Efficiently approximating distance distributions in temporal networks

Pierluigi Crescenzi - Professor at IRIF, Université Paris-Diderot

Abstract:

Temporal networks are graphs in which edges have temporal labels, specifying their starting times and their traversal times. Several notions of distances between two nodes in a temporal network can be analyzed, by referring, for example, to the earliest arrival time or to the latest starting time of a temporal path connecting the two nodes. In this talk we mostly refer to the notion of distance based on the earliest arrival time. In particular, we first show how the sketch approach, which has been already used in the case of classical graphs, can be applied to the case of temporal networks in order to approximately compute the temporal cones of a temporal network. By making use of this approach, we subsequently show how we can compute the distance distribution of large social temporal networks in a few seconds. Finally, we apply our algorithm in order to analyze and compare the behavior of 25 public transportation temporal networks. Our results can be easily adapted to the case in which we want to refer to the notion of distance based on the latest starting time. This is a joint work with Clémence Magnien and Andrea Marino.

Mini Bio :

Pierluigi Crescenzi is a professor at IRIF, Université de Paris (on-leave from the University of Florence). His main research interests include computational complexity, approximation algorithm, distributed computing, complex network analysis, and computer science education. He is co-author of the two books "Complexity and Approximation" and "Introduction to the Theory of Complexity".