POZNAN UNIVERSITY OF TECHNOLOGY

EUROPEAN CREDIT TRANSFER AND ACCUMULATION SYSTEM (ECTS)

COURSE DESCRIPTION CARD - SYLLABUS

Course name
Machine Learning for the Internet of Things [S2Inf1-IP>UMIP]

Course

Field of study	Year/Semester
Computing	1/2
Area of study (specialization)	Profile of study
Internet of Things	general academic
Level of study	Course offered in
second-cycle	Polish
Form of study	Requirements
full-time	compulsory

Number of hours

Lecture	Laboratory classes	Other
30	30	0
Tutorials	Projects/seminars	
0	0	

Number of credit points

5,00

Coordinators

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Lecturers

Prerequisites

A student entering the subject should have a basic knowledge of Python programming and machine learning for data classification and preprocessing. He or she should also have the ability to obtain information from the indicated sources and have a willingness to cooperate as part of a team.

Course objective

Provide students with knowledge and skills in the field machine learning

Course-related learning outcomes

Knowledge:
1. has knowledge of machine learning with the use of complex models (e.g. sequential classification, bayesian classifiers, neural networks, including deep networks)
2. has knowledge of development trends and new achievements in machine learning
3. knows advanced methods, techniques and tools used in solving complex engineering tasks in the field of computer science related to machine learning
3. is able to assess the usefulness and applicability of new developments (methods and tools) and new it products from the area of internet of things and machine learning.

4. can assess the usefulness of machine learning methods and tools in the internet of things.
5. is able to solve complex it tasks in the area of internet of things, including tasks with a research component.
6. is able - according to a given specification, taking into account non-technical aspects - to design an information system from the area of internet of things using appropriate methods, techniques and tools of machine learning.

Skills:
1. is able to plan and conduct experiments in the area of machine learning, interpret the obtained results and draw conclusions.
2. is able - when formulating and solving engineering tasks in the area of internet of things - to integrate

Social competences:
1. understands that knowledge and skills become obsolete very quickly in computing.
2. understands the importance of using the latest knowledge of machine learning in solving problems in the field of internet of things.

Methods for verifying learning outcomes and assessment criteria
Learning outcomes presented above are verified as follows:

The knowledge acquired in the lecture is verified on a credit test. The threshold for passing: 50% of the points. Optionally, it is possible to increase the grade by oral examination.

Skills acquired in laboratory classes are verified on the basis of the implementation of a project related to the problems of machine learning.

Programme content
Machine learning problems: classification, feature selection, clustering.

Course topics
Lecture topics include: naive Bayesian classifier, SVM classifier, feature selection, sequential classification, clustering with k-Means algorithm, hierarchical clustering.

Laboratory classes: deepening the issues discussed in lectures by solving practical problems using, among others, the scikit-learn library for the Python language and the Jupyter environment (Jupyter notebooks).

Teaching methods
Lecture: multimedia presentation
Laboratory exercises: practical exercises, discussion, team work

Bibliography
Basic
1. Python. Uczenie maszynowe, Wydanie II, Sebastian Raschka, Vahid Mirjalili, Helion 2019
2. Uczenie maszynowe z użyciem Scikit-Learn i TensorFlow, Wydanie II, Aurelien Geron, Helion 2020
Additional
1. Naczelny Algorytm. Jak jego odkrycie zmieni nasz świat, Pedro Domingos, Helion 2016

Breakdown of average student's workload

	Hours	ECTS
Total workload	125	5,00
Classes requiring direct contact with the teacher	60	2,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	65	2,50