Rishabh Jangir

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EDUCATION

University of California San Diego　　　　　　　　　　　　　　　San Diego, USA
MS in Intelligent Systems, Robotics and Control　　　　　　　　　Sept 2020 - May 2022

Indian Institute of Technology Guwahati　　　　　　　　　　　　Guwahati, India
Bachelor of Technology in Engineering Physics　　　　　　　　　　July 2013 - June 2017

SKILLS AND COURSEWORK

- **Coursework**: Data Structures, Algorithms, Robotics, Reinforcement Learning, Computer Vision, SLAM, Motion Planning
- **Languages and Frameworks**: Python, C++, ROS, OpenCV, PyTorch, Protobuf, Mujoco, PyBullet

EXPERIENCE

Nimble Robotics, Warehouse Automation Startup　　　　　　　　San Francisco, CA
Robotics ML Engineer　　　　　　　　　　　　　　　　　　　　July 2022 - Jan 2023
  - Designed and Implemented a representation learning paradigm for training downstream A2C RL algorithm to solve dense 3D bin packing problem using a robotic arm with a suction cup. Developed high-fidelity simulation in Mujoco to handle dynamic movements of the packing bin on a conveyor belt.
  - Designed and implemented a multi-robot serialized execution system in C++ used for faster training of multi-agent algorithms. Worked on building an extension to Multi Agent Path Finding (MAPF) algorithm for decentralized motion planning for single agent tasks given reservations from other robots on the grid.

Wang Lab, UCSD　　　　　　　　　　　　　　　　　　　　　　San Diego, CA
Graduate Research Assistant with Dr. Xiaolong Wang　　　　　　　Oct 2020 - Jan 2022
  - Developed and trained Deep RL models on an xArm robot to perform manipulation tasks in a physics simulator. Successfully designed a pipeline to transfer the policies to a real-world robot (**sim2real**) using computer vision techniques. Published at leading AI conferences.

Institute of Robotics and Industrial Informatics (IRI-UPC)　　　Barcelona, Spain
Research Assistant with Dr. Guillem Alenya and Dr. Carme Torras　　Jan 2018 - Oct 2020
  - Implemented a Deep RL agent to solve dynamic cloth folding problem in simulation. Programmed OpenAI gym interface for SOFA and Mujoco to simulate the cloth folding task.
  - Extended Hindsight Experience Replay (HER) algorithm to incorporate demonstrations. Demonstrated significant improvement in learning performance for block stacking task in simulation with sparse rewards. Wrote a blog post on it.

RELEVANT PUBLICATIONS*

- **Rishabh Jangir***, Nicklas Hansen*, Ghosal, Jain, Xiaolong Wang, *"Look Closer: Bridging Egocentric and Third-Person Views with Transformers for Robotic Manipulation"*, **RA-L+ICRA**, Robotics and Automation Letters 2022. (link)

- Nicklas Hansen, **Rishabh Jangir**, Sun, Alenyà, Pieter Abbeel, Alexei A. Efros, Lerrel Pinto, Xiaolong Wang, *"Self-Supervised Policy Adaptation during Deployment"*, **ICLR**, International Conference on Learning Representations, 2021 (Spotlight). (link)

- **Rishabh Jangir**, Guillem Alenya and Carme Torras, *"Dynamic Cloth Manipulation with Deep Reinforcement Learning"*, **ICRA**, International Conference on Robotics and Automation, 2020. (link)

- Sateesh Kumar, Jonathan Zamora, Nicklas Hansen, **Rishabh Jangir**, Xiaolong Wang *"Graph inverse reinforcement learning from diverse videos"*, **CoRL**, Conference on Robotic Learning 2022. (link)

OTHER PROJECTS

- **6D Pose estimation of known objects**: Implemented Iterative closest point (ICP) algorithm to predict poses of objects given scene image and depth map. Extended to a learning based approach using **PointNet** given a training dataset. Object semantic segmentation was implemented using a U-Net architecture.

- **Suction grasp affordance detection**: Designed a system that predicts object-agnostic grasp points for suction cups in cluttered environments. The semantic segmentation based system was based on **U-Net** design with carefully chosen augmentations to aid the learning process.

- **Autonomous Vehicle state prediction and mapping**: SLAM with LIDAR data - Implemented a Particle filter based SLAM algorithm for estimating the state of an autonomous vehicle given **LIDAR**, wheel encoder and Gyroscope sensor data. Visual-inertial SLAM with Stereo image data - Implemented a Extended Kalman Filter (EKF) algorithm to estimate the state of an autonomous vehicle.

- **Motion Planning in 3D Euclidean Space**: Implemented search-based (**A***) planning algorithm for 3D navigation problem. Ran a comparative study with the performance of sampling-based (**RRT**) algorithm. Sampling based algorithm was implemented using stat-of-the-art motion planning library OMPL.

- **Apprenticeship learning using Inverse Reinforcement Learning**: Created an AI agent capable of learning distinct behaviors from expert demonstrations by estimating the underlying reward functions using Inverse RL. Wrote a blog post on the same and released reproduce-able code on Github which gained attention in the machine learning community.