Séminaire de Probabilités et Statistique

Mardi 02 Février à 14h00

Laboratoire Dieudonné

ZOOM

Laurent Dragoni

Université Côte d'Azur, LJAD

A convolutional sparse approach to spike sorting

Spike sorting is a crucial pre-processing step in the field of neuroscience. From brain activity recordings, spike sorting consists in determining the activity of each neuron during the experiment. To perform this task, the traditional strategy relies on clustering and template matching techniques. Unfortunately, this strategy requests to perform manual operations, especially when in presence of spike synchronization. Due to their large number of electrodes, recent acquisition devices tend to generate large data sets, making manual calibrations intractable. Our objective is to provide a new spike sorting strategy that is computationally efficient on such large data sets and that requires few manual calibrations. First, we introduce our problem as the estimation of a sparse activation vector from a convolutional model, and the active set strategy which allows us to compute this vector in high dimension. Then, we present an improvement of the active set strategy, which leads to a computational complexity independent of the recording's duration. Finally, taking into account spatial properties of the problem, we prove that the support of the activation vector estimated is close to the true support and that the complexity can be further reduced.