Siddhant Saoji

First Year MS, Electrical and Computer Engineering
University of California San Diego
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Education

University of California San Diego — La Jolla, CA
MS - Electrical and Computer Engineering |Intelligent Systems, Robotics, and Control — *2021 – Expected June 2023*
Courses: Sensing and Estimation*, Principles of AI, Statistical Learning 1, Linear Systems Theory

Indian Institute of Technology Jodhpur — Jodhpur, India
B.Tech - Mechanical Engineering | Specialization in Robotics | Department Rank 1 — *2017 – 2021*
Courses: Robotics, Autonomous Systems, Swarm Robotics, Mechatronics, AI- 1, Smart Manufacturing

Experience

Existential Robotics Laboratory, UCSD — June 2021 – Present
Student Researcher — *Advisor: Prof. Nikolay A. Atanasov*
* Working on **IRL** for long horizon interactive tasks in realistic robotic environment.
* Investigated various Interactive environments for Embodied AI and trained RL agent in them

Division of Robotics, IOC-UPC (BarcelonaTech) — April 2020- September 2020
Research Intern — *Advisor: Prof. Jan Rosell*
* 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
Undergraduate Intern — *Advisor: Mr Durairaj R and Dr Suril V Shah*
* 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 in a static environment.

Robotics Lab, IIT Jodhpur — May 2019 – July 2019
Undergraduate Research Intern — *Advisor: Dr Suril V Shah*
* Worked on Quality biased incremental RRT - qRRT
* Biased the nodes of RRT tree for better and faster solution trajectories using **Reinforcement Learning**
* Introduced goal bias as a hyperparameter for better results and implemented on **Pioneer 3-DX** mobile robot

Projects

Vision based control and Motion Planning for Half Humanoid Robot — Jan 2020 – June 2021
ISRO RESPOND Project | ISRO — *Guide: Dr Suril V Shah*
* Set up and controlled the custom half humanoid developed by ISRO using ROS and MoveIt.
* Extracted pose from vision data in 3D Cartesian space to implement motion planning with and without obstacles.
* Implemented eye to hand Image Based Visual Servoing in Joint Space for the custom robot

Featureless Visual Servoing for Tumbling Objects — June 2020 – Dec 2020
B.Tech Project | IIT Jodhpur — *Guide: Dr Suril V Shah, Dr Rajendra Nagar*
* Created a dataset of 600k videos of tumbling objects using **Blender**
* Trained **CNN** to extracted static features of tumbling object using **optical flow**
* Simulated **Position Based Visual Servoing** using the extracted features in **VRep**

Technical Skills

Programming Languages: C/C++ • Python
Tools: ROS • MATLAB • RaspberryPi •Tensorflow • Keras • OpenCV
Softwares: Gazebo • CoppeliaSim (VRep) • MoveIt! • ADAMS • SAPIEN •iGibson • GraspIt • The Kautham Project
Skills: Robotics •Computer Vision • Machine Learning • Deep Learning • Reinforcement Learning

Publications

- **Siddhant Saoji** and Dhruv Krishna, Vipul Sanap, Rajendra Nagar, and Suril V Shah. 2021. Learning-based Approach for Estimationof Axis of Rotation for Markerless Visual Servoing to Tumbling Object. DOI: 10.1145/3478586.3478639
- **Siddhant Saoji** and Jan Rosell, Flexibly configuring task and motion planning problems for mobile manipulators*, ETFA 2020. DOI: 10.1109/ETFA46521.2020.9212086