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Joint Seminar STAT/ULB

"Sparsity in Regression and Learning Problems"

Friday, March 13, 2009

16:00

**ULB - Campus PLAINE - Bâtiment NO/Building
Etage/Floor 9**

Abstract

The need for sparse solutions of regression, learning or inverse imaging problems arises from a range of applications involving high-dimensional data, such as microarray data analysis.

In this talk, I will analyze the "lasso" regularization scheme aiming at variable selection by means of a L1-type penalty and the "elastic-net" scheme aiming at the selection of sparse groups of correlated variables by means of an additional L2-type penalty.

I will discuss consistency properties of these schemes within the framework of learning theory, i.e. random-design regression, and present recent results we derived under the assumption that the regression function admits a sparse representation on a possibly infinite and redundant dictionary. In particular, it can be shown that there exists a representation of the regression function such that, if the number of data increases, the elastic-net estimator is consistent not only for prediction but also for variable/feature selection. Our results include finite-sample bounds and an adaptive scheme to select the regularization parameter.

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