

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

SolidWorks • Ansys FEA • Python • C/C++ • AutoCAD • CATIA • CMake • ROS • OpenCV • ArcGIS • QGIS • Agi32 • Visual Lighting • Docker • Linux • BASH • Tensorflow • Keras • PyTorch • SQL • Git/GitHub • Jira • Jenkins • MATLAB • Arduino • MS Office

Work Experience

ENGINEERING PROJECT MANAGER/NYC DOT, NEW YORK, NY

2024 - CURRENT

- Own the Design of DOT Infrastructure Projects for the Capital Projects Division, following all NYCDOT and USDOT Standards.
- Manage the Design of Public Infrastructure Projects across multiple disciplines, including using AutoCAD, to ensure NYC public roads are properly designed to our engineering standards for all people using the roadways.
- Review consultants designed infrastructure projects for compliance with engineering standards and coordinate corrections.
- Coordinate with engineers, consultants, and clients to review, edit, and approve mechanical and electrical engineering designs.

ROBOTICS AUTONOMY ENGINEER/PRATT & MILLER ENGINEERING, NEW HUDSON, MI

2023 – 2024

- Worked on a Robotics Engineering Team to Design Custom Robotic Systems for Autonomous Applications with Python, C++, & ROS.
- Utilized Agile to define project goals, align with stakeholder needs, and give visibility into product development via milestones.
- Designed Algorithms for autonomous wayfinding and path navigation using Python, ArcGIS/QGIS, and GeoServer.
- Created Data Entry Automations of Terrain data for Robotic Platforms to the Company's Relational Database with SQL.
- Wrote unit tests as well as worked with CI/CD software using Docker, CMake, and CTest for Safety Critical Systems.

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.

ROBOTICS 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 - AUTONOMOUS SURFACE VESSEL

- 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.
- 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.