

# DHRUV KRISHNA

Final Year B.Tech, Mechanical Engineering  
Indian Institute of Technology Jodhpur  
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## EDUCATION

### B.Tech - Mechanical Engineering

IIT Jodhpur | CGPA: 8.45/10

2017 – 2021

### Higher Secondary (HSC)

Sir Padampat Singhania Education Centre | Percentage: 88.8%

2015 – 16

### Secondary (SSC)

Sir Padampat Singhania Education Centre | CGPA: 10.0

2013 – 14

## PUBLICATIONS

- Siddhant Saoji and **Dhruv Krishna**, Vipul Sanap, Rajendra Nagar, and Suril V Shah. 2021. Learning-based Approach for Estimation of Axis of Rotation for Markerless Visual Servoing to Tumbling Object.

## EXPERIENCE

### Obstacle Avoidance using Path Planning for Dual Arm Half Humanoid Robot

June 2020 – Aug 2020

ISRO Inertial Systems Unit | Undergraduate Intern

- Integrated MoveIt path planning and perception pipeline with Gazebo for the task of obstacle avoidance during manipulation in static environments.
- Created the URDF and simulated the humanoid robot designed by ISRO
- Reduced the convergence time and studied the performance of various path planners with and without obstacles in a static environment

### Smart Robot Group

June 2020 – August 2020

National University of Singapore (NUS) | Research Intern

[Prof. Gregory Chirkjian](#)

- Discussed and presented the recent developments in the fields of **Smart Robotics** and **Robot Imagination**
- Compared the performance of various state of the art pose estimation networks on the **Linemod** and **Occluded Linemod** datasets
- Fine tuned the networks to improve the performance of the network on dataset for kitchen utensils

### Quality biased incremental RRT - qRRT

May 2019 – July 2019

IIT Jodhpur | Undergraduate Research Intern

- Aim to bias the nodes of Rapidly Exploring Tree for better and faster solution trajectories using **Reinforcement Learning**
- Introduced goal bias as a hyperparameter for better results
- Implemented the qRRT algorithm on **Pioneer 3-DX** mobile robot

## PROJECTS

### Featureless Visual Servoing for Dual Arm Half Humanoid Robot

April 2021 – June 2021

ISRO RESPOND Project | ISRO

[Guide: Dr Suril V Shah](#)

- Segmented the end effector using color based segmentation and generated real time point cloud using RGB-D data from **Microsoft Kinect**
- Performed **Principal Component Analysis** on the point cloud end effector to generate real time pose of the end effector.
- Simulated **Position based Visual Servoing** using the extracted pose in **VRep**.

### Featureless Visual Servoing for Tumbling Objects

April 2020 – Jan 2021

B.Tech Project | IIT Jodhpur

[Guide: Dr Suril V Shah](#)

- Created a dataset of 600k videos of tumbling objects using **Blender**
- Trained **CNN** to extract static features of tumbling object using **optical flow**
- Simulated **Position Based Visual Servoing** using the extracted features in **VRep**

### Vision based manipulation and grasping

November 2019 - June 2020

ISRO RESPOND Project | ISRO

[Guide: Dr Suril V Shah](#)

- Simulated the Reachy 7 DoF Robotic Arm in **Gazebo** by adding actuators and Velocity Controllers using **ROS Control** package
- Created the **URDF** and controllers for custom robot designed by ISRO and controlled it in Gazebo
- Implemented eye to hand **Image based Visual Servoing** in Joint Space in Gazebo for the custom robot

## Autonomous navigation of mobile robots

February 2019 - April 2019

B.Tech Project | IIT Jodhpur

Guide: [Dr Suril V Shah](#)

- Mapped the environment through Microsoft KINECT Sensor using **Real Time Appearance Based Mapping** (RTAB-Map)
- Navigated the **Pioneer-3 DX** Mobile robot in the mapped environment autonomously

## Tremor Suppressing gloves

Nov 2018 - Dec 2018

7th Inter IIT Tech Meet | IIT Bombay

- Created a light weight and cheaper solution to suppress Parkinson Tremors for the project of Parkinson Tremor Suppression hosted by **BETiC Lab, IIT Bombay**
- The prototype secured first position among the top 21 institutions for technical education (IITs) in India

## CNC Engraver

June 2018 - Aug 2018

Student Gymkhana | IIT Jodhpur

- Wrote an **Arduino** code to control the speed of 2 Stepper motors simultaneously and independently
- Used **Bresenham's Algorithm** for simple contours like Lines and Arcs
- Coded a **G Code interpreter** on Arduino for arbitrary contours and simulated on MATLAB

## TECHNICAL SKILLS

**Programming Languages:** C++ • Python • MATLAB • Arduino

**Skills:** ROS • Computer Vision • Machine Learning • Deep Learning • Reinforcement Learning

**Softwares:** Gazebo • CoppeliaSim (VRep) • MoveIt! • ADAMS • Cinderella

**Tools:** Tensorflow • Keras • OpenCV

## RELEVANT COURSES

Introduction to Robotics  
Artificial Intelligence- 1  
Linear Algebra and Calculus  
Probability and Statistics

Swarm Robotics  
Smart Manufacturing  
Mechatronics  
Industry 4.0 and its applications

Autonomous Systems  
Kinematics of Machines and Mechanisms  
Computer Programming

## POSITIONS OF RESPONSIBILITY

**Vice Captain** | Robotics Club

Aug 2018 – May 2019

**Core Member** | Career Development Cell

Aug 2020 – April 2021

**Volunteer** | Career Development Cell

July 2017 – April 2018

## ACHIEVEMENTS

- Former selected intern at **Carnegie Mellon University**
- Secured **Gold** medal in Inter IIT Techmeet 2018.
- Placed among the top 0.5% of 1.4 million applicants in JEE Advanced 2017.