

Gautham Narayan Narasimhan
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EDUCATION

- **Carnegie Mellon University** Pittsburgh, PA
Master of Science in Mechanical Engineering - Robotics Concentration Aug. 2018 – May 2020
- **Vellore Institute of Technology** Vellore, India
Bachelor of Technology in Mechanical Engineering Aug. 2013 – Jul 2017

PUBLICATIONS

Transparent Liquid Segmentation for Robotic Pouring

Gautham Narayan, Kai Zhang, Ben Eisner, Xingyu Lin, David Held
ICRA 2022 (In Review); NeurIPS Deep Generative Models Workshop (Accepted)

ROLL: Visual Self-Supervised Reinforcement Learning with Object Reasoning

Yufei Wang*, Gautham Narayan*, Xingyu Lin, Brain Okorn, David Held
Conference on Robot Learning (CoRL), 2020

Segmentation For Learning Image Based Goal Conditioned Policies

Gautham Narayan, David Held
Master's thesis - Carnegie Mellon University, 2020

Experimental Droplet Spatter Analysis Using Least Squares Approximation

Gautham Narayan, Bill Eddy
Internal Report - NIST Center of Excellence in Forensic Science, 2020

Effect Of Winglet Induced Tip Vortex Structure On The Performance Of Subsonic Wings

Gautham Narayan, Bibin John
Elsevier - Aerospace Science and Technology, 2016

* denotes equal contribution

RESEARCH AND WORK EXPERIENCE

- **Robot Perception Lab - CMU** Pittsburgh, USA
Research Assistant with Prof. David Held Jun 2020 - Present
 - Utilized self supervised unknown object segmentation to improve sample efficiency, goal sampling and reinforcement learning(RL) policy performance on a range of manipulation tasks
 - Presented a novel matching loss along with VAE+LSTM neural network architecture that improved RL policy robustness to occlusions at CoRL 2020
 - Developed a novel transparent liquid segmentation framework without requiring annotations
 - Presented a pouring system using Franka Panda robotic arm for transparent liquids at NeurIPS DGM workshop 2021 (In review at ICRA 2022).
 - Currently working on a physics based differentiable simulator to learn a particle dynamics model for granular/liquid media
- **Robot Perception Lab - CMU** Pittsburgh, USA
Master's thesis with Prof. David Held Sept 2018 - Jun 2020
 - Improved performance and sample efficiency of image based reinforcement learning algorithms using segmentation.

- Transferred human demonstrations to robots through imitation learning.
- Worked with Sawyer Robots for large scale segmentation data collection.
- Worked on a grasping end effector system for cloth manipulation using pinch grasps.

- **General Motors Collaborative Research Lab - CMU** Pittsburgh, USA
Research Assistant with Prof. Raj Rajkumar Nov 2018 - Jan 2019
 - Curated a pointcloud dataset using a Velodyne VLP16 LiDAR within the CMU campus
 - 3D reconstructed surfaces of cars and pedestrians using Point Cloud Library(PCL) Poisson Solver.
 - Utilized PointNet and VoxelNet for detecting cars and pedestrians around the CMU campus.
 - Further utilized predicted bounding boxes to improve surface reconstruction around pedestrians.
- **Image and Video Understanding Lab - KAUST** Jeddah, SA
Visiting Research Student Sept 2017 - Feb, 2018
 - Implemented state of the art Imitation Learning algorithms for autonomous flying using Tensorflow.
 - Utilised MaskRCNN and SORT algorithms for real-time object detection and tracking.
 - Programming using C++ and visual scripting within Unreal game engine for a photo-realistic simulator.
 - Implemented high speed TCP socket communication between Unreal and Tensorflow for real time image transfer during training and testing.
 - Solved and submitted fast algorithms for reinforcement learning problems in OpenAI Gym.

PROGRAMMING SKILLS

Programming Languages: C/C++, Python, Matlab

Open-Source Frameworks: Tensorflow, PyTorch, OpenCV, Robot Operating System(ROS), Point Cloud Library(PCL)

Robots & Sensors: Franka Panda, Rethink Sawyer, Azure Kinect, Kinect v2, Realsense, Primesense

SERVICE

Conference Reviewer:

- International conference on Learning Representations (ICLR)
- Conference on Robot Learning (CoRL)