Estimating the Granger Causality Graph in Linear Hawkes Processes by Minimum Message Length

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Résumé

Many practical applications deal with a large amount of irregular and asynchronous sequential data. One can see such data as event sequences containing stereotypic events, which can be modeled via multi-dimensional point processes. These events can be e.g. user viewing records, the patient records in hospitals, or earthquakes, high-frequency financial transactions or neuronal activity. One of the most popular options to deal with this type of data is to use Multivariate Hawkes Processes. Their main advantage over the other point processes (for example, Poisson processes) is that they possess a memory of the past events, and also they are able to model the interactions between different particles of the system. The main objective of our talk is to infer the connectivity graph, which describes the interactions between the components of MHP, in the sense of Granger causality. We use the Minimum Message Length method, widely used in coding theory.

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