UNIVERSITÁ DEL PIEMONTE ORIENTALE
DIPARTIMENTO DI SCIENZE E INNOVAZIONE TECNOLOGICA

EVENTI DiSIT

Seminario | Seminar

22-05-2024

10:30-11:30

Sala seminari C192

L'evento sarà raggiungibile anche in modalità online attraverso la Piattaforma Zoom

Using the Causal Topology of Temporal Networks in Machine Learning Tasks

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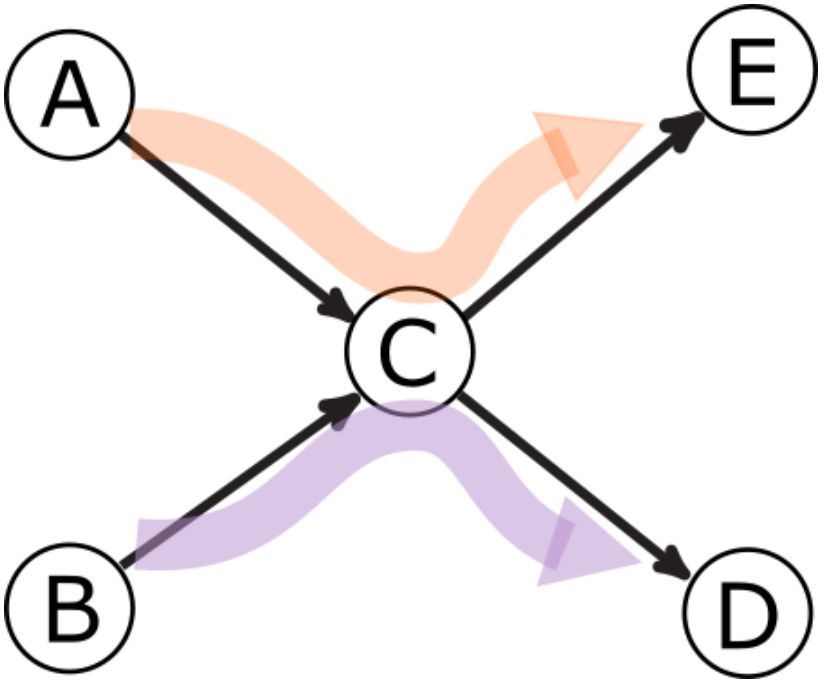

Networks characterize diverse, complex systems across a wide range of domains. For example, they have been crucial in biological studies, such as neuroscience and gene dynamics, for sociological analyses of homophily and consensus formation, or for studying infrastructural systems, including the internet, the World Wide Web, and transportation networks. Static network analysis infers indirect interactions from known direct links. However, empirical observations of causal paths—the sequences of timed events propagating influence—deviate from predictions of conventional static models. This discrepancy distorts findings on node importance, community structure, diffusion processes, and more. This talk illustrates methods that use causal topological information from temporal network data to enhance machine learning tasks. First, we present a statistically grounded approach to infer causal topology from temporal network or sequence data. Then, we introduce techniques that integrate these causal dependencies into machine learning algorithms. By accounting for the rich causal patterns underlying network dynamics, rather than relying on traditional static representations, these algorithms gain a performance advantage across various tasks. These results contribute to a broader context of techniques for machine learning on networks that push the analysis beyond simplistic pairwise representations, calling for approaches capturing the so-called higher-order interactions inherent to complex systems. By incorporating these complexities from the dynamics of real-world systems, these techniques bring a new perspective to the analysis of network systems, thus holding the potential for novel insights into understanding networks across diverse domains.

EVENTO APERTO A:
Docenti | Teachers, Borsisti | Research Fellows, Assegnisti | Postdoctoral researchers, Dottorandi | PhD students, Studenti | Students, Esterni UNIUPO | external UNIUPO people
SEMINARIO IN LINGUA: Inglese/English