

Education

BITS Pilani, KK Birla Goa Campus

Goa, India

B.E. IN ELECTRICAL ENGINEERING

Aug 2019 - Present

- Major in Electrical and Electronics Engineering
- Minor in Physics
- *CourseWork*: Calculus, Linear Algebra, Probability and Statistics, Differential Equations, Signals and Systems, Communication Systems, Control Systems, Modern Control Systems
- CGPA: 7.78/10

Experience

Ottonomy Inc.

India

ROBOTICS INTERN

Sep 2021 - Dec 2021

- Built a package for Simulation of Robot in 3D Urban environment with ramps, walls etc. in Gazebo Simulator
- Looked into integration of move-base-plugin for 3D Environments using packages like Spatio-Temporal-Voxel-Layer, Voxblox, Octomap.
- Analysed volumetric mapping and the usage of Voxblox for Path Planning in 3D
- Compared planners like BIT*, AIT*, RABIT* for efficiently planning a path in 3D environments.
- Developed of a 3D Path Planning algorithm using Multi Heuristic Search A-Star with custom heuristics apt to Urban Navigation

Peppermint Robots

India

ROBOTICS INTERN

May 2021 - Jul 2021

- Built a GUI based on Qt Quick and QML
- Integrated the GUI with ROS2 and tested it out on the Robot
- Researched about State Lattice Based Path Planning for Indoor Robot and analysed better ways to perform local planning using incremental Graph Search Techniques
- Developed a Motion Primitives based local planner and implemented a move-base-flex plugin for the same

Research

State Estimation for Autonomous UAV

Bits Goa

UNDERGRADUATE RESEARCH

Sept 2021 - Dec 2021

- Conducted research under Prof. Rakesh Warier on State Estimation Techniques for transitions between Indoor and Outdoor Autonomous flight.
- Learnt and compare different paradigms of State Estimation, i.e., Filtering, Fixed-lag smoothing etc.
- Analysed Optimisation based methods with tightly coupled VIO measurements.

Projects

Indoor Autonomous Drone

GOA

PERSONAL

July 2020 - Dec 2020

- Worked on the navigation stack of an Indoor Aerial Robot
- During the project, I learned more about agile Autonomous drones, Path planning in complex 3D environments and trajectory optimisation.
- Used ROS and several Open Source packages to develop a Navigation stack for Indoor Autonomous Drone and tested it out using RotorS Simulation
- Wrote an *article* explaining the project

Trotbot

BITS, Goa

CLUB

Jan 2020 - PRESENT

- I am leading the team on building an indoor autonomous Robot capable of traversing in indoor environments. The robot can travel omnidirectionally is called *Trotbot*
- Researched and implemented State Estimation algorithms in Indoor Environments using LiDAR, IMU and Wheel Encoders
- Lead and advised the team on using Deep learning algorithms for Semantic Scene understanding

Gennav

BITS Goa

CONTRIBUTOR

Jun. 2020 - Dec. 2020

- Contributed to building a modular python package for autonomous navigation algorithms.
- Worked on integrating the algorithms to ROS using a wrapper, gennav ROS

Drone Mapping of Mangrove Swamps in Goa

Goa

MEMBER

Sep. 2021 - Dec. 2021

- Under the guidance of Prof. Shibu Clement funded by the Forest Department of Goa, 3D Map 44 sq. km of Mangrove Swamps in and around Goa using a DJI Phantom 4 Pro V2.
- Built a Ensemble model for Identification of 16 different Mangrove Species using Resnet18 and VGG (acc 86% and f1-score 0.86)
- Built a Desktop application using Tkinter to run the inference of the Model built.
- Worked on stitching images together and using Image Processing techniques to obtain boundaries of each Mangrove

Extracurricular Activity

Center for Technical Education

BITS, Goa

PRESIDENT

May 2021 - PRESENT

- I lead a motivated team of 30+ students from different backgrounds and collectively we work in the largest Technical Organisation in BITS Goa, Campus with the sole aim of improving the Technical Culture of Campus
- We collaborate with all the technical clubs of campus and host many events together. We host industry professionals to talk about their fields of expertise etc.
- We conduct courses, workshops, Hackathons, provide Project Funding to prospective projects on campus
- In my previous years as a Core Member, I improved systems of Automation in areas of Emailing, Certificate Generation etc.
- I also worked as the Lead for Academic Assistance Program, where we aim to help out Juniors in academics by organising informal peer-to-peer discussion sessions and study groups.

Project Kratos

BITS, Goa

MEMBER

Aug 2020 - August 2021

- Project Kratos is student run team which aims to participate in the Univesity Rover Challenge
- I was part of the Autonomous subsystem. I contributed to the navigation pipeline of the Rover an implemented obstacle avoidance.

Teaching

Robot Automation using ROS

BITS Goa

MENTOR, QSTP

Summer 2021

- Taught and provided resources for the basics of Robotics with the Introduction of Robot Operating System, Control and basics of Path Planning

Aerial Robotics

BITS Goa

MENTOR, QSTP

Summer 2021

- Taught Path Planning and State Estimation for Drones.
- Provided material for Path Planning in 2D and 3D environments, G-H Filter, Kalman Filters in 2D and 3D

Tech-Stack

Tools Robot Operating System, Arduino Programming, Pytorch, Tensorflow, Simulink, Fusion 360, Eagle

Programming Python, C/C++, MATLAB, RUST, LaTeX

Languages English, Telugu, Hindi, Tamil

Clubs and Departments

2020 **AAP Head**, Center for Technical Education

BITS, Goa

2020 **Senior Core Member**, Electronics and Robotics Club

BITS, Goa

2020 **Senior Core Member**, Aerodynamics Club

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2020 **Core Member**, Project Kratos

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