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Functional graphical model in corpus linguistic: an analysis of the spatio/temporal changes in Brexit debate on Twitter

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A literature on multivariate functional graph models has emerged in recent years. The graphical representation of conditional dependency among a finite number of random variables is indeed appealing in a variety of applications, such as brain connection studies. We want to investigate a novel extension of this methodology that considers spatially and temporally correlated random functions. A motivating example is the analysis of the semantic network formed by Twitter users. The main purpose of our analysis is to track the evolution of the Brexit debate on Twitter across the UK during a specific time frame. By considering the change in a word's usage over time as a functional realization, the semantic network is then defined as a graphical representation of the conditional dependence among functional variables. Since each tweet considered is localized in both time and space, we shall take into accounts such features to properly define the functional semantic networks. To summarize the richness of information provided by the estimated networks we used different descriptive statistics on graph, which underlie the changes in both time and space of the public debate around Brexit. The main consequence of this work is a novel representation of the links between words in a social network based on their monthly trends. Consequently, we offer a different perspective on a public debate, moving beyond classical semantic networks built from co-occurrences of words in a sentence/tweet.

Keywords

Functional graphical models, Functional data analysis, Kernel Smoothing, Brexit, Twitter

Topics

• Statistical methods and models for network analysis

Primary author(s) : PRONELLO, Nicola (Università degli Studi 'G. d'Annunzio' Chieti - Pescara); DEL GOBBO, Emiliano (Università degli studi di Foggia); FONTANELLA, Lara (Università degli Studi 'G. d'Annunzio' Chieti - Pescara); IGNACCOLO, Rosaria (Università degli Studi di Torino); IPPOLITI, Luigi (Università degli Studi 'G. d'Annunzio' Chieti - Pescara); FONTANELLA, Sara (Imperial College London)

Presenter(s) : PRONELLO, Nicola (Università degli Studi 'G. d'Annunzio' Chieti - Pescara)

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