29 JAN

🕐 **14h00 à 16h00**
📍 ENS Paris-Saclay

Batiste LE BARS : Event detection and structure inference for graph vectors

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Soutenance : 29/01/21

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Résumé :

This thesis addresses different problems around the analysis and the modeling of graph signals i.e. vector data that are observed over graphs. In particular, we are interested in two tasks. The first one is the problem of event detection, i.e. anomaly or changepoint detection, in a set of graph vectors. The second task concerns the inference of the graph structure underlying the observed graph vectors contained in a data set.
At first, our work takes an application-oriented aspect in which we propose a method for detecting antenna failures or breakdowns in a telecommunication network. The proposed approach is designed to be effective for communication networks in a broad sense and it implicitly takes into account the underlying graph structure of the data.

In a second time, a new method for graph structure inference within the framework of Graph Signal Processing is investigated. In this problem, notions of both local and global smoothness, with respect to the underlying graph, are imposed to the vectors. Finally, we propose to combine the graph learning task with the change-point detection problem. This time, a probabilistic framework is considered to model the vectors, assumed to be distributed from a specific Markov Random Field. In the considered modeling, the graph underlying the data is allowed to evolve in time and a change-point is actually detected whenever this graph changes significantly.