Seminar Series

INDUSTRIAL ENGINEERING

DMA-POMDP: A Multi-agent Framework for Decentralized Control and Its Application to Outbreak Response

Thursday, April 18, 2013 • 12:30 – 1:30 pm
Imhoff Study Lounge – Bell 4008

Dr. Julie Simmons Ivy

Associate Professor, Edward P. Fitts Department of Industrial and Systems Engineering, North Carolina State University

In this research, we present a multi-agent partially observable Markov decision process framework (DMA-POMDP) for decentralized control of multiple agents under uncertainty. DMA-POMDP can be applied to problems where agents have partial information about both other agents and system state and communication between agents is explicitly formulated. We apply the DMA-POMDP framework to a public health setting where local and state health departments seek to optimize the timing of response under a disease outbreak such as influenza - one of the most significant and widely spread threats to public health.

Dr. Julie Simmons Ivy is an Associate Professor in the Edward P. Fitts Department of Industrial and Systems Engineering and Fitts Faculty Fellow in Health Systems Engineering. She previously spent several years on the faculty of the Stephen M. Ross School of Business at the University of Michigan. She received her B.S. and Ph.D. in Industrial and Operations Engineering at the University of Michigan. She also received her M.S. in Industrial and Systems Engineering at Georgia Tech. Dr. Ivy served as the 2007 Chair (President) of the INFORMS Health Applications Society (HAS) and is currently the President for the INFORMS Minority Issues Forum. The focus of her research is decision making under conditions of uncertainty with the objective of improving the decision quality. Dr. Ivy's medical decision making research relates to studying the cost-effectiveness of mammography screening, dynamic breast cancer screening policy development, false positive prediction as a function of breast cancer screening policy, the impact of comorbidity on breast cancer patient outcomes, modeling birth delivery choice as a function of long term consequences such as pelvic floor dysfunction, and public health preparedness. Her research has been funded by the NSF and the Centers for Disease Control.

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