Hanzehogeschool Groningen
University of Applied Sciences

Vak: Data Science 6 credits: 5

Vakcode	BFVM22DATASC6
Naam	Data Science 6
Studiejaar	2022-2023
ECTS credits	5
Taal	Engels
Coördinator	F. Feenstra

Werkvormen	Hoorcollege
Toetsen	TOETS-01 - Overige toetsing TOETS-02 - Overige toetsing

Leeruitkomsten

The student can:

- implement methods for reducing the complexity of datasets, including multidimensional scaling and principal component analysis
- explain of several frequently used machine learning strategies and algorithms how they work and when they are applicable
- implement machine learning algorithms in Python for prediction and classification
- check the validity of outcomes from the methods and algorithms used
- design a (pre)processing pipeline to extract features from image data
- implement a convolutional neural network to perform image classification and image recognition

Inhoud

Unsupervised Machine Learning: k-means, hierarchical clustering, spectral clustering, multidimensional scaling, manifold learning.

Supervised Machine Learning: k-nearest neighbour, logistic regression, decision trees, discriminant analysis, support vector machines, ensembles (averaging/bagging/voting/boosting), cross-validation, over-/underfitting, regularisation, online learning

Deep learning: feed-forward neural networks, activation and loss functions, optimisers, regularisation, convolutional neural networks

This course provides an introduction to several concepts used in predictive modelling. Data reduction techniques are discussed, and several machine learning techniques for both supervised and unsupervised learning will be covered, such as decision trees, neural networks and clustering methods. The student will learn how to validate and evaluate the employed algorithms. The application of machine learning algorithms in image analysis is covered, together with additional concepts to perform image analysis, such as image enhancement, edge detection and image segmentation. The methods will be implemented in Python using data analysis modules (scikit- learn, Tensorflow).

Opgenomen in opleiding(en)

Master Data Sciences for the Life Science

School(s)

Instituut voor Life Science & Technology