# Co-clustering of evolving count matrices in pharmacovigilance with the dynamic latent block model

Charles Bouveyron

Pharmacovigilance is a central medical discipline aiming at monitoring and detecting public health events caused by medicines and vaccines. The purpose of this work is to analyze the notifications of adverse drug reactions (ADRs) gathered by the Regional Center of Pharmacovigilance of Nice (France) between 2010 to 2020. As the current expert detection of safety signals is unfortunately incomplete due to the workload it represents, we investigate here an automatized method of safety signal detection from ADRs data. To this end, we introduce a generative co-clustering model, named dynamic latent block model (dLBM), which extends the classical binary latent block model to the case of dynamic count data. The continuous time is handled by partitioning the considered time period, allowing the detection of temporal breaks in the signals. A SEM-Gibbs algorithm is proposed for inference and the ICL criterion is used for model selection. The application to a large-scale ADRs dataset pointed out that dLBM was not only able to identify clusters that are coherent with retrospective knowledges, in particular for major drug-related crises, but also to detect atypical behaviors, which the health professionals were unaware. Thus, dLBM demonstrated its potential as a routine tool in pharmacovigilance.

Reference: https://hal.archives-ouvertes.fr/hal-03146769