

# VEDANSHEE TRIVEDI

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## EDUCATION

### University of Southern California

August 2023 - May 2025

### Master of Science in Mechanical Engineering

GPA: 3.83/4.0

Relevant Coursework: Autonomous Cyber-Physical Systems, Manufacturing Automation, Advanced Robotics, Mechatronics, Machine Learning, Multimedia systems engineering

### Ahmedabad University

July 2019 - June 2023

### Bachelor of Technology in Mechanical Engineering

GPA: 3.63/4.0

Relevant Coursework: Control Systems, Industrial Automation, Electronics, Mobile Robots, Sensors, Computer Vision

## SKILLS

- **Programming** : Python, Embedded C, C++, MATLAB, Matplotlib, NumPy, Pandas, OpenCV, Webots, Git, ROS/ROS2, Gazebo
- **Hardware and Design**: Arduino, Raspberry Pi, 3D printing, PLC, Autodesk Fusion 360, ESP32, NVIDIA Jetson, STM32, WindChill RVS, NI LabVIEW, NI TestStand, NI VeriStand, FreeRTOS
- **Communication Protocols**: I2C, SPI, UART, TCP/UDP, CAN, SAE J1939

## EXPERIENCE

### Cummins Inc

January 2025 - Present

### Electronic Systems Test Engineer Intern, Columbus, Indiana

- Developing and implementing automated test sequences using NI TestStand, LabVIEW, VeriStand
- Verifying ECM compatibility with Cummins' proprietary software tools, ensuring reliable bench-to-ECM communication
- Integrating oil level and temperature sensor system with ECM
- Performing automated testing to validate sensor performance and support robust software-hardware integration

### Hampton Lumber

May 2024 - August 2024

### Robotics Engineer Intern, Willamina, Oregon

- Developed autonomous sweeper robot for sawmill equipped with SICK LiDAR, NVIDIA Jetson, and ROS2 to perform SLAM and navigation
- Leveraged MPU9250 IMU to enhance odometry data and implemented EKF to improve localization and sensor fusion
- Integrated Adafruit Huzzah ESP32 board and four channel relay module to control brushes for sweeping and vacuuming process
- Utilized AmpFlow motors with encoders, Basic Micro Motor Controller to ensure precise control and movement
- Enhanced sweeping functionalities of industrial cleaning operations at Hampton Lumber Mills by 75%

### Bosch Future Mobility Challenge, Bosch Romania

December 2022 - May 2023

### Team member, Akatsuki, Romania

- Developed working model of 1/10th scale autonomous car to perform lane detection, parking behaviors using ROS and Gazebo
- Integrated and optimized positional data from localization system, IMU, and ultrasonic sensors with an accuracy of  $\pm 5$  cm
- Utilized YOLOv5 model for traffic sign detection with 97% accuracy and Raspberry Pi camera for lane-keeping
- Deployed Pure Pursuit and Dijkstra algorithms for path planning optimization

## ACADEMIC PROJECTS

### Pneumatic Control Panel for Soft robot gripper | Embedded C, C++

- Designed a pneumatic system for a four-chamber soft robot arm using Arduino MEGA, pressure sensors and flow control valves, controlled via a PID algorithm
- Enhanced system efficiency by 45% by implementing real-time feedback and adaptive control strategies, ensuring precise pressure modulation and improved movement accuracy of robotic arm

### Industrial Autonomous Rover Robot | C/C++, Python

- Constructed Industrial autonomous rover robot based on Inverse Double Lambda suspension mechanism and incorporated NEO-8M GPS module to get continuous x and y location
- Leveraged YOLO-v3 model on OAK-D Lite stereo camera for depth tracking and object detection with 90% accuracy
- Integrated A\* algorithm for optimal path finding and Pure Pursuit algorithm for precise heading control, significantly enhancing rover's navigation and adaptability in dynamic environments

## ACADEMIC ACHIEVEMENTS

- Secured 21st rank globally among 118 teams in 6th edition of Bosch Future Mobility Challenge
- Engaged in Robofest 3.0 competition and secured second position among 150 teams nationally in Rover Robot category and applied for provisional patent and received a grant of 12000 USD to develop it
- Received a Gold Medal and High Excellence Award for securing first rank among 60 students at Ahmedabad University