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, Jira
Frameworks: Flask, Django, Bootstrap, React, PostgreSQL
ML Libraries: NumPy, Pandas, TensorFlow, OpenCV, Matplotlib, SciKit Learn, Transformers, PyTorch

Projects

AI-Powered Dash Cam | *Numpy, HERE Maps, OpenCV, Pandas, SciKit Learn, React, SQLite, YOLOv8*

- 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 **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

Robotic Rover | *RobotC, PostgreSQL, EV3, Ultrasonic/Light Sensors, Python, Distance Matrix API*

- Contructed a robotic rover with **RobotC** and ultrasonic sensors to automate food packaging assembly
- Crafted a **Python algorithm** using a **distance matrix API** to optimize delivery routes for food package drop off
- Implemented a website to retrieve real-time locations of volunteers via **query requests** to assign delivery routes
- Developed a **colour sorting algorithm** with an EV3 Colour Sensor to prevent duplicate package selection

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 terms form equations using OpenCV's contour detection

AI Wearable for SOS | *Raspberry Pi, Hume AI, Gemini, Mapbox, Tensorflow, React, Flask*

- Built a keypad-triggered SOS device with a Raspberry Pi to capture video and audio recording via a flask
- Created an **audio classification CNN model with spectrograms** to fine-tune Hume AI for emotional analysis
- Generated **contextual summaries** of location, emotional analysis, and key features identified in video frames
- Integrated real-time emergency updates on MapBox and automated calls to 911 for quicker response times

Experience

IT Developer Intern May 2024 – Present
Generis Global Partners *Toronto, ON*

- Automated data cleansing via a full-stack platform using **embeddings, web scraping, and Python scripting**, saving 20 hours/week
- Created a **Chrome extension** for email parsing and component generation with **Flask, JavaScript, and Python**, 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)