Sumedh Pendurkar

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Research Interests

Reinforcement Learning, Heuristic Search, Combinatorial Optimization, AI

Education

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

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 *2023*

Under Submission.

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

S. Pendurkar, L. Lelis, N. Sturtevant, G. Sharon *2023*

Under Submission.

Defining and Achieving an "Appropriate" Curriculum in Reinforcement Learning

V. Bajaj, S. Pendurkar, G. Sharon *2023*

Under Submission.

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)

Semantic Guided Deep Unsupervised Image Segmentation *Trento, Italy*
S. Saha, B. Banerjee, S. Sudhakaran, S. Pendurkar *2019*
International Conference on Image Analysis and Processing (ICIAP)

Experience

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

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

Other Projects

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

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

Professional Activities

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