

JESAL DEEPAKBHAI SHAH

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EDUCATION

B.E. in Electronics and Communication

CGPA: 7.63/10.0

Gujarat Technological University

Jun 2024

Thesis: *Impedance-based trajectory tracking for quadrupedal locomotion*

Focus: *Robot Dynamics, Legged Locomotion, Computed Torque Control, and Robotics Software.*

PROFESSIONAL EXPERIENCE

Associate Robotics Engineer

Sept 2024 – Present

Strider Robotics

Bengaluru, IN

- Performed system identification and developed actuator models using machine and reinforcement learning, enhancing sim-to-real transfer of reinforcement learning policies for quadrupedal hardware.
- Designed and implemented push- and fall-recovery behaviors for a quadrupedal robot to recover from slips, external pushes, and full fall scenarios.
- Improved Model Predictive Control (MPC) and implemented a foothold optimization framework, achieving more stable locomotion for a quadrupedal robot on uneven terrain.
- Designed and implemented a Kalman Filter-based state estimator fusing IMU, leg kinematics, and contact data; validated against motion-capture ground truth, resulting in highly accurate and robust state estimation for a quadrupedal robot.
- Maintained and extended the robot software stack and developed an internal SDK, enabling faster experimentation and scalable development for control and navigation workflows.

Robotics Intern

Jan 2024 – Aug 2024

Strider Robotics

Bengaluru, IN

- Developed an impedance-based trajectory tracker for quadrupedal legs within the MPC framework using computed torque control algorithm, enabling force-compliant behavior in leg motion.
- Benchmarked multiple actuator designs, including quasi-direct drive and harmonic drives, evaluating speed, torque, and efficiency, and provided quantitative data for optimal actuator selection.
- Integrated the Unitree SDK for hardware testing, enabling seamless deployment and evaluation of control algorithms on the GO1 robot.

Technical Content Writer

Jan 2023 – Present

CircuitBread

(Remote) Boise, US

- Published in-depth articles on communication protocols for embedded systems, contributing to an online learning platform used by students and early-career engineers
- Collaborate with the CircuitBread team on ongoing educational content, contributing to documentation and future technical tutorials.

LEADERSHIP AND ACTIVITIES

Software Lead

Aug 2022 – Nov 2023

GTU Robotics Club

Ahmedabad, IN

- Mentored and coordinated a multi-member software team, steering a strategic transition from ad-hoc hardware integration to a modular robotics software stack, which directly enabled a **national championship win** at DD Robocon 2023 (1st of 63 teams) and representing **India** at ABU Robocon 2023 (6th of 13 countries).
- Implemented inverse kinematics and motion planning for a 3WD omnidirectional mobile base, enabling repeatable point-to-point navigation.
- Developed a state estimation framework for a wheeled robot by fusing wheel encoder and IMU data via dead-reckoning, achieving centimeter-level localization accuracy.

Software Member

Aug 2022 – Apr 2023

Team GRC, e-Yantra 2023

Ahmedabad, IN

- Developed a 3WD holonomic mobile base simulation in ROS and Gazebo, enabling the testing of motion-planning algorithms via high level commands before hardware deployment.
- Implemented a low-level control framework using the theory of coordinate transforms and inverse kinematics, converting task-space velocity commands into wheel velocities for hardware deployment.
- Built a vision-based pose estimation pipeline with OpenCV and ArUco markers using a ceiling-mounted camera, enabling localization for the robot hardware.
- Integrated perception, localization, and control into a wheeled robot that autonomously drew digital images on a real-world canvas during the final stage of e-Yantra 2023 (HOLA Bot theme).

Software Member

Oct 2021 – Jul 2022

GTU Robotics Club

Ahmedabad, IN

- Developed software for a semi-autonomous wheeled robot by fusing data from multiple onboard sensors, enabling robust and low-latency teleoperation during competition runs.
- Implemented a real-time perception pipeline using YOLOv5 for object detection and tracking, providing reliable visual feedback of the object's position to the shooting mechanism.
- Designed and deployed semi-autonomous control logic for the pick-and-place mechanism, reducing operator workload and contributing to a **top-10 national finish** (10th out of 43 teams) at DD Robocon 2022.

ACHIEVEMENTS AND AWARDS

2023	Team (India) received SMC Corporation Award, ABU Robocon 2023	Phnom Penh, KH
2023	Team (GRC 2023) secured 1st place (National Champions), DD Robocon 2023	Delhi, IN
2022	Team (GRC 2022) received Visvesvaraya Best Design Award and a cash prize of ₹1000, DD Robocon 2022	Delhi, IN

OPEN SOURCE CONTRIBUTIONS

RViz Dynamic Reconfigure

Maintainer

Created a **RViz2** plugin for GUI-based dynamic parameter reconfiguration, allowing real-time inspection, modification, and logging of **ROS2 node** parameters, enhancing development productivity.

SKILLS

Programming Languages	:	C++, Python, Bash
Software/Tools	:	ROS 2, Linux, CMake, Git, Gazebo, MuJoCo, Nvidia Isaac Lab, Qt, LaTeX
Libraries	:	PyTorch, TensorFlow, NumPy, Matplotlib, scikit-learn, Eigen, CVXPY, Pinocchio, YOLOv5, OpenCV
Platforms	:	Nvidia Jetson, Raspberry Pi, Arduino, STM32