Varshil **Gandhi**

Final Year Undergrad IIT Guwahati · Reinforcement learning Enthusiast · Avid Learner

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Education

Indian Institute of Technology, Guwahati , B.Tech Major in Electronics & Electrical Engineering and Minor in Computer Science — CGPA : 9.15/10 — 2016 - Present — *Guwahati, India*

Navrachana Vidhyani Vidhyalaya, Senior Secondary — Percentile : 99.97% — 2014 - 2016 — *Vadodara, India*

Skills

Programming	Python, C/C++, Matlab, Bash Scripting*
Tools/Frameworks/IDE	Tensorflow, Pytorch, Scikit Learn, Git, OpenAI Gym, Numpy, Matplotlib, ROS*
Miscellaneous	Arduino, Raspberry Pi, Gazebo*
Operating Systems	Linux, Windows, Raspian*

Experience

Research Internship at RISE Lab, IIT Madras — *Chennai, India*

Mentor: Prof.Balaraman Ravindran, Professor at IIT Madras & Head, RBC DSAI — *May 2019 - Jul. 2019*

- Strived upon designing robust **Imitation learning** models for autonomous driving scenarios
- Examined how introducing **graph-based structural biases** can help neural networks reason about the relations between the objects present in the view of a self-driving car
- Studying the effects of relational models in transfer learning from simulation driving datasets to real world driving datasets **(Sim-2-Real)**

Research Internship at Intel Labs — *Bengaluru, India*

Mentor: Dr.Venkat Natarajan, Senior Staff Engineer — *May. 2018 - Jul. 2018*

- Explored the domain of **Reinforcement learning & Imitation Learning** for plausible innovations towards intelligent learning of robotic systems as collaborative multi-agents
- Designed variants of **Generative Adversarial Imitation Learning (GAIL)** algorithm that can learn robotic arm maneuvers given expert trajectories
- Performed literature review on Imitation Learning methods that includes Inverse RL, Behavior Cloning and Generator-Discriminator algorithms

Distant Research Work, MILA — *Montreal, Canada*

Mentor: Dr.Jie Fu, PostDoc at Quebec AI Institute (MILA) — *August. 2019 - Ongoing*

- Experimented the effects of improving language modelling in **Text-Based Parser Games** using current advances in Language modeling
- Focused upon Reinforcement learning agents that could learn better in complex combinatorial action space
- Currently working upon whether counting may have originate from **multi-agent communication** in reinforcement learning agents

Projects

Exploring E2E networks for MultiLingual Speech recognition — *IIT Guwahati*

Bachelor Thesis Project — *July. 2019 - Ongoing*

- Showed performance enhancement in acoustic models using **trainable feature extraction methods** over traditional log mel filter-banks, thus allowing for pre-training with excessive amount of unlabeled data
- Extending the idea of trainable feature representations to design an **unified multilingual acoustic model** without compromising WER scores
- Completed an intensive literature survey on advances in multi-lingual acoustic models, incorporated and studied various novel concepts

Robotic Human Palm Replication — *IIT Guwahati*

Design Lab Project | 6 member team | Github — *Jan. 2019 - May. 2019*

- Developed a camera based framework that helps our robotic palm to replicate the motion of human fingers using **Hand Pose Estimation** techniques and deep learning models
- Integrated state-of-the-art pose estimation models & designed mathematical formulations for mapping skeleton data-points to angular outputs

Automated Robot For Library Enhancement — *Robotics Club, IITG*

4i Labs, IIT Guwahati | 6 member team | Github — *July 2017 - April 2019*

- Target is to automate the work done in arranging the books in the library shelves through a movable wheeled robot in human intervened environment
- Worked upon **SLAM, Indoor navigation, Design and 3D modeling** of a bot

Low-cost Safety System for Shipping Vessels — *Robotics Club, IITG*

InterIIT Tech Meet | 4 member team | Github — *Oct 2017 - Jan 2017*

- Devised a novel solution based on **EM signal's power decay** to avoid shipping vessel collisions
- Lead the team towards a successful prototype of the proposed low cost product taking into consideration all cost factors.

Key Courses

Electrical & Electronics	Advanced Control Systems, Probability & Random Processes, Digital Systems, Microprocessors
Computer Science	Formal languages & Automata Theory, Data Structures & Algorithms, Operating Systems, Computer Networks
Math Courses	Linear Algebra, Real & Complex Analysis, Game Theory & Economics, Advanced Topics in Random Processes
Miscelleneous	Reinforcement Learning (UCL online course), Deep Learning (Coursera), Machine Learning (Coursera)

Awards

2018	**Bronze Medal**, Safety Device for Shipping vessels, InterIIT Tech Meet	*Chennai, India*
2016	**AIR 701, Secured Research Fellowship**, KVPY 2015-16	*Mumbai, India*
2016	**AIR 1915**, Joint Entrance Exam - Advanced	*Vadodara, India*
2016	**AIR 529**, Joint Entrance Exam - Mains	*Vadodara, India*
2014-16	**State Rank 7**, GSEB Board Exams	*Vadodara, India*
2012	**Silver Medalist**, IRIS National Science Fair by Intel, CII and DST,India	*Delhi, India*

Positions of Responsibility

Apr. 2018 - Apr. 2019	**Technical Project Manager**, Robotics Club, IIT Guwahati	*Guwahati, India*
Jan. 2020 - Ongoing	**Project Mentor**, IITG.ai	*Guwahati, India*
Jan. 2020 - Ongoing	**Lecturer @ AI Lecture Series**, Robotics Club, IITG	*Guwahati, India*