Charles Montagnoli

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Education

Master of Science & Bachelor of Science in Mechanical Engineering Concentrated in Robotic Systems **GPA: 3.80**

Embry-Riddle Aeronautical University, Daytona Beach, Florida **August 2016 – May 2023**

Computer Skills

Python • C/C++ • CMake • ROS • OpenCV • Docker • Linux • BASH • Tensorflow • Keras • PyTorch • SQL • Git/GitHub • Jira • Jenkins • MATLAB • Arduino • CATIA • Ansys FEA • SolidWorks • AutoCAD • MS Office

Work Experience

Engineering Project Manager/NYC DOT, New York, NY **2024 - Current**

- Coordinate with engineers and clients to review, edit, and approve mechanical and electrical engineering designs.
- Ensure that submitted designs meet all NYC DOT engineering design criteria and create changes where necessary.
- Use AutoCAD to create engineering drawings, review submitted designs, and make changes to in-progress models.

Autonomy Engineer/Pratt & Miller Engineering, New Hudson, MI **2023 – 2024**

- Worked on a Robotics Software Development Team to Write Software for Advanced Autonomous Capabilities.
- Designed Algorithms using modified K-Means for PointCloud Filtering and Feature Extraction in C++ & ROS.
- Created Data Entry Automations for Robotic Platforms to the Company's Relational Database.
- Wrote unit tests as well as worked with CI/CD software using Docker, CMake, and CTest for Safety Critical Systems.
- Utilized Agile to define project goals, align with stakeholder needs, and give visibility into product development via milestones.

Machine Learning Researcher/Embry-Riddle, Daytona Beach, FL **2020 – 2023**

- Autonomous Tasking Team Lead - Developed Robotic Tasks in C++ and Python with ROS.
- Developed Deep Learning Methods for Autonomous Robotic Tasking using Semantic Segmentation and Object Detection.
- Created a Computer Vision Pipeline for the Capture of Imagery using BASH and GStreamer.
- Trained and Created a CUDA Accelerated Machine Learning Model for the Live Processing of Imagery for Autonomous Tasks.
- Onboarded New Members to the Team - Providing Introductions to Linux, ROS, C++, Python, and Git.

Autonomy Engineering Intern/Pratt & Miller Engineering, New Hudson, MI **summer of 2022**

- Using C++ and ROS, I created an Efficient Ground Vehicle Route Planner using A* and D* Search Algorithms.
- Combined my Efficient Ground Vehicle Route Planner with a Terrain Mapper using GeoServer and QGIS to plan the optimal route for a Ground Vehicle based on Terrain Traversal Difficulty.
- Tracked Issues and Development Progress through the use of Remote Version Tracking Tools like JIRA and Git.

Project Experience

Master's Thesis - Semantic Segmentation Deep Learning for Object Detection in the Maritime Environment

- Trained HDR Imagery Data for Semantic Segmentation Deep Learning Using TensorFlow and Keras on the DeepLabV3+ Network.
- Performed Hyperparameter Tuning and Optimization of the Deep Learning Network.
- Implemented Data Augmentation Methods with Python to Expand Trainable Data from a Smaller Dataset.
- Presented a Written Paper and Oral Defense of my Master's Thesis to a Committee of University Advisors and Field Experts.

Embry-Riddle RobotX Software Team Lead

- ERAU Maritime RobotX software team lead. We created an autonomous surface vessel that performed tasks like autonomous boat docking, obstacle avoidance in a narrow corridor of buoys, and signal detection and reaction.
- My team won the 2022 Maritime RobotX Challenge in Sydney, Australia. Our successes in combining Machine Learning Models with Autonomous Tasking Decision Making allowed us to perform best-in-class at Autonomous Tasking and Mission Planning.
- Performed Calibration and Integration of Camera and LiDAR Systems into Autonomous Surface Vessel.
- Created the Design for Integration of Additional Sensors Including RADAR and GPS/INS.
- Onboarded Junior Research Group Members through Education and Hands-On Training with Mobile Robotics, Machine Learning, and Software Development

Multi-Modal Sensor Fusion for Autonomous Surface Vessel (ASV) Situational Awareness

- Designed and created a system for integrating three different sensing modalities into the team's ASV. We created a Sensor Suite of 6 Cameras, 3 LiDAR, and 1 Marine Radar to increase the situational awareness capabilities of the vessel through sensor fusion.
- Performed sensor efficacy studies, planned mounting, integrated sensors, and created software for capturing all sensor data simultaneously through an Nvidia Jetson.