**Harshal Bhat**

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**EDUCATION**

**Worcester Polytechnic Institute (WPI)** **Worcester, MA**

*Master of Science in Robotics Engineering Aug 2023 - April 2025*

* GPA: 4.0/4.0 Coursework: Deep Learning, Robot Control, Advanced Navigation, Computer Vision

**Veermata Jijabai Technological Institute(VJTI), Mumbai University** **Mumbai, India**

*Bachelor of Technology in Mechanical Engineering Aug 2018 - April 2022*

* GPA: 8.28/10

**SKILLS**

* **Programming Languages/ Libraries:** Python, C/C++, MATLAB, PL/SQL, OpenCV, TensorFlow, PyTorch, Latex
* **Environments:** AWS, CARLA, ROS/ROS2, Linux, Simulink, Jetson Nano, Raspberry Pi, Arduino

**WORK EXPERIENCE**

**Pricewaterhouse Coopers (PwC) LLP Mumbai, India**

*Technology Consultant: Software Development July 2022 – Aug 2023*

* Worked extensively on AWS cloud migration from MySQL to PostgreSQL and pipeline for **50** procedures Environment setup and end-to-end migration of **50** Qliksense applications and formulated data visualizations.
* Contributed to spark scripts to optimize AWS Redshift performance by **60% faster query** response. Gained familiarity with Docker, Bitbucket, JIRA, Confluence, and creating clean, modular, scalable software.

**iHub-AWaDH IIT Ropar Ropar, India**

*Research and Development Intern May 2021 – Aug 2021*

* Designed and implemented an autonomous harvester capable of navigating in known environments and harvesting **15** different crop vegetables, utilizing AMCL and odometry data, and developed a bidirectional G2V/V2G charging station.
* Employed **DWA local planner** for obstacle avoidance and **A\* global planner** for optimal path planning using Python and C++. Integrated these components within the Move Base Node for efficient and interactive robot navigation in ROS.

**PROJECTS**

**Decentralized Multi-agent system formation control under localization errors** *Aug 2023 - Present*

* Tech Stack: MATLAB, C++, ArGOS, Swarm Robots, ADAS
* Currently working on Multi-agent formation control using Distributed Kalman filtering and consensus algorithms for heterogenous agents to localize and track obstacles simultaneously.

**Zero-Shot Semantic Style Transfer for Images** *October 2023 - Present*

* Tech Stack: Python, PyTorch, CUDA, LLMs
* Implemented a style transfer algorithm utilizing a VGG19 backbone to encode both content and style images.
* Utilized AdaAttN for generating content-style attention maps, combining them with segmentation mask information from the content image, and applying this fused attention to produce stylized features integrating with LLMs for user-prompted style.

**Stereo Depth Estimation for Pseudo LiDAR | Github** *Aug 2023 – Sep 2023*

* Developed a 3D Computer Vision project, implementing disparity maps, 3D obstacle estimation, and 3D Point Cloud creation from Stereo Images using Python.
* Utilized Stereo BM and Stereo SGBM algorithms and integrated camera calibration for depth mapping and obstacle detection.

**Adaptive Cruise Control system |** [**Github**](https://github.com/Lucifer2700/Adaptive_Cruise_Control_System_using_MATLAB)*Dec 2020 – Feb 2021*

* Implemented an ACC System in MATLAB and Simulink, utilizing Model Predictive Control and Stateflow for vehicle behavior planning, achieving optimal speed control and safe distance maintenance.

**Road Segmentation Model for Autonomous Driving |** [**Github**](https://github.com/Lucifer2700/UCBerkley_Segmentation)*April 2023 – May 2023*

* Engineered deep learning model using an encoder-decoder architecture in TensorFlow for drivable area detection.
* The model, trained on the BDD 100K Dataset, demonstrated detection for drivable area detection in real-time video feeds, showcasing proficiency in image segmentation, and real-time video processing.

**Conditional Monitoring of Conical Journal Bearing using Machine Learning** *Sep 2021 – April 2022*

* Tech Stack: Python, C++, MATLAB, Embedded systems, Deep Learning
* Led a **5-member team** Conical Journal Bearing Test Rig, extracting vibration data at **10 loads/speed** conditions using C++.
* Pioneered SVM fault classification algorithms achieving **93.93%** accuracy, alongside CNN using FFT, spectral kurtosis, and kurtogram inputs. Executed Random Forest, KNN comparison with SVM.

**PATENTS AND PUBLICATIONS**

* **An Autonomous System For Low Payload Gripper Changing Mechanism and its Method Thereof**  
  *The Indian Patent Office Journals No. 05/2022, Dated 04/02/2022, Part 1, pp. 24, Application no. (202211000649)-Under Review*
* **Automatic Harvester**

*The Indian Patent Office Journals No. 12/2022, Dated 25/03/2022, Part 4, pp. 92 Application no. (356209-001)-Under Review*

* **Vibration Analysis of Hydrodynamic Conical Journal Bearing and Fault Prediction using Machine Learning**

*In Proceedings of the International Conferences on Industrial Tribology (ICIT),2022, New Delhi*

**AWARDS**

**Startup Grant:** Received startup grant of USD 12000 **| IIT Ropar, India |** [**Video**](https://drive.google.com/file/d/1JCyVSrhjjQOD1XIvO48dMo_iNRr0IZwt/view?usp=drive_link)*May 2022* **1st Runner-up IEEE VJTI technical paper presentation | VJTI, India |** [**Github**](https://github.com/Lucifer2700/End-to-End-Behavioral-Cloning-for-Autonomous-Vehicles-using-CNN-model) *March 2022*