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Presents

Non-Bayesian Social Learning

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Abstract:

One of the main features of social, natural or engineering networks is the possibility of information sharing and aggregation. For example, in social networks, individuals form their opinions not only by direct observation, but also by hearing the opinions of others in their social clique; people such as their colleagues, friends or family members. Similarly, in distributed sensor networks, different agents communicate with their neighbors and use their measurements in order to estimate the unknown global parameters. Even though it is crucial for the learning process, due to the complexity of social networks, the agents often lack the necessary computational capabilities to rationally incorporate the information provided to them by their neighbors.

In this talk, I address this fundamental problem by proposing a non-Bayesian scheme, which is both local and computationally tractable. I will show that the distributed update scheme results in information aggregation over the network, in the sense that the agents would be able to correctly forecast every other agents' signals. Moreover, I show that under independent observations, the agents asymptotically learn the true underlying state of the world as if they were completely rational. In this sense, the presented update scheme (often called a learning rule) can be considered as a generalization of the well-known consensus schemes: not only all agents asymptotically reach an agreement, but also they agree on the correct value; i.e., social learning is achieved.

About the Speaker:

Alireza Tahbaz-Salehi is currently a Ph.D. candidate in electrical and systems engineering in the University of Pennsylvania, where he is a member of the GRASP lab. He received the MSE degree in electrical engineering, and the MA degree in economics from the University of Pennsylvania, in 2006 and 2008, respectively. His research interests are in distributed control of multi-agent systems, networked dynamical systems, applications of algebraic topology in analysis and design of algorithms for sensor networks, social and economic networks and game theory.