Machine Learning in Finance

ECTS : 3

Description du contenu de l'enseignement :

· Introduction to statistical learning: The Vapnik Chervonenkis dimension, PAC learning and the calibration versus prediction paradigm.

· Primal and Dual Problem, Lagrangian and KKT conditions

· Supervised learning: SVM, Mercer's theorem and the kernel trick, C-SVMs, mu-SVMs, a few words on SVMs for regressions.

· Unsupervised learning: Single class SVMs, clustering, anomaly detection, equivalence of different approaches via duality.

· Introduction to random forests and ensemble methods: bias variance trade-off, bootstrap method

· Remarks on parsimony and penalisation: Ridge and Lasso regressions, dual interpretation of Lasso.

Compétence à acquérir :

To understand the principles of supervised and unsupervised learning. Some Statistical Learning results are presented and applied to credit rating, anomalies detection and yield curves modelling. The principal notions are presented in the context of these case studies in finance.

Mode de contrôle des connaissances :

Exam

Bibliographie, lectures recommandées :

[1] James, Hastie, Witten, Tibshirani, Taylor; An introduction to Statistical Learning: file: https://hastie.su.domains/ISLP/ISLP_website.pdf.download.html

[2] A Burkov; The hundred-pages machine learning book : chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/http://ema.cri-info.cm/wp-content/uploads/2019/07/2019BurkovTheHundred-pageMachineLearning.pdf

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