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

ML & NLP Research Intern   **May 2023 – Present**
Professor Jaime J. Dávila | University of Massachusetts Amherst | Github Code
• Analyzed transformer based multimodal models: BLIP, GIT, CLIP, and custom vision language model (VLM) with BERT (LLM) encodings, EfficientNet (CNN), and LSTMs with PyTorch (CUDA) to generate prompts of AI generated images, achieving a BLEU score of 68%.
• Created training and validation datasets for R&D using Python & Selenium, web scraping 1000+ AI generated images and prompts.

AI & RNN Research Intern   **Feb 2023 – Present**
Professor Edward A. Rietman | Biologically Inspired Neural and Dynamical Systems Lab
• Built simulations in Julia to study the applications and dynamics of oscillatory neural networks and increased efficiency by 60%.
• Designed algorithms to solve the ongoing challenge of recurrent neural network oversaturation; potentially applicable in robotics.
• Enhanced data visualization by generating over 1000 raster plots, difference of lattice output graphs, and video heatmaps; effectively visualizing the evolution of time series data.

Computer Science + Residential & Academic Peer Mentor   **Sep 2022 – Present**
University of Massachusetts Amherst
• 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%.

AP Computer Science Principles Teaching Assistant   **Sep 2019 – June 2020**
Blackstone-Millville Regional
• Facilitated the understanding of core computer science concepts for 30+ students through effective communication and assistance.
• Ensured understanding of JavaScript by providing software development guidance for over 150 apps and games.

Projects

Hack(H)er413 Hackathon Winner: Sign Language AI | signdecoder.com | (Python, OpenCV, Tensorflow, Google Teachable Machine)
• Awarded "Best Use of AI" by travelers.com for developing an American Sign Language translator using DL & computer vision (CV).
• Led the creation of a custom dataset of 10,000+ images using computer vision algorithms to track and capture our hand gestures.
• Generated a supervised learning ML model and then optimized it to classify various signs with over 83% accuracy.

eBay: Machine Learning & Name Entity Recognition (NER) Competition | (Python, spaCy, Pandas, NumPy, LLMs)
• Developed a 94% accurate NER model using 10 million raw eBay listings in German; effectively classifying each word.
• Enhanced quality and searchability of listings using data processing, data analytics, and natural language processing with spaCy.
• Conducted data analysis & data cleaning on raw, non-english dataset; streamlining feature extraction & validity for a F1 score of 87%.

Roommate Finder Web App | Github Code | (JavaScript, React, Node, Express, MySQL, AWS cloud (RDS, S3), MUI, Tailwind)
• Collaborated as a software engineer in a team of 10 to develop a full-stack web app that matches roommates based on their preferences, allowing matched users to go chat and customize their profiles.
• Incorporated Amazon web services to store 1000+ images & MySQL database; enhancing data management & security optimization.
• Implemented software testing to make over 45 routes & queries for frontend and backend to seamlessly interact with the database.
• Deployed the web app & API while enhancing the UI/UX with over 30 animations, creating a dynamic and captivating platform.

Deep Learning & Reinforcement Learning Flappy Bird AI | Github Demo | (Python, NEAT, PyGame)
• Created Flappy Bird (60 FPS) from scratch by applying OOP whilst simulating physics and collisions with Python and PyGame.
• Implemented the NEAT genetic algorithm with evolving artificial neural networks, outperforming 99% of humans.
• Trained the AI birds to be unbeatable by the 11th generation with only 3 inputs states from the environment.

Skills

Programming Languages: Python, Java, JavaScript, TypeScript, Julia, C, C++, C#, SQL, HTML, CSS
Frameworks: React, PyTorch, Tensorflow, Keras, spaCy, Next.js, Node.js, Express.js, Sequelize, Scikit-learn, Pandas, NumPy, Bootstrap
Tools: AWS RDS, AWS S3, Git, Hugging Face, Unity, PyGame, Matplotlib, Jupyter, Linux, Unix, GPU, Microsoft Excel, Agile, Scrum
Courses: Artificial Intelligence, Software Engineering, Data Structures and Algorithms, Computer Systems, Statistics, Linear Algebra, Discrete Math, Multivariable Calc, Ethics & Social Issues in Computing, Software Developer Project Management
Languages: English, Urdu, Pashto, Hindi

Activities

Member of the UMass Cyber Security Club	Sep 2023 – Present
Member of the UMass Machine Learning Club	Jan 2023 – Present
Member of the UMass Wrestling Club	Nov 2022 – Present
Vice President of the UMass Brazilian Jiu Jitsu Club	Sep 2021 – Present