

Course Description Intelligent Time Series Analytics

Keywords: **Big Data, Data Mining, Time Series, Classification, Forecasting, Querying, Machine Learning**

Target Group: **Semester AIM1 and AIM2** **Modul Number:** **AIM 800 6632**

Workload: **5 ECTS** **150 h**
Divided into **Contact time** **60 h**
 Self study **60 h**
 Exam preparations **30 h**

Course language: **English**
Module director: **Prof. Dr. Gabriele Gühring**

Valid from: **24.01.2021**

Requirements:

- Knowledge in
- Mathematics, Statistics and Optimization.
 - Programming

Overall Aims of the Module:

Students will gain basic knowledge in time series data mining with the software R or Python. They will be able to use selected algorithms and procedures like querying, classification and prediction to time series. The methods and concepts learned can also be applied to other data types for the purpose of data mining.

The students know

- basics in time series analytics
- applications in generating and recording time series
- methods of classifying time series data,
- methods of regression analysis and prediction,
- basics of artificial neural networks for processing time series.

Students are able to select and apply the most suitable analytical methods.

Students can analyze time series with the help of algorithms from the areas of data mining and machine learning.

Contents:

- Introduction to Data Mining with a focus on Time Series Data (Temporal Data Mining)
- Fundamentals of Time Series Data
- Classification, Time Series Querying, Regression/Forecasting
- Visualization of Time Series
- Artificial Neural Networks

Literature:

- T. Mitsa: Temporal Data Mining. Data Mining and Knowledge Discovery. Chapman & Hall/CRC, 2010
- J. Han, M. Kamber, J. Pei: Data Mining – Concepts and Techniques, 3rd ed., Morgan Kaufman, 2012
- R. J. Hyndman, G. Athanasopoulos: Forecasting: principles and practice. Available online at <https://www.otexts.org/fpp>, 3rd ed., 2014
- R. H. Shumway, D. S. Stoffer: Time Series Analysis and Its Applications, 4th ed., Springer, 2027

Offered:

Every summer semester

Submodules and Assessment:

Type of instruction/learning:

Lecture with homework/self-study

Type of assessment:

Written exam (90 minutes)

Hours per week:

4 SWS

Estimated student workload:

150 hours

Overall Assessment:

Written exam