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Data Science Seminar Series

AI and Multi-agent Systems for Societal Benefit

Arunesh Sinha, Ph.D.
Assistant Professor
Singapore Management University

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Web Link: Zoom Meeting Link

The world is inherently multiagent. AI has a rich tradition of study of multiagent systems. In this talk, I will present work that utilizes multiagent AI models to solve pressing real world problems in public safety and better modelling of human-decision making systems. In particular, I will describe modeling of adversarial interaction using Stackelberg games and applications to public safety and security. I will focus on a model that I developed called threat screening game, which was tested at some US airports for screening passengers. I will also present novel techniques in optimization used for solving this game, as well as a repeated version of threat screening that is solved using reinforcement learning. The reinforcement learning approach introduces a novel technique of enforcing hard constraints on neural network outputs.

In another topic in multiagent systems, I will talk about my effort to build high fidelity simulators of human decision-making systems using deep generative models. These simulators can help learn better policies and decisions for the real world. Overall, multiagent reasoning in AI is key to solving many real world problems.

Dr. Arunesh Sinha is an Assistant Professor of Computer Science in the School of Computing and Information Systems at Singapore Management University. Prior to this, he was a Research Scientist in the Computer Science Department at the University of Michigan and a postdoctoral scholar at the University of Southern California. He received his Ph.D. from Carnegie Mellon University, where he was advised by Prof. Anupam Datta. He obtained his undergraduate degree in Electrical Engineering from IIT Kharagpur in India. He was awarded the Bertucci fellowship during his PhD at Carnegie Mellon University in appreciation of his novel research. His paper was nominated for the best innovative application paper in AAMAS 2016 and he won the best Demo award in AAMAS 2021. Dr. Sinha has conducted research at the intersection of security, machine learning and game theory. His interests lie in the theoretical aspects of multiagent interaction, machine learning, security and privacy, along with an emphasis on the real-world applicability of the theoretical models.