

Analysis of temporal interactions with link streams

Money or data transfers, contacts between individuals, or product sales, may all be modeled as temporal interactions. Studying the structure and dynamics of interactions is therefore crucial for many fundamental and applied questions (like event detection in traffic, fraud fighting, recommender systems, network optimisation, and the interplay between relations and interactions). Their structure is studied with graphs and networks (sets of nodes and links); their dynamics is studied with signals and time series (variations of a property over time); to study the dynamics of their structure, one uses graph sequences. However, these approaches poorly capture the both structural and temporal nature of interactions, that calls for a dedicated formalism. I will present a generalization of graphs, that we call link streams, and that makes it possible to consistently handle both aspects. We thus obtain a language for the study of interactions over time, similar to the one provided by graphs for the study of relations.

Matthieu Latapy is a CNRS senior researcher at LIP6, Paris, France, in the Complex Networks team. He introduced the concepts of link streams and stream graphs to capture the structure and the dynamics of interactions in a unified and consistent way. He works mainly on this topic now, at a crossroad of computer science, sociology, and mathematics.