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Presentation Title

Can Society Learn without Opinion Leaders?

(with Itai Arieli and Rann Smorodinsky)

Abstract

A model of learning on a social network with fully-rational Bayesian agents and random arrival order is considered. We show that if for a given large network, most of the agents learn the correct action, then learning persists with high probability even after deleting randomly 99% of the population. In other words, random groups of agents are never critical for learning even if these groups contain a majority of agents. This robustness does not rule out the existence of a certain small minority of agents critical for learning. The classical sociological theory of "two-step information flow" conveys the idea that learning is always facilitated by such a small group of influencers predetermined by the network structure. We challenge this thesis by showing that learning can also be possible in totally-egalitarian networks, where all agents are ex-ante symmetric and thus equally influential. We construct such networks relying on insights from the theory of expanders and demonstrate that adversarial elimination of large groups of agents does not spoil learning outcomes, i.e., no minority of agents (and even majority) is critical for learning. For a network-designer, our results offer a recipe for building networks that aggregate information even if a subset of agents do not participate in the learning process. This subset of absent agents can be large and picked in an adversarial way.

Keywords

Social learning; networks; Bayes rule; robustness; expanders; herding

Affiliation

Technion