Sumedh Pendurkar

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Research Interests

Reinforcement Learning, Heuristic Search, Multi-agent systems, 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, 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 Heuristic Approximators for NP-Hard Search Problems
S. Pendurkar, T. Huang, S. Koenig, G. Sharon
Short version: Accepted at Symposium on Combinatorial Search as extended abstract. Full version: under review.

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

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
- Proposed method involves gradient-free optimization techniques like CMA-ES for balancing the game statistics while Monte Carlo based RL methods are used for learning the best AI agent
- *Advisor:* Dr. Roger Luo, Dr. Guni Sharon

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*
Research Intern   *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
- Investigated zero-shot techniques for super-resolution of optical satellite images
- *Advisor:* Dr. Biplab Banerjee

Technical Skills

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

Projects

Sampling an action from a Q function in continuous action spaces
August 2021 - Present

- 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

Learning heuristic function for large search problems
September 2020 - Present

- Investigating reinforcement learning based approaches for lifelong heuristic search algorithms
- Studying the scalability of such approximators for NP-hard problems
- Currently, extending our approach to multi-agent path finding (MAPF)
- *Advisors:* Dr. Guni Sharon, Dr. Sven Koenig

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	**Reviewer**, AAAI 2023