Adaptation of two Big-data indexing algorithms for LOCAL-PLS

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Context: Nowadays, considerable amounts of heterogeneous data can be generated. LOCAL-PLS can provide a potential solution to this situation. However, using LOCAL-PLS with large amounts of data is almost impossible.

How to associate LOCAL-PLS with big-data algorithms?

LOCAL-PLS [1]

Selection and weighting of nearest neighbors → Optimization of PLS model → Final PLS model

Operational issues :
- Extremely long calculation time
- Choice of neighborhood not always relevant (types of compressions / metrics)

Scientific issues

? How to define the relevance of a **neighbor**?

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? How to adapt big-data algorithms to obtain a directly relevant neighborhood?

Envisaged directions

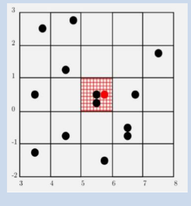
Modification of big-data algorithms for optimal direct prediction

Use of iSAX / ParCorr algorithms and adapted LOCAL-PLS

The « Big-data » algorithms

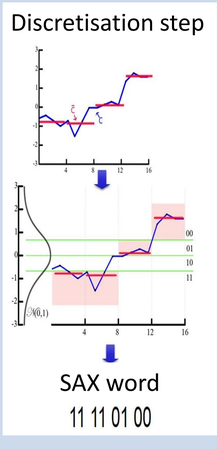
ParCorr [2]

ParCorr generates a set of random vectors, and realizes the product of vectors by the spectral matrix. This method makes it possible to reduce the size of the spectral matrix. Then, the matrix is cut in a group of columns and stored in different grids. When, searching neighbors, ParCorr looks at the grids in parallel, and the spectrums that are in the same cells (in a minimum number of grids) are good neighbor candidates.



iSAX [3]

iSAX discretizes the variables and creates a SAX word to summarize each spectrum. The system is represented by a tree that will become deeper depending on the final number of neighbors to get.



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