POZNAN UNIVERSITY OF TECHNOLOGY

EUROPEAN CREDIT TRANSFER AND ACCUMULATION SYSTEM (ECTS)

pl. M. Skłodowskiej-Curie 5, 60-965 Poznań

COURSE DESCRIPTION CARD - SYLLABUS

Course name

Selected topics in machine learning

Course

Field of study	Year/Semester
Control and Robotics	2/2
Area of study (specialization)	Profile of study
Autonomous Robots and Systems	general academic
Level of study	Course offered in
Second-cycle studies	Polish
Form of study	Requirements
full-time	compulsory

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
15	30	0
Tutorials	Projects/seminars	
0	0	

Number of credit points

3

Lecturers

Responsible for the course/lecturer:

dr inż. Marek Kraft

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tel.: 61 647 5920

Wydział Automatyki, Robotyki i Elektrotechniki

Poznań, Piotrowo 3A

Responsible for the course/lecturer:

Prerequisites

Knowledge: A student beginning this subject should have basic knowledge of mathematics - including, mainly, matrix calculation, knowledge of elements of mathematical logic, basics of mathematical analysis and probabilistics.

Skills: He or she should have the ability to operate a PC and implement simple algorithms and programming tasks. Additionally, the ability to obtain information from indicated sources is essential.

Course objective

The aim of this course is to learn the theoretical basis and characteristics of selected machine learning algorithms and related issues. After completing the training, the student should be able to select an algorithm or a set of algorithms that make up a complete machine learning system and implement and test such a system on their own.

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Course-related learning outcomes

Knowledge

Skills

Social competences

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture - final credit test carried out on Moodle plaftorm.

Laboratories - design and final practical programming test.

Programme content

Lecture:

Definition of machine learning and differences between machine learning and traditional programming.

Supervised, unsupervised machine learning, reinforcement learning.

Evaluation of machine learning methods - measurements and metrics.

The role of features in machine learning.

Presentation of machine learning algorithms, their operating principles and characteristics: Bayesian classifier, decision trees, random forest, carrier vector machines, clustering, neural networks.

Reinforncement learning- algorithms and applications.

Laboratories:

Familiarization with scikit-learn and TensorFlow libraries. Implementation of selected algorithms with the use of the library, performance evaluation and graphical presentation of the output of algorithms in practical applications.

Teaching methods

Lectures with multimedia presentations, additionally uploaded to a streaming service to be played later. Laboratory classes covering the implementation and testing of selected algorithms for image and video processing using Python language and solving selected practical problems.

Bibliography

Basic

1. 1. Sebastian Raschka, Vahid Mirjalili, Python. Uczenie maszynowe. Helion, 2019
2. Supplementary course materials posted on Moodle

Additional

Selected scientific papers related to the course.

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Breakdown of average student's workload

	Hours	ECTS
Total workload	90	3,0
Classes requiring direct contact with the teacher	45	2,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	45	1,0

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[1] delete or add other activities as appropriate