

Temporal graphs

Complessità nei sistemi sociali

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**ISI
Foundation**

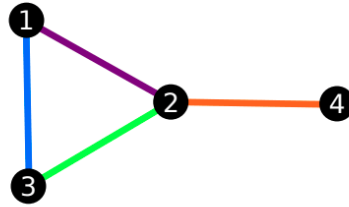
- Email: `lorenzo.dallamico@{isi, unito}.it`
- Note: `lorenzodallamico.github.io/teaching`
- Notebook:
`https://maximelucas.github.io/complexity-book/intro.html`



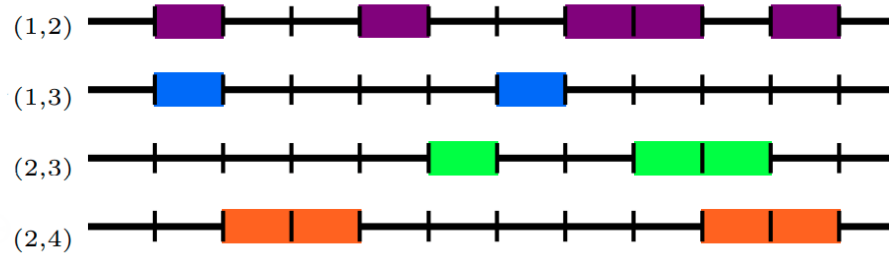
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Representing temporal graphs

(a)

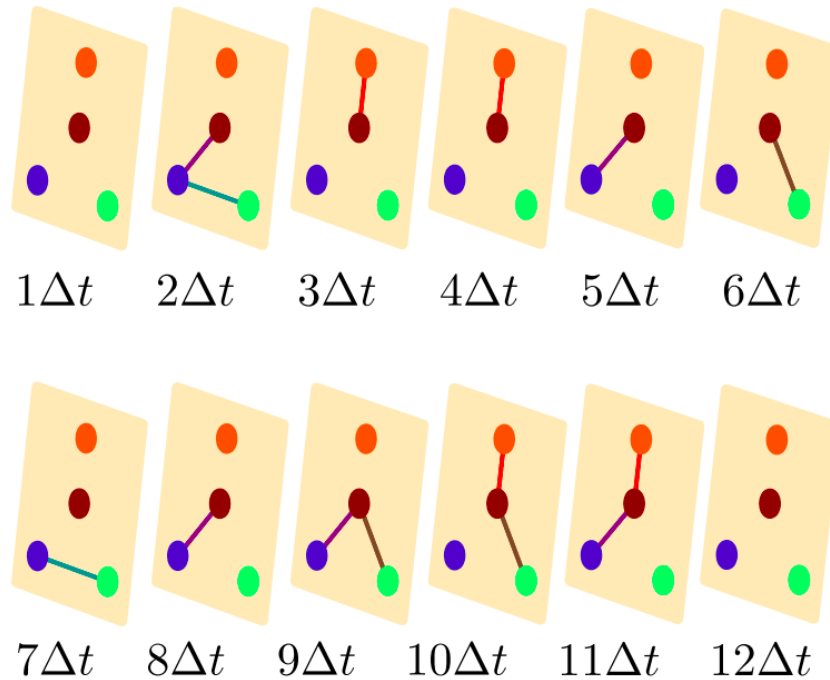


(b)



