SARVESH PRAJAPATI

prajapati.s@northeastern.edu prajapatisarvesh prajapatisarvesh prajapatisarvesh

EDUCATION

M.S. in Robotics, Northeastern University, GPA: 3.71/4.00 Dec, 2024 (expected)

Thesis: *Risk-Aware planner for robots incorporating perceptual aware spectral analysis*

Focus: *Algorithms*, *Reinforcement Learning*, *Robotic Systems*, *Controls*, *Manipulation*, *Perception*

B.E. in Computer Engineering, Gujarat Technological University, GPA: 3.7/4.00 June, 2022

Thesis: *Advancements in autonomous mobile robots for warehouse management and small scale industry.*

Focus: *Robotics*, *DBMS*, *Data Structure and Algorithms*, *Operating Systems*, *Object Oriented Design*

RESEARCH EXPERIENCE

Applied Scientist Co-Op January, 2024 - Jun, 2024

Amazon Robotics Westborough, US

- Created a robust simulation environment from scratch; tested and integrated planning algorithms for robotic manipulators, enhancing system performance and reliability.
- Conducted research involving Manipulators, Deep Learning, Human-Robot Interaction, Perception, LLM and Optimization.

Research Assistant January, 2023 - present

RIVeR Lab, Northeastern University Boston, US

- Researching on DL based approaches to map RGB to hyperspectral images for material recognition and friction estimation improving traversability for mobile and legged robots.
- Led perception team for FRASIER, developed a robust mobile manipulation pipeline in C++, Python, and ROS. Increased accuracy of the pipeline to 93% from 83% by leveraging Mask-RCNN.

Research Assistant September, 2022 - December 2022

ReGame-XR Lab, Northeastern University Boston, US

- Researched on XR game development and cognition for secondary language learning in older adults.
- Led software development team for ExerBike project; modified GTA V, interfaced ANT+ sensor, integrated VR using **.NET** framework that helped securing $\$50$K CBH award and conference publication.

Research Scholar June, 2020 - August 2022

Gujarat Technological University Ahmedabad, IN

- Researched on embedded systems, motion generation and path-planning for mobile robots. Migrated robots controller from Arduinos to STM32 and wrote a short book for undergrads.
- Reseached on different control methods; developed a system for autonomous PID tuning for DC motors.

SKILLS

Programming Languages C++, Python, MATLAB, JavaScript, Bash

Software/Tools ROS 2, Linux, CMake, Docker, MoveIt!, Git, Gazebo, Nvidia Isaac Sim, LaTeX

Libraries PCL, OpenCV, PyTorch, TensorFlow, NumPy, Matplotlib, scikit-learn, OpenAI Gym, JAX, Eigen, Open3D, OctoMap, SciPy, Drake, CasADi, CVXPY, Numba

Platforms Clearpath, Universal Robots, Franka Emika, Unitree, Human Support Robot, Xarm, Kinnova, TurtleBot, Nvidia Jetson, Raspberry Pi, Arduino, STM32

Interests Aerospace and Aviation simulation, Piano, Guitar, Books

PUBLICATIONS

1. A. Trivedi, **S. Prajapati**, A. Shirgaonkar, M. Zolotas, T. Padir, "Data-Driven Sampling Based Stochastic MPC for Skid-Steer Mobile Robot Navigation," 2025 IEEE Conference on Robotics and Automation (ICRA), Atlanta, GA, USA, 2025 (Under Review).
2. A. Trivedi, **S. Prajapati**, M. Zolotas, T. Padir, "Chance-Constrained Convex MPC for Quadruped Locomotion," IEEE Robotics and Automation Letters (RAL) (Under Review).
3. N. Hanson, J. Tukpah, **S. Prajapati**, Y. Mewada, and T. Padir, "Automated Forest Biomass Mapping with Autonomous Hyperspectral Imaging for Wildfire Monitoring," 2024 IEEE International Symposium on Safety, Security, and Rescue Robotics (SSRR), New York, US, 2024 (Under Review).
4. A. Trivedi, M. Zolotas, A. Abbas, **S. Prajapati**, S. Bazzi, and T. Padır, "A Probabilistic Motion Model for Skid-Steer Wheeled Mobile Robot Navigation on Off-Road Terrains," 2024 IEEE Conference on Robotics and Automation (ICRA), Yokohama, JP, 2024.
5. **S. Prajapati**, A. Trivedi, B. Maxwell, and T. Padir, "Predictive Mapping of Spectral Signatures from RGB Imagery for Off-Road Terrain Analysis," Workshop on Resilient Off-road Autonomy, ICRA, Yokohama, JP, 2024.
6. A. Trivedi, **S. Prajapati**, M. Zolotas, T. Padir, "Online Refinement of Uncertainty Sets for Robust MPC of Quadrupedal Robots Using Convex Cone Programming," Workshop on Advancements in Trajectory Optimization and Model Predictive Control, ICRA, Yokohama, JP, 2024.
7. Y. Qian, **S. Prajapati**, A. Schwartz, A. Jung, U. Seitz, J. Alfen, L. Lewis, M. Kim, A. Kramer, L. Chukoskie, "Integrated Aerobic Exercise into Adult Second Language Learning in Virtual Reality Game," 2023 IEEE Conference on Games (CoG), Boston, MA, USA, 2023.

TEACHING EXPERIENCE

Advanced Perception, Northeastern University — Boston, US
Teaching Assistant — September, 2024 - Present

- Responsible for grading students' weekly research paper reviews and presentations, offering office hours for guidance, and assisting in developing novel aspects for research-based projects.

Embedded Design Enabling Robotics, Northeastern University — Boston, US
Teaching Assistant — September, 2023 - December, 2023

- Conducted lab sessions for 100+ students using the De1SoC FPGA board, guiding them through assignments from basic logic gate design to programming a robotic arm.

GTU Robotics Club, Gujarat Technological University — Ahmedabad, IN
Team Leader — July, 2021 - July, 2022

- Taught 40 peers robot programming, computer vision and machine learning over a course of 1 year.

HONORS AND AWARDS

2023 **CS Reseach Mentorship Program Scholar**, Google — Boston, US
2021 **Team represented India in international robotics competition**, ABU Robocon — Jimo, CN
2021 **Code-Decode champion**, Parul University — Vadodara, IN
2020 **Won CTF and OSCP voucher**, Secarmy — Ahmedabad, IN

SERVICE AND VOLUNTEERING

1. Reviewer for IEEE conferences and International Journal for Dynamics and Control.
2. Mentored undergraduates, guided them in robotics research and projects.