서 울 대 학 교
산업혁신 애널리틱스 교육연구단

BK21 FOUR SEMINAR

일 시	2024.07.04.(목) 14:00~15:00	장 소	서울대학교 39동 321호

연 사

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Dr. Young-Jun Son is the James J. Solberg Head and Ransburg Professor of School of Industrial Engineering at Purdue University. He is a Department Editor of the Institute of Industrial and Systems Engineers (IISE) Transactions, and serve on the editorial board for six other international journals. He is a Fellow of Institute of Industrial and Systems Engineers (IISE), and has received the Society of Manufacturing Engineers (SME) 2004 Outstanding Young ME Award, the IIE 2005 Outstanding Young IE Award, the IISE Annual Meeting Best Paper Awards (2005, 2008, 2009, 2016, 2018, 2019), and the Best Paper of the Year Award (2007) in International Journal of Industrial Engineering.

주 제

Multi-paradigm Simulation and Decision Models for Planning and Control of Complex Systems

내 용

In this talk, we will discuss multi-paradigm simulations to support planning and control decisions. First, we will discuss a simulation-based planning and control (SPC) approach, where a fast-running simulation is used to evaluate decision alternatives at the planning stage, and the same simulation model (running in real-time) is used as a task generator to drive a smart manufacturing system at the control stage. Second, we then discuss extension of SPC to a dynamic data driven adaptive multi-scale simulation (DDDAMS) framework for surveillance and crowd control via unmanned aerial vehicles (UAVs) and unmanned ground vehicles (UGVs). The DDDAMS framework is composed of integrated planner, integrated controller, and decision module for DDDAMS. The integrated planner, employing agent-based simulation (ABS) and physics-based game simulation, devises best control strategies for 1) crowd detection, 2) crowd tracking, and 3) UAV/UGV motion planning. The integrated controller then controls real UAVs/UGVs via 1) sensory data collection and processing, 2) control command generation based on strategies provided by the decision planner, and 3) control command transmission to the real system. The decision module for DDDAMS enhances computational efficiency via dynamic switching of fidelity of simulation and information gathering. Finally, we will share the results of our field demo, which integrated a fast running simulator, a real-time simulator, and the real system (UAVs, UGVs, and crowd).

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