Department: 07 Computer Science and Mathematics

Course title: Big Data Analytics

Hours per week (SWS): 4

Number of ECTS credits: 5

Course objective: The students will be able to understand, describe and apply principles of storing, indexing, and analysing huge amounts of data (big data) in cluster environments. Further, they learn the foundations of programming in Scala and the compute framework Apache Spark. Moreover, they will be able to analyse, conceptualise, implement and evaluate solutions of big data problem.

Prerequisites: advanced programming skills, basic knowledge of data networks

Recommended reading:
- Wills, Josh & Laserson, Uri & Owen, Sean & Ryza, Sandy (2017). Advanced Analytics with Spark: Patterns for Learning from Data at Scale. O'Reilly UK Ltd.

Teaching methods: beamer, whiteboard, Jupyter/Zeppelin notebooks, dashboards (ElasticSearch, Kibana)

Assessment methods:
- IG 2010: student assignment (40%) + written exam 90min (60%)
- IG 2019: bonus (30%) + written exam 90min or oral exam

Language of instruction: English

Name of lecturer: Prof. Dr. David Spieler

Email: david.spieler@hm.edu

Link: https://w3-o.cs.hm.edu:8000/public/module/331/

Course content: Many applications of machine learning are based on huge amounts of data which can not be handled on single machines due to the enormous amount of storage and compute demands. The underlying principle of methods and technologies in big data is to distribute storage and computation to clusters of computers.

In this course, we will discuss distributed file systems, data sets and computation on the basis of Apache Hadoop (HDFS, YARN, MapReduce) and Apache Spark. Further, a basic introduction to the JVM-based functional programming language Scala will be given followed by topics like data preparation for efficient processing, programming frameworks like MapReduce and Spark, realtime analysis with indexing (ElasticSearch) and dashboard visualisations (Kibana), as well as the distributed implementation of machine learning algorithms.

Remarks