

Varshith Sreeramdas

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Experience & Education

Georgia Institute of Technology (GT)

Atlanta, US

MS IN COMPUTER SCIENCE | SPECIALIZATION IN COMPUTER PERCEPTION AND ROBOTICS

2022 - Present

- Working on Human-Robot Collaboration in racquet sports with **Prof. Matthew Gombolay**.
- Expecting to graduate in May 2024.

Frontier Robotics, Honda Innovative Research Excellence (R&D)

Tokyo, Japan

RESEARCH ENGINEER

2019 - 2022

- Worked on Classical Control and Deep Reinforcement Learning for Dexterous Manipulation.

Indian Institute of Technology Bombay (IITB)

Mumbai, India

B.TECH. IN COMPUTER SCIENCE AND ENGINEERING (WITH HONORS, THESIS) | GPA: 8.72

2015 - 2019

- Course Work: Advanced Machine Learning, Foundations of Intelligent and Learning Agents, Organization of Web Information, Neuromorphic Engineering, Computer Graphics.
- Thesis on out-of-distribution detection and active learning advised by **Prof. Sunita Sarawagi**.

Research Interests

Reinforcement Learning, Learning from Demonstrations, Sim-to-Real for Robotic Manipulation, Human Robot Interaction.

Key Research

Learning Human Robot Collaboration in Tennis from Limited Data

GT

PROF. MATTHEW GOMBOLAY

Aug '22 - Present

- Developing methods for learning collaborative robot movement, reasoning about strategies in the doubles format.
- Evaluated baseline of mixture of Interaction Primitives, based on ProMPs, to infer strategies from dataset modes.
- Exploring methods to construct a latent strategy space using skill learning and few shot imitation formulations.

Dexterous In-Hand Manipulation using Data driven Deep Reinforcement Learning

Honda R&D

AKINOBU HAYASHI, TADAAKI HASEGAWA

Apr '20 - Aug '21

- Evaluated baseline, existing demo-based and offline Deep RL methods in simulation on dexterous In-Hand Manipulation tasks involving **transitions among tripod, precision and power grasps** of cylindrical, cuboidal objects.
- Collected expert demonstrations using manually designed controllers, and exploration data with noisy behaviour-cloned policies, on **real in-house prototype Robot Hand** with motion capture for object pose tracking.
- Deployed RL on real setup to achieve tolerance to init. noise of ranges 4cm and 30° in two tasks resp. [\[PR\]](#) [\[Video\]](#)

Hierarchical RL of Motor Primitive based Robotic Manipulation Control

Honda R&D

PROF. TAKAYUKI OSA, AKINOBU HAYASHI

Apr '20 - Sept '21

- Deep RL framework for gating policies that operate Dynamic Motion Primitives with **inferable goal, duration**.
- Investigated variants involving primitive interruption heuristics, duration inference mechanisms, optimization of inference costs, local planning, utilization of sub primitive trajectory information for frequent network updates.
- Evaluated exploration efficiency, **trajectory smoothness** with Maze Navigation, Box Pushing, InHand Manipulation.

Domain Adaptation of Cloud NLP Services though Word Substitutions

IITB

PROF. SUNITA SARAWAGI, PROF. SOUMEN CHAKRABARTI | THESIS

July '18 - May '19

- Adaptation of cloud NLP services with sub-optimal performance on client domains with obscure tokens.
- Built **contextual token substitution** model based on ELMO language model architecture to adapt input sentences.
- Employed RL with sentence, token level rewards based on discrepancy b/w true labels and predictions from service.
- Surveyed use of sentiment aware embeddings for improving exploration for sentiment classification. [\[Report\]](#)

Leadership Experience

Teaching Assistantships

INTERACTIVE ROBOT LEARNING

GT, Fall 2022

- Conducted office hours, facilitated discussion on online class forum, graded homeworks.

SOFTWARE SYSTEMS LAB

IITB, Fall 2018

- Delivered guest lectures on Build Tools and Introduction to Android Development.
- Awarded 'Certificate of Excellence' for the Month of Oct '18 in the CSE Dept.

Synergy From Diversity

Honda R&D

FRONTIER ROBOTICS (DIVISION)

Apr '21 - Apr '22

- Co-established a working group to promote cultural sensitivity among different nationalities, and communication in the context of remote work during COVID-19. Organized language exchange sessions and sensitivity workshops.

Academic Mentor

IITB

CSE DEPARTMENT ACADEMIC MENTORSHIP PROGRAM

May '18 - May '19

- Mentored 7 sophomore students, helped coordinate solutions to common academic problems with CSE Dept.
- Advised a back-logged student under the [Academic Rehabilitation Program](#).

Skills

Deep RL Algorithms AWAC (rlkit), DAPG (mjrl), SAC, TD3, baselines (OpenAI).

ML Models VAEs for Representation Learning; LSTMs for Music Synthesis; Deep Kalman Filters for Time Series Forecasting; RL of Spiking Neural Networks for Inverse Pendulum.

ML Libraries PyTorch, TensorFlow (1, 2), CUDA (basic).

Simulation PyBullet, ROS, MuJoCo (basic), MoveIt, Pinocchio (basic).

Miscellaneous Git, pybind11, OpenGL, \LaTeX .

Languages English, Japanese (JLPT N3), Hindi, Telugu.

Other Projects

Out-of-Distribution metrics for Active Domain Adaptation

IITB

PROF. SUNITA SARAWAGI, PROF. SOUMEN CHAKRABARTI

July '18 - May '19

- Evaluated out-of-distribution (OOD) detection methods involving image classifiers: likelihood temperature scaling (TS), Variational Information Bottlenecks, multi-label and calibrated NNs, perturbation based detectors (ODIN).
- Investigated applicability of OOD-ness as a **proxy for informativeness** of data samples in Deep Active Learning.
- Extended TS, ODIN to sequence inputs for Active Domain Adaptation in Named Entity Recognition. [\[Report\]](#)

Augmenting Scene Graph Generation with Knowledge from Corpora

IITB, IBM Bangalore

PROF. SOUMEN CHAKRABARTI, AMRITA SAHA | INDEPENDENT STUDY UNDER FACULTY

Jan '19 - Apr '19

- Studied various sources of side information to improve Scene Graph Completion in a gold data-scarce scenario.
- Built pipeline to parse text corpus, infer relevant entities and relations, and construct usable priors using OpenIE.
- Implemented and evaluated **LK distillation**, a method of prior incorporation, to improve Neural-Motifs.
- Investigated methods to deal with relation label space discrepancy among text and visual sources. [\[Report\]](#) [\[Code\]](#)

Sign Language Synthesis with Adversarial Styling

Honda Research JP

BROCK, HEIKE | SUMMER INTERNSHIP

May '18 - July '18

- Developed seq-to-seq models to synthesize motion gestures of an animated character from annotated sentences.
- Studied incorporation of natural human-like variability into gestures using adversarially learnt style features.
- Investigated various representations of orientations for efficient learning in a data scarce scenario. [\[Report\]](#) [\[Code\]](#)