Mustafa Mannan

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EDUCATION

University of South Florida — Tampa, FL
Bachelor of Engineering in Computer Science — *Expected Graduation Date: May 2025*

- Relevant Coursework: Programming Concepts, Data Structures, Program Design, Discrete Mathematics, Automata Theory, Linear Algebra, Analysis of Algorithms, Software Engineering, Operating systems, Database Design, Compilers, Statistics

TECHNICAL SKILLS

Languages: Python, C/C++, C#, JavaScript, SQL
Frameworks/Tools: React.js, Angular.js, Django, PyTorch, Scikit-learn, TensorFlow, Keras, Git, Docker, Kubernetes
ML Skills: Deep Learning, Model Training & Validation, Machine Learning Techniques & Algorithms, Neural Network Stability Optimization, Pipeline Automation, Simulation, Model Evaluation & Optimization, Data Pre-processing, Feature Engineering, Statistical Modeling
Software Skills: Database Design, Data Modeling, API Integration and Design, iOS/Android Development, Frontend Development, Authentication Security, Data Analysis, Data Visualization, Data Extraction, Transformation
Databases: PostgreSQL, Firebase, NoSQL, MySQL, Redis
Cloud: AWS Stack (EC2, RDS, S3, Elastic Beanstalk, Lambda), GCP Stack (CE, CSQL, GCS, GAE, GCF)

EXPERIENCE

AI/ML Research Assistant — May 2024 – Present
TKAI Research Lab — *Tampa, FL*

- **Developing 4 novel recurrent architectures** inspired by automata theory and designed for Lyapunov stability, addressing longstanding issues of learnability and stability in neural networks to enhance performance and generalization.
- Achieved 99.8% accuracy in predicting various context-free languages using LSTMs by optimizing hyperparameters and improving long-term dependency handling, demonstrating model effectiveness at capturing hierarchical patterns in CFLs.
- Optimized Memory Augmented RNNs through activation function visualization, increasing push/pop prediction accuracy and model stability by 10% each.
- Developed a visualization framework for Stack RNNs, enabling real-time monitoring of CFL sequence processing and reducing analysis time by 30%, driving insights that enhanced efficiency and system transparency.

Co-Founder & Lead Developer — December 2023 – Present
Jamaa — *Tampa, FL*

- Spearheaded development of a cross-platform mobile app using React Native and Django.
- Engineered backend with Redis caching and optimized PostgreSQL queries, reducing server load times by 50%.
- Designed and implemented an algorithm to display nearby mosques and events, cutting average response time from 200ms to 65ms.
- Deployed the app using AWS Elastic Beanstalk with Docker, ensuring 99.9% uptime.
- Built 25+ RESTful APIs and implemented JWT authentication with role-based access control.
- Fine-tuned an AI model to automate the verification of mosque credentials and prayer time schedules from uploaded images, enhancing system integrity and preventing fraudulent sign-ups, resulting in a 60% reduction in manual review efforts and increased user trust.

PROJECTS

Lugha - Hackathon Project | *Fastapi, PostgreSQL, RDS* — September 2024 – September 2024

- Built a language learning app with 300+ interactive lessons and quizzes to provide users with structured learning, improving language retention and foundational skills.
- Developed real-time AI voice conversation functionality for 5+ Languages with situational prompts, enabling users to practice speaking in a low-pressure environment, enhancing fluency and confidence.
- Devised and executed a ranking and recommendation system using a max-heap, priority queue, and Redis, enabling anonymous voice calls between users of similar proficiency and fostering long-term language practice with a friend-adding feature.

Additional Projects: See more at mannanmustafa.com. Notable projects include Soccer Analysis: A Machine Learning Approach and Financial Fraud Detection with GNNs.

LEADERSHIP & EXTRA-CURRICULARS

USF NSBE | *Professional Development Chair* — March 2024 – Present

- Spearheaded a hands-on project for USF NSBE members, teaching Git, web development, and deployment, resulting in the organization's website and enhanced skills for 10 participants.
- Led resume workshops, mock interviews, and a Conference Prep event with sponsors like Honeywell, Duke Energy, GE, and Citi, fostering job readiness and professional growth for over 60 members while connecting 150+ students with industry professionals for meaningful networking opportunities.