

Master's in Data Science

Course

Machine Learning

Description

Machine Learning transforms data into knowledge and provides general-purpose systems able to make rational decisions. This course presents several methods to solve classification problems, both supervised and unsupervised, methods to find probabilistic relationships between system variables and models of spatial statistics.

Course contents:

1. Introduction to Machine Learning.

- 1.1 Introduction

- 1.2 Information theory

2. Supervised classification.

- 2.1 Assessment methods.

- 2.2 Non-probabilistic classifiers:

- k-nearest neighbors
- Rule induction
- Classification trees
- Support vector machines

- 2.3 Probabilistic classifiers:

- Discriminant analysis
- Bayesian classifiers
- Logistic regression

- 2.4 Feature subset selection.

- 2.5 Metaclassifiers.

2.6 Multilabel classification.

3. Unsupervised classification

3.1 Non-probabilistic clustering.

3.2 Probabilistic clustering.

4. Probabilistic graphical models

4.1 Bayesian networks: Basics + Inference + Learning.

4.2 Markov networks: Basics + Inference + Learning.

5. Spatial statistics with spatial point patterns

5.1 Complete spatial randomness.

5.2 Goodness-of-fit tests via simulation

5.3 Common models of spatial point processes.

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