UNIVERSITY OF CENTRAL FLORIDA
CENTER FOR RESEARCH IN COMPUTER VISION

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## "Video Analysis - Motion Prediction and Object Tracking"

**Monday, November 28, 2022 · 2:00PM · Zoom**



**ABSTRACT**

A variety of applications, including moving object detection, motion prediction, object tracking, motion segmentation, event detection, and behavior understanding, are addressed in the current research disciplines of video analysis and interpretation. In this talk, I will focus on motion prediction and object tracking, which are essential components for a variety of applications, including autonomous driving, security and surveillance, traffic control, UAV navigation, and assistive robotics.

The human motion prediction problem aims to estimate a graph of human joint values at some future time. When modeling human motion, the positions of the joints in the predicted frames generally depend on both the temporal smoothness and the bio-mechanical dynamics of human motion. Nevertheless, modeling the spatio-temporal correlations over multiple frames is a challenging issue.

Tracking moving objects over space and time is fundamental for understanding the dynamic visual world, which has many practical applications in forecasting complex trajectories. It however remains a challenging task to automate since the underlying relationships or dynamical model evolve over time into a stochastic sequential process with a high degree of inherent uncertainty.

In this talk, I'll discuss how we've recently deployed cutting-edge technologies like normalizing flows and diffusion models to address these issues.

**BIOGRAPHY**

Mohsen Zand is a Postdoctoral Fellow at the Robotics and Computer Vision (RCV) lab at Queen's University, Kingston, Canada. He has also been affiliated with Queen's University's Ambient Intelligence and Interactive Machines (Aiim) Lab and Ingenuity Labs Research Institute since 2020. In 2016, he obtained his Ph.D. in Multimodal Information Retrieval from Putra University. Dr. Zand formerly worked as an Assistant Professor in the Computer Engineering Department at Azad University in Iran, where he was recognized for his research and teaching skills with the Excellence in Teaching Award and Prosperous Researcher Award. Dr. Zand has led and participated in a variety of industrial collaboration initiatives. He has published in various venues including IEEE Transactions on Image Processing, IEEE Transactions on Geoscience and Remote Sensing, Journal of Visual Communication and Image Representation, ECCV, AAAI, 3DV, ICASSP, ICIP, and VISAPP. Dr. Zand's research intersects the areas of computer vision, machine learning, and robotics, with a focus on the development of efficient and robust object recognition, pose determination, and tracking methods.