

# Talha Ahmed

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## EDUCATION

### Lahore University of Management and Sciences

*B.S Mathematics - Economics (Joint Major) + Minor in Computer Science*

Sep. 2020 – May 2024

CGPA/Minor GPA: 3.83/3.87

**Relevant Courses:** *Real Analysis, Adv. Calculus, Applied Probability, Machine Learning, Convex Optimization, Data Mining, Deep Learning, Adv. Signal Processing, Reinforcement Learning, Adv. Econometrics, Generative AI, Numerical Analysis*

## RESEARCH EXPERIENCE<sup>1</sup>

### Research Assistant

*Dr. Hassan.Mohy-ud-Din - Website*

Summer. 2024 – Present

*Lahore, Pakistan*

- Working on "Theory and Practice of Diffusion Models in Medical Imaging and Inverse Problems". This work has link with the research below. (Work in Progress - Survey)

### Research Assistant

*Dr. Muhammad Tahir - LinkedIn*

Summer. 2024 – Present

*Lahore, Pakistan*

- Working on "Interpretable and Controllable Diffusion Models" with applications to signal processing and semantic correspondence.

### Senior Year Research

*Dr. Muhammad Tahir*

Summer. 2023 – May. 2024

*Lahore, Pakistan*

- Worked on "Model Based Deep Learning" as a Senior Project. (Report + Presentation)

### Research Assistant

*Dr. Hassan Mohy-ud-Din*

Sept. 2023 – Dec 2023

*Lahore, Pakistan*

- Worked on a brief term project on compiling detailed, concise notes on prominent mathematical inequalities and their applications to fields of data science, information theory etc. Compiled work can be found here: **Dropbox**

### Research Assistant

*Networks Systems Group @ LUMS*

Jan. 2023 – May. 2023

*Lahore, Pakistan*

- As a directed research project, developed an app for measuring 'Digital Literacy' under supervision of Dr. Ihsan Ayub Qazi - **LinkedIn**.
- App can be found here: (**Github Link**)

## ACADEMIC DISTINCTIONS

- Ranked in the **top 10%** of LUMS SBASSE Batch of 2024
- Placed on **Dean's Honor List** for **2020-2021, 2021-2022, 2022-2023**
- Graduated with **Dean's Honour List** and **High Distinction**

## TEACHING + WORK EXPERIENCE

### ACTA 6304: Advanced Machine Learning (Spring 2024)

*Teaching Assistant*

Professor Momin Ayub Uppal

- Held weekly office hours, made and graded assignments, and engaged in semi-formal student counseling

### CS 535: Machine Learning (Fall 2024)

*Teaching Assistant*

Professor Momin Ayub Uppal

- Held weekly office hours, invigilated quizzes and exams, held tutorials, made and graded assignments, and engaged in semi-formal student counseling

### EDUX 562: Data Lab (Spring 2023)

*Teaching Assistant*

Professor Ahmad Ayub

- Held weekly office hours, invigilated STATA labs, graded assignments, and engaged in semi-formal student counseling

<sup>1</sup>Further details on these research projects can be found at my [website](#).

## ECON 221: Intermediate Macroeconomics (Fall 2022)

Professor Usman Elahi

Teaching Assistant

- Held weekly office hours, conducted assignment tutorials, created/reviewed/invigilated/graded quizzes, created/reviewed/solved assignments, and engaged in semi-formal student counseling

## STATA Workshop (Dec 2022 - Jan 2022)

Professor Usman Elahi

Teaching Assistant

- Assitant for Professor Usman Elahi (usman.elahi@lums.edu.pk) for 'Capacity Building and Training on Data Management & Analysis Using STATA' organized in collaboration with Bureau of Statistics, Government of Punjab for Statistical Officers.

## UNDERGRADUATE COURSE PROJECTS/PRESENTATIONS<sup>2</sup>

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### Speech Recognition and Translation System For Medical Communication

Spring 2024

CS 5302: Generative AI for Natural Language and Speech Processing

- We aimed to develop an application that can interpret, translate, and vocalize spoken language in real-time, and is specifically catered for patient-doctor conversations.
- We integrated various open source models of Automatic Speech Recognition, Neural Machine Translation, and Text-to-Speech synthesis etc. (**Project Deliverables**), (**Github Link**)

### Reinforcement Learning Algorithms on Tic-Tac-Toe

Fall 2023

CS 6314: Dynamic Programming and Reinforcement Learning

- Trained a reinforcement learning agent to play 2D and 3D Tic-Tac-Toe using algorithms like Value Iteration, Temporal Difference Learning, and Deep Q Networks. (**Project Report**), (**Github Source Code**)

### Panel Data and Tobit Analysis on Health Care Dataset

Fall 2023

ECON 438: Econometrics II

- Conducted panel data and Tobit analysis on a German healthcare dataset to determine factors influencing doctor or hospital visits using fixed/random effects and tobit models. (**Project Report + Source Code**).

### Clustering, Association and Frequent Pattern Mining

Spring 2023

CS 432: Introduction to Data Mining

- Analyzed drug consumption patterns in Connecticut, USA using DBSCAN, Apriori, and Fpgrowth algorithms for clustering, association, and frequent pattern mining. (**Project Report**).

### Sentiment Analysis on Audio Recordings

Spring 2023

CS 535: Machine Learning

- Identification and extraction of features followed by a mathematical background of some popular machine learning methods and their performance evaluation (**PDF Link**).

## TECHNICAL SKILLS

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**Languages:** C++, Python, STATA, MATLAB, R, HTML/CSS, Tableau

**Programming Frameworks:** Keras, Tensorflow, PyTorch, OpenCV, Shiny, Numpy, Pandas, Matplotlib, Seaborn

**Tools:** Linux, Git, Dropbox, Latex, Microsoft, VS Code, Google Colab

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<sup>2</sup>Further details on these and additional course projects can be found at my [website](#).