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 (GRC 2023) 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 (GRC 2022) 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