

# AHMAD MAHMOOD

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## Website

**Nationality:** United States of America

**Date of Birth:** 2000-11-09

## Education

### ETH Zurich

*Masters in Computer Science*

Sep. 2023 – Present

*Zurich, Switzerland*

### Lahore University Of Management Sciences (LUMS)

*Bachelor of Science in Computer Science*

Sep. 2019 – May 2023

*Lahore, Pakistan*

## Research Publications

- **Ahmad Mahmood\***, Muzammal Naseer\*, Salman Khan, Fahad Khan, **Boosting Adversarial Transferability using Dynamic Cues** (*Accepted to the International Conference on Learning Representations (ICLR '23)*)
- **Ahmad Mahmood\***, Ashmal Vayani, Muzammal Naseer, Salman Khan, Fahad Shahbaz Khan, **VURF: A General-purpose Reasoning and Self-refinement Framework for Video Understanding** (*Accepted to the NeurIPS 2024 Workshop on Video-Language Models.*)
- Zuhao Liu, Aleksander Yanev, **Ahmad Mahmood**, Ivan Nikolov, Saman Motamed, Wei-Shi Zheng, Xi Wang, Luc Van Gool, Danda Pani Paudel, **InTraGen: Trajectory-controlled Video Generation for Object Interactions** (*Submitted to the International Conference on Computer Vision (ICCV 2025)*)

## Experience

### Disney Research

*Master's Thesis*

April 2025 –

*Zurich, Switzerland*

- Image/Video Deblurring and Super-resolution using Diffusion Models

### Institute for Computer Science, Artificial Intelligence and Technology

*Researcher*

April 2024 – December 2024

*Sofia, Bulgaria*

- Research Intern, Computer Vision department
- Conducted research on video generative diffusion models with trajectory-conditioned inputs.
- Co-authored a research paper submitted to ICCV
- Advisors: Dr. Danda Paudel, Dr. Luc Van Gool

### Mohamed bin Zayed University of Artificial Intelligence

*Research Assistant - Internship*

March 2022 – August 2022

*Abu Dhabi, UAE*

- Worked as a research assistant for the computer vision department.
- Research on utilizing temporal information through frozen image models to improve adversarial transferability from Image-to-Video models.
- Later, researched the topic of video understanding through Large Language Models. Applied the technique of Visual Programming to video understanding tasks via in-context LLM learning.
- Advisors: Dr. Salman Khan, Dr. Muzammal Naseer

### ETH Zurich

*Teaching Assistant*

September 2024 – Present

*Zurich, Switzerland*

- Assisting Dr. Michael Hoffman in the graduate level course, Algorithms Lab

### Lahore University of Management Sciences

*Student Researcher*

June 2022 – June 2023

*Lahore, Pakistan*

- Worked on exploring how the insights of the Central Limit Theorem could be used to achieve robust performance in Federated Learning tasks over non-IID data.
- Supervised by Dr Ihsan Ayyub Qazi, Dr Agha Ali Raza and Dr Zafar Ayyub Qazi

*Teaching Assistant*

*Lahore, Pakistan*

- Assisting Dr Agha Ali Raza in the graduate level course, CS 535: Machine Learning

## Personal Projects

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### Heart Rhythm Classification from Raw ECG signals | *Python, Pytorch, Numpy* | [Github](#) November 2024

- The project focuses on classifying entire time series of raw ECG signals into one of four classes
- The dataset comprises ECG recordings of varying lengths, sampled at 300Hz.
- Extracted features like PR intervals, QRS complex etc. using Neurokit2

### Adversarial Robustness Verification Using DeepPoly for Neural Networks November 2024

- Developed a verifier to analyze neural network robustness against adversarial perturbations using DeepPoly convex relaxation.
- Test and evaluate 17 pre-trained networks (MNIST and CIFAR10) to certify robustness.

### Backdoor Vulnerabilities in Communication-based Reinforcement Learning | *Python* March 2024

- Investigated the vulnerabilities of communication-based multi-agent reinforcement learning (MARL) systems to backdoor attacks
- By introducing a single malicious agent that sends deceptive messages, demonstrated how this disruption can propagate through the network, leading to suboptimal decision-making and degraded performance.

### Trigger word detection using RNN | *Python, Numpy, Tensorflow Keras, Jupyter* September 2021

- Implemented a bidirectional recurrent neural network using keras to detect trigger words in an audio file as part of the Sequence Models course on Coursera.
- Code not available on github due to coursera's honour code.
- Course certification available on Linkedin profile.

### Tic-Tac-Toe AI | *Python* May 2021

- Implemented the Min-Max algorithm to build an AI that plays the classic tic-tac-toe game against a person.
- Code available on github.

## Honors and Awards/Extracurricular

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### Top 6 Mathematicians in Pakistan, International Mathematics Olympiad

- Represented Pakistan in the **International Mathematics Olympiad (IMO)** 2019 held in Bath, UK.
- Shortlisted from a pool of around 2000+ participants through series of camps.

### Dean's Honour List

- The honor has been awarded to me in my first, second, and third year at LUMS, based on a cGPA of 3.85/4, 3.93/4, and 3.89/4 respectively.

### Invited Reviewer

- ACML 2022

### Competitive Programming

- **1st** place (Pakistan) in multiple Google Kickstart rounds.
- **2nd** place (LUMS) in one of Pakistan's largest programming contests conducted by IEEE LUMS Society, Codin' Guru 3.0

### Sports

- Member of the School Football Team throughout A'Levels.
- Former member of the LUMS Football Team.
- Received gold and silver medals in various Table Tennis competitions.

## Technical Skills

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**Programming:** Python, C/C++, HTML, CSS, Javascript, Haskell, LaTeX

**Frameworks:** Pytorch, NodeJS, ReactJS, ExpressJS, Flask

**Cloud Computing:** Amazon Web Services(AWS), DigitalOcean

**Version Control:** Git, Github

**Software:** CUDA, Jupyter, Google Colab, VS Code, Sublime Text

**Databases:** MySQL, PostgreSQL, MongoDB