



Artificial Intelligence Initiative (Aii)

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Invited Speaker

Dr. Amrit Singh Bedi, University of Maryland

“Deployable Reinforcement Learning: Addressing Real-World Challenges of Artificial Intelligence”

Monday, June 26, 2023 • 10:00AM • R1 101 • [Zoom](#)



Abstract:

Recent advancements in Artificial Intelligence (AI), such as AlphaZero and ChatGPT, have significantly impacted various fields. Reinforcement learning (RL) plays a crucial role in these achievements. However, deploying RL in real-world applications, including robotics, finance, and healthcare, presents challenges such as efficient exploration, scalability, domain adaptation, and safety. One key aspect common to all these challenges in RL is the design of effective reward functions, which are often assumed to be known but remain elusive in practice. In this talk, we will discuss our recent results in addressing these challenges, specifically focusing on sparse rewards in robotic applications. While designing sparse rewards may seem easier, it introduces significant exploration challenges that make traditional algorithms inefficient. To tackle this, we propose heavy-tailed policy gradient algorithms, which provide a promising solution. We derive precise sample complexity bounds for the proposed algorithms and demonstrate their effectiveness in both simulators and real robots.

Furthermore, we will shed light on the broader topic of reward design in RL through bilevel optimization and explore potential solutions. Additionally, we will discuss the relevance of similar ideas from RL in overcoming safety concerns when deploying Large Language Models (LLMs) such as ChatGPT effectively in real-world settings.

Bio:

Amrit Singh Bedi is a research scientist at the Computer Science Department at the University of Maryland, College Park, MD, USA. He obtained his Ph.D. in Electrical Engineering from IIT Kanpur, Kanpur, India, in 2018. Following his doctoral studies, he worked as a Research Associate within the Computational and Information Sciences Directorate at the US Army Research Laboratory (ARL) in Adelphi, MD, USA, from 2019 to 2022. His research interests lie in artificial intelligence (AI) for autonomous systems, with specific emphasis on scalable & sample-efficient reinforcement learning algorithms and trustworthy AI through reliable AI-generated text detection. Currently, he is working on developing deployable reinforcement learning algorithms with applications in robotics, finance, etc. His paper was selected as one of the Best Paper Finalists at the 2017 IEEE Asilomar Conference on Signals, Systems, and Computers. He received an honorable mention from the IEEE Robotics and Automation Letters in 2020. He was awarded the Amazon Research Award in 2022.