

YASH SHUKLA

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OBJECTIVE

Summer Internship in Robotics with applications in Reinforcement Learning, Sim2Real transfer, Machine Learning

EDUCATION

Ph.D. in Computer Science and Human-Robot Interaction

Tufts University, Medford, MA

Sept '20 – Present

(GPA - 4.0/4.0)

Relevant Courses: Reinforcement Learning, Probabilistic Robotics

Master of Science in Robotics Engineering

Worcester Polytechnic Institute (WPI), Worcester, MA

Aug '18 – May '20

(GPA - 4.0/4.0)

Relevant Courses: Deep Learning for Perception, Artificial Intelligence, Robot Control, Human Robot Interaction

Bachelor of Engineering (Hons.) in Mechanical Engineering

Birla Institute of Technology and Science, Pilani, India

Aug '14 – May '18

(CGPA - 8.36/10)

Relevant Courses: Digital Image Processing, Object Oriented Programming, Robotics and Mechanisms, Mechatronics

SKILLS

Programming: Python, C/C++, MATLAB, Java

Robotic Frameworks: Robot Operating System

Deep Learning Frameworks: PyTorch, Tensorflow, Keras

Simulation Softwares: PyBullet, Gazebo, OpenRave, NVIDIA FleX, OpenAI gym, MuJoCo, Ansys, SolidWorks

Libraries: OpenCV, Point Cloud Library, scikit-learn

EXPERIENCE

Tufts University, Medford, MA

Aug '20 – Present

- Designed a framework for curriculum transfer from a low-fidelity to a high-fidelity environment.
- Experimentally validated improved jumpstart performance and quicker learning in complex realistic scenarios.
- Manuscript submitted to IJCAI 2021 for review.
- Currently extending this work to transfer policy for efficient curriculum optimization.

Computer Vision Team, MathWorks, Natick, MA

May '19 – Aug '19

- Formulated an innovative CV algorithm to improve accuracy of camera calibration parameters for Fisheye Cameras.
- The Checkerboard Detection algorithm designed for Fisheye Cameras had better true positive detection even for images from Pinhole and Stereo Cameras.
- Achieved better checkerboard detection precision (98 %) as compared to the existing technique (83 %).

Centre for Artificial Intelligence and Robotics, Bangalore, India

Jan '18 – June '18

- Developed a novel image processing algorithm for efficient road segmentation in unstructured environment.
- Generated costmap in ROS using pointcloud information from Velodyne LIDAR, Stereo Camera and Ultrasonic sensor.
- Achieved better segmentation accuracy (91 %) as compared to existing Pyramid Scene Parsing Network (79 %).

PUBLICATIONS

Yash Shukla, Gyan Tatiya and Jivko Sinapov, A Framework for Curriculum Transfer from Simple to Complex Environments, *Under review at International Joint Conference on Artificial Intelligence (IJCAI) 2021*.

Gyan Tatiya, **Yash Shukla**, Michael Edegware and Jivko Sinapov, [Haptic Knowledge Transfer Between Heterogeneous Robots using Kernel Manifold Alignment](#), *In proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Las Vegas, USA (Virtual), October25-29, 2020*.

PROJECTS

Curriculum Optimization on a graph, WPI

Jan '21 – Present

- Currently working on optimizing graph based curriculum for reinforcement learning agents.

Model-Based RL for efficient learning in novel situations, WPI

Jan '21 – Present

- Working on Model-Based RL techniques to leverage knowledge graph to deal with novelty.

Multi-Source Feature Alignment for Collaborative Learning in Robots, Tufts University

Jan '20 – May '20

- Designed representation for knowledge transfer using kernel manifold alignment (KEMA).
- The representation enabled two source robots to transfer knowledge about novel objects to a target robot.

Graphical Neural Network For Real-Time Simulation of Soft Robotic Snakes, WPI

Jan '20 – May '20

- Developed a graph neural network to model structure of a soft snake robot for efficient locomotion.
- Achieved improved time to threshold and regret on PPO compared to non graphical model.

Learning based Motion Planning for Manipulators, WPI

Aug '19 – Dec '19

- Designed and applied DDPG-MP to a 4 DOF manipulator to achieve motion planning faster than RRT.
- Compared and evaluated Imitation Learning, Supervised Learning and DDPG-MP approaches for motion planning.

Viewpoint optimization for aiding grasp synthesis using Supervised learning, WPI

Jan '19 – Dec '19

- Implemented active vision methodology to optimize depth sensor viewpoint to increase synthesized grasp quality.
- Simulated results using Gazebo. Currently implementing the algorithms on Franka Emika Panda Robot.

Ship Detection and Segmentation from Aerial Images, WPI

Aug '18 – Dec '18

- Implemented a two model Deep Learning architecture to segment ships from aerial images on Airbus Dataset.
- Applied ResNet to classify images containing ships which were later fed to a stacked Hourglass model for segmentation.