**AI enabled Discrete Event Dynamic Systems**

Li Xia\*, Qianchuan Zhao (China)

Code: 11i61

**Abstract**

Discrete event dynamic systems (DEDS) aim at studying the man-made systems driven by events, such as the systems of manufacturing, transportation, computer, communication, energy, robots, etc. The foundation of DEDS is built on mathematical models, such as Markov systems, queueing

systems, Petri net, automata, etc. The decision and control of DEDS is fundamental to improve the operation efficiency of those man-made systems, which involves the optimization theory such as Markov decision process (MDP), optimal control, etc. Recently, the remarkable successes of AI attract intensive attention on the study of data-driven learning and optimization. One of the main research streams of AI is to handle the dynamic decision-making problem with reinforcement learning, whose mathematical foundation is MDP. Therefore, with these facts, the research development of DEDS theory encounters a crossroad, combining the techniques of AI and enabling the study of DEDS in a manner of data-driven learning and optimization. This special session aims to bring together the international scholars and industry practitioners to discuss the recent progress of DEDS in the background of big development of AI techniques, while focusing on the field of automation science and engineering. The potential topics include but are not limited to the development of DEDS theory such as Markov systems, queueing systems, Petri net, automata, the development of reinforcement learning & MDP theory, the AI enabled solution to dynamic games & multi-agent systems, and the application of above theories to solve engineering problems in the field of automation science and engineering.