Consensus-Based Distributed Computation: Algorithm, Scalability & Resilience

Abstract:
In this seminar, we will introduce our recent progress in consensus-based distributed algorithms for solving linear equations in multi-agent networks, in which each can only communicate with its nearby neighbors. We suppose information known to each agent is only part of the overall equation, other than the whole equation. Such information could one or several rows, or even just one entry for better scalability. We will present a distributed algorithm for solving linear equations, which is applicable to all types of linear equations as long as solution exists, do not involve any sufficiently small step size that needs to be shared by all agents in the network, and works asynchronously. Applications of the algorithm includes large content delivery across vehicular networks, distributed network localizations, and so on. We will also introduce a distributed algorithm for achieving the least square solutions. A method to achieve resilience of consensus-based distributed algorithms under malicious attacks with unknown locations will also be discussed.

Shaoshuai Mou received his bachelor and master degree in Harbin Institute of Technology in 2006 and 2008, respectively. He completed his Ph.D. study at Prof. A. Stephen Morse’s group in Electrical Engineering at Yale University in 2014. Then he worked as a post-doc at MIT for a year. During his Ph. D. study, he also held a position of visiting scholar at Australian National University and worked part-time for Yale Law School. Since 2015, Shaoshuai Mou has been working as an assistant professor at School of Aeronautics and Astronautics at Purdue University. His research interests include distributed algorithms and control, multi-agent networks, formation control, collaborations of multiple UAVs, cyber-security & resilience.