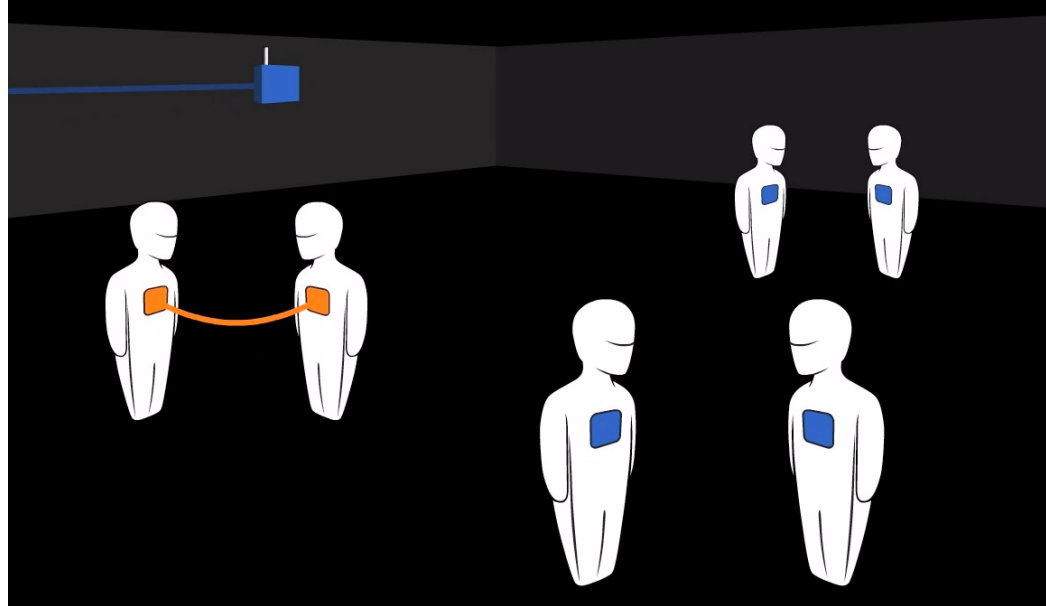
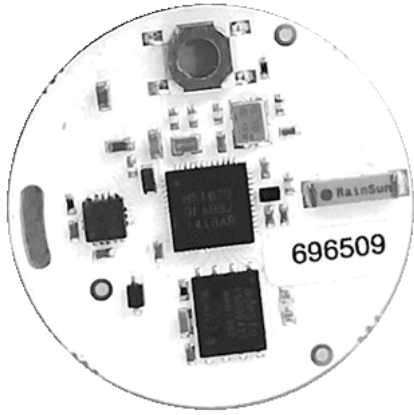
(a) A graph with 4 nodes with $V = \{1, 2, 3, 4\}$ and $E = \{(1, 2), (1, 3), (2, 3), (2, 4)\}$. (b) the temporal activation patterns of each edge (with color code). The x-axis represents time. Picture taken from Gauvin et al., Randomized reference models for temporal graphs

Snapshot graphs



A pictorial representation of a snapshot graph. Each slice corresponds to a different time step in which the edges progressively are activated. Picture taken from Gauvin et al., Randomized reference models for temporal graphs

SocioPatterns



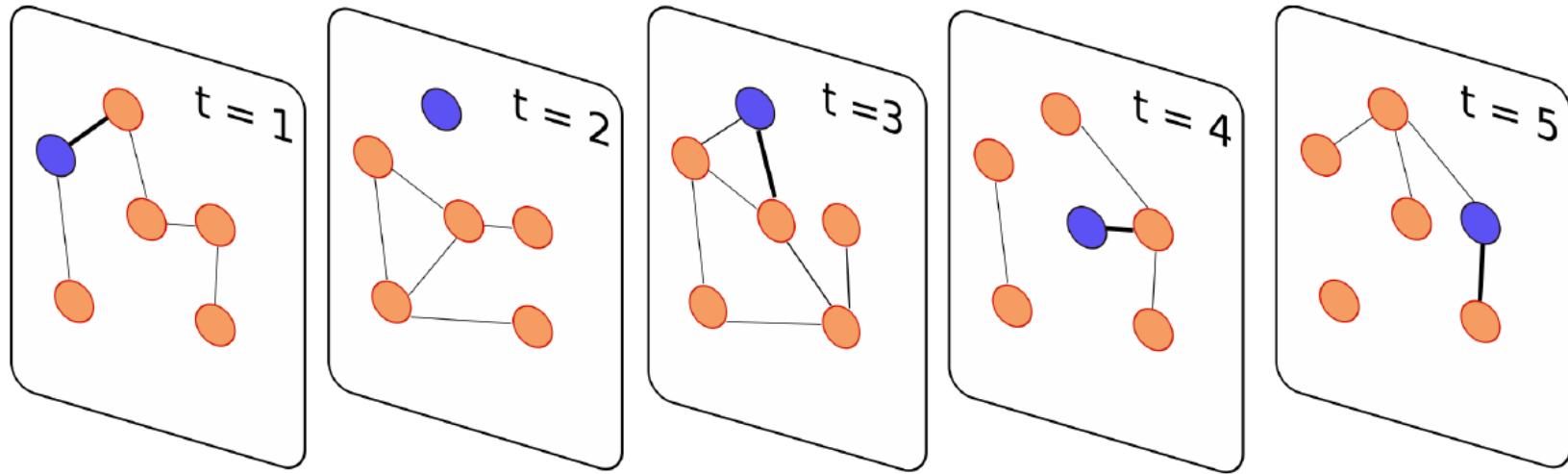
SocioPatterns proximity sensors. Six people in a room wearing a proximity sensor. The orange ones (with the line), indicate a recorded F2F interactions between two individuals. Picture taken from

<http://www.sociopatterns.org/>.

