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Time-varying network approach in social dynamics: data-driven and analytical modelling.

The temporal dimension of social systems is fundamental in shaping the topological properties of the corresponding networked representation, and it deeply impacts the behaviour of dynamical processes running on top of them, such as epidemic spreading or information diffusion. In this talk, I will give an overview of some recent works addressing the role of the temporal dimension in social network modelling. First, I will focus on a data-driven approach, by considering empirical face-to-face interaction networks, recorded in different social gatherings. I will present a simple model, based on the social attractiveness of individuals, able to quantitatively reproduce most statistical features of these human contact networks. The importance of the network's dynamics will be also illustrated by analysing the behaviour of simple diffusion processes on top of empirical time-varying networks. The case of social networks formed by multiple layers, representing different kinds of social interactions, is particularly interesting in order to show the effects of temporal correlations between layers on coupled spreading processes. Finally, I will briefly present an analytical approach in modelling the bursty nature of human dynamics. I will focus on two examples: temporal network modelling that incorporates the burstiness of social interactions, and the Non-Markovian dynamics of epidemic spreading processes. Our contributions in social dynamics modelling shed light on the temporal features of human interactions, and it will be of interest to researchers in the broad field of time-evolving complex systems.