# Prashanth Ravichandar

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## EDUCATION

**University of Southern California** — August 2022 – Present
*M.S. in Computer Science (Honors)* — *4.0/4.0*

**Indian Institute of Technology Guwahati** — 2016 – 2020
*B.Tech. in Engineering Physics, Minor in Computer Science and Engineering* — *9.11/10.00 (DR 1)*

## EXPERIENCE

**Student Researcher - Dynamic Robotics and Control Laboratory, USC** — July 2023 - Present
*Mentor: Prof. Quan Nguyen* — *Los Angeles*
- Developing dynamically consistent policies to find task-specific skills for biped robots.
- Combining high-level skill planner and low-level RL policy for behavior generalization within task parameter limits.

**Research Intern - Robotic Embedded Systems Laboratory, USC** — June 2023 - Present
*Mentor: Prof. Gaurav Sukhatme* — *Los Angeles*
- Working on small and efficient neural network policies for memory-constrained robots.
- Exploring parameter prediction for visual control policies using transformer-based graph hypernetworks and RL.

**Senior Technology Associate** — August 2020 – July 2022
*Morgan Stanley* — *Mumbai*
- Analysed distributed in-memory caching solutions, with Redis and Apache Ignite, to speed up risk calculations.
- Developed .NET Core application using microservices architecture as part of the mortgages team. Adopted domain-driven design to upgrade existing monolithic architecture to microservices-based architecture.

**Research Intern - Indian Institute of Science** — May – August 2019
*Mentor: Prof. Aditya Gopalan* — *Bengaluru*
- Investigated the problem of sequential detection of change in the distribution of data with adaptive measurements.
- Performed a literature survey along with a preliminary problem formulation, in the context of multi-armed bandits.

## PROJECTS

**Controller for Unitree A1 Quadruped Robot** — Jan 2023 – May 2023
*Course Project: Robot dynamics and control* — *Github link*
- Designed controllers for Unitree A1 quadruped robot in MATLAB Simscape to perform walking, turning, running, stair climbing and obstacle avoidance.
- Developed and implemented QP and MPC controllers, trotting gait sequence, a linear trajectory for walking, a cycloid trajectory for running and a 5th-order polynomial trajectory for stair climbing.

**Masked Autoencoders for Adversarial Purification** — Jan 2023 – May 2023
*Course Project: Deep Learning and its Applications* — *Github link*
- Designed and implemented an adversarial image purification model using fine-tuned Masked Autoencoders (MAEs) to restore perturbed images to their original form, rendering adversarial attacks ineffective.
- Conducted experiments on the ImageNet dataset, successfully mitigating adversarial attacks generated by Gaussian noise and the Fast Gradient Sign Method (FGSM).

**Analysis of Surface Names for entities in Wikipedia** — July 2019 – June 2020
*Bachelor's Thesis under Prof. Amit Awekar, Dept. of CSE, IIT Guwahati* — *Github link*
- Analyzed the characteristics of incorrectly mapped links in Wikipedia pages and explored solutions to correct them.
- Created a novel dataset to aid in further research to provide contextual information of errors.

**Atari Pong - OpenAI gym** — *Github link*
- Trained an agent to play the Atari game - Pong, using policy gradients, with raw game pixels as input.

**Line Follower Robot** — March 2017
*TechKriti, IIT Kanpur*
- Led the development of a line follower robot using an Arduino board and a PID controller.

## Key courses

**Mathematics**: Linear Algebra, Advanced Calculus, Graphs and Matrices
**Computer Science**: Analysis of Algorithms, Computer Systems, Computer Architecture, Software Engineering
**Artificial Intelligence**: Fundamentals of AI, Machine Learning, Deep Learning, Convolutional Neural Networks (CS231n Stanford), Reinforcement Learning (David Silver), Autonomous Decision-Making*
**Robotics**: Robotics, Robot Learning, Robot Dynamics and Control
**Miscellaneous**: Game Theory, Computational Physics                                      * : Ongoing

## Technical skills

**Languages**: Python, JavaScript, C++, C, MATLAB, C#, SQL, TypeScript, HTML/CSS, LaTeX
**Libraries/Frameworks**: PyTorch, MuJoCo, JAX, ROS, Nvidia Isaac Gym, Pandas, NumPy, Matplotlib, Scipy, Flask, Angular
**Tools**: Docker, Git, Linux

## Achievements

- **USC Computer Science Master's Honors Program**: Selected for the honors program for maintaining a GPA of 3.9 and above.

- **Institute Silver Medal 2020**: Received the Institute Silver Medal for securing **1st rank** in the Department of Physics, IIT Guwahati

- **Institute Merit Scholarship, IIT Guwahati**: Received a scholarship for best academic performance in the class in the academic year 2018-19

- **Inter IIT Tech Meet 2018**: Secured **Bronze medal** in the Star Cluster Identifier event, amongst the 23 IITs participating

- **M.P.Birla Institute of Fundamental Research**: Graded excellent at the Summer School in Astronomy & Astrophysics, 2014

- **Hindustani Talavadya Junior Grade in Tabla - 2012**: Secured first class

- **21st National Chess Championship - 2007**: Ranked 158 on the merit list in the Under 9 category

## Extracurricular activities

**Viterbi Graduate Mentor, USC**                                               *Jan 2023 - Dec 2023*
- Mentored 3 Master's students over the spring and fall semesters. Helped new graduate students adjust to life at USC and provided guidance on achieving academic and professional goals. Nominated for the **Outstanding Mentor Award**.

**Club Secretary, Astronomy Club, IIT Guwahati**                               *April 2018 - 2019*
- Supervised the financial and technical planning and growth of the club. Led the development of projects including constructing a planetarium, astronomical data analysis, star spectroscopy, space balloon, and radio astronomy.

**Organizer, Techniche, IIT Guwahati**                                         *September 2016 - 2017*
- Organized the Exhibitions and Industrial Conclave modules of the annual techno-management festival. Interacted with prominent industrialists from Bosch, IBM, and Dell as well as several research groups from USA, Bangladesh and India.

**Volunteer, Prashanthi Balamandira Trust**                                    *October 2015 - Present*
- Participated in several activities such as serving breakfast to children at government schools, providing COVID relief kits in slums, developing a website to help deliver free educational content, and translating Sanskrit verses from ancient Indian texts.