Harshal Bhat

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Education

Worcester Polytechnic Institute **Aug 2023 - 2025**
Master of Science in Robotics Engineering

Veermata Jijabai Technological Institute(VJTI) **Aug 2018 - June 2022**
Bachelor of Technology in Mechanical Engineering *GPA: Distinction (8.28/10)(3.49/4.0)*

Skills

Languages: C/C++, Python, MATLAB, SQL, Pyspark, LaTeX
Environments Tools: Linux, Git/Github, ROS, AWS, CARLA, Jupyter, Simulink, Raspberry Pi, Jetson Nano, Pytorch, OpenCV, Open3D

Patents and Publications

An Autonomous System For Low Payload Gripper Changing Mechanism and its Method Thereof
The Indian Patent Office Journal No. 05/2022, Dated 04/02/2022, Part 1, pp. 24, Application no. (202211000649)
Automatic Harvester
The Indian Patent Office Journal No. 12/2022, Dated 25/03/2022, Part 4, pp. 92 Application no. (356209-001)
Vibration Analysis of Hydrodynamic Conical Journal Bearing and Fault Prediction using Machine Learning *Under Review*

Projects

Adaptive Estimation-Based Safety-Critical Cruise Control | *Directed Research* Aug 2023 – Present
- Working on adaptive estimation-based control for autonomous vehicles using Control Lyapunov Functions (CLFs) and Control Barrier Functions (CBFs) to ensure safety and stability on inclined roads with and without vehicle-to-vehicle communication in AirSim.
- Developed and tuned a Linear MPC-based Adaptive Cruise Control (ACC) system, ensuring efficient longitudinal speed control and simulation in VRealm environment.

Road Segmentation Model for Autonomous Driving | *Github* April 2023 – May 2023
- Implemented a CNN-based road segmentation model utilizing the UC Berkeley BDD 100K dataset, achieving over **95%** accuracy in identifying drivable road regions.

Conditional Monitoring of Conical Journal Bearing using Machine Learning | Sep 2021 – April 2022
- Led 4 member team Conical Journal Bearing Test Rig, extracting vibration data at **10 loads/speed** conditions
- Pioneered SVM fault classifier achieving **85.71%** accuracy, alongside CNN using FFT, spectral kurtosis, and kurtogram inputs. Executed Random Forest, KNN comparison with SVM.

Behavioral cloning system for autonomous vehicles | *Github* Jan 2022 – March 2022
- Implemented robust behavioral cloning for autonomous vehicles using end-to-end imitation learning, achieving an outstanding **97%** model accuracy and successful validation in the Udacity simulator.

Experience

Pricewaterhouse Coopers LLP | *Technology Consultant Data Analytics* July 2022 - Aug 2023
- Achieved seamless AWS cloud migration for **50 SQL Procs**, optimizing strategy & data migration.
- Transformed **45 Qlik apps**, enhancing data visualization impact with **80%** faster upload ensuring utmost accuracy.

iHub-AWaDH - IIT Ropar | *Research Intern* May 2021 – Aug 2021
- Designed an autonomous harvesting robot for 15 vegetables, featuring self-navigation.
- Engineered a bidirectional G2V/V2G in Simulink charger for 1.5-hour robot recharge. Executed ROS simulation, integrating YOLO v4 for obstacle detection and enhanced navigation.

Team VJTI Racing | *Vehicle Dynamics lead* May 2021 – Aug 2021
- Working with a 25-member team to design an All-Terrain Vehicle for BAJA SAE 2021 INDIA and bagged AIR 18
- Developed an Electrically Heated Disk type catalytic convertor control module to achieve a **15%** reduction in emissions and Driver rear collision avoidance system using yolov4 and Kalman Filters

Awards

Startup Grant: Received startup grant of INR 10 lakhs| *IIT Ropar, India* May 2022
1st Runner up IEEE VJTI technical paper presentation| *VJTI, India* March 2022