Darshankumar Prajapati

Linkedin: darshankumar-prajapati
Email: djprajapati.1002@gmail.com
Portfolio: djp1002.github.io
Mobile: +91-9104030970

Research Summary

M.Tech (Research) Scholar at IIT Mandi's Centre for AI and Robotics, specializing in legged systems, optimal control, and sim-to-real reinforcement learning. I work on dynamic modeling, MPC-based quadruped control, RL-driven dual-arm manipulation, and dynamic biped locomotion, integrating perception, planning, and control into cohesive multi-robot frameworks. I build robots that respect dynamics before they learn to bend them.

Education

- **Indian Institute of Technology Mandi** — Mandi, India
  Master of Technology (Research) - Robotics and AI; GPA: 8.76 — *Mar 2023 - Feb 2026*
- **Marwadi University** — Rajkot, India
  Bachelor of Technology - Mechanical Engineering; GPA: 8.13 — *July 2017 - June 2021*

Skills Summary

- **Robotics, AI & Vision**: ROS, ROS2, Gazebo, Isaac Sim, Simulink, PyBullet, PyTorch, OpenCV, RGB-D
- **Embedded & Edge Systems**: Arduino, STM32, ESP8266/ESP32, Jetson Nano/Xavier/AGX Orin, Raspberry Pi
- **Tools**: Git, Linux, SolidWorks, Creo, Matlab, ANSYS, LaTeX | **Languages**: Python, C, C++
- **Control & Planning**: Classical & Optimal Control, Reinforcement Learning, Motion Planning, Trajectory Optimization

Experience

- **IIT Mandi** — Onsite
  Teaching Assistant (Full-time) — *Mar 23 - Feb 26*
  - Supervised undergraduate research projects in robotics and mechanical systems
  - Conducted laboratory sessions for Design Practicum, and Robot Kinematics & Dynamics
  - Conducted hands-on robotics and drone workshops for 100+ students and delivered a 3-day Faculty Development Program, training 40+ faculty members across institutions.
- **IIT Bhilai** — Onsite
  Robotics Research Intern — *July 22 - Feb 23*
  - Designed and developed a Micromouse robot encompassing hardware, software, and control systems
  - Built UGV pick-and-place system integrating mechanical design, embedded programming, and motion control
- **OSVIPL** — Onsite
  Automation Intern — *Apr 21 - Sep 21*
  - Developed automation system for clothes donation bin collection and sorting
  - Designed a cloth transport mechanism using belt-drive systems

Projects

- **Autonomous Multi-Terrain Navigation Framework for UAV and Quadruped (Visual Servoing, Legged Robot, Path planning)**: Developed a coordinated UAV–quadruped system for terrain-aware search operations. The UAV generates a global terrain map, which informs adaptive locomotion strategies for the quadruped via visual servoing and potential-field-based planning. Focused on autonomous multi-terrain traversal for search-and-rescue scenarios. Tech: ROS, Deep Learning, OpenCV, Jetson Orin, Artificial Potential Field.
- **Fully Actuated Tiltrotor UAV for Improved Gust Rejection (System Dynamics Modeling and Control, Sensors and Actuators, Sensor Fusion)**: Designed and developed a fully actuated tilt-quadrotor UAV enabling 6-DoF hovering and path tracking at arbitrary orientations, with improved disturbance rejection compared to conventional quadrotors. Tech: ROS, Optimal Control, STM32, ICM20948, PWM, SPI, Servo & BLDC motors.
  Full list of projects available at Portfolio/Projects

Publications

- D. Prajapati et al., "MPPF: Mobile Probe Potential Field for Real-Time Multi-Agent Navigation in Industrial Environments," *IEEE Access, 2026*
- Surya Prakash SK et al., "iAPF: an improved artificial potential field framework for asymmetric dual-arm manipulation with real-time inter-arm collision avoidance," *Frontiers in Robotics and AI, 2025*
- Surya Prakash SK et al., "Competitive Task Allocation with Real-Time Collision Avoidance for Autonomous Dual-Arm Manipulations," *Transactions on Auto. Sci. and Eng., 2025* (Rev1 Under Review)
  Full list of 12 publications available at Portfolio/Publications

Conferences and Workshops

- Advanced Legged Robots: Dynamics and Control workshop, Lucknow, May 2024
- ROSCon India, Bengaluru, Dec 2023
- Demonstrated autonomous systems: G20-S20, IIT Mandi, June 2023
- Exhibited drone-robotics integration: Drone Conclave, Palampur, June 2023