

# Influential node detection on Graph on Event Sequence

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## Abstract

The seminar is centered on the paper [1] that investigates how to identify the most influential nodes, or opinion leaders, in social networks. It proposes a novel approach, different from static and temporal networks models, to capture the causal influence between interactions. This approach defines a graph on event sequence, where, rather than representing people as nodes, the events become the nodes of the graph. The model presented in the paper is formulated as a deterministically defined graph, but the idea behind this model is based on the Topological Hawkes Process, a type of multivariate Hawkes process modelled to capture the temporal and topological features of the spreading phenomena, and the model could potentially be extended using this framework.

The proposed method is implemented through the Soft K-Shell algorithm, which analyzes the underlying spreading dynamics of the network.

## References

- [1] Lu, Z., Wang, S., Ren, X. L., Costas, R., Metze, T.(2023) *Influential Node Detection on Graph on Event Sequence* International Conference on Complex Networks and Their Applications (pp. 147-158). Cham: Springer Nature Switzerland.
- [2] Cai, R., Wu, S., Qiao, J., Hao, Z., Zhang, K., Zhang, X.(2022). *THPs: Topological Hawkes processes for learning causal structure on event sequences* IEEE Transactions on Neural Networks and Learning Systems", 35(1), 479-493.
- [3] Bacry, E., Mastromatteo, I., Muzy, J. F. (2015) *Hawkes processes in finance. Market Microstructure and Liquidity* Market Microstructure and Liquidity", 1(01), 1550005.