Module Description 39-M-Inf-ABDA_a Advanced Big Data Analytics / Big Data Machine Learning

Faculty of Technology

Version dated Feb 9, 2026

This module guide reflects the current state and is subject to change. Up-to-date information and the latest version of this document can be found online via the page

https://ekvv.uni-bielefeld.de/sinfo/publ/modul/411904104

The current and valid provisions in the module guide are binding and further specify the subject-related regulations (German "FsB") published in the Official Announcements of Bielefeld University.

39-M-Inf-ABDA_a Advanced Big Data Analytics / Big Data Machine Learning

Faculty

Faculty of Technology

Person responsible for module

Prof. Dr. Alexander Schönhuth

Regular cycle (beginning)

unregelmäßig

Credit points

5 Credit points

Competencies

Non-official translation of the module descriptions. Only the German version is legally binding.

The emphasis of this module is on understanding and application of machine learning and artificial intelligence techniques for the analysis of large datasets. Examples of such techniques often deal with popular internet based applications, such as recommender systems or web advertisements, in any case techniques that are influential for modern daily life.
The basic motivation is to develop a deeper understanding for the algorithms, the statistics that underlie such techniques and the processes they drive. The goal is that seminar participants feel well equipped, and poised to actively engage in related processes, both in theory and in professional practice.
Depending on concrete choice of topics, the seminar/project can start with tutorials run by the teacher, to introduce seminar participants to the topics of choice. Presentations or projects then are supposed to practice how to understand, how to interpret and evaluate original literature, or to implement relevant theory in practical applications. While in case of a presentation, the focus is on presentation techniques, programming techniques are stressed in case of programming projects. Drafting a scientific report is supposed to generate text that complies with actual scientific and ethical standards; an important aspect is the exact reproducibility of the facts and processes discussed.

Content of teaching

Contents of tutorials and literature relevant for the seminar cover topics where the employment of artificial intelligence and machine learning for the analysis of big datasets plays a prevalent/pivotal role. Popular, ubiquitous examples are the identification of communities, or the prediction of (not yet recognizable, because hidden) links in social networks, the employment of deep neural networks in predicting the fit of advertisements with (e.g. search engine) users, or the recommendation of products in online stores that promise maximal profits. Classification systems that evaluate big data streams, which need to be regularly updated, are equally relevant.

Recommended previous knowledge

Participation in the lecture ‘Big Data Analytics’ is helpful. Basic knowledge of algorithms, data structures and artificial intelligence is required.

Necessary requirements

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Explanation regarding the elements of the module

Module structure: 1 bPr [1]

Courses

Title	Type	Regular cycle	Workload [5]	LP[2]
Machine Learning and AI in Advanced Big Data Analytics	project o. seminar	Wird unregelmäßig angeboten, vorzugsweise im Wintersemester	60 h (30 + 30)	2 [Pr]

Examinations

Allocated examiner	Type	Weighting	Workload	LP[2]
Teaching staff of the course **Machine Learning and AI in Advanced Big Data Analytics (project o. seminar)** *Presentation of 20 to 30 minutes with a written paper of 8 to 10 pages*	Referat mit Ausarbeitung	1	90h	3

Further notices

The module can be recognised in the following compulsory optional subject areas (WP):
- WP in the Master's programme Intelligent Systems
- WP in the Master's programme Bioinformatics and Genome Research
- WP in the Master's programme Informatics for the Natural Sciences

Legend

1	The module structure displays the required number of study requirements and examinations.
2	LP is the short form for credit points.
3	The figures in this column are the specialist semesters in which it is recommended to start the module. Depending on the individual study schedule, entirely different courses of study are possible and advisable.
4	Explanations on mandatory option: "Obligation" means: This module is mandatory for the course of the studies; "Optional obligation" means: This module belongs to a number of modules available for selection under certain circumstances. This is more precisely regulated by the "Subject-related regulations" (see navigation).
5	Workload (contact time + self-study)
SoSe	Summer semester
WiSe	Winter semester
SL	study requirement
Pr	Examination
bPr	Number of examinations with grades
uPr	Number of examinations without grades