameter tuning to maximize the cross-validation accuracy.
- Concluded that the Random Forest model was the most effective as it attained a test accuracy of 91% and an area under the ROC curve (AUC) of 0.978.

Fine-Tuning Wav2Vec2 for Urdu ASR

CS433 – Speech Processing **Mar '22 – May '22**

As a project for the course *CS433 – Speech Processing*, I tackled the issue of Automatic Speech Recognition (ASR) systems being prevalent for higher-resource languages like English, but lacking for lower-resource languages like Urdu due to the challenge of data scarcity.

- Decided to use the pre-trained Wav2Vec2 model due to its sublime performance on scarce data.
- Recorded a 7-hour long, phonetically-complete Urdu dataset to fine-tune the model with Connectionist Temporal Classification (CTC).
- Achieved a Word Error Rate (WER) of 37%.

Professional Experience

Educative Inc., Lahore, Pakistan

Technical Content Engineering Intern **Jun '22 – Aug '22**

- Carried out approximately 160 hours of research pertaining to various concepts within a wide range of disciplines, such as: Machine Learning, Networks, Natural Language Processing, Human-Computer Interaction, Data Structures, & Algorithms.
- Authored 33 articles on the various concepts (previously mentioned) to be read by a technical audience, such as software engineers. A select few of these articles can be seen here.

Honors and Awards

Graduated with High Distinction at SBASSE, LUMS **Jun '23**

High Distinction was granted for graduating with a CGPA greater than 3.80.

Recipient of 50% Merit Scholarship at SBASSE, LUMS **2021 – 2023**

Conferred for being among the top 15 students, placed on the Dean's Honor List, with the highest academic standing in my batch.

Placed on the Dean's Honour List at SBASSE, LUMS **2019 – 2023**

Awarded for completing a minimum of 32 credit hours in a year and attaining a cumulative GPA of at least 3.60.

Cambridge Outstanding Learner Award, Saudi Arabia **2017**

Awarded for attaining the third-highest marks across 9 IGCSE subjects throughout Saudi Arabia.

Skills

- Programming Languages: Python, C++, C, JavaScript, React, Node.js, Django, Flask, MATLAB, Haskell
- Applications: Jupyter Notebook, MAXQDA, Figma, Canva, LaTeX, Microsoft Office Suite
- Statistical Packages: Pandas, Stata