DISTINGUISHED LECTURE SERIES

PERFORMANT, EFFICIENT, AND TRUSTWORTHY CPS-IoT SYSTEMS – CHALLENGES AND OPPORTUNITIES FROM NEUROSYMBOLIC ARCHITECTURES AND FOUNDATION MODELS

ABSTRACT

The previously discrete technologies of CPS-IoT and AI have now entered a tight, virtuous embrace. CPS-IoT allows sensing and actuation in our physical, social, and urban spaces with unimaginable ubiquity. AI allows sophisticated inferences and decisions to be made algorithmically using deep neural networks, even from unstructured and high-dimensional data, with uncanny performance. Together, they seek to perform sophisticated perception-cognition-communication-action loops in diverse applications. However, designers of learning-enabled IoT systems face the challenge of highly resource-constrained edge platforms operating in uncertain environments while assuring performance and trustworthiness. Moreover, in many applications, the systems go beyond taking actions based on inferences about the current world state to perform long-term reasoning about complex activities and project them in space and time while being cognizant of the underlying physics, rules, and constraints. Based on our experience designing systems in mHealth, ocean health, agriculture robotics, and military applications, this talk explores new capabilities and challenges offered by emerging neurosymbolic architectures, multimodal foundation models, and LLMs.

BIO

MANI SRIVASTAVA

Mani Srivastava is a Distinguished Professor, Mukund Padmanabhan Term Chair, and Vice Chair of Computer Engineering at UCLA's ECE Department with a joint appointment in the CS Department. He is also an Amazon Scholar affiliated with Amazon's AWS AI Labs. He enjoys working on learning-enabled, resource-constrained, and trustworthy CPS-IoT systems interacting with humans and the physical world. His research examines problems across the entire spectrum of applications, architectures, algorithms, and technologies in the context of systems and applications for mobile health, intelligent built environments, national security, and sustainability. He is a Fellow of the ACM and the IEEE.

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