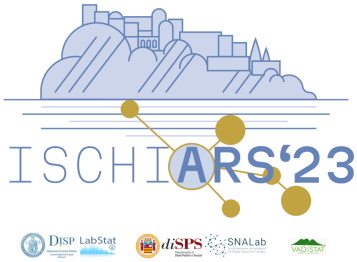

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Influence, inertia, and independence: a diffusion model for temporal social networks

Wednesday, 3 May 2023 15:00 (15)

Many diffusion models consider a static network on which a dynamic influence process unfolds. We propose a novel diffusion model for temporal social networks. The proposed model establishes directed and weighted influence relationships between any pair of nodes based on two antagonistic components: first, the susceptibility to be influenced (or, conversely, the inertia to change the status quo) and, second, the tendency to grow independent from past influence of others. At any point in time, the influence relationships of a node are expressed in a distribution that describes the proportion to which the node is influenced by others or itself. In these distributions, all indirect and time-respecting traces of influence are accumulated by processing time-dependent dyadic interactions and individual independence rates.

We show that the proposed model generalizes the Friedkin-Johnsen model of opinion pooling with stubborn actors. While the model is only an over-parametrization on static networks, it is a proper generalization on dynamic networks. The main reason is that inertia allows for any past influence in the temporal network to have an impact, whereas the same influence dynamics repeat over and over again in static networks.

Keywords

diffusion model, social influence, temporal networks

Topics

- Temporal networks, network dynamics and evolution patterns

Primary author(s) : MARMULLA, Gordana (ETH Zurich); Prof. BRANDES, Ulrik (ETH Zurich)

Presenter(s) : MARMULLA, Gordana (ETH Zurich)

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