SocioPatterns

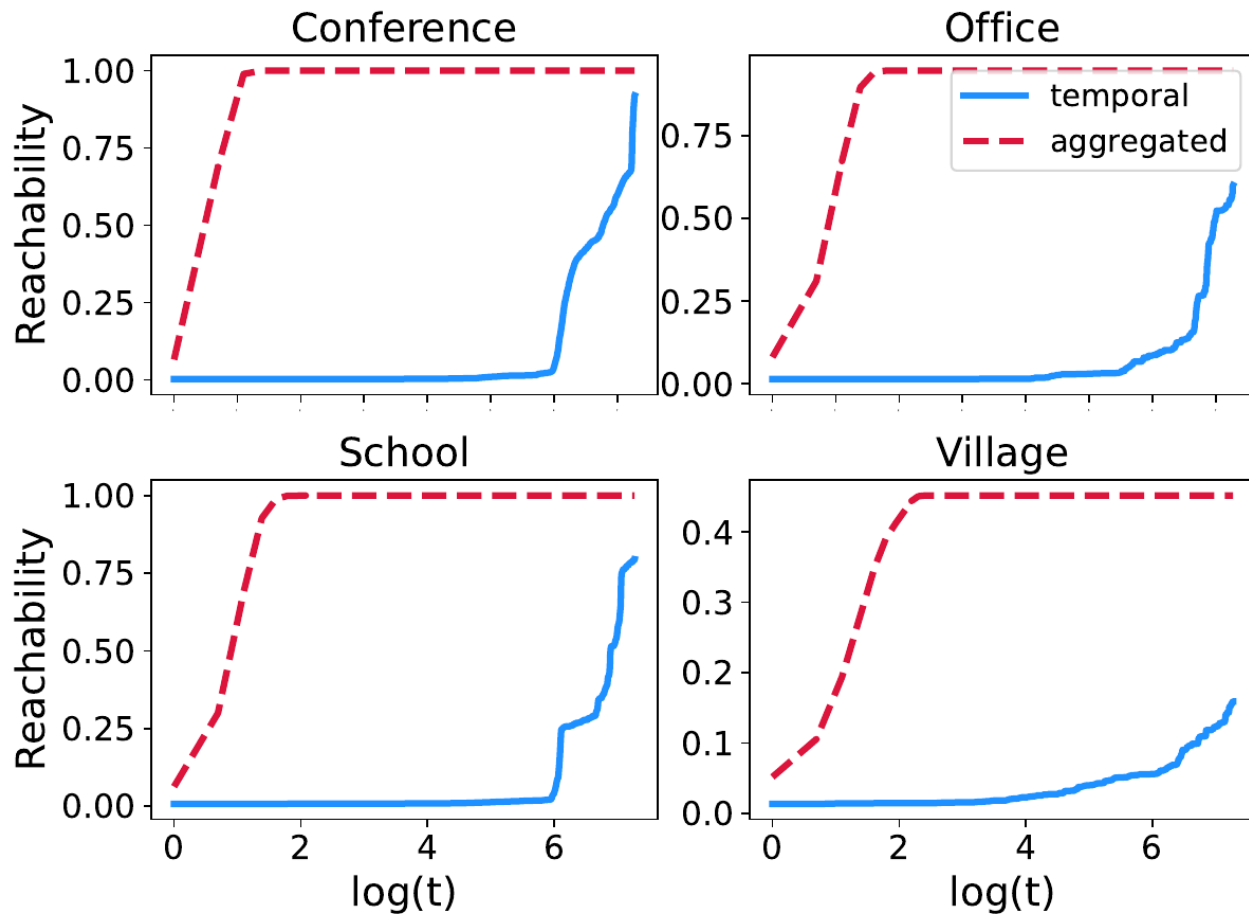
Name	n	Observation time	Description
School	180	from a Monday to the Tuesday of the following week in November 2012.	interactions between students in a high school in Marseilles, France belonging to 5 classes.
Office	92	June 24 to July 3, 2013	interactions between individuals measured in an office building in France
Village	86	between 16th December 2019 and 10th January 2020	interactions between the people of Mdoliro village in Dowa district in the Central Region of Malawi.
Conference	405	June 4-5, 2009	interactions at the SFHH conference in Nice

