

Machine Learning Guest Speaker



Kwan-Yee Lin

EECS Department
University of Michigan, Ann Arbor

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Presentation: 10:30 A.M. – 11:30 A.M.

MSEE 180

<https://purdue-edu.zoom.us/j/93231720452>

Learning Humanoid Motion Intelligence from Structured Perception

Abstract Large language and generative models have advanced rapidly by scaling on internet-sized data. In contrast, motion intelligence, the ability for embodied agents to move, adapt, and act by their own eyes and feels, remains far behind. Much of today's effort attempts to bridge this gap by collecting ever-larger video-action datasets and training massive visuomotor models, like VLA. In my view, this path misses the essence. The world is not entirely random; actions are diverse but not arbitrary, they follow the rules of geometry, physics, and are influenced by interaction. Simply scaling imitation data treats motion as an unorganized pixel-to-action mapping, ignoring these underlying physical regularities.

In this talk, I will discuss how to move towards motion intelligence through the approach of structured perception, a data-driven, context-adaptive methodology for extracting actionable structure from sensory streams and grounded in the agent's own experience, not rigidly prescribed. With such representations, adaptive motion emerges not from mimicking demonstrations but from what the agent sees, senses, and interacts, inferring within a structured, reasonable searching space. I will show how structured perception operates across multiple levels, from a first-principle understanding of how human motion is represented, to low-level control and high-level planning in humanoids. Finally, I will share several future directions that I believe can move us closer to full motion intelligence.

Bio Dr. Kwan-Yee Lin is a Research Fellow in the EECS Department at Umich, working with Prof. Stella X. Yu. She received her Ph.D. from Peking University, where she was awarded the Presidential Scholarship, the university's highest graduate-level honor for academic and research excellence. She previously was a postdoctoral researcher at The Chinese University of Hong Kong, and spent several years in industry as Director of an R&D department, leading the development of over 30 mass-produced systems used by major automotive manufacturers worldwide. Her research lies at the intersection of computer vision, computer graphics, and robotics, focusing on algorithms for building realistic and intelligent virtual humans, to make the embodied human-like systems not only resemble humans in form but also emulate their remarkable motor capabilities. Dr. Lin serves as a reviewer for top-tier conferences and journals and as an Area Chair for 3DV 2026.