Swiss Center for Affective Sciences

WORKSHOP

Wednesday, January 25th 2017

13:00 - 17:00

Campus Biotech
Room H4-02 232.080
9, chemin des Mines
Geneva

Introduction to Machine Learning

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In this workshop I will provide an accessible introduction to machine learning. First, I will emphasize the connection between machine learning and familiar concepts from linear regression. Second, I will outline the general philosophy behind cross-validation to evaluate model fit. Third, I will discuss specific machine learning models, their properties, and their applications (e.g., nearest neighbors, discriminants, support vector machines, random forests, neural networks). In this workshop you will acquire novel statistical concepts and learn how to use machine learning to deal with practical problems such as automatic detection of interaction effects and evaluating variable relevance without p-values. During the workshop R-code will be presented intermittently to show how models can be run in practice.

BACKGROUND Data analysis in the social sciences is dominated by the standard linear model, including its special cases of Pearson correlation, t-test, and factorial ANOVA. However, many data contain patterns that are not necessarily linear (e.g., curves, interactions), or pose challenges to conventional methods of analysis (e.g., multicollinearity, high-dimensionality, serial correlation). An area of statistics that deals with such challenges is machine learning (a.k.a, data mining, pattern recognition). Although this field is popularly known as a branch of artificial intelligence research (e.g., facial recognition software, self-driving cars, robotics), models of machine learning descend directly from principles of classical linear regression. These models now comprise an extensive "zoo" of different algorithms, all with the same primary purpose, that is, to model a response variable, **given a number** *of predictor variables.*

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