JOEY QUINLAN

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EDUCATION

University of Alberta Sept. 2020 – Dec. 2024
Honors Computing Science, BSc ***Cumulative GPA**: 4.0/4.0*
Relevant Coursework: OS, Algorithms, DB Management, Numerical Methods, Machine Learning, Robotics

WORK EXPERIENCE

NSERC Undergraduate Research Assistant May 2023 – Aug. 2023
University of Alberta *Edmonton, AB*

- Built a video processing algorithm capable of detecting and tracking 15 classes of vehicles, reducing manual data extraction time by 75% (code)
- Fine-tuned **yolov8** and **rt-detr** object detection models and used **MLFlow** to ensure experiment reproducibility
- Implemented a closed-loop active learning pipeline utilizing **Roboflow**, alleviating an unbalanced data set and cutting 80% off of manual labeling time
- Labeled and reviewed 5000+ images for object detection over a week-long annotation sprint, building a foundational data set for further research
- Developed various data conversion and visualization scripts utilizing **Pandas** and **Matplotlib**, creating a raw image data lake and allowing analysis to be done on it

Software Engineering Intern May 2022 – Aug. 2022
Promise Robotics *Edmonton, AB*

- Engineered sequencing actions for a robotic cell by leveraging **Django** models and unit tests, providing building blocks for more complex robot activity
- Designed a multi-threaded client-server computer vision system using **Python** and the StereoLabs **ZED SDK**, resulting in a 3x increase in acquired image data
- Extracted wood stud locations with a precision of 5mm using **OpenCV** edge detection and color space transforms
- Labeled image data for a semantic segmentation task and preprocessed it for utilization in a UNet CNN

EXTRACURRICULARS

University of Alberta Formula Racing | *ROS2, C++, Python, Docker* Aug. 2023 – Present

- Co-leading the development of an autonomous driving stack for an electric Formula 1 racecar
- Overseeing the full project development pipeline, including goal planning, software architecture construction, and part research/acquisition
- containerized our self-driving and simulation stacks with Docker to allow for consistent development across operating systems

Autonomous Robotic Vehicle Project | *ROS2, Python, OpenCV* Jan. 2023 – Aug. 2023

- Collaborated with a small team to build a software stack capable of piloting an underwater autonomous vehicle
- Generated 3D bounding boxes for object and pose detection by utilizing Apriltag fiducial markers, OpenCV, NumPy, and a lot of rigid/projective transforms
- Constructed behavior trees using the Py Trees library to allow for easy composition of mission tasks such as object detection and recovery behavior

PROJECTS

Autonomous Foosball, with a Twist | *Python, OpenCV, NumPy* | code Dec. 2023

- Engineered a 1v1 autonomous foosball/pong system for a final course project
- Calibrated a fixed-camera system using OpenCV calibration and point projection functionality, along with empirical testing, to reduce localization error to $\approx$ 0.2 cm in both x and y directions
- Built a multi-threaded image processing loop with an eye for speed, capable of detecting objects and building trajectory estimates while maintaining 28 fps for real-time operation

TECHNICAL SKILLS

Languages: Python, C/C++, JavaScript, SQL, MATLAB

Technologies: OpenCV, ROS2, Git, NumPy, PyTorch, Pandas, Docker, MLFlow, SQLite, Unity, Django, Firebase, MongoDB