Prashanth Ravichandar

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Education

University of Southern California August 2022 – May 2024
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 (Rank 1)*

Experience

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

- Enhancing exploration and planning efficiency for complex, unseen tasks through reinforcement learning.
- Developing a task planner for agile locomotion in bipedal robots using a pre-trained low-level controller.

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 - 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 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.

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

Projects

Controller for Unitree A1 Quadruped Robot *GitHub*
Course Project: Robot dynamics and control

- 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 *GitHub*
Course Project: Deep Learning and its Applications

- 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 *GitHub*
Bachelor's Thesis under Prof. Amit Awekar, Dept. of CSE, IIT Guwahati

- 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*

- Trained an agent to play the Atari game - Pong, using policy gradients, with raw game pixels as input.

Line Follower Robot

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

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.