

SANIYA PATWARDHAN

Mechanical Engineering — Robotics — Indian Institute of Technology Gandhinagar
patwardhan.saniya@iitgn.ac.in — LinkedIn Profile — GitHub — Website

RESEARCH INTERESTS

Robotic Manipulation and Grasping, Robot Control, Robot Perception.

EDUCATION

Indian Institute of Technology Gandhinagar , India	June 2024
B.Tech in Mechanical Engineering (Minor in Robotics)	CPI: 8.75/10

Dr. Kalmadi Shamarao Junior College , Maharashtra, India	2020
Higher Secondary Certificate (HSC)	Percentage: 90%

Dr. Kalmadi Shamarao High School , Maharashtra, India	2018
Secondary School Certificate (SSC)	Percentage: 93.8%

PUBLICATIONS

Publications in Review

1. **S. Patwardhan**, S. Barat, and H. J. Palanthandalam-Madapusi, "Experiences from Experiments with Dynamic Sequential Multi-object Grasping for Cylindrical Objects," *Submitted to the 2025 IEEE International Conference on Robotics and Automation*, Atlanta, USA.
2. V. K. Jonnalagadda, C. K. Mullapudi, **S. Patwardhan**, V. K. Knight, X. Yang, E. U. Samani, and A. G. Banerjee, "Extremum-Seeking Active Object Recognition in Clutter Using Topological Descriptors," *Submitted to the 2025 IEEE International Conference on Robotics and Automation*, Atlanta, USA.

Accepted Publications

1. V. K. Jonnalagadda, C. K. Mullapudi, **S. Patwardhan**, E. U. Samani, and A. G. Banerjee, "Extremum-Seeking Active Object Recognition in Clutter Using Topological Descriptors," *Accepted at the 2024 IEEE International Conference on Robotics and Automation*, PACIFICO Yokohama: 2nd Workshop on Mobile Manipulation and Embodied Intelligence. [Link to paper](#)
2. A. Dan, **S. Patwardhan**, S. K. Saha, and K. RamaKrishna, "A Novel Control Strategy for Stance Stability of a Quadruped Robot against External Disturbance," *Presented at Advances in Robotics 2023, 6th International Conference of the Robotics Society*. [Link to paper](#)
3. **S. Patwardhan**, A. Dan, S. K. Saha, and K. Rama Krishna, "Simscape Modelling of Quadruped Robot under External Disturbance," *Poster presented at the 2nd International and 14th National Conference on Industrial Problems on Machines and Mechanisms (IPRoMM 2022)*. [Link to paper](#)

ACHIEVEMENTS

- **Student Travel Grant for ICRA 2024:** Received a total grant of USD 1000, sponsored by Mobile Manipulation TC and Robot Learning TC, for attending ICRA 2024 and participating in the 2nd Workshop on Mobile Manipulation and Embodied Intelligence.
- **Sabarmati Bridge Fellowship, IIT Gandhinagar:** Awarded a fellowship to conduct full-time research at the IITGN Robotics Lab as a Predoctoral Researcher for the academic year 2024-25.
- **Director's Silver Medal:** Awarded for outstanding overall performance at the 13th Convocation Ceremony of IIT Gandhinagar.
- **UW Mechanical Engineering Summer Research Grant:** Received a grant of USD 5700 to pursue a 10-week research program at the University of Washington.
- **MITACS Globalink Research Internship:** Selected for a fully funded summer research internship at Queen's University, Canada.
- **Dean's List, IIT Gandhinagar:** Recognized on the Dean's List for excellent academic performance.
- **Excellence Scholarship in Sports, IIT Gandhinagar:** Awarded for outstanding performance in both inter-college and intra-college sports leagues.

SELECTED PROJECTS

Multi-object Grasping with LEAP Hand <i>Sabarmati Bridge Fellowship, IIT Gandhinagar</i> Developed a dynamic sequential grasping strategy utilizing the LEAP hand for effective pinch and power grasp transfer. Enhanced efficiency in multi-object manipulation tasks and currently implementing a dynamical systems controller for grasp transfer between grasps.	<i>Aug 2024 - Present</i>
--	---------------------------

6D object pose feedback for Grasping on LEAP Hand

Sep 2024 - Present

Sabarmati Bridge Fellowship, IIT Gandhinagar

Developed a system to acquire 6D object pose information relative to the Leap Hand, and implemented nullspace and object impedance control to enhance interaction grasp precision and stability.

