Abstract:

We propose a stochastic model of opinion exchange in networks. A finite set of agents is organized in a fixed network structure. There is a binary state of the world and each agent receives a private signal on the state. We model beliefs as urns where red balls represent one possible value of the state and blue balls the other value. The model revolves purely around communication and beliefs dynamics. Communication happens in discrete time and, at each period, agents draw and display one ball from their urn with replacement. Then, they reinforce their urns by adding balls of the colors drawn by their neighbors. We show that for any network structure, this process converges almost-surely to a stable state. Further, we show that if the communication network is connected, this stable state is such that all urns have the same proportion of balls. This result strengthens the main convergence properties of non-Bayesian learning models. Yet, contrary to those models, we show that this limit proportion is a full-support random variable. This implies that an arbitrarily small proportion of misinformed agents can substantially change the value of the limit consensus. We propose a set of conjectures on the distribution of this limit proportion based on simulations. In particular, we show evidence that the limit belief follows a beta distribution and that its average value is independent from the network structure.