

# VIRAJ PARIMI

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## EDUCATION

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<b>Massachusetts Institute of Technology (MIT)</b> Doctor of Philosophy in EECS <i>Relevant Coursework:</i> Algorithms for Inference, Robotic Manipulation	Pittsburgh, PA Present
<b>Carnegie Mellon University (CMU) - School of Computer Science</b> Master of Science in Robotics   GPA: 4.08/4 <i>Relevant Coursework:</i> Computer Vision, Mathematical Fundamentals for Robotics, Graduate Artificial Intelligence, Statistical Techniques in Robotics, Planning and Decision Making in Robotics, Mechanics of Manipulation	Pittsburgh, PA August 2021
<b>Indraprastha Institute of Information Technology (IIIT)</b> Bachelor of Technology in Computer Science and Engineering (Honors)   GPA: 8.96/10 <i>Relevant Coursework:</i> Statistical Machine Learning, Deep Learning, Advanced Operating Systems, Graph Theory, Numerical Methods, Computer Graphics, Natural Language Processing, Network and Systems Security, Parallel Programming	Delhi, India May 2019

## EXPERIENCE

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<b>MERS</b> Research Assistant · Working on safe skill learning by combining multiple hybrid-constraint concurrent automata with safety constraints. · Developing a formalism for the framework to deploy on multi-agent systems working in shared environments.	Cambridge, MA August 2021 - Present
<b>NASA HOME STRI</b> Research Assistant · Developed a robust multi-agent planner by combining timeline-based planning and hierarchical task planning frameworks. · Designed and deployed the planner in a test-bed designed to mimic deep space habitats.	Pittsburgh, PA August 2019 - August 2021
<b>RISS</b> Research Scholar · Developed a computationally scalable bayesian sequential learning framework for time-series forecasting with up to <b>4 orders of magnitude speed improvement</b> compared to other benchmarks.	Pittsburgh, PA June 2018 - August 2018
<b>Precog</b> Data Analytic Intern · Devised data analytic tool for National Bomb Data Center (NBDC) working under National Security Guards (NSG) to generate analysis based on historic data. · Assembled tool that automates whole process from input stage to output stage where useful insights are passed upon user request.	Delhi, India May 2017 - September 2017

## PUBLICATIONS

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<b>T-HTN: Timeline based HTN Planning for Multi-Agent Systems</b> <u>V. Parimi</u> Master's Thesis, CMU	2021
<b>On the Vulnerability of Community Structure in Complex Networks</b> <u>V. Parimi</u> , A. Pal, S. Ruj, P. Kumaraguru, T. Chakraborty Principles of Social Networking, Springer	2021

## Hierarchical Bayesian Framework for Bus Dwell Time Prediction

I. Isukapati, C. Igoe, E. Bronstein V. Parimi, S. Smith  
IEEE Transactions on Intelligent Transportation Systems

2020

## Analysis of DSRC accuracy for pedestrian localization

A. Lakshman\*, V. Parimi\*, S. Smith  
RISS 2018 Working Paper Journal

2018

## SELECTED PROJECTS

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### Catching a Ping Pong Ball with an iiwa

MIT | November 2021

[Prof. Russ Tedrake](#)

- Programmed the kinematics of a Kuka iiwa using Drake to catch a ping pong ball with a ping pong paddle
- Applied finite-state machine (FSM) techniques to model the paddle's trajectory off equations of motion of projectiles while in a pre-initial-contact mode, while we switched to a PD controller with offset stabilization in the post-initial-contact mode

### Sampling-based Planning in Discrete Space

CMU | November 2020

[Prof. Maxim Likhachev](#)

- Proposed a hierarchical decomposition algorithm where we discretize the continuous sample space of PRM/RRT algorithms in order to provide tighter completeness guarantees.
- Demonstrated the performance improvement of the proposed approach for 6-link robotic arm.

