KIOS Distinguished Lecture Series

Prof. Yang Tang
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Intelligent Optimization and Decision-making in Multi-Agent Systems

LECTURE ABSTRACT

Multi-agent systems are rapidly developing, demonstrating tremendous potential in fields such as UAVs and autonomous driving. This talk addresses issues of intelligent optimization decision-making, unfolding discussions in two parts: intelligent optimization and game-theoretic decision-making. The optimization section encompasses distributed optimization, key node identification, and separability analysis. For asynchronous fixed optimization and synchronous online optimization problems, dynamic event-triggered and edge-based event-triggered mechanisms are introduced to reduce communication resource consumption, simultaneously identifying key nodes that play a pivotal role in large-scale clusters, and further establishing the criteria for decoupling separable large-scale optimization problems. Game-theoretic decision-making includes analytic games and reinforcement learning-based games. Analytic games construct inter-cluster member game models to derive individual optimal strategies through mathematical analysis, while reinforcement learning-based games emphasize resolving game strategies under imperfect information through trial-and-error using deep learning methods.

BRIEF BIO

Yang Tang (Fellow, IEEE) received the B.S. and Ph.D. degrees in electrical engineering from Donghua University, Shanghai, China, in 2006 and 2010, respectively. From 2008 to 2010, he was a Research Associate with The Hong Kong Polytechnic University, Hong Kong. From 2011 to 2015, he was a Post-Doctoral Researcher with the Humboldt University of Berlin, Berlin, Germany, and with the Potsdam Institute for Climate Impact Research, Potsdam, Germany. He is now a Professor with the East China University of Science and Technology, Shanghai. His current research interests include distributed estimation/control/optimization, computer vision, reinforcement learning, cyber-physical systems, hybrid dynamical systems, and their applications.

Prof. Tang is an IEEE Fellow. He was a recipient of the Alexander von Humboldt Fellowship. He is an Senior Area Editor of IEEE Transactions on Circuits and Systems-I: Regular Papers, Associate Editor of IEEE Transactions on Neural Networks and Learning Systems, IEEE Transactions on Cybernetics, IEEE Transactions on Industrial Informatics, IEEE/ASME Transactions on Mechatronics, IEEE Transactions on Circuits and Systems-I: Regular Papers, IEEE Transactions on Cognitive and Developmental Systems, IEEE Transactions on Emerging Topics in Computational Intelligence, IEEE Systems Journal, Engineering Applications of Artificial Intelligence (IFAC Journal), Science China Information Sciences and Acta Automatica Sinica, etc. He has published more than 200 papers in international journals and conferences, including more than 150 papers in IEEE Transactions and 20 papers in IFAC journals. He has been awarded as best/outstanding Associate Editor in IEEE journals for six times. He is a (leading) guest editor for several special issues focusing on autonomous systems, robotics, and industrial intelligence in IEEE Transactions.

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