Time-respecting paths

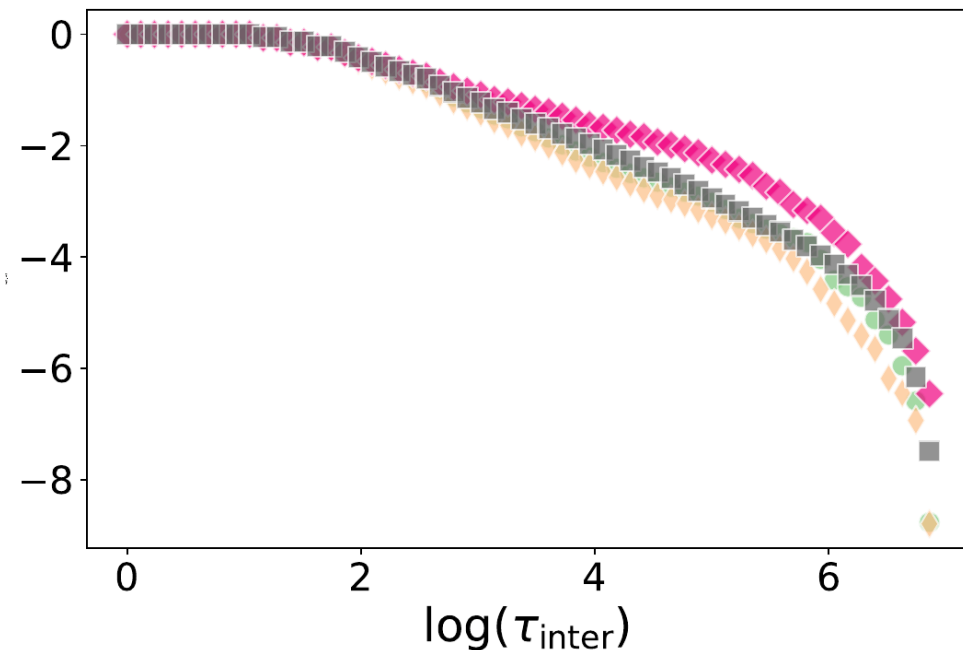
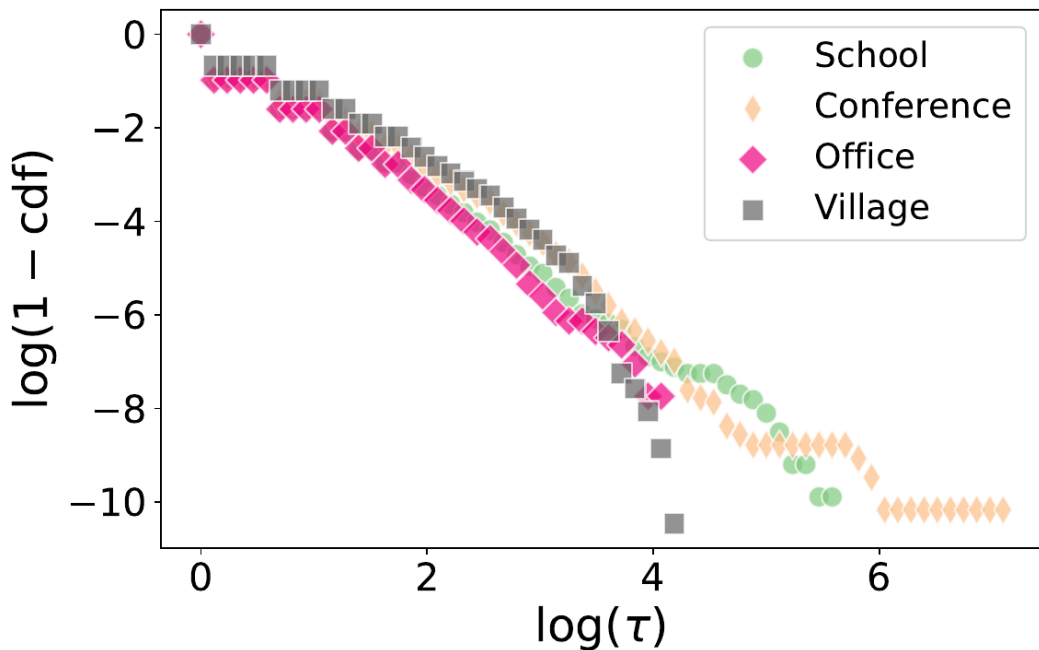


Five snapshots of a temporal graph in which unoccupied nodes are depicted in orange at each time, while the currently occupied node is in blue. A larger width is used to highlight the edge that causes the transition.

Reachability



Duration and inter-event distributions



Burstiness

