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Title: Beyond Pixels: Structured Representations and Robust Robot Manipulation

ABSTRACT

The manipulation of deformable objects—such as textiles or cables—remains one of the most challenging problems in robotics. Due to their high degrees of freedom and strongly nonlinear behavior, learned control policies often exhibit significant sensitivity to previously unseen situations.

This talk presents ongoing doctoral research investigating whether a learnable hypergraph encoder can produce a semantic intermediate representation that captures invariants relevant to manipulation. The objective is to design a structured representational layer that enhances the robustness of a frozen Vision-Language-Action (VLA) policy when deployed in novel environments.