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)
- **B.S. in Mathematics** (Concentration: Data Science & Statistics) | Dual Degree

Experience

University of Massachusetts Amherst **May 2023 – Present**

Deep Learning & NLP Research Assistant | Professor Jaime J. Dávila | Github Code

- Compared various transformer based multimodal models such as BLIP, GIT, and our custom model built with BERT encodings, EfficientNet, and LSTMs with Pytorch 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.

BiNDS Lab **Feb 2023 – Present**

AI Research Assistant | Professor Edward A. Rietman

- Designed and studied applications and dynamics of reservoir computers built from oscillatory neural nets in Julia. 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.

University of Massachusetts Amherst

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%.

Blackstone-Millville Regional **Sep 2019 – June 2020**

AP Computer Science Principles Teaching Assistant

- 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)

- Awarded "Best Use of AI" by travelers.com for developing an American Sign Language translator using ML & computer vision.
- 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 Code | (JavaScript, React, Node, Express, MySQL, AWS (RDS, 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.

eBay: Machine Learning & Name Entity Recognition (NER) Competition | (Python, spaCy, Pandas, NumPy)

- Developed a 94% accurate NER model using 10 million raw eBay listings in German; effectively classifying each word.
- Enhanced the data quality and searchability of listings by analyzing and extracting key features with spaCy.
- Analyzed and preprocessed the raw, non-english dataset with Pandas; ultimately streamlining feature extraction and performance.

Deep Learning Flappy Bird AI with NEAT | 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.

Skills

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

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 Nov 2022 – Present
Member of the UMass Cyber Security Club Sep 2023 – Present