TEXAS A&M Institute of Data Science

Texas A&M Institute of Data Science Seminar Series

Communication-Aware and Decentralized Strategic Learning in Networked Multiagent Systems

Networked multi-agent systems include multiple autonomous decision-makers that aspire to achieve their objectives in the absence of a central coordinator. Examples of such decision-makers are robots in a team or individuals during an infectious disease outbreak. The central challenge in these systems is to design decision-making rules that achieve system-wide desired behavior given the limitations of agent sensing and communication. In a networked multi-agent system, when agents' objectives depend on each other's actions and environmental variables, barring unreasonable accuracy of environmental information and unjustifiable levels of coordination, agents cannot be sure of what other agents are optimizing. In such settings, agents have persisting differences in their estimates of their objectives. In this talk, upon adopting game-theoretic equilibrium notions as the optimal (desired) behavior, we present a decentralized algorithm based on the fictitious play algorithm in which agents reason about the actions of other agents to make their selections, whether to communicate or not, and who to communicate with. We show the convergence of the algorithm to an equilibrium under a general condition for any communication protocol. Based on this general condition, we provide a suite of novel communication protocols for costly and random communication environments and discuss trade-offs in cost of communication versus reaching optimality. Lastly, we provide convergence guarantees when environmental uncertainty among agents persists, i.e., when consensus is not feasible.

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Date: Monday, Sept 6, 2021
Time: 1:50 – 2:40 p.m. US Central Time
Zoom Meeting ID: 998 4499 3279
Passcode: 724615
Faculty host: Yu Ding, TAMIDS

Biography

Dr. Ceyhun Eksin is an assistant professor in the Industrial and Systems Engineering Department at TAMU since 2018. He received his Ph.D. in Electrical and Systems Engineering from the University of Pennsylvania in 2015, and was subsequently a Postdoctoral Fellow at the Georgia Institute of Technology affiliated with both the School of Electrical & Computer Engineering and the School of Biological Sciences. He was also a visiting research associate at the Max-Planck Institute for Dynamics and Self-organization Department, Göttingen, Germany. His research interests are in the areas of distributed optimization, network science, game theory and control theory. His current research focuses on designing distributed strategic learning algorithms for multiagent systems, e.g., autonomous teams and energy systems, and modeling, forecasting and control in epidemic networks.

You can also click this link to join the seminar https://tamu.zoom.us/j/99844993279?pwd=TkJodWFVRURyMmkwakI4SWZGeVJTQT09

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For more information about TAMIDS seminar series, please contact Ms. Jennifer South at jsouth@tamu.edu