Marcus Yearwood

Durham, North Carolina
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Technical Skills

Languages: R, Java, Python, C, JavaScript, HTML, CSS, Assembly, SQL, XML, JSON, Bash
Technologies: Git, Node.js, BeatifulSoup, Tensorflow, PyTorch, Numpy, Pandas, React, Flask, Django, Langchain, HuggingFace, Sklearn

Education

Duke University **August 2022 – May 2026**
B.S in Computer Science, B.A in Mathematics, Minor in Statistics *Durham, North Carolina*
- GPA: 3.95 / 4.0

Relevant Coursework
- Intro to NLP (A+), Elements of Machine Learning (A+), Intro to AI (A), Design/Analysis of Algorithms (A), Data Structures and Algorithms (A), Linear Algebra (A), Intro to Computer Systems (A), Everything Data (A), Probability (A), Intro to Data Science (A-)

Projects

NLP Information Retrieval Model Combining Sparse and Dense Representations | *Python, PyTorch* **May 2024**
- Achieved the highest recall rate (.752) in a graduate level course by implementing an dense attention based cross-encoder architecture ensembled with a TF-IDF encoder to represent sparse information.

PDF to Quizzes | *JavaScript, Python, OpenAI, Pinecone, Langchain, Flask, React* **May 2023 - June 2023**
- Successfully developed a full-stack web application that dynamically generates test questions from PDF documents by leading a team of 3 students and integrating OCR technology, LLMs, and Retrieval Augmented Generation, utilizing a React frontend and Flask backend.

Predictive Modeling and Analysis of NC Voting Trends | *Git, Numpy, Matplotlib, Sklearn* **December 2022**
- Worked in a group of 4 to developed a comprehensive report on NC voting trends by building predictive models and conducting exploratory data analysis on election, economic, and health datasets in Python, revealing key insights into county-level voting behaviors.

Volunteer Management System | *JavaScript, React, Bootstrap, CSS, NodeJS* **March 2022 - August 2022**
- Engineered a secure, full-stack web application in a team of 3, utilizing React for the frontend and Node.js for the backend to streamline volunteer data management for a mid-sized non-profit organization, with robust role-based authentication for efficient logging and tracking

HackDuke Prize Winner - Amazon Carbon Footprint Chrome Extension | *JavaScript, Git* **October 2022**
- Competed with 5 other teammates in a 24 hour programming sprint to develop a Amazon product carbon emissions estimator winning an $800 prize for our innovative use of Checkbook API

Sanctuary Village Intern | *Web Design, Project Management* **September 2021 – February 2022**
- Enhanced the credibility and outreach of the non-profit by designing and launching a user-friendly website, improving donor engagement and communication through regular updates and strategic content management.

Experience

Duke NLP Lab **August 2024 – Present**
Research Assistant *Durham, North Carolina*
- Engineered and deployed large-scale vision-language models (VLMs) across distributed GPU clusters in containerized Linux environments.
- Achieved precise reproduction of benchmarking and adversarial results, leveraging quantization and model parallelism to accelerate inference and training efficiency.
- Led the design and execution of experiments using state-of-the-art adversarial attacks on large VLMs, resulting in a substantial degradation of model performance on mathematics benchmarks, showcasing vulnerabilities and identifying areas for improvement.

Duke University Department of Computer Science **August 2023 – Present**
Undergraduate Teaching Assistant for Intro to Computer Systems *Durham, North Carolina*
- Led weekly recitations for up to 30 students, driving engagement through presentations and interactive sessions on advanced topics like x86-64 Assembly, race conditions, and data representation.
- Delivered targeted one-on-one support to 20+ students, aiding in debugging complex C programs and demystifying key concepts like containerization, memory management, compilation, and multi-threading.

Collaborative AI **November 2023 – August 2024**
Research Assistant *Durham, North Carolina*
- Advanced our team's domain knowledge by conducting a wide breadth of in-depth literature reviews on over 20 research papers, focusing on Deep Voice Conversion architectures utilizing Loss Alignment, Diffusion, BERT-style Encoders, and Vector Quantization.
- Significantly advanced our capabilities by integrating multiple audio datasets and model architectures, including Diffusion Models and Variational Autoencoders (VAEs) into the existing research pipeline for experimentation.

Skills & Interests

Software: Microsoft Suite, Wix, Google Suite & Colab, Adobe Suite
Interests: Archery, Gaming, Running, Lifting, World History