Olivia Markham

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Education

University of Waterloo Waterloo, ON

Bachelor of Science in Mechatronics Engineering. GPA: 3.7/4.0 *Sep. 2022 – Apr. 2027*

- Relevant courses: Algorithms and Data Structures(C++), Digital Computation, Circuits, Linear Algebra, Calculus
- Clubs: WARG(Drone team), WatAI, Data Science Club
- Google Computer Science Research Mentorship Program Scholar (2023)

Experience

Computer Vision Machine Learning Research Assistant May 2023 – Present

Vision and Image Processing Lab- University of Waterloo *Waterloo, ON*

- Developing accurate image captioning capabilities, food item segmentation, image generation, and NeRF 3D models, with the ultimate goal of enabling nutrition value estimation from a singular photograph of a plate.
- Researching and implementing computer vision and machine intelligence techniques, including Stable Diffusion, Segment Anything Model, GroundingDINO, Real Fusion, and Generative Object Compositing.
- Employing Python scripting and multi-GPU training to develop a sophisticated Stable Diffusion model, trained on 1 million+ image-caption pairs and fine-tuned with LoRA, achieving 100% accurate food generation.
- Collaborated on research paper for MADiMa 2023; "NutritionVerse: Empirical Study of Various Dietary Intake Estimation Approaches"

Machine Learning Researcher May 2023 – Present

WatAI *Waterloo, ON*

- Propelling the development of a real-time audio event detection network optimized for the Raspberry Pi 4 (RPI4) platform in home environments, leveraging Docker for seamless deployment of YAMNet and AST models
- Implemented cutting-edge techniques in feature engineering, Vision Transformers (ViT), and data augmentation to significantly enhance model performance.

Autonomy Team Developper Dec. 2022 – Present

Waterloo Aerial Robotics Group (WARG) *Waterloo, ON*

- Troubleshot MAVLINK integration with Mission Planner, enabling QR code scanning for mission points and uploading waypoints to the drone for autonomous flight.
- Resolved camera hue issue, enhancing image quality, and implemented an efficient logging system for streamlined diagnostics and troubleshooting.

Diffusion Reading Group Member Dec. 2022 – Present

Vision and Image Processing Lab- University of Waterloo *Waterloo, ON*

- Engaging in technical discussions and presenting research papers on diverse topics, including object detection, vision-language models, text-to-image generation, 3D reconstruction, synthetic image detection, and Neural Radiance Fields (NeRF).

Projects

Chess Engine | *C++, SDL2* Jul. 2023 - Present

- Spearheading the development of a sophisticated chess engine featuring SDL2 graphics, expertly implementing all standard chess rules, including castling, promotion, and en passant.
- Leverageing the Alpha-Beta Minimax algorithm and evaluation function for intelligent move selection, demonstrating strategic decision-making, remarkable efficiency, and successful passing of perft tests

Skim-Literature | *Python, TensorFlow, SciKit-Learn* Feb. 2023 - Mar. 2023

- Optimized an NLP model for classifying abstract sentences, enabling efficient literature skimming for researchers.
- Utilized transfer learning with pre-trained embeddings and deep learning techniques, achieving an accuracy increase from 78% to 85%.

Technical Skills

Languages: Python, C++, C, Java, SQL, HTML/CSS
Libraries: TensorFlow, PyTorch, Keras, Pandas, NumPy, OpenCV, Matplotlib, Pygame, SciKit-Learn
Developer Tools: Git, Linux, Docker, AWS, Windows OS, Bash, CUDA, LaTeX