



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Machine learning for the Internet of Things

Course

Field of study

Computing

Area of study (specialization)

Mobile and embedded applications for the Internet of Things

Level of study

Second-cycle studies

Form of study

part-time

Year/Semester

2/3

Profile of study

general academic

Course offered in

Polish

Requirements

elective

Number of hours

Lecture

16

Tutorials

0

Laboratory classes

16

Projects/seminars

0

Other (e.g. online)

0

Number of credit points

3

Lecturers

Responsible for the course/lecturer:

dr inż. Jędrzej Potoniec

Responsible for the course/lecturer:

dr inż. Tomasz Łukaszewski

Prerequisites

A student starting this course should have basic knowledge of probability and statistics, linear algebra, mathematical analysis and artificial intelligence. They should also have the ability to obtain information from the indicated sources and be ready to cooperate as part of the team.



Course objective

Introduction to data analysis and machine learning with regard to big data. Learning about selected problems of data analysis and methods of solving them:

1. Providing students with basic knowledge about data analysis, in particular regarding supervised learning.
2. Developing students' skills to select appropriate methods of solving data analysis problems.
3. Introducing the students to the methodology of practical solving of data analysis problems and the stages of a data analysis project.

Course-related learning outcomes

Knowledge

1. Has knowledge of preliminary data analysis and processing for machine learning experiments.
2. Has knowledge of supervised machine learning algorithms.
3. Has knowledge of contemporary neural networks.

Skills

1. Can perform an initial data analysis and processing as preparation of a machine learning experiment in one of the popular tools.
2. Can use libraries implementing machine learning algorithms to carry out an experiment.
3. Can use libraries implementing components of neural networks to construct a neural network and conduct an experiment.

Social competences

1. Understands that knowledge related to data analysis and machine learning is becoming obsolete very quickly.
2. Understands the importance of using the latest knowledge in the field of computing in solving research and practical problems

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The knowledge acquired during the lecture is verified on the basis of answers to questions about the material discussed in the lecture (e.g. entrance tests, online quizzes). The skills acquired during the laboratory classes are verified by assessing the student's performance of the assigned tasks of a practical nature.

Programme content

Lecture: preliminary data analysis and processing, supervised learning (selected regression and classification algorithms), model evaluation, regularization. Selected problems of gradient optimization, fully connected, convolutional and recursive neural networks.



During the laboratory classes students learn about the issues presented in the lecture from the practical side through the implementating of the indicated algorithms in Python or using of available libraries (numpy, scikit-learn, matplotlib, PyTorch) to construct machine learning experiments.

Teaching methods

Lecture: multimedia presentation, illustrated with examples given on the board; discussion.

Laboratory classes: problem method, discussion, performing tasks given by the teacher - practical exercises.

Bibliography

Basic

Aurélien Géron, *Uczenie maszynowe z użyciem Scikit-Learn i TensorFlow*, Helion, 2018

Additional

Ian Goodfellow and Yoshua Bengio and Aaron Courville, *Deep Learning*, MIT Press 2016

On-line: <https://www.deeplearningbook.org/>

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3
Classes requiring direct contact with the teacher	32	1,25
Student's own work (literature studies, preparation for laboratory classes, homework, preparation for tests) ¹	43	1,75

¹ delete or add other activities as appropriate