# SOHAM DASGUPTA

**Indian Institute of Technology Roorkee , Roorkee - 247667**

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## EXPERIENCE

### Research Intern

**AVRL Lab,University of Waterloo**

May 2022 – July 2022 Ontario

- Worked with a Camera-Lidar setup to acquire data and process them for point cloud aggregations of multiple objects(chairs).
- Developed and tested different modules for clustering, tracking and point cloud aggregation for multiple rigid objects(chairs).
- Used modified DBScan based method for clustering, 3D Kalman Filter for tracking and generalised ICP for point cloud aggregation.
- Modelled a real-time ros-based package to detect and aggregate point clouds for multiple objects in an indoor environment.

## PROJECTS

### Object Aggregation in an Indoor Environment

**Bachelor Thesis**

August 2022 - Present

- Used transfer learning on Yolov4(Darknet architecture) to detect custom objects. Trained the model with over 400+ images from different orientations and positions.
- Implemented sensor fusion techniques using lidar-camera calibration to attribute class ID and confidence score to detected clusters.
- Improved the clustering algorithms using the projection of 2D bounding boxes from YOLO to remove points from other objects.

### Reinforcement Learning Based Control on a Biped Robot in soft terrain

**Machine Intelligence Lab , IIT Roorkee**

June 2021 - August 2022

- Implemented a Reinforcement learning-based control for a biped robot travelling in deformable terrain conditions.
- Developed a simulator in PyChrono for a 9 DoF Biped traversing in soft terrain conditions using multibody dynamics.
- Initialised the gait trajectory as cycloidal and used DDPG to train the biped for gait and trajectory control.

### Design and Control of Arm Manipulator

**ERC-2021,Team Robocon IITR**

December 2020 - May 2021

- Designed a 5DOF robotic manipulator , which will be used to complete numerous tasks in diverse rover competitions.
- Manipulator links were actuated by a worm gear, lead screw and a dual bevel gear based mechanisms, respectively.
- The software was developed in Ros with the help of Moveit packages. The manipulator was navigated using AR_tags and to the exact coordinate using move it commander

## EDUCATION

### Bachelor of Technology in Mechanical Engineering

**IIT Roorkee**

July 2019 – Present CGPA:8.97

### Class XII

**Hariyana Vidya Mandir**

June 2019 95%

### Class X

**Kendriya Vidyalaya**

June 2017 CGPA:9.8

## SKILLS

C/C++ Python ROS Open3D Pytorch OpenCV Git Pychrono

## COURSEWORK

- Data Structures and Algorithms
- Computer Vision
- Computer Aided Design
- Automatic Control
- Engineering Mathematics I & II

## POSITION OF RESPONSIBILITY

- **Leap Secretary,Student Mentorship Program** Leap stands for Linguistic Enhancement and Assistance Program. It is designed to help the student who have rudimentaryEnglish proficiency cope with the rigorous english based curriculum of the Institute
- **Volunteer , NSS** Organized an inter-school sports competition and participated in two fundraisers for severely ill students. Actively participated in organizing a blood donation camp where my primary task was to promote the events over multiple hostels

## ACHIEVEMENTS

- Mitacs Globalink- Recipient of research internship fellowship in Canad
- Runner up Inter IIT Tech Meet Agrobot Innovation Challenge
- Ranked 2483 in JEE Advance 2019