Pearl Natalia

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Technical Skills

Languages: Python, C/C++, Javascript/TypeScript, SQL (Postgres), HTML/CSS, Java, XML
Tools: Google Cloud, AWS, Jupyter/Collab Notebooks, Mapbox, Figma, Linux, Android Studio, Git, WordPress, Jira
Frameworks: Flask, Django, Bootstrap, React, PostgreSQL
ML Libraries: NumPy, Pandas, TensorFlow, OpenCV, Matplotlib, SciKit Learn, Transformers, PyTorch

Projects

Mathematical OCR | *OpenCV, NumPy, TensorFlow, Matplotlib, Keras, PIL*
- Built a **CNN from scratch** to convert images into evaluable mathematical expressions, trained on thousands of images for digit and symbol recognition
- Preprocessed images using color thresholing, dilation, and interpolation to improve model accuracy
- Developed an **image segmentation algorithm** to extract equation terms using OpenCV's contour detection

AI-Powered Dash Cam | *Numpy, HERE Maps, OpenCV, Pandas, SciKit Learn, React, SQLite, YOLOv8, Roboflow*
- Built **geolocation processing algorithms** to detect vehicle speeds, turns, violations, and nearby traffic cameras
- Implemented real-time traffic light and road sign detection from live dashcam footage using **YOLOv8**
- Improved accuracy of a **CNN model** via relative positioning, color masking, and Hough transformations
- Created a full-stack React platform to display real-time footage, driving metrics, road violation warnings

AR Networking Glasses | *PostgreSQL, Mediapipe, Fusion 360, HTML/CSS, Unity*
- Engineered an **augmented reality (AR) headset with hand tracking** using Fusion 360 and Mediapipe
- Designed an AR environment to display resumes via QR code scanning, executed with a Unity script
- Built a full-stack platform with an **SQL database** to send real-time user information to the AR environment

AI Wearable for SOS | *Gemini Flash API, Raspberry Pi, Hume AI, Mapbox, Tensorflow, React, Flask*
- Built a keypad-triggered SOS device with a Raspberry Pi to capture video and audio recording via a flask
- Developed a **CNN-based audio classification model** using spectrograms to filter audio files before sent to **Hume AI** for emotional analysis
- Generated contextual **summaries of video frames via Gemini Flash**, prompting it to highlight critical threats
- Integrated real-time emergency updates on Mapbox and automated calls to 911 for quicker response times

Experience

Machine Learning Engineer August 2024 – Present
Mimrr *Waterloo, ON*
- Improving **LLaMA's text generation** accuracy by integrating outlines for more structured and desired outputs
- Generating a code reference graph with **Neo4J** for Mimrr's web app codebase

IT Developer Intern May 2024 – August 2024
Generis Global Partners *Toronto, ON*
- Automated data cleansing via a full-stack platform using **embeddings from Open AI's CLIP Model**, web scraping, and Python scripting, **saving 20 hours/week**
- Created a **Chrome extension** for email parsing and component generation with a Flask hosted on Render, **accelerating website updates by 73%**
- Rebuilt 15 websites to **increase website traffic and SEO by 35%** using Google Analytics

Programming Instructor June 2022 – September 2023
Code Ninjas *Toronto, ON*
- Instructed **game development** with JavaScript and Scratch to 90+ students ages 4-14
- Conducted workshops and developed projects with Arduino, Makeblock and Makecode
- **Expanded junior program by 37%** through redesigning a children's programming curriculum

Education

The University of Waterloo September 2023 - Present
Bachelor of Software Engineering (BSE) *Waterloo, ON*
- Courses: Programming Principles (C), Data Structures and OOP (C++), Digital Circuits & Systems (VHDL)