Varshith Sreeramdass

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Experience & Education

Frontier Robotics, Honda Innovative Research Excellence, Tokyo — *2019 - Present*
Research Engineer

Indian Institute of Technology Bombay, Mumbai — *2015 - 2019*
B.Tech. in Computer Science and Engineering with Honours — *GPA: 8.72*

Telangana State Board of Intermediate Education, Hyderabad — *2013 - 2015*
Intermediate/+2 in Maths, Physics and Chemistry — *GPA: 9.78*

Key Research

Hierarchical Reinforcement Learning of Motor Primitive based Robotic Manipulation Control — *Honda R&D, RIKEN*

Prof. Takayuki Osa, Akinobu Hayashi — *Apr '20 - Aug '21*

- Studied applicability of Dynamic Motion Primitives with **inferable goal, duration params** in robotic manipulation environments.
- Built a framework for **learning gating policies** operating in DMP params space, employing SOTA RL algorithms **TD3**, **SAC** & **AWAC**.
- Investigated variants of the framework involving **primitive interruption** heuristics, **duration inference** mechanisms, optimization of **inference costs**, utilization of **sub primitive** trajectory information for dense network updates.
- Investigated the performance and utility of the method regarding **exploration efficiency**, optimality, **trajectory smoothness** in 2D Point Mass and complex In-Hand Manipulation environments.

In-Hand Manipulation using Data driven Deep Reinforcement Learning — *Honda R&D*

Akinobu Hayashi — *Apr '20 - Aug '21*

- Evaluated baseline, existing **demo based** (DAPG) and **offline** (AWAC) RL methods in simulation on In-Hand Manipulation tasks which involved **transitions among tripod, precision and power grasps** of cylindrical or cuboid objects.
- Collected expert demonstrations using manually designed controllers, and exploration data with noisy behaviour-cloned policies; on **real in-house prototype Robot Hand** setup with motion capture for object pose tracking.
- Deployed mentioned data driven RL algorithms on the above robot setup achieving modest tolerance to initialization noise.

Domain Adaptation of Cloud NLP Services through word substitutions — *IIT Bombay*

Prof. Sunita Sarawagi | Undergraduate Thesis II — *Jan '19 - April '19*

- Built models to perform **contextual word substitutions** in sentences to improve performance of **cloud NLP services** like sentiment classification, NER tagging regarding OOV words, domain specific phrases.
- Designed an RL algorithm to train the above model using **sentence and token level** rewards based on similarity between target labels and those returned by cloud services.
- Studied **task aware exploration strategies** in word substitution space to find relevant words efficiently - use of sentiment aware embeddings for sentiment classification.

Augmenting Scene Graph Generation with knowledge from corpora — *IIT Bombay, IBM Bangalore*

Prof. S. Chakrabarti, Amrita Saha | Research Project — *Jan '19 - April '19*

- Studied various sources of **side information** to improve Scene Graph Completion task 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 the baseline model of **Neural-Motifs**.
- Investigated methods to deal with relation label space discrepancy among text and visual sources.

Positions of Responsibility

Teaching Assistant

Software Systems Lab, Autumn 2018 — *July '18 - Nov '18*

- Designed assignments, projects; organized tutorials, help sessions for a class of 130 sophomores.
- Co-led a team of 7 TAs.

Department Academic Mentor

CSE Department, IIT Bombay — *May '18 - May '19*

- Mentored 7 sophomore students and helped them cope with academic problems.

Research Interests

Data Mining: Knowledge Graphs, Topic Embeddings

Modeling: Latent representations, Bayesian Reasoning

Robotics: DRL, Control theory, Theory of mind

Geometry Processing: Shape Understanding, Scene Synthesis

Neuroscience: Spiking NNs

Skills

ML, CV, ROBOTICS

PyTorch, Tensorflow, Keras, CUDA (basic)

OpenCV, OpenGL

PyBullet, ROS, Pinocchio (basic)

OTHERS

Git, Android Studio, Django, SQL

C++/C, Java, Python, JS, LaTeX

MATLAB, STATA, R

Other Projects

Sign Language Synthesis with Adversarial Styling
Honda Research Institute Japan

BROCK, HEIKE | INTERNSHIP
May '18 - July '18

- Developed seq2seq models to **synthesize JSL gestures** from annotated Japanese sentences.
- Modeled the generation of gestures with **adversarially learnt style features** to incorporate natural human-like variability in the synthesized gestures.
- Explored various representations of orientations for efficiently learning them in a data scarce scenario.

Out-of-distribution detection with Neural Networks
IIT Bombay

PROF. SUNITA SARAWAGI | UNDERGRADUATE THESIS I
July '18 - Nov '18

- Analyzed **calibration performance** of established models on **out of distribution** samples.
- Surveyed out-of-distribution detection methods for deep image classification models.
- Methods include multi-label modeling of classification, variational information bottlenecks and their extensions.

Hand Gesture Recognition
IIT Bombay

INSTITUTE TECHNICAL SUMMER PROJECT | SELF PROJECT
June '16

- Designed, built **gesture recognition glove** using accelerometer, gyroscope, flex sensors & Bluetooth module.
- Interfaced sensors with **microprocessors programmed in C** relaying data to an Android mobile device.
- Developed algorithms to process the data stream using **DTW** matching with prerecorded **static and dynamic gestures**.
- Investigated further development of the recognition software using **classification models** built on **weka**.

Distributed Database System over PostgreSQL
IIT Bombay

PROF. SUDARSHAN S | COURSE PROJECT
July '17 - Nov '17

- Built a wrapper over **multiple PostgreSQL servers** to facilitate use as a single database system.
- Developed algorithms for parallelizing select, insert, aggregate and delete operations over nodes.

Scholastic Achievements

2015	**AP Grade**, Exceptional Performance in Engineering Graphics
2015	**AIR 204**, Joint Entrance Examination Advanced
2014	**AIR 710**, Kishore Vaigyanik Protsahan Yojana Fellowship
2014	**Top 1%**, NSE Physics, Andhra Pradesh, IAPT

Miscellaneous

Organized workshops at Honda R&D as a part of 'Synergy from Diversity' working group, to promote cultural sensitivity.	*2021*
Assisted in recruitment activities of Honda R&D, hiring candidates from premier engineering universities in India.	*2021*
N4 level proficiency in Japanese Language - on track for N3 by Dec '21.	*2021*
Part of a production crew of a low budget short film, involved in location scouting and sound.	*2019*
Participated in the Performance Arts Festival, IIT Bombay as a part of the winning dance team.	*2015*
Participated in the Asian Regional Space Settlement Design Competition and stood Runners' Up.	*2013*