

Sapan Agrawal

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EDUCATION

Worcester Polytechnic Institute

Master of Science in Robotics Engineering, GPA: 4.00

Worcester, MA

Aug 2019 – May 2021

Visvesvaraya National Institute of Technology

Bachelor of Technology in Mechanical Engineering, GPA 3.22

Nagpur, India

Aug 2014 – May 2018

TECHNICAL SKILLS

Languages: C++, Python, Kotlin, MATLAB

Platforms: Tensorflow, PyTorch, OpenAI, CARLA, ROS, Gazebo, MoveIt, KDL, RBDL, Drake, TrajOpt

Hardware: UR5e, Panda, Fanuc Manipulators, dVRK, Husky, TurtleBot, Humanoids, Hebi motors

EXPERIENCE

Honda Research Institute (HRI)

Robotics Research Intern supervised by Dr. Soshi Iba

San Jose, CA

Jan 2021 - Present

- **Intention Estimation for Robot Teleoperation:** Developing Inverse Reinforcement Learning (IRL) based probabilistic method for estimating and automating intended tasks of the teleoperator in shared autonomy.

Amazon Robotics

Adv. Robotics R&D Intern managed by Mr. Felipe Polido

North Reading, MA

Aug 2020 - Dec 2020

- Worked as a Systems Engineer with the Manipulation team, integrating and testing software for tote consolidation across hardware and simulation platforms.

NASA Jet Propulsion Lab (JPL)

JVSRP Intern supervised by Mr. Rohan Thakker, Dr. Hiro Ono & Mr. Kalind Carpenter

Pasadena, CA

May 2020 - Aug 2020

- Worked with EELS software team in developing grasping based new planning & control framework for snake robot climbing in crevasse for Enceladus exploration [EELS Link].

Carnegie Mellon University

Research Scholar supervised by Dr. Matthew Travers and Prof. Howie Choset

Pittsburgh, PA

June 2018 - July 2019

- **Motion Planning and Controls for a hybrid walking robot:** Implemented A* algorithm in C++ to select between rolling and walking gait while optimizing the cost of transportation. Later, developed iLQR-MPC based unified motion and footstep planning algorithm for bipedal locomotion [Flyped Link].

PROJECTS

- **Personalization for assisted driving vehicle in CARLA Simulator:** Developed a driver-in-loop framework and personalized an assistive driving system in Carla Simulator. Implemented and tested Lateral & Longitudinal PID Controller, Stanley Controller and MPC controller.
- **Deep Prediction for Self-driving vehicles:** Implemented Social-GAN to predict motion behaviors of the traffic actors using the Argoverse Motion Forecasting dataset with ADE = 2.41 and FDE = 5.52 [Code].
- **Social Robot Navigation:** Integrating social force model into real-time adaptive motion planning (RAMP) framework using Recurrent Neural Network based DQN.
- **Motion Planning for Autonomous System using Hybrid A*:** Developed a navigation stack using Hybrid A* in C++ on Husky robot in unknown environment using local Occupancy map and PID Controller in ROS-Gazebo [Code].
- **Impedance Controller for MTM of dVRK:** Implemented and compared task-space impedance controller and Computed Torque Controller in python for 7 DoF MTM and KUKA LBR in AMBF Simulator using RBDL. [Link]
- **Multi-Snake Modular Robot, Undergraduate Thesis:** Developed a bio-inspired modular self-assembling robot capable of changing its morphology to adapt to unforeseen environmental challenges [Link] [ICRA 2018 Poster].

PUBLICATIONS

- **Towards Proprioceptive Climbing in Ocean Worlds using a Snake Robot: A Grasping Perspective.** Rohan Thakker¹, Benjamin Blacklock¹, Sapan Agrawal¹, et.al. Submitted at Robotics Science and Systems (RSS) 2021.
- **Unified Foothold Selection and Motion Planning for Legged Systems in Real-Time.** Crews Steven¹, Sapan Agrawal², and Travers Matthew³, in the proceedings of the International Conference on Humanoid Robots (Humanoids) 2019.