Siddhant Saoji

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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, Planing and Learning, Principles of AI, Statistical Learning 1

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

Amazon Robotics — June 2022 – September 2022

Advanced Robotics Engineering Intern — *North Reading, MA*

* Worked on interfacing and data collection of robotic manipulators for performance testing and analysis.

Existential Robotics Laboratory, UCSD — June 2021 – June 2022

Student Research Volunteer — *Advisor: Prof. Nikolay A. Atanasov*

* Worked 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. Contributed to The Kautham Project

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 obstacle avoidance for manipulation
* 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*

* 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

Agent Motion Planning — April 2022- June 2022

ECE276B: Planning and Learning| UCSD

* Implemented receding-horizon certainty equivalent control (CEC) and generalized policy iteration (GPI) to find the optimal control policy to follow a trajectory while avoiding obstacles for a differential-drive robot.
* Implemented A* and RRT for catching a moving target aware of the agent's next move in a 2D map

Sensing and estimaition — Jan 2022- April 2022

ECE276A: Sensing and Estimation| UCSD

* Implemented Particle filter SLAM with encoder, FOG sensor and the 2D LiDAR data to create an occupancy grid
* Implemented Visual Inertial SLAM using Extended Kalman Filter (EKF) and landmark from image data

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*

* Trained **CNN** using synthetic data 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 •PyTorch • OpenCV

Softwares: Gazebo • CoppeliaSim (VRep) • MoveIt! • ADAMS • SAPIEN •iGibson • GraspIt • The Kautham Project

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