

# RISHABH JANGIR

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## EDUCATION

<b>University of California San Diego (UCSD)</b> Master of Science (MS) in Intelligent Systems, Robotics and Control.	California, USA (2020-2022)
<b>Indian Institute of Technology Guwahati (IIT)</b> Bachelor of Technology (B.Tech) in Engineering Physics.	Guwahati, India (2013-2017)

## EXPERIENCE

<b>Research Assistant - University of California San Diego (UCSD)</b> <i>Electrical and Computer Engineering, Guide: Prof. Xiaolong Wang</i>	California, USA (Oct '20 - Present)
<ul style="list-style-type: none"><li>– 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.</li></ul>	
<b>Teaching Assistant - University of California San Diego (UCSD)</b> <i>Electrical and Computer Engineering, Prof. Xiaolong Wang</i>	California, USA (Jan '21 - June '21)
<ul style="list-style-type: none"><li>– ECE 176: Introduction to Deep Learning and Applications.</li><li>– ECE 285: Introduction to Visual Learning.</li><li>– Designing assignments, mentoring projects conducting discussions (Computer Vision, Deep Learning, PyTorch).</li></ul>	
<b>Research Assistant - Institut de Robòtica i Informàtica Industrial (IRI-UPC)</b> <i>Perception and Manipulation Group, Guide: Prof. Carme Torras, Prof. Guillem Alenya</i>	Barcelona, Spain (Jan '18 - Oct '20)
<ul style="list-style-type: none"><li>– 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.</li><li>– 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.</li></ul>	
<b>Summer Intern - Robotics Research Centre, IIIT Hyderabad.</b> <i>Guide: Prof.K.Madhava Krishna, Prof.Balaraman Ravindran</i>	Hyderabad, India (May '16 -July '16)
<ul style="list-style-type: none"><li>– Developed a Reinforcement Learning agent to solve monocular SLAM breakage problem on a mobile robot.</li><li>– 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.</li></ul>	

## 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. ([link](#))
- 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

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

## PROJECTS

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### 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

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- **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

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- **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

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- **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

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