Autonomous Campus Shuttle

Jul 2023 - May 2024

IIT Gandhinagar •Video link•

Designed an autonomous vehicle for intra-campus transport with lane-following and object detection capabilities. Implemented a closed-loop feedback system using Pixhawk, RGBD cameras, and Lidar sensors to enhance navigation accuracy.

Active Robot Perception in Object Recognition

May 2023 - Sep 2023

University of Washington

Implemented an extremum-seeking control strategy for next-best-view in object recognition. Integrated a mobile LoCoBot with an RGBD camera, improving recognition in cluttered environments and enhancing robustness.

Novel Control Law for Quadruped Robot Locomotion

Mar 2022 - Sep 2022

IIT Delhi

Developed a control strategy using centroidal dynamics and Momentum Jacobian Matrix for stance stability on varied surfaces. Recognized with the best paper presentation award at Advances in Robotics 2023.

Robotic Heist: Autonomous Safe-cracking System

Jul 2022 - Dec 2022

IIT Gandhinagar

Designed a 3P Gantry robot for autonomous safe-cracking tasks, utilizing computer vision, inverse kinematics, and force analysis for precision. Employed CAD modeling and 3D printing for fabrication.

Single Actuation, Six Motions: Mechanical Musical Band Project

Jan 2023 - May 2023

IIT Gandhinagar •Video link•

Engineered a musical band model with six distinct mechanical motions driven by a single crank, applying cam systems and four-bar mechanisms. Fabricated using laser-cut MDF sheets.

Basketball Rebound-taking Robot

Sep 2023 - Nov 2023

IIT Gandhinagar •Video link•

Controlled an SPS Stewart-Gough platform to rebound a ball to a desired position, conducting kinematic and dynamic analysis for precise positioning.

Motorized Printing System for Efficient Logo Stamping

Jan 2023 - May 2023

IIT Gandhinagar

Developed a printing machine driven by a single-speed motor, optimizing for production speed and ensuring consistent logo impressions.

Cartpole Balance using Reinforcement Learning

Jan 2023 - May 2023

IIT Gandhinagar

Designed a reinforcement learning model using Proximal Policy Optimization for balancing, employing the stable baselines library for visual simulations.

SKILLS**Programming:** Python, C++, MATLAB, ROS 1 & 2, Arduino**Tools:** Gazebo, Simulink, Fusion 360, ANSYS, OpenCV, Git**Prototyping:** 3D Printing, Laser Cutting, CNC Machining, Lathe, Welding**RELEVANT COURSES**

Robotics: Introduction to Robotics, Advanced Robotics, Introduction to Robot Grasping, Control Theory, Synthesis and Analysis of Mechanisms

Mechanical Engineering: Dynamics and Vibrations, Mechanics of Deformable Bodies, Manufacturing Processes and Systems, Solid Mechanics, Fluid Mechanics, Thermodynamics

EXTRA-CURRICULAR ACTIVITIES & POSITIONS OF RESPONSIBILITY**Captain, Women's Basketball Team, IIT Gandhinagar**

2022 - 2024

Led the institute's basketball team at the 55th and 56th Inter-IIT Sports Meet, organizing training sessions and fostering team spirit.

Secretary, StepUp - The Dance Club of IIT Gandhinagar

2021 - 2022

Coordinated club events, choreographed performances, and managed rehearsals for inter-college competitions, building a vibrant dance community.

Core Committee Member, Marketing Head, Blithchron '22, Annual Cultural Festival

2022

Led a 120-member team to conduct IIT Gandhinagar's offline cultural fest, managing marketing strategies and sponsorships for successful event participation.

Core Team Member, Mean Mechanics - The Robotics Club

2021 - 2022

Organized workshops on Arduino IDE and OpenCV, and supported club projects, mentoring members on basic robotics and coding.