Mohsin Shah

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Education

University of Massachusetts Amherst **GPA 3.96** Expected Graduation: Dec 2024

- **B.S. in Computer Science** (Artificial Intelligence Track) | Primary Major
- **B.S. in Mathematics** (Concentration: Data Science & Statistics) | Secondary Major

Skills

- **Programming Languages**: Python, Java, JavaScript, Julia, C, C#, MySQL, HTML, CSS
- **Frameworks**: Pytorch, Tensorflow, Keras, Scikit-learn, Pandas, NumPy, React, Next.js, Node, Express, Sequelize, Bootstrap, Tailwind
- **Technologies**: AWS RDS & AWS S3, Git, Hugging Face, Unity, PyGame
- **Courses**: Artificial Intelligence, Software Engineering, Computer Systems, Statistics, Linear Algebra, Discrete Math, Multivariable Calc, Data Structures and Algorithms, Ethics & Social Issues in Computing, Software Engineering Project Management
- **Languages**: English, Urdu, Pashto, Hindi

Experience

Artificial Intelligence Research Assistant under Professor Edward A. Rietman |BiNDS Lab| (Julia) Feb 2023 – Present

- Designed and studied applications and dynamics of reservoir computers built from oscillatory neural networks. These networks were composed of two-dimensional lattices formed by Nv-neurons constructed with Schmitt-triggers, capacitors, and resistors.
- Developed simulations to investigate how different tau modulation, capacitor values, and control nodes featuring various trigonometric and pulse train functions affect the limit cycles, ring saturations, and saturation histories of nervous neuron lattices.
- Visualized results by generating raster plots, difference of lattice output line graphs, and video heatmaps to efficiently showcase the evolution of saturation histories of lattices.

Deep Learning & NLP Research under Professor Jaime J. Dávila | Github | (Pytorch, Hugging Face) May 2023 – Present

- Compared various transformer based multimodal models such as BLIP, GIT, and our custom model built with BERT encodings, EfficientNet, and LSTMs to generate prompts given AI generated images.
- Created a custom dataset using python & selenium, scraping 1,000+ AI generated images and the prompts used to create them.

UMass Computer Science + Residential & Academic Peer Mentor Sep 2022 – Present

- Devised tailored academic success strategies for 200+ students in their transition to college through academic success mentoring.
- Collaborated with campus organizations to plan and execute events to foster a sense of community and boost engagement by 75%.

Volunteer AP Computer Science Principles Teaching Assistant Sep 2019 – June 2020

- Facilitated the understanding of core computer science concepts for 30+ students through effective communication and assistance.
- Ensured students' understanding of JavaScript by providing guidance in the development of apps and games via Code.org's App Lab.

Projects

Hack(H)er413 Hackathon Winner: Sign Language AI | signdecoder.com | (Python, OpenCV, Tensorflow, Teachable Machine)

- Employed deep learning and computer vision to develop American Sign Language to text translator.
- Led the creation of a custom dataset of 10,000+ images using computer vision algorithms to track and capture our hand gestures.
- Generated an AI model and then used it to classify various signs with over 87% accuracy.

ShareSpace: Roommate Finder Web App | Github | (JavaScript, React, Node, Express, MySQL, AWS RDS, AWS S3, MUI, Tailwind)

- Collaborated with a team of 10 to develop a full-stack web app that matches roommates based on their preferences, allowing matched users to chat and customize their profiles.
- Incorporated AWS RDS & AWS S3 to integrate a MySQL database and store user images to enhance data management security.
- Designed efficient routes and queries for frontend and backend to seamlessly interact with the database.
- Deployed the web app & enhanced the UI/UX by adding engaging animations, creating a dynamic and captivating platform.

Deep Learning Flappy Bird AI | Github Demo | (Python, NEAT, PyGame)

- Created Flappy Bird from scratch by applying OOP whilst simulating physics and collisions with Python and PyGame.
- Implemented the NeuroEvolution of Augmenting Topologies (NEAT) genetic algorithm with evolving artificial neural networks.
- Trained AI birds to be unbeatable by the 11th generation with only 3 inputs states from the environment.

COVID-19 Health Center Appointments Simulation | (C)

- Developed a semaphore based calling system to prevent concurrency issues, ensuring optimal system performance and reliability.
- Synchronized threads to enable multiple call operators to parallelly process 20+ callers with 100% success rate.
- Streamlined management and accountability by monitoring the status of each caller in real-time.

Activities

- **Vice President of the UMass Brazilian Jiu Jitsu Club** Sep 2021 – Present
- **Member of the UMass Machine Learning Club** Jan 2023 – Present
- **Member of the UMass Wrestling Club** Jan 2023 – Present
- Captain of Varsity Track and Field for high school Mar 2015 – June 2021
- Captain of Varsity Cross Country for high school Sep 2017 – Nov 2021