

Machine Learning in Biomedical Monitoring

【Course Overview】

In this course you will learn about aspects of information processing including data preprocessing, visualization, regression, dimensionality reduction, feature selection, classification (LR, SVM, NN) and their usage for decision support in the context of healthcare. The course aims to provide an overview of computer tools and machine learning techniques for dealing with medical datasets (e.g. medical time series). The course will be illustrated with computer-based tutorials and assignments. The necessary theory will be covered. The lectures are divided in three sets: ML basis, Popular classifiers and Deep Learning. In this course, you'll learn the basics of modern AI as well as some of the biomedical applications of AI. Along the way, we also hope to excite you about the numerous applications and huge possibilities in the field of AI, which continues to expand human capability beyond our imagination.

【Prerequisites and Necessary Background】

Basic mathematical understanding

Prior programming experience in matlab or python

【Lecture Topics】

Intro to biomedical applications Data exploration and preprocessing Introduction to lab exercise
Linear models for regression
Linear models for classification Regularization
Training a classifier Evaluating a classifier in a biomedical context
Case study Features Support vector machines
Feature selection Popular classifiers
Artificial neural networks: introduction Artificial neural networks: training
Deep learning CNN Deep learning RNN

【Final Project】

Present the solution to a real-world biomedical problem in a clear presentation and elaborate on the different choices you made during the design of the solution.