MUHAMMAD ISLAM
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Education

University of Maryland, College Park   **Cumulative GPA: 3.92**

Bachelors of Science in Computer Science - Data Science Track, Minor in Physics   *August 2022 - December 2025 (expected)*

- **Selected Coursework:** Introduction to Data Science, Introduction to Machine Learning, Introduction to Computer Vision

Research Experience

Independent Researcher   **College Park**

Advised by Prof. Abhinav Shrivastava   *June 2025 - present*

- Creating a more reliable evaluation technique to assess alignment of synthetically generated images with a given description.
- Generated 1,500 images using the T2I-R1 framework and the Commonsense-T2I benchmark.
- Labeled all 1,500 images using various strategies, such as by ranking examples and individually labeling them.
- Comparing multiple metrics - cross-correlation, mAP, and MRR - for assessing how each proposed evaluation technique performs relative to the ground-truth manual annotations.
- Using the BLIP captioning model to caption the images and compared several text-encoders - CLIP, BERT, T5 - for one of our evaluation techniques.
- Used Qwen-2.5 VLM models of various parameter sizes to evaluate, obtaining a cross-correlation score of 0.420.

Research Assistant   **College Park**

Advised by Prof. Tom Goldstein & Prof. Furong Huang   *August 2025 - present*

- Creating a programmatic, scalable data generation pipeline to create image, question examples of varying difficulty.
- Refining examples from several multimodal reasoning benchmarks, including MathVista and MATH-Vision.
- Comparing various VLMs and prompts to automatically create code and verify its effectiveness to scale the data.

Capstone Research Project   **College Park**

Advised by Tom Goldstein   *August 2024 - December 2024*

- Worked in a team to create a diverse dataset of business-specific system prompts containing context, system prompts, and output examples for training LLM models to comply with system prompts using Python and Gemini 1.5 Flash.
- Created a pipeline for generating adversarial examples, incorporating persona attacks and GCG attacks
- Generated over 2,000 examples of the final dataset.

Work Experience

ML Intern   **Remote**

St. Jude Children's Research Hospital   *June 2025 - August 2025*

- Explored several end-to-end pipelines for classifying tumors from over 1,000 2D cross-sectional MRI scans and their corresponding radiomics features.
- Trained and evaluated 3D-imaging-based ResNet Models on four-class and five-class classification, achieving an F-1 score of 0.90
- Trained and evaluated ResNet and MLP models on tabular radiomics data, achieving an F-1 score of 0.93
- Achieved an overall F1 of 0.95 and AUC of 0.98 by training a lightweight MLP on the hidden states of the imaging and radiomics models.
- Showed the imaging model demonstrates good localization of tumors by producing heatmaps of its intermediate activations using the LayerCAM algorithm

Undergraduate Teaching Assistant **College Park**

CMSC320: Introduction to Data Science *February 2024 - May 2024*

- Reviewed over 230 code submissions for each of four major Python-based data science projects.
- Developed and debugged Python scripts for web scraping, data processing, and analysis tasks using Selenium, Matplotlib, Beautiful Soup, and Pandas.
- Held troubleshooting sessions, guiding students in resolving code integration and system compatibility issues.

Projects

Foundational ML Projects

- Built **a neural network** with ReLU activations and implemented backpropagation for **MNIST digit recognition**
- Implemented and trained Decision Trees, K-Nearest Neighbors, and Perceptron in Python with Squared, Logistic, and Hinge losses, applying L2 regularization
- Implemented PCA to perform dimensionality reduction on high-dimensional image data

Fundamental Computer Vision Projects

- Implemented several computer vision techniques using Python, NumPy, OpenCV, and Matplotlib
- Built a Harris Corner Detector with non-maximum suppression for keypoint extraction from an image
- Implemented the Lucas-Kanade algorithm to compute the optical flow of keypoints across video frames

"Do we need more highly rated professors at UMD?" Tutorial

- Conducted exploratory data analysis using Python on 10,000+ rows of professor ratings, professor salary data, and other relevant factors.
- Utilized machine learning techniques, such as regression analysis or classification algorithms, to predict the likelihood of a course receiving high ratings based on various factors.
- Communicated key patterns found in the data through various data visualization charts such as scatterplots, heatmaps, and histograms using the Seaborn and Matplotlib libraries in Python.
- Conducted a hypothesis test using the statsmodel Python library to determine how salary and department correlate with professor ratings, providing insights into the potential benefits of recruiting more highly rated professors.

Awards

- Dean's List (Fall 2022–present)
- Computer Science Departmental Honors (Spring 2023–present)
- UMD Dean's Scholarship Award (Fall 2022)

Technical Skills

Languages: Python, C++, C, Java, Rust, Racket, OCaml, SQL, HTML, CSS

ML Libraries: PyTorch, OpenCV, NumPy, Scikit-learn, Matplotlib, Pandas, Seaborn

ML Algorithms/Models: *Unsupervised*—K-Means, PCA; *Self-Supervised*—Transformers, Diffusion Models; *Supervised*—KNN, Decision Trees, Naive Bayes, SVM, MLP, Neural Networks, CNN

Tools: Git, Docker, VS Code, Jupyter, IntelliJ, Figma