Muhiim Ali

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69 Brown Street, Box #6377, Providence RI

Education

Brown University **GPA: 4.0** **Providence** **Sep 2025—May 2026**
Pursuing Master of Science in Computer Science

Brown University **GPA: 3.85** **Providence** **Sep 2021—May 2025**
Degree Bachelor of Science in Computer Science
Courses Software Engineering, Deep Learning, Data Science, Essential Statistics, Computational Linguistics, Machine Learning, Applied Cryptography, Database Management Systems, Design + Implement Prog Langs.
Proficient in Python, Java, JavaScript, PyTorch, NumPy, Technical Writing, TensorFlow, SQLite, React.
Interests Educational Podcasts, Calisthenics, Running.

Experience

Brown's Conversational AI Lab **Research Assistant** **Providence** **May 2024—February 2025**

- Built DRIVE, a computer vision model improving CLIP-based relationship detection by 33.5% (text-to-image) and 24.8% (image-to-text), surpassing SOTA models like EVA-02 and SigLIP
- Engineered custom contrastive loss function for CLIP architecture significantly improving image-to-text performance while reducing computational costs across model comparisons
- Created CROCO and CROCO-D datasets for research advancement in relation inference tasks, focusing on distinguishing relational nuances ("fixes" vs "rides") and directional relationships; research currently under publication

Brown University – Department of Computer Science **Teaching Assistant** **Providence, RI** **Jan 2023 — Dec 2025**

- Served as a TA for **five semesters** across core CS courses: **Data Structures & Algorithms (2x), Data Science (1x), and Machine Learning (2x)**, supporting over **400 students** through labs, office hours, and EdStem discussions.
- Led the **Mosaic+ Summer Transition Program** as Head TA, designing and coordinating a **4-week Python pre-orientation** for **25+ incoming underrepresented students** and managing a team of 4 TAs.
- Redesigned and improved course assignments for clarity, rigor, and engagement; delivered detailed code reviews for student Python and Java submissions.

Projects

Secure Multi-Candidate Voting System **Applied Cryptography, Zero-Knowledge Proofs** **Systems & Security** **April 2025—May 2025**

- Generalized an ElGamal-based voting protocol from a 2-candidate design to full *k-of-t* elections by encoding ballots as vectors of encrypted bits, enabling per-candidate privacy and homomorphic tallying.
- Developed zero-knowledge proofs—including a sum-constraint proof enforcing exactly *k* selections and correctness proofs for threshold decryption shares—to guarantee ballot validity, verifiability, and secure partial decryption.
- Revamped adjudication and verification pipelines to operate over ciphertext vectors and performed end-to-end benchmarks demonstrating correct tallying, robustness, and strong voter-privacy preservation (evaluated on *t=5, k=3*).

BERT Question-Answering System **Python, Pytorch, Cuda, NLP** **Comp. Linguistics** **Nov 2024—Dec 2024**

- Reimplemented the "BERT for Question Answering" paper, surpassing the baseline metrics on short answer dev performance (P: 61.3% vs 59.5%, R: 47.9% vs 47.3%, F1: 53.8% vs 52.7%)
- Used Weights & Biases (WandB) for hyperparameter optimization and experiment tracking, achieving superior performance with minimal training epochs
- Implemented distributed training across multiple GPUs using PyTorch's DistributedDataParallel, reducing training time from 40 minutes to under 15 minutes

Craigslist Item Price Predictor **Python, ML, Web Scraping** **Data Science** **Apr 2024—May 2024**

- Developed a machine learning pipeline to predict second-hand item prices on Craigslist, leveraging VGG16 for image processing and spaCy for text embeddings, resulting in a model that explains 35% of price variance across 3,200+ listings
- Assisted in building and deploying a comprehensive web scraping system to collect Providence Craigslist data, including images, titles, prices, and location data across multiple categories over a 4-day period
- Improved model performance by 27% through implementation of Gradient Boosting Regression and strategic incorporation of location data, reducing median RMSE from 262.70 to 0.99