DYNAMICS OF OPINION SPREAD IN SOCIAL NETWORKS

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ABSTRACT

Human behavior is profoundly affected by the influenceability of individuals and their social networks. We discuss the dynamics of spread of opinions using two fundamental models for Social Contagion: the binary agreement model (BAM) study the role of committed minorities, and threshold model, to investigate cascades of opinions. Both models, for certain setting of their parameters, undergo significant change in their dynamics.

In BAM model, all individuals initially adopt either opinion A or B. Then, repeatedly, randomly selected node acts as a speaker and choses randomly one of his acquaintances as a listener. Speaker selects one of its opinions and sends it to listener who either adds this opinion as its own, if they are different, or both speaker and listener keep only opinion sent by the speaker. When a small fraction of all individuals commits to their opinion, those individuals are immune to influence from speakers, but otherwise follow the prescribed rules for opinion change. We will show that the prevailing majority opinion in a population can be rapidly reversed by a small fraction of randomly distributed committed individuals. When committed individuals exist for both opinions, the difference between larger and smaller fractions of them needed for rapid majority conversion decreases as the smaller minority increases. We will discuss how these results can be used to understand and to influence the social perceptions of ideas and policies as well as applied to reputation protection.

In threshold model, all nodes start in the initial state-zero, except for initial spreaders that are in state one. The node whose fraction of opinion one holding neighbors is higher than the threshold, changes its state to one. We will discuss how the threshold model can be used to find efficient spreaders, to develop fast heuristic for spreader selection strategies, and to measure the impact of clustering on system dynamics. We will show that even for arbitrarily high value of threshold, a critical initiator fraction of spreaders exists beyond which the cascade caused by them becomes global. Network structure, in particular clustering, plays a significant role in this scenario. Similarly to the case of single-node or single-clique initiators studied previously, we will demonstrate that community structure within the network facilitates opinion spread to a larger extent than a homogeneous random network. Finally, we will discuss the efficacy of different initiator selection strategies on the size of the cascade and the cascade window.

* Invited talk

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