Table 5.2. Course specification

Study program : Advanced Data Analytics in Business
Course title: Machine Learning
Teachers: Kupusinac Aleksandar, Brcanov Dejan, Ronald Hohrajter
Status of the course: Obligatory
Number of ECTS: 7
Condition: No

Goal of the course

The aim of the course is that student builds an abstract thought within the area of machine learning and on the basis to master the possibilities of its application in data science. The student should apply the acquired knowledge from machine learning methods (linear regression, artificial neural networks, decision trees, associative rules, support vector machine, genetic algorithm) in solving real problems.

Learning outcome

Acquisition of modern knowledge and skills in machine learning. The student is able to study and solve real problems in data science by applying the acquired knowledge from the application of machine learning methods. Solving concrete problems with use of algorithms and techniques of machine learning. Introduction of main machine learning techniques. Understanding of matrix problem set up, definition of criteria functions through probabilities and solving regression and qualification problems. Understanding optimization and regularization procedures, modular approach in multilayer architecture, and ansable of methods and techniques of dimension reduction.

Content of the course

Theoretical part

1. The concept of machine learning

2. Modeling based on machine learning

3. Linear regression

4. Artificial neural networks

5. Decision trees

6. Associative rules

7. Support vector machine

8. Genetic algorithm

9. Application of the method of machine learning in the data science

10. Big data analysis

11. Predictions

12. Evaluations

13. Application of the method of machine learning in the prediction and evaluation

14. Classification

15. Application of the method of machine learning in the classification

Practical part

Selected methods and techniques of machine learning. Selected problems that require the implementation of methods and techniques of machine learning for their solving. Application of machine learning in different fields. Analysis and development of concrete examples.

Literature

1. Ethem Alpaydin: Introduction to Machine Learning, MIT Press, 2004

2. M. Magdon-Ismail, Y. AbuMostafa: Learning from Data, AMLBook, 2012

3. S. Shalev-Schwartz, S. BenDavid: Understanding Machine Learning: From Theory to Algorithms, Cambridge university press, 2014

4. Goodfellow, I., Bengio, Y., Courville, A.: Deep Learning, MIT Press, Cambridge, 2017

Bishop, C.M.: Pattern Recognition and Machine Learning, Springer, New York, 2006

Number of hours of active teaching	**Theoretical teaching:** 2	**Practical teaching:** 3
Teaching methods		

Lectures. Computer practice. Consultations. The student is obliged to independently do the project and write a seminar paper.

Assessment (maximum number of points 100)

Pre-exam obligations	Points	Final exam	Points
Project	50	Theoretical exam	30
Seminar paper	20		

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Project	50	Theoretical exam	30