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Computer Science Seminar Series, 2010
National Capital Region

Harnessing Computer Science Research and Advances to Support Hurricane Research

Speaker: Dr. Shen-Shyang Ho
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1:00PM-2:00PM, NVC 325

Abstract

In this talk, I will provide an overview of my current and past projects that utilize computer science research advances for technology development to support hurricane research. In particular, I will discuss two projects, namely

1. Hurricane tracking using heterogeneous satellite data sources, and
2. Moving objects database technology to support ad-hoc spatio-temporal query and hurricane data analysis.

For hurricane tracking, the developed tracking system utilizing infrared images from Geostationary Operational Environmental Satellites (GOES), precipitation measurements, and ocean surface wind field from orbiting satellites will be described. An automated approach to identify hurricane eye from the wind field will also be presented. Next, I will describe our current research to develop an information system to provide scientists with previously unavailable database management, analysis, and query capabilities that will advance the research and understanding of dynamic weather events based on weather event trajectories and sensor measurements from multiple satellites. In particular, I will briefly describe my research on (i) multivariate trajectory similarity search based on machine learning techniques, and (ii) retrieval of satellite measurements from moving satellite given weather event trajectory query outputs. Before I end the talk, I will share with the audience some lessons learned and thoughts related to working on these multidisciplinary projects from a computer scientist's perspective.

Biography

Dr. Shen-Shyang Ho received his PhD in Computer Science from George Mason University in 2007 and his Bachelor (Honors) in Science (Mathematics and Computational Science) from the National University of Singapore in 1999. From 2007 to 2010, he was a NASA postdoctoral fellow and a Caltech Postdoctoral Scholar working at the Jet Propulsion Laboratory (JPL) at the California Institute of Technology. His research interests include artificial intelligence, machine learning, pattern recognition, and data mining for streaming data and on mobile devices. Currently, he is a researcher in the Center for Automated Research of the Institute of Advanced Computer Studies at the University of Maryland. His current research is a collaboration with JPL and University of Florida, Gainesville, and is funded by NASA.