Siddhant Saoji

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Education

Indian Institute of Technology Jodhpur Jodhpur,India

Bachelor of Technology, Mechanical Engineering— Specalization: Robotics and Mobility Systems *Expected 2021*

- CGPA 8.96/10 (Department Rank 1)

Publications

Flexibly configuring task and motion planning problems for mobile manipulators 2020

25th IEEE International Conference on Emerging Technologies and Factory Automation *TU Wien, Austria*

- doi.org/10.1109/ETFA46521.2020.9212086

Internship Experience

Division of Robotics, IOC-UPC April 2020- September 2020

Advisor: Prof. Jan Rosell — Internship *Barcelona, Spain*

- Worked on Task and motion planning for mobile manipulators.
- Developed multiple ROS packages and implemented on TiaGo robot.
- Made contributions to various projects including The Kautham Project and GraspIt-RosNode.

ISRO Inertial Systems Unit June 2020 -August 2020

Internship *Thiruvananthapuram, India*

- 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 compared the performance of various path planners with and without obstacles in a static environment.

Projects

Vision Based Manipulation and Grasping January 2020 – Present

Advisor: Dr Suril V Shah — Indian Space Research Organisation, RESPOND Project *IIT Jodhpur, India*

- Controlled the Half Humanoid Robotic Arm developed by ISRO using MoveIt.
- Performed motion planning of arm by using 3D pose estimation of goal.
- Implemented eye to hand Image Based Visual Servoing in Joint Space for the custom robot

Featureless Visual Servoing for Tumbling Objects June 2020 – December 2020

Advisor: Dr Suril V Shah, Dr. Rajendra Nagar — Research Project *IIT Jodhpur, India*

- Created a dataset of 600k videos of tumbling objects using Blender and calculated Optical Flow in coarse to fine manner.
- Extracted static features of tumbling object from the calculated optical flow using Convolutional Neural Networks for use in control law to control manipulator.
- Simulated Position Based Visual Servoing by using the extracted features of the tumbling object on VRep.

qRRT:Quality Biased Incremental RRT for optimal motion planning May 2019 – September 2019

Advisor: Dr Suril V Shah — Research Project *IIT Jodhpur, India*

- Biased the nodes of Rapidly Exploring Random Tree for better and faster solution trajectories using Deep Reinforcement Learning
- Introduced goal bias as a hyperparameter for better results.

Technical Skills

Programming Languages: Python, C/C++
Robotics Tools: Robot Operating System(ROS), MATLAB, Raspberry Pi, Arduino, NodeMCU, Beaglebone
Software: ADAMS, Cinderella, Gazebo, VRep, MoveIt!, GraspIt!, The Kautham Project