### Lossy Compression using Neural Networks

CMU | May 2020

[Prof. Zico Kolter](#)

- Formulated quantization techniques to generate discrete latent space representations among image and text based autoencoder models without significant performance implications.
- Showcased that incorporating commit-loss to the learning process improved the compression ratio of both image and text based models while maintaining the quality of reconstructions.

### COTTON

IIIT-Delhi | November 2018

[Prof. Vivek Kumar](#)

- Developed a light-weight work-stealing runtime for async-finish task parallelism which was energy efficient without incurring significant impact on the performance.
- Used different power saving drivers in combination with `cpufreq` to change the CPU frequency based on some task based heuristics.

### Understanding Vulnerability of Communities in Complex Networks

IIIT-Delhi | May 2018

[Prof. Tanmoy Chakraborty](#) & [Prof. Ponnurangam Kumaraguru](#)

- Identified vulnerable nodes in communities defined in a complex network by investigating several global and community centric properties to observe their effects on underlying community structure of the network.
- Proposed a hierarchical greedy heuristic based approach with a novel task based extrinsic evaluation strategy to measure its robustness.

### Autoencoder based Recommender System

IIIT-Delhi | November 2017

[Prof. Angshul Majumdar](#)

- Engineered a new recommender system for GitHub where users are suggested with relevant repositories to contribute towards based on profiles while leading a group of 2.
- Applied similar technique to single-celled RNA-seq data and showed better gene expression recovery compared to other alternatives.

### Advanced Application for Social Media Analytics (AASMA).

IIIT-Delhi | November 2016

[Prof. Ponnurangam Kumaraguru](#)

- Collaborated with a team of 7 people to extend a tool launched by CERC Lab by incorporating sentiment model along with improvements in efficient data handling and depiction using redis queue for real-time utilization by more than 75 agencies.

## Smart Glasses

IIIT-Delhi | April 2015

[Prof. Alexander Fell](#)

- Created a prototype to help blind people understand text and allow them to identify people they know.
- Selected as top 10 projects of the year and was showcased at the Delhi Mini-Maker Faire.

## HONORS

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Full scholarship from advisors at CMU	2020
Robotics Institute Summer Scholar (35 selected from $\sim 800$ applicants)	2018
FICCI Scholarship, CMU	2018
GSoC Internship	2018
Dean's List, IIIT-Delhi	2017
Secured 99.7 <sup>th</sup> percentile among 1.5 million students in JEE Mains Examination	2015

## ACTIVITIES

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<b>Graduate Research Assistant</b> <a href="#">Model-Based Embedded and Robotics Systems Group</a> - MIT CSAIL Research Group	August 2021 - Present
<b>Graduate Research Assistant</b> <a href="#">Intelligent Coordination and Logistics Laboratory</a> - CMU Research Group	August 2019 - August 2021
<b>RISS Admissions Committee</b> CMU	January 2020 - March 2020
<b>Undergraduate Researcher</b> <a href="#">Laboratory for Computational Social Systems</a> - IIIT-Delhi Research Group	August 2017 - May 2019
<b>Undergraduate Researcher</b> <a href="#">Precog</a> - IIIT-Delhi Research Group	August 2016 - May 2019
<b>Teaching Assistant</b> Advanced Programming	August 2017

## INVITED TALKS

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<b>Planning under Uncertainty for Joint-Task Execution</b> <a href="#">NASA HOME STRI</a>	October 2020 Pittsburgh, PA
<b>Computationally Scalable Bayesian Inference Framework</b> <a href="#">Rapid Flow Technologies</a>	June 2020 Pittsburgh, PA
<b>Analysis of DSRC accuracy for pedestrian localization</b> <a href="#">Hi-tech Robotics Systemz Ltd.</a>	October 2018 Delhi, India

## SKILLS

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<b>Programming Languages</b>	Python, C, C++, Lisp, Java
<b>Tools and Technologies</b>	ROS, Tensorflow, Pytorch, Keras, HCLIB, CUDA, Git, Django, Processing, OpenCV, Docker, MongoDB, MySQL
<b>Languages</b>	English (Fluent), Hindi (Native), Telugu (Native)