

# Pearl Natalia

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## Technical Skills

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**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

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**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 thresholding, dilation, and interpolation to improve model accuracy
- Developed an **image segmentation algorithm** to extract terms from equations using OpenCV's contour detection

**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

**AR Networking Glasses** [↗](#) | *PostgreSQL, Mediapipe, Fushion 360, HTML/CSS, Unity*

- Engineered an **augmented reality (AR) headset** with hand tracking using **Fushion 360 and Mediapipe**
- Designed an AR environment to display resumes via **QR code scanning**, executed with a **C# 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** [↗](#) | *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

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**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, 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

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**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)