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One if by Land and Two if by Sea: A Glimpse into the Value of Information in Strategic Interactions

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ABSTRACT: Agents in networked systems often have to make decisions with uncertainty about their environment and about the behavior of other agents. This is particularly challenging with strategic agents. A simple setting of the general problem is the Social learning problem with myopic Bayes-rational agents. An instantiation of this is in online platforms where users often have to make purchase decisions with imprecise knowledge of the true value of an item. Observing the other agent's actions and/or reviews/ messages is one common method to learn about an item. However such observational learning can lead to an information cascade, in which agents ignore their private information and herding, in which agents blindly follow the actions of others. Even though individually optimal, information cascades can result in agents choosing an inferior action with positive probability, leading to a loss in social welfare. In this talk we discuss the value of richness of information and the importance of understanding and designing good information structures. In the first part, we show that fundamentally non-intuitive results can hold for many information structures by exhibiting information Braess paradoxes. Specifically, we find out that more information does not universally lead to improvements. In the second part, we present some recent work where efficient strategic communication can help to break information cascades. The first part is joint work with Tho Le at JD.com and Randy Berry at Northwestern University, and the second part is joint work with Shih-Tang Su and Grant Schoenebeck at the Univ. of Michigan.

BIO: I am an Associate Professor in the EECS Department at the University of Michigan. My main research interests are in stochastic modeling, communications, information theory and applied mathematics. A large portion of my past work has been on probabilistic analysis of communication networks, especially analysis of scheduling and routing algorithms. In the past I have also done some work with applications in immunology and coding of stochastic processes. My current research interests are on game theoretic and economic modeling of socio-technological systems and networks, and the analysis of associated stochastic processes.

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