

Dev Soni

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Education

Worcester Polytechnic Institute

Aug 2023 – May 2025

MSc. In Robotics Engineering

Worcester, MA

Courses: Deep Learning, Motion Planning, Robot Control

ITM Vocational University

Aug 2018 – May 2022

B.Tech In Mechatronics Engineering || CGPA: 9.8/10

Gujarat, India

Courses: Robotics and Machine Vision, Design of Mechatronics System, Artificial Intelligent System

Publications

Learning-based NMPC Framework for Car Racing Cinematography Using Fixed-Wing UAV ([Link](#))

Dev Soni, Amith Manoharan, Prakrit Tyagi, PB Sujit

IEEE International Conference on Unmanned Aircraft Systems, 2022

Experience

Perception And Autonomous Robotics Group (PeAR), Worcester

Sep 2023 – Present

Graduate Researcher

[Dr. Nitin J. Sanket](#)

- Engaged in enhancing the perception stack of a quadrotor to execute agile vision-based actions, such as ball-catching, exclusively relying on onboard sensing.

Mowito Automation Pvt. Ltd, Bangalore

Feb 2023 – May 2023

Computer Vision Engineer Intern

- Implemented Mask-RCNN model, trained on AWS EC2 and Jetson AGX, to find masks and pick points for SKUs handled by UR5
- Managed a dataset of over **2000 SKUs** on an S3 bucket, performing data manipulation using bash and Python scripts for various training and operational needs
- Implemented/Ported ROS1 custom purposes stack into ROS2

Indian Institute of Science Education and Research Bhopal (IISERB), Bhopal

Jan 2022 – Dec 2022

Research Intern

[Dr. P. B. Sujit](#)

Learning-NMPC Framework for Multi-Car Racing Cinematography Using Heterogeneous AAVs

- Enhanced L-NMPC framework for filming multiple racing cars with various AAVs, employing Multi-tabular Q-learning for training
- Achieved a **32%** overall error reduction through this approach ([GitHub](#))

Learning-based NMPC Framework (Q-Learning + Nonlinear Model Predictive Controller)

- Developed a Nonlinear Model Predictive Controller (L-NMPC) for filming racing cars using a fixed-wing AAV, incorporating Q-learning Reinforcement Learning for training
- Created a custom RL environment in OpenAI Gym, employed CasADi library for NMPC optimization, and validated the proposed algorithm through simulations, resulting in a remarkable **70%** error reduction ([Paper](#)) ([GitHub](#))

Projects

Powered Lower-Limb Exoskeleton Robot ([Web-Page](#))

Jan 2021 – Mar 2022

- Analyzed human gait with Kinovea, generated torque trajectory in OpenSim, and employed geared motors with SolidWorks-designed spur gears
- Utilized PID controllers on Arduino for precise motor control, ensuring accurate tracking of gait using encoders

Factory Automation Using ROS In Simulated Environment ([Web-Page](#))

Oct 2020 – Dec 2020

- Developed ROS nodes, achieved autonomous navigation, and implemented a pick-and-place pipeline with MoveIt
- Designed a state machine for a production line with UR-5 arms and a TurtleBot using FlexBe

Technical Skills

Languages: Python, C++, MATLAB

Software & Tools: ROS, Git, Docker, L^AT_EX, Gazebo, Carla, V-REP, Blender

Liberally: PyTorch, OpenCV, CasADi, OpenAI Gym, NumPy, Matplotlib

Awards

- Secured first place in [Robofest-2.0](#) competition for the Powered Lower-Limb Exoskeleton Robot among 8 out of 300 teams, with total funding of 750,000 INR (approximately \$9,200) ([Web-Page](#))