Prashant Trivedi

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RESEARCH INTERESTS

My research focuses on advancing decision-making under uncertainty, with an emphasis on both theoretical and practical aspects of machine learning, reinforcement learning (RL), multi-agent systems, and AI alignment. Specifically, I am interested in

Machine Learning: Exploring reinforcement learning (RL), multi-agent reinforcement learning (MARL), deep reinforcement learning, multi-armed bandits.

Sequential Decision Making: Applying various Markov decision process, dynamic programming, stochastic dynamic programming methods for various applications.

AI Alignment: Addressing challenges in robustness, prompt optimization, safety, reliability within the context of reinforcement learning from human feedback (RLHF).

Optimization: Investigating problems at the intersection of optimization, stochastic approximation, and AI with human feedback.

CURRENT POSITION

University of Central Florida, Florida   Jun 2024 – Present

Post-Doctoral Scholar, College of Engineering and Computer Science (CECS)

Advisor: Dr. Amrit Singh Bedi

WORK EXPERIENCE

One Network Enterprises, India   May 2023 – Jun 2024

Machine Learning Scientist

- Designed and implemented optimization and reinforcement learning-based solutions for demand sensing and demand planning, optimizing predictive accuracy and decision-making to improve supply chain efficiency and adapt to market fluctuations.

Indian Research Lab, IBM Bangalore   May 2020 – Aug 2020

Summer Research Intern

- We provide a stackelberg game based framework to give the valuation to dataset sample in federated setting when sharing the data with server is not possible.

EDUCATION

Indian Institute of Technology Bombay, India   Jul 2018 – Jul 2023

Doctor of Philosophy (Ph.D.), Industrial Engineering and Operations Research (IE&OR)

- **Thesis Title**: Multi-Agent Reinforcement Learning and Decision Making
- **Supervisor**: Prof. N. Hemachandra
- **Date of Defence:** July 27 2023
- **Award**: IEOR Alumnus Endowment: Excellence in Doctoral Dissertation Award for 2023-24

Indian Institute of Technology Bombay, India   Jul 2016 – Jun 2018

Master of Science (M.Sc.), Industrial Engineering and Operations Research (IE&OR)

- Cumulative GPA: 8.5/10

Banaras Hindu University Varanasi, India   Jul 2013 – Jun 2016

B.Sc. (Honors) Mathematics, Institute of Science

- Cumulative GPA: 8.43/10

Refereed Journal Articles

- <u>Trivedi, P.</u>, Hemachandra, N. (2022). *Multi-Agent Natural Actor-Critic Reinforcement Learning Algorithms. In Special Issue on Multi-Agent Dynamic Decision Making and Learning, Dynamic Games and Applications, 2022.* https://doi.org/10.1007/s13235-022-00449-9.

Conference Proceedings

- <u>Trivedi, P.</u>, Hemachandra, N. (2023). *Multi-Agent Congestion Cost Minimization With Linear Function Approximation. In 26th International Conference on Artificial Intelligence and Statistics (AISTATS) 2023.* https://proceedings.mlr.press/v206/trivedi23a.html.

- <u>Trivedi, P.</u>, Hemachandra, N. (2022). *Noise Robust Core-stable Coalitions of Hedonic Games. In 14th Asian Conference on Machine Learning (ACML) 2022.* https://proceedings.mlr.press/v189/trivedi23a.html.

- Tripathi, S., Hemachandra, N. and <u>Trivedi, P.</u> (2020). *Interpretable Feature Subset Selection: A Shapley Value Based Approach. In IEEE 2020 International Conference on Big Data (Big Data).* https://ieeexplore.ieee.org/abstract/document/9378102.

Manuscripts Under Review

- <u>Trivedi, P.</u>, Chakraborty, S., Reddy, A., Aggarwal, V., Bedi, A.S., Atia. G. (2024). *Align-Pro: A Principled Approach to Prompt Optimization for LLM Alignment.* Paper.

- <u>Trivedi, P.</u>, Hemachandra, N. (2024). *MA-LDP: Regret Minimization in Decentralized Multi-Agent Locally Differentially Private Reinforcement Learning.* Paper.

Working Papers

- <u>Trivedi, P.</u>, Verma, A., and Hemachandra, N. *Regret Minimization in Constraint Multi-Agent Reinforcement Learning with Non-Linear Function Approximations.*

- <u>Trivedi, P.</u>, Reddy, A., Chakraborty, S., Sahu, A., Aggarwal, V., Atia. G., Bedi, A.S. *ProFIT: A Unified Approach to Alignment via Prompter and LLM Fine-Tuning.*

(Workshop) A two-day workshop on "Markov Decision Processes, Reinforcement Learning and Multi-Agent Reinforcement Learning" at IIM Bangalore, India, May 2023.

(Talk) "Multi-Agent congestion cost minimization with linear function approximations" at *International Conference on Artificial Intelligence and Statistics (AISTATS)*, Spain, Apr 2023.

(Talk and Poster) "Noise Robust Core Stable Coalition of Hedonic Games" at *Asian Conference on Machine Learning*, ISB Hyderabad, Dec 2022.

(Talk) "Multi-Agent Natural Actor-Critic Reinforcement Learning Algorithms" at the *Department of Computer Science and Automation*, IISc Bangalore, Nov 2021.

(Talk) Presented a paper titled "Learning Noisy Hedonic Games" at *GAMES 2020, the 6th World Congress of the Game Theory Society*, Online, Jul 2020

(Poster) "Shapley Value For Multichoice Cooperative Games: A New Approach" at *International workshop on game theory*, Dibrugarh University Assam, India, Sep 2018.

Teaching Assistant at IE&OR, IIT Bombay for the following courses:

Core Courses: Operations Analysis, Engineering Statistics, Decision Analysis and Game Theory.

Elective Courses: Topics in Learning Algorithms, Data Analytics in Operations Research, Markov Decision Processes, Introduction to Financial Engineering.

Additional Course: Naval Operations Analysis (special offering for Indian navy officers).

WORKSHOPS AND SCHOOLS ATTENDED	1) Workshops and Tutorials in ACML 2022 at *ISB Hyderabad*. Dec 2022
	2) Online Asian Machine Learning School (OAMLS). Nov 2021, Dec 2022
	3) Learning Theory 1 and 2 Workshop at *TIFR, Bombay*. Jan 2019, Jan 2020
	4) Advance in Applied Probability II (Online). Jan 2021, Jan 2021
	5) The 'Indo-French Center for Applied Mathematics (IFCAM) summer school on Mathematics for Data Science' at *IISc, Bangalore*. Jul 2019

ACADEMIC SERVICES

Reviewer: AISTATS 2023, AISTATS 2024, Neurips 2024, ICLR 2025.

Volunteer: 51st Annual Convention of the Operations Research Society of India (ORSI) and International Conference on "Emerging Trends in Operations Research and Management Science (OR/MS)" held at IIT Bombay.

TECHNICAL SKILLS

Programming Skills: Python.

Statistical and Simulation Tools: MS Excel, Salabim.

Optimization Solvers: AMPL, Gurobi, Cplex, Baron, Snopt, PuLP.

Machine Learning Tools and Libraries: NumPy, Scikit-learn, Tensorflow, Pandas, TRL.

Other Skills: LaTeX, Beamer, MS Office.