Pearl Natalia

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Technical Skills

Languages: Python, C/C++, Javascript/TypeScript, SQL (Postgres), HTML/CSS, Java, XML, Assembly
Tools: Google Cloud, AWS, Jupyter Notebooks, Figma, Linux, Android Studio, Git, WordPress, Jira, Docker, MondoDB
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*
- Created a **CNN from scratch** to solve math expressions from images, trained on thousands of samples
- Preprocessed images using color thresholding, 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

AI Wearable for SOS ⬈ | *MondoDB, 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
- Generated contextual **summaries of video frames via Gemini Flash**, prompting it to highlight critical threats
- Integrated real-time emergency updates on Mapbox with MondoDB and automated 911 calls for quicker responses
- Developed a **CNN-based audio classification model** with spectrograms to pre-filter files sent to **Hume AI** for emotional analysis

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

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 **CLIP embeddings**, web scraping, Google Sheets API, and a Flask, **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 and **MySQL**

Programming Instructor   June 2022 – September 2023
Code Ninjas   *Toronto, ON*
- Instructed **programming concepts** and game development with Python and JavaScript to 90+ students
- Conducted software development workshops with Arduino, Makeblock, and Makecode
- **Expanded Code Ninja's program by 37%** through redesigning the 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 Computers (Assembly)
- Other: Autonomous Software Engineer at Watonomous (Self-Driving Car Design Team)