

Talha Ahmed

☎ +92 331 4165009 | ✉ Email | 🌐 Website | 🔗 LinkedIn | 🐙 GitHub | 🎓 Google Scholar

EDUCATION & RESEARCH BACKGROUND

Lahore University of Management and Sciences (LUMS)

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, Data Structures, Machine Learning, Convex Optimization, Data Mining, Deep Learning, Adv. Signal Processing, Reinforcement Learning, Adv. Econometrics, Generative AI, Numerical Analysis*

Research Interest Keywords: *Generative AI, Diffusion/Score-Based Models, Computational/Medical Imaging, Inverse Problems, Representation/Unsupervised Learning, Compressed Sensing. See [Presentation Overview](#)*

RESEARCH EXPERIENCE

Research Assistant

Summer 2024 – Present

Dr. Hassan Mohy-ud-Din – [Algorithms in Theory & Practice Lab](#) @ LUMS

Lahore, Pakistan

- Main research is centered on generative models and their applications in medical imaging and inverse problems like MRI reconstruction, binary/multi-class segmentation and image restoration, resolution etc.
- First author of **Wave-GMS** (ICASSP 2026, under review): lightweight multi-resolution generative model (~2.6M params) achieving state-of-the-art segmentation and cross-domain generalization on medical imaging datasets.
- Compiled notes on mathematical inequalities, e.g. [Jensen's Inequality](#), and their applications in data science and information theory.

Senior Year Thesis

Summer 2023 – Summer 2024

Dr. Muhammad Tahir

Lahore, Pakistan

- Senior year project on **Model-Based Deep Learning** for matrix completion. Proposed ConvMC-Net, a convolutional network replacing nuclear-norm updates with trainable layers, achieving faster and more accurate recovery compared to ALM and ADMM-Net.
- Extended this work with ConvHuberMC-Net, introducing a convex Huber criterion and unfolded Majorization–Minimization framework to improve robustness to impulsive GMM noise, eliminate explicit singular value thresholding, and enable parallelizable computations. See [Report + Presentation](#).

Directed Research Project

Spring 2023

Dr. Ihsan Ayub Qazi – [Network Systems Group](#) @ LUMS

Lahore, Pakistan

- Developed a *Shiny* app to predict digital literacy using a pre-trained Random Forest model. See [GitHub](#).

PUBLICATIONS

Wave-GMS: Lightweight Multi-Scale Generative Model for Medical Image Segmentation

Talha Ahmed, Nehal Ahmed Shaikh, and Hassan Mohy-ud-Din. *Under review at ICASSP 2026*. See [Github](#) | [arXiv](#).

Unified Perspective on Diffusion Models: Theory, Practice, in Medical Imaging and Inverse Problems

Talha Ahmed and Nehal Ahmed Shaikh. *Survey manuscript in preparation*; See [Draft](#).

TEACHING + WORK EXPERIENCE

EE 563/MATH 325: Convex Optimization (Spring 2025)

Professor Hassan Mohy-ud-Din

Teaching Assistant

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

ACTA 6304: Advanced Machine Learning (Fall 2024)

Professor Momin Ayub Uppal

Teaching Assistant

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

CS 535: Machine Learning (Spring 2024)

Professor Momin Ayub Uppal

Teaching Assistant

- 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)

Professor Ahmad Ayub

Teaching Assistant

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

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 2023)

Professor Usman Elahi

Teaching Assistant

- Assistant 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

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. See [Project Deliverables](#) | [Github](#).

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. See [Project Report](#) | [Github](#).

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. See [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. See [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. See [Project Report](#).

ACADEMIC DISTINCTIONS

- Ranked in the **top 9%** of LUMS SBASSE Batch (300+ students) of 2024
- Placed on **Dean's Honor List** (CGPA ≥ 3.60) for **2020-2021, 2021-2022, 2022-2023**
- Graduated with **Dean's Honour List** and **High Distinction** (CGPA ≥ 3.80)

TECHNICAL SKILLS

Languages: C++, Python, STATA, MATLAB, R, HTML/CSS**Programming Frameworks:** PyTorch, OpenCV, Shiny, Numpy, Pandas, HuggingFace, MONAI, Diffusers, Accelerate**Tools:** Linux, Git, Dropbox, L^AT_EX, Microsoft, VS Code, Google Colab, Jupyter Lab