Michael Elrod

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Skills

Languages & Frameworks: Python, C/C++, Java, SQL, JavaScript, TypeScript, React, Next.js, Flutter, HTML/CSS, Tailwind

Machine Learning & Data: PyTorch, Deep Learning, Classification, Regression, Computer Vision, MySQL, PostgreSQL, DynamoDB

Development Tools: Windows, Linux, AWS, Docker, Git, Agile, Scrum, Jira, Confluence

Education

Clemson University, *Master of Science in Computer Science* *Aug 2023 – May 2025*

- Coursework: Machine Learning, Data Mining, Cyber Security, Malware Reverse Engineering

Clemson University, *Bachelor of Science in Computer Science* *Aug 2020 – May 2024*

- Coursework: Software Engineering, Cloud Architecture, Database Management, DevOps

Experience

Full-Stack Software Engineer, *Independence County Contracting* *Aug 2024 – current*

- Led end-to-end development as sole engineer, directly engaging with clients to gather and refine requirements for a project management web application
- Architected and deployed a full-stack solution serving 100+ daily users, optimizing cost-efficiency through strategic client-side rendering with Next.js and AWS RDS with MySQL
- Built and engineered robust cloud infrastructure using AWS Amplify for CI/CD, achieving reliable uptime while maintaining low operational costs

Machine Learning Engineer - Intern, *Naval Information Warfare Center (Pacific)* *Oct 2024 – current*

- Worked in a collaborative environment to research and propose a machine learning solution to dynamically locate and decode unique QR codes for the purpose of measuring atmospheric turbulence from images
- Developed the proposed solution using a mixture of predefined ML models and python libraries such as QReader, OpenCV and YOLO, a real-time object detection framework

Machine Learning Engineer - Intern, *MIT Lincoln Laboratory* *May 2024 – Aug 2024*

- Researched and developed a graph neural network solution that demonstrated a 25% performance improvement over standard DQN approaches for multi-agent path planning, leveraging inherent message-passing capabilities for enhanced UAV collaboration
- Accelerated training process by 2x through parallel computing implementation at the Lincoln Laboratory Super-computing Center (LLSC), efficiently decoupling agent experiences

Graduate AI Researcher, *Clemson University* *Aug 2023 – current*

- Researched and implemented the conversion of a traditional mathematical solution for drone swarm plant pollination to a deep reinforcement learning approach by combining graph neural networks and deep q-learning using Python & PyTorch to facilitate communication between drones with limited fields of view
- Worked with other student researchers to engineer the architecture in a collaborative lab environment

Full-Stack Software Engineer, *Naval Information Warfare Center (Atlantic)* *Jan 2023 – Dec 2023*

- Led collaboration with the Blue Ridge Innovation Foundation to develop a STEM-focused educational mobile app as part of the NIWC STEM Outreach Program
- Engineered the RESTful API using TypeScript with Docker for local hosting, and implemented the Flutter-based frontend with integrated API endpoints
- Deployed the solution on AWS and managed the development workflow using Figma for collaborative design

Software Engineer - Intern, *BlueCross BlueShield of SC* *May 2023 – Aug 2023*

- Engineered an autonomous database cleaning tool to identify and remove unused objects from the department's database, resulting in a 12% reduction in storage usage using Python & Selenium
- Collaborated with cross-functional teams to implement new features for client contact centers using Java, Python, and other proprietary software

Selected Projects

Neural Networks for Classification & Path Finding *2023 – 2024*

- Implemented Graph Neural Networks for agent communication, reducing decision-making latency by 20% compared to centralized approaches
- Developed a multi-agent DQN system achieving 85% success rate in complex path-finding tasks using PyTorch and OpenAI Gymnasium
- Built and compared performance of various ML models (SVM, logistic regression, K-means) on real-world datasets, achieving 92% accuracy in data segmentation
- Engineered a CNN-DQN comparative study for rapid image classification, demonstrating CNN's improved accuracy and faster inference time over traditional DQN approaches
- Tools: Python, PyTorch, Scikit-learn, Parallel Computing

Cloud Certification & Architecture Through Amazon Web Services *2023 – 2024*

- Foundational Cloud Practitioner Certified
- Implemented auto-scaling infrastructure using AWS Lambda and DynamoDB, maintaining response times under 100ms
- Designed CI/CD pipeline with AWS Amplify, achieving zero-downtime deployments
- Tools: AWS (Lambda, RDS, DynamoDB, EC2, S3, CloudWatch, Amplify)

Full-Stack Database Management System *2022 – 2024*

- Developed a Next.js project management platform with optimized MySQL database queries handling 100+ daily users
- Integrated Flutter mobile app with TypeScript backend, implementing secure authentication and real-time data updates
- Architected a serverless food ordering system using AWS Lambda functions and API Gateway, implementing RESTful endpoints defined in YAML with comprehensive Postman testing
- Tools: Postman, JavaScript, TypeScript, MySQL, DynamoDB, AWS (Lambda, API Gateway)

High-Performance Game Engine Architecture *2021 – 2022*

- Engineered two complete game engines from scratch in C++ and Python, implementing core systems including physics, rendering, and entity management
- Optimized memory management and frame processing achieving consistent 60+ FPS with 200+ simultaneous entities
- Designed flexible component-based architecture allowing runtime behavior modification through observer pattern implementation
- Utilized cross-validation, feature scaling, and polynomial feature generation for robust model evaluation
- Tools: C++, Python, SDL2, Pygame, Design Patterns (Observer, Component, Factory)