Sriyash Poddar

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Research Interests

Human Robot Interaction: Reinforcement Learning, Social Navigation, Multi-Robot Systems, Lifelong Learning

Education

Indian Institute of Technology Kharagpur
M.Tech and B.Tech in Computer Science and Engineering 2018 – 2023
Advisor: Prof. Partha P. Chakrabarti GPA: 9.40/10.0

Publications

[1] Does Human Motion Prediction Quality Always Transfer to Robot Performance in Crowd Navigation?
S. Poddar, C. Mavrogiannis, S. S. Srinivasa
Preprint November 2022.

[2] Winding Through: Crowd Navigation via Topological Invariance
C. Mavrogiannis, K. Balasubramanian, **S. Poddar**, A. Gandra, S. S. Srinivasa
In the IEEE Robotics and Automation Letters (RA-L) November 2022. [PDF]

[3] TRACE: Topologically Constrained Reward Aware Action Embeddings for Life-Long Learning
S. Poddar, T. Anand, P. Badjatiya, J. Subramanian, G. Theocharous, K. Balaji
Under review at NeurIPS Workshop on Human in the Loop Learning 2022. US Patent accepted. [PDF]

[4] Understanding the Role of Affect Dimensions in Detecting Emotions from Tweets: Multi-task Approach
R. Mukherjee, **S. Poddar***, A. Naik*, S. Dasgupta, N. Ganguly
In International ACM SIGIR Conference on Research and Development in Information Retrieval 2021. [PDF]

Experience

Mila - Quebec AI Institute - Research Intern, Chandar Lab May 22 - Jul 22
Research Areas: Multi-Agent Reinforcement Learning, Curiosity based Learning *Advisor:* Prof. Sarath Chandar

- Worked on intrinsic motivation and curiosity in multi-agent reinforcement learning to solve problems of non-stationarity and multi-observation variance in centralized training decentralized execution.
- Developed a framework, exploiting the difference in global and local state values as intrinsic rewards.
- Contributed to RLHive: a singular reinforcement learning framework for single and multi-agent training.

University of Washington - Research Intern, Personal Robotics Lab Apr 21 - Jan 22
Research Areas: Human Robot Interaction, Social Navigation *Advisor:* Prof. Siddhartha Srinivasa

- Currently exploring the transfer of performance of models in human motion prediction [1] to safety and efficiency in model predictive controllers for robot navigation in crowded and challenging scenarios.
- Proposed T-MPC [2], a topologically compliant MPC for safer and adaptive control in crowd navigation.
- Demonstrated and tested the robustness and safety of the framework in real-world experiments using the Honda P.A.T.H Bot, running lab trials with humans navigating with the robot in challenging interactions.

Adobe Inc. - Research Intern, Media and Data Science Research May 21 - Jul 21
Research Areas: Continual Learning, Topology based Learning *Team:* Media and Data Science Research Lab

- Trained a lifelong learning agent to generate action representations and policy across environments with dynamic action spaces, such as offers in marketing campaigns and content on a recommender system.
- Proposed TRACE [3], topology preserving and reward aware action representations in lifelong learning agents for efficient transfer of performance across the changing action spaces in these environments.

Kharagpur RoboSoccer Students Group - Humanoid Team Lead Apr 20 - May 22
Research Areas: Humanoids, Inverse Kinematic Control, Evoultionary Learning
- Developed a cooperative multi-agent system of autonomous humanoid agents, capable of playing soccer.
- Optimized the parameters of the inverse kinematic walk-engine using evolutionary learning; increasing speed of the humanoid from 5m/s to 9.5m/s. Proposed an end to end walk engine for Nao bots, using RL.

The Cornell, Maryland, Max Planck Pre-doctoral Research School 2022 Attendee August 2020
Attended a summer school at MPI-SWS in Saarbruecken, Germany; including lectures from and interactions with professors doing state of the art research across domains like machine learning and user privacy.

Outreach and Service

Reinforcement Learning, IIT Kharagpur - Teaching Assitant Fall 2022
Mentoring 30+ students on the term projects. Delivered course lectures Multi-Agent Reinforcement Learning.

Robotics Reading Group, IIT Kharagpur - Organizer Spring, Fall 2020
Organised reading group on foundational and recent research on robotics, motion planning, and robot learning.

IEEE Winter School, IIT Kharagpur - Student Mentor Fall 2019
Mentored students at IIT Kharagpur in a week-long boot camp for image processing and machine learning.

Code Club, IIT Kharagpur - Student Coordinator Fall 2018
Organized up.AI 2018, an event dedicated to AI for Social Good in association with Intel and other tech giants.

Projects

Scalable Robotic Warehouses [Report] Guide: Prof. Partha Pratim Chakrabarti
- Working on learning policies for large-scale warehouse systems involving pickup and drop tasks.
- Exploring transfer of a policy over-limited agents to large-scale systems using scene decomposition.

Web Interface for NLI Proof Generation [Demo] Design Lab Project, Fall 2022
- Created a web interface *Generating Intermediate Steps for NLI with Next-Step Supervision, Ghoshal, et al.*
- Implemented a deployable framework for this research done at Microsoft India.

Gaussian Processes for Trajectory Prediction [Report] AI Course Term Project, Fall 2021
- Built Gaussian process-based models for predicting human trajectories in real-world human datasets.

Reproducibility Challenge: Average Policy Optimization [Report] RL Course Term Project, Fall 2021
- Reproduced the results and verified claims for the paper published in IJCAI 2021.

Accelerating Graph Algorithms on GPUs [Report] HP Computing Course Project, Spring 2021
- Wrote CUDA code for algorithms such as BFS, and DFS on GPUs, improving performance on large-scale graphs.

Incompatible Control with Transformers Guide: Dr. Fabio Pardo
- Built zero shot control transfer across robot morphologies using Transformers and Graph Grammar.

Achievements

CMMRS 2022 - Received full funding to attend summer school at the Max Planck Institute in Germany.

RoboCup 2022 - Among the top 10 teams in the world to qualify for Humanoid 3D simulation League.

MITACS Globalink and DAAD-Wise - Awarded funding for research at labs in Canada and Germany.

IBM Green Hack - Awarded the first position at the IBM Green Hack 2020, a hackathon on climate change.

Competitive Examinations - In the top 0.2% in JEE Advanced and top 0.1% in JEE Mains, among all students.

KVPY Scholarship - Awarded the prestigious fellowship by the Government of India.