

# PRANAV GOYAL

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## EDUCATION

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### University Of Michigan - Ann Arbor

Aug 2024 - Aug 2029

Ph.D Candidate in Robotics, Advisor: [Dr. Christoforos Mavrogiannis](#)

CGPA- 4.12/4.00

**Courses:** Math for Robotics, Robotic Systems Laboratory, Computational HRI, Robot Learning for Planning and Control, Information Theory and Statistics, Advanced Computer Vision

### BITS PILANI, K.K BIRLA GOA CAMPUS

Aug 2019 - Mar 2023

Bachelor's in Electronics and Instrumentation Engineering

CGPA-8.58/10

**Courses:** Modern Control Systems, Neural Networks and Fuzzy Logic, Foundations of Data Science, Signals and Systems, Non Linear Dynamics and Chaos, Industrial Instrumentation and Control

## EXPERIENCE

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### Fluent Lab, University of Michigan - Ann Arbor

Ann Arbor, USA

Research Assistant, Advisor: [Dr.Christoforos Mavrogiannis](#)

Aug 2024 - Present

- Developed MPPI-based goal-intent expression algorithms in PyTorch for human-aware navigation and investigated contextual legibility effects (e.g., human distraction) in social navigation using the Stretch2 platform.
- Developing a scenario-centric social navigation dataset for training foundational navigation models.
- Formalizing information theoretic implicit communication in human-robot settings integrating multiple modalities
- Developing Alpaca, an open-source social navigation platform integrating interaction and human-aware planning.

### CLeAR Lab, National University of Singapore

Singapore

Research Assistant, Advisor: [Dr.Harold Soh](#)

Aug 2023 - Aug 2024

- Researched navigation strategies for quadrupedal robots in dense urban environments, such as canteens.
- Formulated an LTL-satisfaction-based diffusion global planning framework for navigation in context-rich environments and demonstrated it on the Unitree Go2 robot.
- Designed an LLM-powered scenario generation tool to evaluate social navigation algorithms in ROS2 and Gazebo.

### Mercedes-Benz Research and Development India

Bangalore, India

CV/DL Internship

Mar 2023 - May 2023

- Led a project on trajectory planning for 3D face scanning using a WidowX robot arm.
- Developed a system for ground-truth head Ho/Hp detection of seated individuals using Aruco markers.

### Biorobotics Lab, Robotics Institute, CMU

Pittsburgh, USA

Research Internship, Advisor: [Dr.Howie Choset](#)

Jun 2022 - Jan 2023

- Conducted my Bachelor's thesis on Control of a Half-Legged wheeled robot.
- Devised a pipeline for automated void detection with 3D perception for SAR applications using real world dataset.

## PUBLICATIONS

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**Pranav Goyal**, Andrew Stratton, Christoforos Mavrogiannis, "[Rethinking Legibility in Social Robot Navigation: Impact of Intent Representation and Human Distraction](#)", HRI Late Breaking Reports 2026

Shashank Rao Marpally ...**Pranav Goyal**...Christoforos Mavrogiannis and Harold Soh, "[ACME: A Multi-Cultural, Multi-Embodiment Social-Navigation Dataset](#)", Under Review IJRR 2026

Shashank Rao Marpally and **Pranav Goyal** and Harold Soh, "[SocRATES: Towards Automated Scenario-based Testing of Social Navigation Algorithms](#)", RA-L 2026

Andrew Stratton, Prudhvi Teja Singamaneni, **Pranav Goyal**, Rachid Alami, Christoforos Mavrogiannis, "**How Human Motion Prediction Quality Shapes Social Robot Navigation Performance in Constrained Spaces**", HRI 2026

Andrew Stratton, Prudhvi Teja Singamaneni, **Pranav Goyal**, Rachid Alami, Christoforos Mavrogiannis, "**Bi3: A Biplatform, Bicultural, Biperson Dataset for Social Robot Navigation**", ICRA 2026

S. Marpally, **Pranav Goyal**, Harold Soh, "**Towards Automated Scenario Testing of Social Navigation Algorithms**", RSS 2024 Unsolved Problems in Social Robot Navigation (Runner-up Best Paper Award)

Zeyu Feng, Hao Luan, **Pranav Goyal** and Harold Soh, "**LTLDoG: Satisfying Temporally-Extended Symbolic Constraints for Safe Diffusion-based Planning**", RA-L 2024

Ananya Bal, **Pranav Goyal**, Ashutosh Gupta, David Merrick, Robin Murphy, Howie Choset, "**Towards Automated Void Detection for Search and Rescue with 3D Perception**", 2023 IROS

## SELECTED PROJECTS

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**Project VeRT (Biorobotics lab, Sponsored by DARPA USA)** Jun 2022 - Jan 2023  
*Vertical Rapid Transport, Advisor: [Dr. Howie Choset](#), [Dr. Beau Pollard](#)* [video](#)

- Implemented convex MPC and kinematics-based geometric control for a half-legged wheeled robot.
- Built on my own a working prototype of Half Legged-Wheeled robot using HEBI modules.

**On Orbit Manipulation (Biorobotics lab, Sponsored by Northrop Grumman)** Jun 2022 - Jan 2023  
*Advisor: [Dr. Howie Choset](#), [Dr. Beau Pollard](#)*

- Conducted hardware-in-the-loop validation for MRV-MEP insertion control using a Universal Robots arm.
- Developed an impedance matching and contact parameter estimation framework for UR robot arms.

**NSF Surside (CMU Biorobotics lab, facilitated by NSF USA)** Jun 2022 - Jan 2023  
*Advisor: [Dr. Howie Choset](#), [Dr. Robin Murphy](#)* [paper1](#) [paper2](#)

- Developed a Point cloud registration pipeline for unstructured real world data from the Surfside Collapse.
- Extracted a 3D reconstruction model using Structure-from-Motion techniques with drone footage from the Miami Surfside collapse site.

**Optimal Control Problems in Robotics** Aug 2021 - Dec 2021  
*Advisor: [Dr. Amit Setia](#)* [code](#)

- Implemented pseudospectral transcription methods to convert optimal control problem to non linear optimization problem for trajectory generation and obstacle avoidance using MATLAB.

## TEACHING AND VOLUNTEERING EXPERIENCE

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**Teaching Assistant, Software for Embedded Systems** Jan 2022 - Jun 2022

The course is part of CS Master program at Bits Goa under the guidance of [Dr. Neena Goveas](#)

**Teaching Head, Electronics and Robotics Club** Aug 2021 - Apr 2022

Organized courses and competitions for inculcating robotics culture in college

**Developed course assignments for ROB 498/599: Computational HRI** Jul 2025 - Oct 2025

## SKILLS

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**Programming skills:** *Intermediate:* C, C++, R Programming *Advanced:* Python, MATLAB, Bash

**Software/Frameworks:** ROS1, ROS2, Gazebo, CloudCompare, OpenCV, Open3D, Pytorch, UR Scripting

**Hardware:** Arduino, ESP32, Raspberry Pi, Helios 3D LIDAR, Intel Realsense, Optitrack, Universal Robot Arm, Turtlebot, Unitree Go2 dog, Hello Robot Stretch, AgileX Ranger Mini 3.0