

UDARI MADHUSHANI

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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
- Sri Lanka Technological Campus, Sri Lanka

September 2017 - Present
January 2016 - August 2017

Research Internships

- Siemens, Princeton, USA
- Atrenta Lanka (Pvt.) Ltd., Sri Lanka

May 2020 - August 2020
October 2014 - January 2015

Assistant in Teaching (Princeton University)

- MAE 542 Advanced Dynamics
- MAE 502/APC 506 Mathematical Methods of Engineering Analysis
- MAE 345/MAE 549 Introduction to Robotics

Fall 2020
Spring 2020
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

Peradeniya University, Sri Lanka

- Lasitha Weerakon (Post graduate, Mechanical Engineering) 2016-17
- Isuru Basnayake (Post graduate, Mechanical Engineering) 2016-17
- Kusal Tennakoon (Post graduate, Mechanical Engineering) 2016-17

Leadership Roles

- Committee member of Graduate Women in Science & Engineering (Princeton University) 2020-Present
- Future Digileaders Training (Stockholm, Sweden) November 2019
- Founder of EE Instructors Scholarship (Peradeniya University) 2016

Volunteer for

- World Maker Faire
- American Control Conference

September 2018
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, IEEE Conference on Decision and Control, American Control Conference, European Control Conference, Journal of Field Robotics, IEEE Transactions on Communications, International Conference of Industrial and Information Systems

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

Travel Grants

- Student travel grant (full registration fee), ICLR 2020
- WiML travel grant (full registration fee), NeurIPS 2020
- Graduate student travel grant, MAE Princeton University 2018, 2019
- Graduate student travel grant, SEAS Princeton University 2019
- Research assistant travel grant, SLTC, Sri Lanka 2016, 2017, 2018

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, 2020.
- [J1] **Semi-globally Exponential Trajectory Tracking for a Class of Spherical Robots**
Udari Madhushani, Sanjeeva Maithripala, Janaka Wijayakulasooriya, Jordan Berg
Automatica, 2017.

Conference Papers

- [C10] Broadcast when Exploring: Cost-effective Communication in Distributed Stochastic Bandits
Udari Madhushani, Naomi Leonard
(In Preparation).

- [C9] **Distributed Bandits: Probabilistic Communication on d -regular Graphs**
Udari Madhushani, Naomi Leonard
 European Control Conference, (**ECC**) 2021 (Under Review).
- [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, L^AT_EX

Language Skills

Sinhala (Mother Tongue), English (Fluent)