# 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*

- Evaluated various transformer based multimodal models such as BLIP, GIT, CLIP, and our custom vision language model (VLM) built with BERT (LLM) encodings, EfficientNet (CNN), and LSTMs with PyTorch (CUDA) to generate prompts given AI generated images.
- 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 used it to classify various signs with over 87% accuracy.

**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 integrate a MySQL database and store user images; enhancing data management & security.
- 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 engaging animations, creating a dynamic and captivating platform.

**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 with Pandas; streamlining feature extraction and performance.

**Deep Learning & Reinforcement 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 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, 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