Ryan Verbrugge

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Professional Summary

holder for stuff

Education

Michigan Technological University   *Aug 2021 – May 2025*
BS in Robotics Engineering

Research Experience

Research Assistant   *Houghton, MI*
Michigan Technological University   *Aug 2022 – Present*

- Conducted research in various topics spreading from legged robotic control to perception and path planning systems in autonomous vehicles
- Assisted graduate student peers in additional research topics

Research Areas

- 8/2024 - Present: Winter Snow dataset for LiDAR systems and neural network training for vehicle detection in heavy snow environments
- 6/2023 - Present: Automated bat counting system for White Nose Disease population study with DNR (See Fat Bat 🔗 Project)
- 6/2023 - 9/2024: ARPA-E NextCar II, road surface analyzation and data collection
- 1/2023 - 5/2023: (main researcher) Bipedal locomotion and gate correction on low mu surfaces
- 8/2022 - 8/2023: (main researcher) Calculating fractional order calculus through the usage of symmetric neural networks

Teaching Experience

Undergraduate Lab Assistant - ROS   *Houghton, MI*
Michigan Technological University   *Sept 2023 – Dec 2023*

- Transferred labs from ROS Melodic to Noetic
- Re-wrote labs to provide better flow and ease of knowledge acquisition for students
- Assisted students in learning and understanding beginning topics for ROS
- Started creation of new lab curriculum for students in up-coming years

Engineering Experience

Autonomous Simulations Intern   *Novi, MI*
Hexagon - Manufacturing Intelligence Division   *June 2024 – Aug 2024*

- Developed interfaces between simulation software and major autonomous vehicle software
- Developed automotive simulations for autonomous vehicle testing and development
- Produced documentation for customer support
- Supported and assisted in customer usage of simulation software

IT Operations Student - Tier 1   *Houghton, MI*
Michigan Technological University IT   *Oct 2021 – Dec 2022*

Skills

Programming Languages

- C/C++, Python, Bash

Robotics and Programming

- Robot Operating System (ROS/ROS2), Linux, PyTorch, Virtual Test Drive, Carla, Unreal, Linux, Matlab, Driving Scenario Designer, RoadRunner, Simulink

Professional Affiliations

- Society of Automotive Engineers (SAE)

Additional Projects

AutoDrive Challenge II   *autodrivechallenge.com 🔗*

The AutoDrive II Challenge is a GM and SAE sponsored event in which universities receive a stock Chevy EUV Bolt and make it autonomous over 5 years. This challenge began in 2021 and ends in June 2026. Scored challenges progressively get harder as each year passes with topics including base-level object detection, and spanning to non-gps-based localization in an area. Teams then meet in June of each year to compete at University of Michigan's test track, M-City.

Roles: Michigan Tech AutoDrive Team Captain, Robotics Systems Enterprise Director, Enterprise Assistant Director, Outreach Coordinator, Lab manager, Team Lead

Personal Contributions:

- Computer vision through usage of a neural network and a camera
- Object detection and tracking through a lidar sensor
- Autonomous Vehicle simulation through for subsystem testing
- Implementation of feature level sensor fusion
- Creation of vehicle behavior management system
- Creation of mapping and path planning system using a standard planning algorithm
- Built LiDAR based localization system from scratch

Current AutoDrive Work:
LiDAR Based Localization System   *github.com 🔗*

In year 4 of the AutoDrive II Challenge, teams are being put up to the task of navigating through an environment with intermittent gps signal drops. With this challenge in mind, I was assigned the task of building the new localization system from scratch for our team. Currently, I am working on making an adaption of KISS-ICP which is a simple ICP based localization system as a way to solve this challenge.

Technologies

Languages: C++, C, Python, Matlab

Software: ROS, PyTorch, Virtual Test Drive, Carla, Unreal, Linux, Matlab DSD and RoadRunner, Simulink, Inventor, NX

Topics of Interest: Simulation, Perception, Mapping and Planning, Autonomous Vehicles, LiDAR, Camera vision