Prashanth Ravichandar

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Education

University of Southern California 2022 - 2024
M.S. in Computer Science (Honors) GPA: 4.0/4.0

Indian Institute of Technology Guwahati 2016 - 2020
B.Tech. in Engineering Physics, Minor in Computer Science and Engineering GPA: 9.11/10.00 *(Rank 1)*

Publications

ICRA 2025 (Under Review) **Dynamic Bipedal Loco-manipulation using Oracle Guided Multi-mode Policies with Mode-transition Preference**
Prashanth Ravichandar, Lokesh Krishna, Nikhil Sobanbabu, Quan Nguyen
arXiv — Website — Video

Experience

Student Researcher - Dynamic Robotics and Control Laboratory, USC July 2023 - Present
Mentor: Prof. Quan Nguyen *Los Angeles*

- Exploring GPU-accelerated simulation and deep reinforcement learning to develop controllers for agile locomotion in humanoid robots.
- Developed a framework to solve dynamic loco-manipulation tasks like playing soccer. Demonstrated simulation results in multiple robots - HECTOR, Berkeley Humanoid, Unitree G1 and H1.

Student Researcher - Robotic Embedded Systems Laboratory, USC June 2023 - Present
Mentor: Prof. Gaurav Sukhatme *Los Angeles*

- Developing efficient neural networks for controlling memory-constrained robots.
- Explored parameter prediction for visual control policies using transformer-based graph hypernetworks and RL.

Senior Technology Associate - Morgan Stanley August 2020 - July 2022
Mortgages, Wealth Management Technology *Mumbai*

- Improved raw read speeds for risk calculations by 15x using distributed caching (Redis and Apache Ignite).
- Upgraded a .NET Core application from a monolithic to a microservices architecture using domain-driven design.

Research Intern - Indian Institute of Science May - August 2019
Mentor: Prof. Aditya Gopalan *Bengaluru*

- Investigated change point detection for predicting distribution shifts in airplane sensor data.
- Performed a literature survey along with a preliminary problem formulation, in the context of multi-armed bandits.

Projects

Model-based Controller for Unitree A1 GitHub
Course Project: Robot dynamics and control

- Designed controllers in MATLAB Simscape for 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 GitHub
Course Project: Deep Learning and its Applications

- Developed an adversarial image purification model by fine-tuning 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 Fast Gradient Sign Method (FGSM).

Analysis of Surface Names in Wikipedia GitHub
Bachelor's Thesis — Advisor: Prof. Amit Awekar, IIT Guwahati

- Analyzed the characteristics of incorrect links in Wikipedia articles and explored solutions to correct them.
- Created a novel dataset by parsing articles to extract contextual information of surface names and links.

Contact estimator GitHub

- Developed a ROS package that predicts foot contact for the bipedal robot HECTOR, using supervised learning on motion capture data, joint states and IMU.

Line Follower Robot

TechKriti, IIT Kanpur

- Led the development of a line follower robot using an Arduino board and a PID controller.

Achievements

USC CS Master's Honors Program, 2024: Secured honors with a 4.0 GPA throughout all semesters
Institute Silver Medal, 2020: Awarded for securing **1st rank** in the Dept. of Physics, IIT Guwahati
Institute Merit Scholarship, 2019: Granted for best performance in the academic year 2018-19
Inter IIT Tech Meet, 2018: Won **Bronze** in the Star Cluster Identifier event, competing against 23 IITs
M.P.Birla Inst. of Fundamental Research, 2014: Graded excellent in the Astronomy Summer School
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

Leadership and Community Engagement

Mentor, Viterbi Graduate Mentorship Program, USC January - December 2023

- Mentored 3 Master's students, assisting with their transition to USC and providing guidance on academic and career development. Nominated for the **Outstanding Mentor Award**.

Secretary, Astronomy Club, IIT Guwahati April 2018 - 2019

- Supervised club operations, planned finances, and drove growth and outreach initiatives. Led key projects, including planetarium construction, astronomical data analysis, star spectroscopy, space balloons, 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 industry experts from Bosch, IBM, and Dell, and research groups from the US, Bangladesh, and India.

Volunteer, Prashanthi Balamandira Trust October 2015 - Present

- Supported initiatives such as giving breakfast to underprivileged children, distributing COVID relief kits in rural areas, developing a website with free educational resources, and translating Sanskrit verses from Indian scriptures.

Technical skills

Languages: Python, JavaScript, C++, C, MATLAB, C#, SQL, TypeScript, HTML/CSS, LaTeX
Libraries/Frameworks: PyTorch, MuJoCo, Nvidia Isaac Lab (Isaac Sim), ROS, JAX, Flask, Angular
Tools: Docker, Git, Linux

Key courses

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