

Shobhit Mehrotra

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EDUCATION

University of Massachusetts Amherst

Bachelor of Science, Computer Science — GPA: 3.85

- Relevant Coursework: Data Structures and Algorithms, Statistics, Machine Learning, Linear Algebra, Calculus, Computer Systems, Quantum Information Science, Information Retrieval, Databases, Reverse Engineering

SKILLS

Languages: Python, C, Java, JavaScript, SQL, HTML, CSS, Julia, Dart

Frameworks & Libraries: React, Tailwind, Flask, Node, Express, TensorFlow, Keras, Scikit-learn, Pandas, NumPy, CUDA, Qiskit, Matplotlib, Music21, Seaborn

Tools & Methodologies: Agile, Git, Docker, Kubernetes, RESTful APIs, Firebase, Google Cloud Platform, AWS, Figma

Honors and Awards: Wolfram Alpha Letter Award, Best Sustainability Hack, Chancellor's Scholar, Dean's List

EXPERIENCE

UMass Krastanov Lab, Amherst, MA

October 2024 - Present

Research and Software Development Engineer

- Developed a Julia package for efficient pathfinding in quantum repeater networks to optimize entanglement sharing
- Conducted research on algorithms to evaluate entanglement fidelity under decoherence and attenuation in networks
- Constructed optimized CUDA kernels for HPC to accelerate Monte Carlo sampling and maximize processing speed

National Center for Technology and Dispute Resolution, Amherst, MA

February 2024 - Present

Software Engineer

- Built a mobile disaster relief app intended for over 100,000 first responders, utilizing Firebase and Flutter
- Designed a cloud based backend using Google Cloud Platform for securely storing user data and handling user auth
- Integrated offline first capabilities with local caching and sync strategies to ensure functionality in low connectivity

UMass Theory Group, Amherst, MA

May 2024 - August 2024

Undergraduate Researcher

- Collaborated with a team of 3 and a PhD mentor to research linear separability on Boolean SAT formulas
- Formulated the problem as a minimum covering ball problem and compared results with linear programming and convex hull methods, achieving a 92% increase in runtime and algorithmic complexity for high dimensions
- Achieved a 95% accuracy in evaluating linear separability using SVM techniques on 10+ benchmark datasets

PROJECTS

ImprovAI | TensorFlow, Python, JavaScript, React, Flask, Music21, SQL

- Developed a jazz improvisation platform using a TensorFlow Keras LSTM model for time series note prediction, achieving 90% accuracy through hyperparameter optimization like learning rate decay and temperature scaling
- Formulated a data pipeline using Music21 to process 50,000+ musical lines, leveraging note tokenization, sequence encoding, and batched data augmentation, resulting in a 45% improvement in model training and generation

RetrievalT | Python, Matplotlib, Numpy

- Engineered a search engine by optimizing web crawling, tokenization, and indexing to improve data retrieval
- Implemented and evaluated L2R and probabilistic retrieval models (BM25, Word2Vec, QL, etc) in NLP, optimizing performance by 45% while using metrics like NDCG, F1 score, and Zipf's law to assess quality of retrieved webpages

BetIt | Python, JavaScript, React, Flask, OpenAI, AWS, Firebase

- Designed a productivity platform using OpenAI API for text generation/verification and AWS Rekognition for labeling
- Created a RESTful API with Flask to connect the React frontend to Firebase for data storage and retrieval

LEADERSHIP & COMMUNITY INVOLVEMENT

BUILD UMass, Amherst, MA

February 2024 - Present

Software Developer

- Attended weekly team meetings, stand-ups, and client discussions to ensure alignment with project deliverables
- Worked with product managers to refine requirements, interview candidates, and gather client feedback

UMass Jazz Band, Amherst, MA

September 2023 - Present

Trumpeter

- Performed in jazz combo and big band, playing at local venues, UMass dining halls, and special events
- Engaged in weekly rehearsals and studied chord progressions, scales, and jazz standards for improvisation