

Pravin Mali

Education

2016–Present **B.Tech and MS in Electronics and Communication**
International Institute of Information Technology, Hyderabad

Honours

2019 Recipient of the Dean's Award For Excellence in Research which is given to the undergraduate students for their recognized research publications.

Publication

2019 **SMA(Shape Memory Alloy) Actuated Dual Arm Flexible Gripper**

Guide: Prof. K Madhava Krishna and Dr Abhishek Sarkar
Designed a flexible gripper for gripping objects having variable curvatures and textures. It has two flexible arms on which SMA(Shape Memory Alloy) is mounted to grip the object, magnets are used to align the arm, and two motors on the end of the arms to pull them back to grip the object.
[Publication]: Advances in Robotics, 2019
(To be published in ACM library 2019)

Work and Experience

2017–2018 **A monocular vision-based exploration, and pick and place drone for search and retrieval tasks in cluttered indoor environments**

Guide: Prof. K Madhava Krishna
This project focuses on the problem of picking and placing indoor objects automatically with the help of a quadcopter in an unknown indoor environment without GPS. It has a 3D printed four-fingered flexible gripper mounted on it for picking a wide range of objects, and a forward-facing monocular camera with IMU for localization and obstacle avoidance in an indoor environment by creating a 3D map of the environment.
[Autonomous pick and place in an indoor environment](#)
[On-board reconstruction, planning and exploration](#)
[Obstacle avoidance](#)

2019–Present **Autonomous pick up and placing various kind of heavy objects with a UAV in an outdoor environment**

Guide: Prof. K Madhava Krishna
This project focuses on the problem of picking and placing of heavy payload in an outdoor environment with the help of a drone. The UAV will be able to pick and place objects from the desired GPS location obtained from RTK GPS mounted over it. It uses Google Map's data to create a global 2D map and then generate a 3D map from it by estimating building height using a forward-facing monocular camera.
[Autonomous flight and object dropping.](#)
[Simulation of drone following minimum snap trajectory with a payload in Gazebo.](#)

ABU **Assigned as Autonomous Robot Operator**

ROBOCON 2018
The problem statement of ROBOCON focuses on the problem of throwing a shuttle-cock from a circular ring which is 6 meters far and 3 meter high and then it should land in a basket which is 9 meter away from starting position with the help of an Autonomous Robot. There is a manual robot also which suppose give shuttle-cock to the Autonomous Robot and there can't be any kind of communication between both the robots.
[Robot Video](#)

Projects

- Internet of things* **Quadcopter which can be controlled through the internet** - The quadcopter can be accessed from anywhere in the world wherever there proper internet connection using a play station controller. It has a camera mounted on it which gives the First Person View and a GPS that gives the current location of the quadcopter. Implemented a communication between Raspberry Pi and Pixhawk using mavlink to send high-level commands to Pixhawk.
- ROS and Gazebo* **Simulation of payload carrying UAV** - Created a simulation of a UAV carrying a payload and following a minimum snap trajectory in Gazebo.
- Medical electronics* **3 Lead ECG** - Made a 3 lead Electrocardiogram for heartbeat rate detection by processing the electric pulses generated by the heart when it pumps the blood.
- Amplifier and Filter* **Audio Amplifier** - Made an audio amplifier to amplify sound between 20Hz-4KHz for a speaker of 1W.
- Logic Gates* **Obstacle Avoidance Car** - Made an obstacle avoiding toy car with logic gates. Sensor - Ultrasonic module.
- Signal Processing* **Empirical Mode Decomposition of signal for instantaneous frequency** - Designed a system to find out the instantaneous frequency of a given signal using Empirical Mode Decomposition.
- Security* **Security of people in a city** - Designed a system to increase the security of people in a city, and tried to ensure that help is provided in a very short duration of time.
- PID Control* **Self Balancing Robot** - Made a toy car having two tires, and was able to balance itself on them. Sensor - MPU6050 , Micro controller - Arduino UNO.
- Arduino* **Line Follower** - Made a toy car that follows a black line using an IR sensor. Microcontroller - Arduino UNO.

Technical Skills

- Languages* Embedded C, XML, C, C++(STL), Python
- Scripting* Python, Bash
- Softwares* ROS, Gazebo, MATLAB, Solidworks CAD Software, APM MISSION PLANNER, Adobe Premiere Pro

Coursework

- Electronics* Advances in Robotics, Mobile Robotics, Information Theory and Coding*, Electromagnetic Theory and its Application, Digital Logical and Processors, Embedded Hardware Design, Linear Electronics Circuit, Electrical Science, Basic Electronic Circuits, Electronics Workshop, Signal and System, Communication Networks, Communication Theory, Digital Signal Processing, ECE Lab, Intro to VLSI
- Computer Science* Machine Learning, Computer Programming, Data Structures, Algorithm and Operating System*, Information Technology Workshop, Computer Systems Organization
- Mathematics* Linear Algebra, Probability And Random Processes, Discrete Mathematics
- * - Courses in current semester

Position of responsibility

- Felicity (2016,2017)* Made RC Cars which can be controlled manually and Arena for robo soccer.
- Student Mentor, 2017* Welcoming and guiding body for incoming freshers.