Nathan Samson
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EDUCATION

University of Maryland Baltimore County — Baltimore, MD
Bachelor of Computer Science — Expected May 2026
Relevant Coursework: CMSC201(Python), CMSC201(C++), Calc 1, Calc 2, Discrete Math — 3.5 GPA

TECHNICAL SKILLS

Languages: Python, C++, Java, JavaScript, Java, SQL
Technologies: TensorFlow, scikit-learn, Flask, TSDB, MQTT, Git, PyTorch
Concepts: Machine Learning, Natural Language Processing, Data Preprocessing, IoT, REST APIs, Compiler Theory

WORK EXPERIENCE

UMBC — Baltimore, MD
Research Assistant — Aug 2023 – Now

- Collaborated within the DAMS research lab(https://damslabumbc.github.io/), specializing in IoT, where I actively engaged with IoT devices and systems while developing code to extract valuable insights from sensor data.
- Developed algorithms for IoT device data analysis, focusing on occupancy detection, and environmental monitoring.
- Designed server infrastructure on cloud platforms, managed databases (SQL and INFLUXDB),Utilized MQTT broker (EMQX) for communication between lidar sensor and implemented RESTful APIs for seamless data access.
- Leveraged the SARIMA (Seasonal AutoRegressive Integrated Moving Average) algorithm to predict future trends and patterns in sensor data, significantly enhancing the lab's capability to forecast occupancy levels and environmental conditions and inform proactive decision-making in IoT environments.

PROJECTS

YouTube Comments Extraction and Sentiment Analysis Project
Skills: Python, Natural Language Processing (NLP), Machine Learning, Data Preprocessing, API usage, Text Analytics

- A Python-based project, where i harnessed the YouTube Data API to fetch comments from videos for sentiment analysis, applying NLP techniques and machine learning models via TensorFlow and scikit-learn. This process effectively categorized comments by sentiment, providing content creators with valuable insights into audience perceptions through a user-friendly interface, thereby assisting in content optimization.

SMART Campus
Skills: Python, SQL, IoT, Data Architecture, Machine learning, Data Structures, Algorithms, API development, InfluxDB, Flask, REST APIS, Real-Time Data Pipeline Development, HTTP Communication Protocols, EMQX, MQTT, Git

- Currently working on a project to make a Smart Campus. focusing on real-time space availability using IoT sensors. Responsibilities include database management, algorithm implementation, and API development, showcasing proficiency in Python, SQL, and data architecture.

Advanced Connect4 AI with Reinforcement Learning
Skills: Python, PyTorch, Reinforcement Learning, Neural Networks, Flask, API Development, Noisy Nets, Prioritized Experience Replay, Dueling Network Architecture

- In this project, I developed an AI for playing Connect4, employing advanced Reinforcement Learning techniques including Distributional Dueling Networks, Noisy Nets, and Prioritized Experience Replay, all built with PyTorch. The AI was integrated into a custom game environment and connected to a real-time interface via a Flask API. The setup, optimized for CUDA-enabled GPUs, allowed for efficient training and evaluation. Performance metrics were closely monitored using TensorBoard, facilitating fine-tuning of the neural network. Additionally, opponent modeling was implemented to enhance the AI's adaptability against various strategies, significantly improving its performance against both conventional algorithms and human players.

LEADERSHIP EXPERIENCES/SOCIETIES

BOYS AND GIRLS CLUB

- Volunteered as an after-school mentor, assisting with homework, organizing games, and creating a positive environment that enhanced self-esteem and confidence in kids.
- Active participant in club activities, including competitions, outings, and local community volunteering, fulfilling my passion for making a positive impact on children's lives.

Societies/Clubs

- EESA (Ethiopian Eritrean Student Association)
- NSBE
- Software Development and Administration Club