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CYBERSECURITY SEMINAR SERIES

Tomer Weiss
New Jersey Institute of Technology

Learning Deep Representations of Collective Behavior

Collective behavior is prevalent in many domains, ranging from traffic, crowd flow, multi-agent robotics to entertainment. As such, realistic models of such behaviors have multiple benefits, from easing congestion, mass event safety regulations, to simulation of such behaviors for training robotics agents. Multiple methods have been proposed but have failed to generalize beyond the specific data and domain which they have been designed for.

In this talk, we discuss our first steps into a general theoretical and practical formalism for crowd behaviors using recent innovations with Deep Learning Koopman Autoencoders, which were demonstrated to predict dynamics of multiple physical phenomena. We discuss how to predict crowd behaviors and demonstrate our recent results. We also provide background on related emerging approaches for capturing collective behavior dynamics, from Deep Reinforcement Learning to traditional physics inspired models.

Image is attached.

Tomer Weiss is an assistant professor with the Department of Informatics, at the New Jersey Institute of Technology. Before that, he was a research scientist with Wayfair, Boston. In 2018, he defended his PhD advised by Prof. Terzopoulos at the University of California, Los Angeles. He received the Best Paper Award from the ACM SIGGRAPH conference on Motion in Games, for his work on virtual crowd simulation. He was a finalist presenter in both ACM SIGGRAPH Thesis Fast Forward, and the ACM SIGGRAPH Asia Doctoral Symposium in 2018. He received his MS in computer science from UCLA in 2016, and his BSc degree in computer science from Tel Aviv University in 2013. His research interests include collective dynamics, scene understanding, and interactive visual computing

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