Rishabh Jangir

http://jangirrishabh.github.io
jangirrishabh@gmail.com
in.linkedin.com/jangirrishabh

DoB: 6th August of 1995
rjangir@ucsd.edu
https://github.com/jangirrishabh

Education

University of California San Diego (UCSD) — California, USA
Master of Science (MS) in Intelligent Systems, Robotics and Control. (2020-2022)

Indian Institute of Technology Guwahati (IIT) — Guwahati, India
Bachelor of Technology (B.Tech) in Engineering Physics. (2013-2017)

Experience

Research Assistant - University of California San Diego (UCSD) — California, USA
Electrical and Computer Engineering, Guide: Prof. Xiaolong Wang (Oct '20 - Present)

- Trained Deep Reinforcement Learning algorithms on a 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.

Teaching Assistant - University of California San Diego (UCSD) — California, USA
Electrical and Computer Engineering, Prof. Xiaolong Wang (Jan '21 - June '21)

- ECE 176: Introduction to Deep Learning and Applications.
- ECE 285: Introduction to Visual Learning.
- Designing assignments, mentoring projects conducting discussions (Computer Vision, Deep Learning, PyTorch).

Research Assistant - Institut de Robòtica i Informàtica Industrial (IRI-UPC) — Barcelona, Spain
Perception and Manipulation Group, Guide: Prof.Carme Torras, Prof. Guillem Alenya (Jan '18 - Oct '20)

- Implemented a Deep Reinforcement learning 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 in the learning paradigm. Demonstrated significant improvement in learning performance for block stacking task in simulation with sparse rewards.

Summer Intern - Robotics Research Centre, IIIT Hyderabad. — Hyderabad, India
Guide: Prof.K.Madhava Krishna, Prof.Balaraman Ravindran (May '16 -July '16)

- Developed a Reinforcement Learning agent to solve monocular SLAM breakage problem on a mobile robot.
- Improved the performance further by estimating the reward through inverse reinforcement learning from human demonstrations for anti-SLAM breakage behaviors. Published a short paper in a top-tier international conference.

Research Papers

- **Rishabh Jangir***, Nicklas Hansen*, Sambaran Ghosal, Mohit Jain, Xiaolong Wang, *"Look Closer: Bridging Egocentric and Third-Person Views with Transformers for Robotic Manipulation"*, **NeurIPS**, Deep Reinforcement Learning Workshop 2021. (Project)/(Paper)
- Nicklas Hansen, **Rishabh Jangir**, Yu Sun, Guillem 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)
- Vignesh Prasad, **Rishabh Jangir**, K. Madhava Krishna and Balaraman Ravindran, *"Data Driven Strategies for Active Monocular SLAM using Inverse Reinforcement Learning"*, (Short paper/extended abstract) Robotics Track, **AAMAS**, International Conference on Autonomous Agents and Multiagent Systems, 2017.

Technical Skills

ML/DL/CV	Python, PyTorch, Tensorflow, OpenCV.
Robotics Simulation	SOFA, Mujoco, Gazebo.
Libraries and Tools	OpenAI gym, OpenAI Baselines, Robot Operating System (ROS), Point Cloud Library(PCL), LaTeX.
Hardware	Intel 8085, Arduino, Raspberry-Pi, Beaglebone.

PROJECTS

Sim2Real Transfer of ML models. (PyTorch, Mujoco, Python)

- Engineered an effective approach for transfer of action policies learned entirely in simulation to a real world robot. The agent was capable of solving manipulation tasks in the real world even in the presence of novel visual distractions.

SOFA simulation for Robotic Textile Manipulation. (TensorFlow, SOFA, Python)

- Built a textile simulation environment in SOFA physics engine with a OpenAI gym like interface, to train and test agents on learning textile manipulation from demonstrations.

Overcoming Exploration in Reinforcement learning with demonstrations. (TensorFlow, Python)

- Implemented ICRA'18 paper on how to use demonstrations in a sparse reward reinforcement learning problem with hindsight experience replay to solve block grasping and stacking tasks which was not achieved through vanilla HER.

Apprenticeship learning using Inverse Reinforcement Learning. (Pygame, Python)

- Created an artificially intelligent agent capable of learning distinct behaviors from expert demonstrations by estimating the underlying reward functions using Inverse Reinforcement Learning (Abbeel and Ng, 2000). Wrote a blog post on the same and released reproduce-able code on Github which gained attention in the machine learning community.

Autonomous Indoor Navigation Robot. (ROS, C++, Arduino)

- Our 6 member team designed, fabricated and programmed a differential drive based robot (inspired from turtle-bot design) capable of mapping, localization and autonomous navigation as a part of Robotics Club, IIT Guwahati.

Pattern Recognition and Machine Learning. (MATLAB, OpenCV)

- Built from scratch a Gaussian mixture model (GMM) for Image segmentation, Bayesian classifier for character recognition, and principal component analysis (PCA) for face recognition, as part of a course project.

RELEVANT COURSES

- **ML/AI**: Principles of Artificial Intelligence: Probabilistic Reasoning and Decision-Making, Linear Algebra, Deep Reinforcement Learning, Statistical Learning, Machine Learning and Pattern Recognition.
- **Computer Vision**: Advanced Computer Vision, Domain Adaptation in Computer Vision.
- **Robotics**: Sensing and Estimation in Robotics, Robot Reinforcement Learning, Planning and Learning in Robotics.

ACHIEVEMENTS

- **Deep RL Bootcamp, Berkeley CA,** Selected for attending the two day long, first ever deep RL bootcamp, Berkeley.
- **Winner (for our autonomous navigation robot)**, technical exhibition competition, Techniche'15, IIT Guwahati.
- Secured **99.3 percentile** in **IIT-JEE 2013**, out of over 1.5 million students appearing for the exam.

HACKATHONS

- **CAMTech-X: Jugaadathon India 2017,** Attended the 48 hour long Urban healthcare technologies Hackathon. Developed a low-cost non-invasive device for measurement of blood pressure wave-forms to predict heart-related diseases.
- **MIT Media Lab REDx camp, July'15,** Among the 30 candidates who were selected from all over India for a week long eye care technologies health camp in Hyderabad. Developed a virtual reality environment based prototype to test various modalities that can help the visually-impaired to navigate efficiently.

SERVICES

- **Paper Review**: ICRA, RA-L, Expert Systems With Applications.