




MANAN ARORA

Janak Puri, New Delhi, India

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Education

BITS Pilani KK Birla Goa Campus

Bachelors of Engineering in Electronics and Communications

2020 – 2024(expected)

Goa, India

Delhi Public School, Dwarka

Class XII

2018 – 2019

New Delhi, India

Relevant Coursework

- Probability and Statistics
- Computer Programming
- Differential Equations
- Multivariable Calculus
- Linear Algebra
- Control Systems
- Modern Control Systems
- Non-Linear Dynamics
- and Chaos
- Neural Networks and Deep Learning(online)
- Reinforcement Learning(online)

Experience

Swaayatt Robots

Research Intern

June 2023 – Present

Bhopal, India

- Working as a Research Intern under the supervision of Mr [Mr Sanjeev Sharma](#)(Founder and CEO, [Swaayatt Robots](#)). My current Research Project focuses on Motion Planning for Autonomous Vehicles using Deep Reinforcement Learning.

MARMot Lab, National University of Singapore

Research Intern

February 2023 – June 2023

Remote

- Working as a research intern under the guidance of [Dr Guillaume Sartoretti](#) on the project 'Foothold Planning using Reinforcement Learning'.
- Worked on control algorithms using Central Pattern Generators for six-legged robot Hebi Daisy.
- Currently working on various Reinforcement Learning based Algorithms for Locomotion.

BITS Pilani Goa Campus

Undergraduate Researcher

September 2022 – Present

Goa, India

- Working with [Dr Sarang Dhongdi](#) on the development of an integrated bridge framework to co-simulate the coverage planning of a swarm of disaster-deployed UAV swarms using PX4 SITL (in Gazebo, ROS) and the communication network between them using the NS3 simulator.

CSIR-CEERI

Research Intern

June 2022 – September 2022

Rajasthan, India

- Worked as a research intern under the guidance of [Dr Kaushal Kishore](#).
- Worked on control and perception algorithms for MAV landing on a generalised moving platform without any markers.
- Designed perception algorithms for detection of the unmarked platform using 3D Lidar and a USB camera, and control algorithms to follow and land on the moving platform.

Project Kratos

Life Detection Subsystem Member

July 2021 – February 2022

Goa, India

- Implemented computer vision based onboard life detection systems.

Projects

TrotBot | Python, ROS, Arduino, C/C++, PyTorch[\[Link\]](#)

November 2021

- TrotBot is an autonomous omni wheel based delivery bot developed by ERC.
- Worked on developing various path planning algorithms like A* for the bot.
- Worked on implementing Kalman Filter for sensor fusion to get reliable odometry from various sensors.
- Worked on Semantic Segmentation i.e categorizing various objects in the image captured by the onboard camera.

SwarmBots | Python, ROS, Arduino, C/C++, OpenCV[\[Link\]](#)

August 2022 – Present

- In SwarmBots, we aim to build a decentralised swarm of autonomous mobile robots and implement various 'collective decision-making' algorithms on this swarm.

Octobounce | Python, ROS, Arduino, C/C++, OpenCV[\[Link\]](#)

April 2022

- OctoBounce is a Stewart based platform for controlling the bounce of a table tennis ball.
- Implemented computer vision based ball detection algorithm.

Maze Solving Robot | *Python, ROS, Arduino, C/C++, OpenCV* [\[Link\]](#)

February 2022

- Developed a control and navigation stack for an omni wheel robot to solve a maze autonomously.
- Implemented a closed loop PID controller and a modified version of RRT for path planning.

UAV Landing on a Generalised Moving Platform | *Python, ROS, PX4, C/C++, OpenCV, RViz* [\[Link\]](#) **September 2022**

- In this work, we attempt to land a UAV on an unmarked moving platform using visual servoing. All the previous approaches usually mark the platforms with AR Tags, identification markers etc.
- A visual servoing based controller is used to perform the landing maneuvers using platforms coordinates and velocity information.
- We use contour detection and optical flow for platform detection and tracking.
- Currently the research is focused on Deep learning based methods for platform detection using 3D Lidars.
- Work done was published in the paper titled **UAV Landing on General Moving Platforms Without Markers** at IMSD-ACMD at IIT Delhi

Technical Skills

Languages: Python, C/C++, MATLAB

Tools and Frameworks: ROS, Gazebo, PyBullet, Gym, Isaac Gym, Simulink, rViz, NS3, Logisim, Autocad

Deep Learning: PyTorch, Tensorflow, NumPy, Pandas, scikit-learn

Technologies/Frameworks: Linux, Git/Github