

# Sumedh Pendurkar

✉ [sumedhpendurkar@tamu.edu](mailto:sumedhpendurkar@tamu.edu) | 🏠 [sumedhpendurkar.github.io](https://sumedhpendurkar.github.io) | 📄 [sumedhpendurkar](#) | 🎓 Scholar

## Research Interests

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Reinforcement Learning, Heuristic Search, Combinatorial Optimization, AI

## Education

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### Texas A&M University

*TX, USA*

Doctor of Philosophy in Computer Science, 4/4 GPA

*August 2020 - Present*

- *Key courses:* Reinforcement Learning, Applied Bayes Methods, Optimization for Machine Learning, Machine Learning, AI, Analysis of Algorithms, Algorithms for Graph Mining
- *Advisor:* Dr. Guni Sharon

### College of Engineering, Pune

*Pune, India*

Bachelor of Technology in Computer Engineering, 9.12/10 CGPA

*July 2015 - May 2019*

- *Key courses:* Data Science, Design and Analysis of Algorithms, AI, Theory of Computation, Introduction to Graph Theory

## Selected Publications

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### Curriculum Generation for Learning Guiding Functions in State-Space Search Algorithms

S. Pendurkar, L. Lelis, N. Sturtevant, G. Sharon  
Under Submission.

2023

### Defining and Achieving an “Appropriate” Curriculum in Reinforcement Learning

V. Bajaj, S. Pendurkar, G. Sharon  
Under Submission.

2023

### The (Un)Scalability of Informed Heuristic Function Estimation in NP-Hard Search Problems

S. Pendurkar, T. Huang, B. Juba, J. Zhang, S. Koenig, G. Sharon  
Transactions of Machine Learning Research (TMLR)

2023

### Bilevel Entropy based Mechanism Design for Balancing Meta in Video Games

*London, UK*

S. Pendurkar, C. Chow, J. Luo, G. Sharon

2023

International Conference on Autonomous Agents and Multiagent Systems (AAMAS)

### Comparison between popular Genetic Algorithm (GA)-based tool and Covariance Matrix Adaptation - Evolutionary Strategy (CMA-ES) for optimizing indoor daylight

*China*

M. Anis, S. Pendurkar, Y. Yi, G. Sharon

2023

IBPSA International Conference and Exhibition on Building Simulation

### The (Un)Scalability of Heuristic Approximators for NP-Hard Search Problems

*New Orleans, USA*

S. Pendurkar, T. Huang, S. Koenig, G. Sharon

2022

Proceedings of NeurIPS workshop. ICBINB.

### A Discussion on the Scalability of Heuristic Approximators

*Vienna, Austria*

S. Pendurkar, T. Huang, S. Koenig, G. Sharon

2022

*Symposium on Combinatorial Search (Extended Abstract)*

### A Joint Imitation-Reinforcement Learning Framework for Reduced Baseline Regret

*Prague, Czech Republic*

S. Dey, S. Pendurkar, G. Sharon, JP. Hanna

2021

*International Conference on Intelligent Robots and Systems (IROS)*

### Single Image Super-Resolution for Optical Satellite Scenes Using Deep Deconvolutional Network

*Trento, Italy*

S. Pendurkar, B. Banerjee, S. Saha, F. Bovolo

2019

*International Conference on Image Analysis and Processing (ICIAP)*

## Experience

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**University of Alberta**

Edmonton, AB, Canada

## Visiting Student

May 2023 - July 2023

- Worked on developing curriculum generation methods for various guided state-space search algorithms.
- Proposed approach (TSC) achieved 5-36 times better performance as compared to the baseline algorithms.
- *Supervisor:* Dr. Nathan Sturtevant and Dr. Levi Lelis

**Niantic Inc.**

Sunnyvale, CA, USA

## Machine Learning Scientist Intern

May 2022 - Aug 2022

- Worked on game meta balancing methods for various peer vs peer games, such as Pokemon video games
- The work resulted in a publication at AAMAS

**Goldman Sachs**

Bangalore, India

## Summer Technology Analyst (Intern)

May 2018 - July 2018

- Worked on UI part of a change management tool for business units using Angular 6
- Developed RESTful web services in Java for the change management tool, currently used in production

**Indian Institute of Technology (IIT), Roorkee**

Roorkee, India

## Visiting Student

May 2017 - July 2017

- Designed deconv-net based model for single image super-resolution on optical satellite images, achieved 0.55 dB PSNR over SOTA. Resulted in a publication at ICIAP.
- Investigated zero-shot techniques for super-resolution of optical satellite images
- *Supervisor:* Dr. Biplab Banerjee

## Technical Skills

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**Programming** Python, C, Javascript**Tools and Libraries** PyTorch, Keras, Git, Angular, GTK, Latex

## Other Projects

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**Developing Autograder for the Deep Reinforcement Learning Course**

August 2022 - Present

- Developed and designed test cases for CSCE 642 Course at Texas A&M University.
- The autograder is being also used by other universities.

**Sampling an action from a Q function in continuous action spaces**

August 2021 - May 2022

- investigating various sampling techniques, to efficiently sample actions from the q function which would resemble Boltzmann sampling in discrete space
- proposed method would enable agents to have better exploration than sota algorithms like DDPG, and would not have any assumptions on distribution like SAC
- *Advisors:* Dr. Guni Sharon

**Light-Regularized-GANs for low light images**

September 2019 - Jan 2021

- Added an intensity based regularisation to LightEnhancementGAN, to control the intensity of light added to the image without any external supervision

**Open-Ended Visual Question Answering System**

April 2018 - May 2019

- Designed an attention based multi-modal fusion model which gives a free flowing answer to a question based on video as it attends to both, question words and video while outputting every single word of answer

**Word completion feature for GNU-Nano text editor**

July 2016 - December 2016

- Authored a word-completion feature which completes the current word based on the text present in the open file
- This feature was incorporated in GNU-Nano, an open source project

**Communication/on-board controller system for pico satellite**

April 2016 - July 2018

- Developed shared memory protocols for two asynchronous controllers for on-board data sharing on a pico-satellite
- Worked on interfacing various peripherals with on-board controllers for data collection

## Honors & Awards

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2020	<b>First Place</b> , 2020 TAMIDS Data Science Competition	<i>TX, USA</i>
2018	<b>Deloitte Innovation Award</b> , Ministry of Road and Railways, Smart India Hackathon	<i>Nagpur, India</i>
2018	<b>Finalist (40/1980)</b> , Philips Hackathon on Data Science	<i>Bangalore, India</i>
2013	<b>Scholarship Holder</b> , National Talent Search Exam (NTSE), awarded to top 1000 students in India	<i>India</i>

## Professional Activities

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2020	<b>Reviewer</b> , ICRA 2021
2021	<b>Reviewer</b> , IROS 2021
2022	<b>Program Committee</b> , AAAI 2023, AAAI workshop on multi-agent path finding
2023	<b>Program Committee</b> , NeurIPS 2023, AAAI 2023, NeurIPS workshop 2023
2023	<b>Student Volunteer</b> , AAMAS 2023