MathWorks® Weeks
at Northeastern University

Machine Learning/AI

Monday, March 13, 1 - 2 pm

Register here: MachineLearningAI.eventbrite.com

Applied Reinforcement Learning with MATLAB and Simulink

Dr. Mohammad Delghani, MIE Department, Northeastern

Deep reinforcement learning (DRL) is a field within artificial intelligence that has recently gained popularity in both research and application domains. Due to MATLAB's strengths in solving RL problems, modular teaching materials are created to enable students learn how to apply RL in multiple domains. This includes problems in Portfolio Management, Autonomous HVAC Control, Classic Control Problems, and Robotics. These hands-on modules will enable students to learn (i) DRL concepts and theory, (ii) how to formulate problems in the MATLAB environment, and (iii) how to use the combination of Simulink, Reinforcement Learning, and Deep Learning toolboxes to solve problems.

A Brain-Inspired Low-Dimensional Computing Classifier for Inference on Tiny Devices

Dr. Xiaolin Xu, ECE Department, Northeastern

This talk presents on the fundamental drawbacks of the so-called hyperdimensional computing (or HDC) and propose a low-dimensional computing (LDC) alternative. Specifically, by mapping our LDC classifier into an equivalent neural network, we optimize the model using a principled training approach. Most importantly, our method can improve the inference accuracy while successfully reducing the ultra-high dimension of existing HDC models by orders of magnitude (e.g., 8000 vs. 4/64).

AI and the Power of Simulation

Dr. Jianghao Wang, MathWorks

Simulation has become an integral part of product development in almost all industries and is reaching new levels with trends like Digital Twins. How can the power of simulation be combined with the impressive models behind the AI hype? Truth be told – in many ways! In this session we will talk about four large trends for AI and Simulation: AI for Reduced Order Modelling (ROM) – a way of managing the computational burden from High-Fidelity models; AI based Virtual Sensors – mimicking a physical sensor where real values cannot be measured; Reinforcement Learning based Controls – letting the model teach itself against a simulation environment; AI model enhancement using Digital Twins – diversify your dataset using simulation