Arjun Krishna

Website: arjun-krishna.github.io
Email: arjunkris96@gmail.com
LinkedIn: arjun-kris
GitHub: github.com/arjun-krishna

Education

Georgia Institute of Technology — Atlanta, U.S.A
M.S. in Computer Science, GPA: 4.00 / 4.00 — 2021 – Present

- Specialization : Computational Perception and Robotics
- *Advisor* : Prof. Matthew Gombolay
- *Project* : Learning stroke controllers for table tennis and wheelchair tennis robots

Indian Institute of Technology Madras — Chennai, India
B.Tech (Hons) in Computer Science and Engineering, GPA: 9.42 / 10.00 — 2014 – 2018

- Minor : Operations Research
- *Advisor* : Prof. Balaraman Ravindran
- *Project* : Model-based Planning for Hierarchical Reinforcement Learning in Continuous Domains [report]

Publications

1. Qinsheng Zhang*, **Arjun Krishna***, Sehoon Ha, and Yongxin Chen. *AsymQ: Asymmetric Q-Loss to mitigate overestimation bias in off-policy reinforcement learning*. [Full Paper]
   - accepted at Deep RL workshop, NeurIPS 2022 [openreview] [poster]
   - under review at ICLR 2023

2. **Arjun Krishna***, Kin Man Lee*, Zulfiqar Zaidi, Rohan Paleja, Letian Chen, Erin Hedlund-Botti, Mariah Schrum, and Matthew Gombolay. *The Effect of Robot Skill Level and Communication in Rapid, Proximate Human-Robot Collaboration*. [Full Paper]
   - accepted at ACM/IEEE International Conference on Human-Robot Interaction, HRI 2023 (*acceptance rate* : 25.2%)
   - presented a poster at GeorgiaTech IRIM Robotics Days for Industry - 2022 [poster]

3. **Arjun Krishna**, Zulfiqar Zaidi, Letian Chen, Rohan Paleja, Esmaeil Seraj, and Matthew Gombolay. *Utilizing Human Feedback for Primitive Optimization in Wheelchair Tennis*. [Short Paper]
   - accepted at Learning for Agile Robotics workshop, CoRL 2022 [poster] [preprint] [webpage]

4. Z. Zaidi*, D. Martin*, N. Belles, V. Zakharov, **A. Krishna**, K. Lee, P. Wagstaff, S. Naik, M. Sklar, S. Choi, Y. Kakehi, R. Patil, D. Mallemadugula, F. Pesce, P. Wilson, W. Hom, M. Diamond, B. Zhao, N. Moorman, R. Paleja, L. Chen, E. Seraj, M. Gombolay. *Athletic Mobile Manipulator System for Robotic Wheelchair Tennis*. [Full Paper]
   - under review at IEEE RA-L [arxiv-preprint] [webpage]
   - presented a poster at GeorgiaTech IRIM Robotics Days for Industry - 2022 [poster]

*denotes equal contribution

Research Experience

CORE Robotics, Georgia Tech Atlanta, U.S.A
Graduate Research Assistant May 2022 – Present

- Implemented a pipeline for deploying striking controllers using probabilistic movement primitives on the table tennis and wheelchair tennis robots.
- Conducted a human-subject experiment with 42 participants to study human-robot collaboration in table tennis
- Mentored new students in the lab and provided actionable tasks to help them get started quickly.

Industry Experience

Indeed Japan K.K. Tokyo, Japan
Software Engineer July 2018 – April 2021

- *Recommendation System*

  - Implemented a Map-Reduce program that extracts rich metadata from millions of job descriptions like degree requirements, skills, benefits, etc., and analyzes users' click & apply patterns to generate personalization vectors for re-ranking recommendations.

  - This re-ranking procedure showed ≈ 8% improvement in apply rates on recommended jobs

- *Algorithmic Bidding System*

  - Built a low-latency pipeline that passes informative features for real-time bid scaling directly to the pre-auction phase of Indeed's core JobSearch service, and introduced partial inference of ranking models to quickly deploy and test new models for bid scaling

  - The new pipeline helped improve the cost efficiency for advertisers, with initial experiments showing a significant decrease (≈ 10%) in the cost per application received

- Responsibilities

  - Software design, deploy management, first responder, A/B testing & analysis, and mentoring new engineers

Skills

- **Robotics:** ROS, Physics Simulators (MuJoCo, PyBullet, IsaacGym), and experience deploying controllers on real-hardware (Barrett WAM Arm)
- **Machine Learning:** PyTorch, JAX, Jupyter Notebooks, Hydra, Tensorboard, WandB
- **Reinforcement Learning:** DM-Acme, CleanRL, Stable-Baselines3 and related ecosystem of libraries
- **Programming:** C/C++, Python, Java, Javascript, Shell scripting, Docker, Git
- **Statistical Analysis and Data Visualization:** R, Matplotlib, D3.js

Languages

- **English:** Full Professional Proficiency
  - **TOEFL iBT (Oct 2022):** 118/120
- **Japanese:** Elementary Proficiency
- **Kannada:** Native Bilingual Proficiency
- **Tamil:** Native Bilingual Proficiency
- **Hindi:** Limited Working Proficiency

Research Projects

- π^*-comm*: Learning to communicate by distilling a privileged expert policy* [ppt] Sept 2022 – Nov 2022
  - Proposed decoupling of learning to act and communicate in cooperative multi-agent setting by distilling an expert policy with access to privileged information to a policy with access to only local sensing information

- *Locomotion controllers with local obstacle avoidance* [blog] Jan 2022 – April 2022
  - Leveraged large-scale GPU physics simulation to learn quadruped locomotion controllers that exhibit local obstacle avoidance behavior while tracking command signals of linear and angular velocities
- *Successor Feature Landmarks for Waypoint Planning in Continuous Control* [web] Mar 2022 – April 2022
  - Investigated boosting long-horizon goal-reaching success rates by planning over state space discretized using successor feature landmarks (SFL) in domains with continuous action spaces

Certifications

[Edx MicroMasters] Fundamentals of Robotics [certificate] Jun 2019 – Nov 2020

UPenn Robotics MicroMasters covering foundational topics in kinematics, dynamics, control, and perception

[Coursera] Advanced Machine Learning with Tensorflow on GCP [certificate] Jan 2019

Course covered aspects of training and deploying models on Google Cloud Platform

Scholarships and Awards

- Sri K Krishnamurthi Prize, IIT Madras April 2016
  Awarded for outstanding academic record in freshman year.
- KVPY Fellowship, SX-Stream 2013

Scholastic Achievements

- IIT-JEE Advanced, All-India Rank 769 2014
- Qualified for National Physics and Astronomy Olympiad (INPhO, INAO) 2013
- Qualified for National Math Olympiad (INMO) 2012

Outreach Activities

- Outreach Volunteer, CORE Robotics Oct 2022
  - Demonstrated the table tennis and wheelchair tennis robots to children from a local Cub Scouts organization
- Volunteer Section Leader, Code in Place - Stanford Apr 2021 – May 2021
  - Member of the teaching team for an introductory python programming online-course offered by Stanford University during the COVID-19 pandemic
  - Prepared and taught a weekly discussion section to a group of 8 students
- Volunteer at Exebit, CSE, IIT Madras Apr 2017
  - Conducted a hands-on workshop on Convolutional Neural Networks
- Project Representative, National Service Scheme (NSS), IIT Madras 2014 – 2016
  - Led a group of 10 volunteers for the project - Teaching at Eureka, Triplicane
  - Tutored underprivileged students in science and math to supplement the concepts they learn at school