JOEY QUINLAN

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EDUCATION

University of Alberta Sept. 2020 – Dec. 2024
Honors Computing Science, BSc ***Cumulative GPA**: 3.9/4.0*
Relevant Coursework: OS, Algorithms, DB Management, Numerical Methods, Machine Learning, Robotics, Graphics

WORK EXPERIENCE

Undergraduate Research Assistant | *Python, OpenCV, NumPy, Pandas, MLFlow* | code | paper May 2023 – Aug. 2023
University of Alberta *Edmonton, AB*
- Received the $8000 NSERC USRA to build a video processing algorithm capable of detecting and tracking 15 classes of vehicles, reducing manual data extraction time by 75%
- Implemented a closed-loop active learning pipeline utilizing **Roboflow**, alleviating an unbalanced data set and cutting off 80% 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

Software Engineering Intern | *Python, OpenCV, Django* 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's** edge detection and color space transforms

EXTRACURRICULARS

University of Alberta Formula Racing | *ROS2, C++, Python, Docker* | code Aug. 2023 – Present
- Leading the development of an autonomous driving stack for an electric Formula 1 racecar
- Building a stereo vision-based perception pipeline for cone detection and localization using Stereolabs ZED2i camera and ROS2 wrapper
- Containerized our software stacks with Docker to allow for consistent development across operating systems
- Established a Continuous Integration pipeline with build and linter checks using clang-based tools for C++ code and flake8/mypy for Python code

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 pose detection ground truth data by utilizing Apriltags, OpenCV, and NumPy
- 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

JournAI (HackED Hackathon) | *JavaScript, React, Next, Firebase* | code Jan. 2023
- Built a journalling app with a team of four that integrates with an NLP model to give users data on their emotions
- Utilized Firebase for authentication and Cloud Firestore for storing user journal entries and emotion data
- Leveraged Next.js dynamic page routing and Firestore query functionality to provide the user easy access to previous journal entries

TECHNICAL SKILLS

Languages: Python, C/C++, JavaScript, HTML/CSS, SQL, MATLAB
Technologies: OpenCV, ROS2, Git, Docker, NumPy, OpenGL, PyTorch, Pandas, MLFlow, SQLite, Unity, Django, Firebase