Data Science Seminar

Hosted by Department of Mathematical Sciences

- Date: Tuesday, April 23, 2019
- Time: 11:45am – 12:45pm
- Room: WH-100E
- Speaker: Daphney-Stavroula Zois (SUNY Albany)
- Title: Spatiotemporal Quickest Change Detection for Traffic Accident Nowcasting

Abstract

Estimated fatalities from motor vehicle crashes topped 40,000 in 2017, whereas approximately 4.57 million people were injured seriously enough to require medical attention with a total cost to society of approximately $\$\,413.8$ billion. In addition to human and monetary loss, it has been recently estimated that traffic accidents cause 4.2 billion vehicle–hours of delay across metropolitan areas, and an equivalent to $\$\,2.8$ billion gallons in wasted fuel. Reducing the delay between the time accidents occur and their mitigation is therefore critical to avoid large-scale, cascading, and costly effects on human lives. In this talk, I will discuss the problem of spatiotemporal quickest change detection, where the goal is to detect statistical changes in spatiotemporal series, and how it relates to the problem of traffic accident nowcasting. Within this context, I will present a new approach that optimally detects the time of an accident and subsequently estimates its geographic location in near–real–time based on speed sensor readings. Finally, I will demonstrate the performance of the proposed approach on a large-scale real-world dataset comprising speed readings and accident reports from the I405 freeway in the Los Angeles County.

About the speaker: Daphney-Stavroula Zois is an Assistant Professor in the Department of Electrical and Computer Engineering at the University at Albany, State University of New York (SUNY). She received her B.S. degree in Computer Engineering and Informatics from the University of Patras, Greece, in 2007, and the M.S. and Ph.D degrees in Electrical Engineering from the University of Southern California in 2010 and 2014, respectively. During 2014-2016, she was a Postdoctoral Research Associate with the Coordinated Science Laboratory at the University of Illinois, Urbana-Champaign. She is the recipient of various fellowships and awards including the Viterbi Dean's and Myronis graduate fellowships. Her research interests are in decision making under uncertainty, machine learning, detection & estimation theory, intelligent systems design, and signal processing.