Udari Madhushani

Ph.D. Candidate
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Research Interest

Deep reinforcement learning, Multi-agent reinforcement learning, Sequential decision making, Multi-robot coverage problem, Collective dynamics, Geometric controls for path planning.

Education

Program	Institution	Years
Ph.D., Mechanical Engineering	Princeton University NJ, USA	2017 - Present
M.A., Mechanical Engineering	Princeton University NJ, USA	2017 - 2019
B.Sc. Eng (Hons), Electronic Engineering	University of Peradeniya Kandy, Sri Lanka	2011 - 2015

Experience

Assistant in Research
- Princeton University — September 2017 - Present
- Sri Lanka Technological Campus, Sri Lanka — January 2016 - August 2017

Research Internships
- Siemens, Princeton, USA — May 2020 - August 2020
- Atrenta Lanka (Pvt.) Ltd., Sri Lanka — October 2014 - January 2015

Assistant in Teaching (Princeton University)
- MAE 542 Advanced Dynamics — Fall 2020
- MAE 502/APC 506 Mathematical Methods of Engineering Analysis — Spring 2020
- MAE 345/MAE 549 Introduction to Robotics — Fall 2019

Outreach

Mentoring (Princeton University)
- Sarah Dillender (B.S.E. Mechanical Engineering) — 2020-21
- Jacob Walrath (B.S.E. Mechanical Engineering) — 2020-21
- Samarie Wilson (B.S.E. Mechanical Engineering) — 2020-21
- Gargi Sadalgekar (B.S.E. Mechanical Engineering) — 2020-21

Leadership Skills
- Committee member of Graduate Women in Science & Engineering (Princeton University) — 2020-Present
- Future Digileaders Training (Stockholm, Sweden) — November 2019

Volunteer for
- World Maker Faire — September 2018
- American Control Conference — June 2018

Academic Service

Student Member of

IEEE (Institute of Electrical and Electronics Engineers), IEEE Young Professionals, IEEE Women in Engineering, APS (American Physical Society)

Reviewer for

Automatica, IEEE Transactions on Automatic Control, IEEE Control Systems Letters, Conference on Decision and Control, American Control Conference, European Control Conference, Journal of Field Robotics, IEEE Transactions on Communications

Honors

Graduate Honors (Princeton University)

- Britt and Eli Harari Fellowship — 2020-21
- Larisse Rosentweig Klein Memorial Award — Fall 2019
- Martin Summerfield Graduate Fellowship — 2018-19
- Athena-Feron Prize for Mathematical Excellence — Fall 2018
- Elliotte Robinson Little '25 Student Aid Fund Fellowship — 2017-18

Awards

- Presidential Award for Scientific Research (Sri Lanka) — 2019
- Best Undergraduate Project Award (IEEE Sri Lanka Section) — December 2015

Publications

Journal Papers

[J4] Decentralized Stochastic Bandits with Probabilistic Communications
Udari Madhushani, Naomi Leonard
(In Preparation).

[J3] Cooperative Bandits: A Class of Communication Protocols with Logarithmic Communication Cost
Udari Madhushani, Naomi Leonard
(In Preparation).

[J2] Heterogeneous Explore-Exploit Strategies on Multi-Star Networks
Udari Madhushani, Naomi Leonard
IEEE Control Systems Letters, (pending 2nd review).

[J1] Semi-globally Exponential Trajectory Tracking for a Class of Spherical Robots
Udari Madhushani, Sanjeeva Maithripala, Janaka Wijayakulasooriya, Jordan Berg
Automatica, 2017.

Conference Papers

[C9] Broadcast when Exploring: Cost-effective Communication in Distributed Stochastic Bandits
Udari Madhushani, Naomi Leonard
(In Preparation).

[C8] Hamiltonian Q-learning: Data Efficient RL Using Importance-sampling
Udari Madhushani, Biswadip Dey, Naomi Leonard, Amit Chakraborty
International Conference on Learning Representations, **(ICLR)** 2021 (Under Review).

[C7] A Dynamic Observation Strategy for Multi-agent Multi-armed Bandit Problem
Udari Madhushani, Naomi Leonard
European Control Conference, **(ECC)** 2020.

[C6] Heterogeneous Stochastic Interactions for Multiple Agents in a Multi-armed Bandit Problem
Udari Madhushani, Naomi Leonard
European Control Conference, **(ECC)** 2019. (Invited Paper)

[C5] Feedback Regularization and Geometric PID Control for Robust Stabilization of a Planar Three-link Hybrid Bipedal Walking Model
Lasitha Weerakon, **Udari Madhushani**, Sanjeeva Mathripala, Jordan Berg
American Control Conference, (**ACC**) 2018.

[C4] Multi-armed Bandit Based Approach for Performance Enhancement of Window Intensity Test (WIT) Detector
Kusal Tennakoon, **Udari Madhushani**, Sanjeeva Mathripala
International Conference of Industrial and Information Systems, (**ICIIS**) 2017.

[C3] Intrinsic PID Controller for a Segway Type Mobile Robot
Isuru Basnayake, **Udari Madhushani**, Sanjeeva Mathripala
International Conference of Industrial and Information Systems, (**ICIIS**) 2017.

[C2] Feedback Regularization and Geometric PID Control for Trajectory Tracking of Mechanical Systems: Hoop Robots on an Inclined Plane
Udari Madhushani, Sanjeeva Mathripala, Jordan Berg
American Control Conference, (**ACC**) 2017.

[C1] WIT: Window Intensity Test Detector and Descriptor
Udari Madhushani, Sanjeeva Mathripala, Janaka Wijayakulasooriya
International Conference of Industrial and Information Systems, (**ICIIS**) 2016.

Workshop Papers

[W2] It Doesn't Get Better and Here's Why: A Fundamental Drawback in Natural Extensions of UCB to Multi-agent Bandits
Udari Madhushani, Naomi Leonard
I can't Believe It's Not Better! Workshop (**ICBINB**), Conference on Neural Information Processing Systems, (**NeurIPS**) 2020. (Spotlight)

[W1] Distributed Learning: Sequential Decision Making in Resource-Constrained Environments
Udari Madhushani, Naomi Leonard
Practical ML for Developing Countries Workshop (**PML4DC**), International Conference on Learning Representations, (**ICLR**) 2020. (Oral)

SKILLS

Computer Skills

   Python, PyTorch, Matlab, LaTeX

Language Skills

   Sinhala (Mother Tounge), English (Fluent)