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"Adaptation from Parallelized Reinforcement Learning Agents for Complex Systems Under Uncertainties"

Thursday, May 9th, 2024 | 11:00 AM to 12:00 PM EST

Zoom - Meeting ID: 898 8452 3090| Passcode: 7Xdkfe

Dr. Zhen Ni,
Associate Professor
Florida Atlantic University

Abstract: Artificial Intelligence (AI) is one of the most exciting developments in the last decade. At the same time, Reinforcement Learning (RL) has emerged as a very successful paradigm for a variety of machine learning tasks. RL method usually finds an action policy that maximizes total cumulative reward over a given timeframe. With a combination of (deep) neural networks, it could handle complex features and make predictions about future states and rewards. However, existing RL - based optimization approaches are hampered by the generalization capacity and the increasing computational burden to accommodate the uncertainties. Some RL methods often analyze with some ideal assumptions without considering the abrupt changes and are hard to transfer to dynamic environments. We have designed a new paradigm of parallelized reinforcement learning (PRL) methods based on probabilistic events to handle the uncertainties. Several local (virtual) learning agents are employed to interact with pertinent environments in a distributed manner and report outcomes to the global agent. The advantage estimate functions of learning agents are designed with a backward sweep to transfer the outcomes to the value function updating process.

Speaker Bio: Dr. Zhen Ni is currently an Associate Professor with the Department of Electrical Engineering and Computer Science (EECS), Florida Atlantic University (FAU), Boca Raton, FL, USA. His research interests mainly include reinforcement learning, approximate dynamic programming, computational AI methods, and smart grid applications. He was an Assistant Professor at EECS department of South Dakota State University between 2015-2019. Dr. Ni is the Chair of IEEE Computational Intelligence Society (CIS) Adaptive Dynamic Programming and Reinforcement Learning Technical Committee from 2023-2024. Reinforcement Learning Technical Committee from 2023-2024.

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