

KARTA PRZEDMIOTU / COURSE DESCRIPTION

Nazwa przedmiotu w języku polskim / Course name in Polish		
Statystyka Sztucznej Inteligencji i Aplikacja w Inżynierii		
Nazwa przedmiotu w języku angielskim / Course name in English		
Statistic under AI and its application to engineering sciences		
Dyscyplina / Scientific discipline		
Informatyka techniczna i telekomunikacja		
Opis skrócony / Short description		
<p>The knowledge of statistics behind Machine Learning helps building models of Machine Learning for a given problem statement in different fields of engineering. In this course, the students will gain information on statistics behind classification or regression, decision-making under uncertainty, supervised and unsupervised learning and reinforcement learning. They will understand the engineering examples that discuss the statistical side of Machine Learning. Moreover, the students will be able to apply the new skills to any sort of engineering problem needing Machine Learning approach. One problem will be presented for being solved by the students (defined, specified, implemented and tested) in the framework of the projects within the course.</p> <p>The idea of the coordinator is to do provide lessons remotely, regardless of the situation of pandemic.</p>		
Opis / Description		
<p>The aim of this course is to understand the statistics related to machine learning and Artificial Intelligence (AI). Statistics is widely recognized as a prerequisite for a deeper understanding of artificial intelligence. With the knowledge gained in this course, the student will be able to understand the effects of Machine Learning and Deep Learning as well as explain the success of AI in various areas of engineering.</p> <p>Knowing machine learning statistics helps you build machine learning models for a given problem statement in various fields of engineering. In this course, students will learn about classification or regression statistics, decision making under uncertainty, supervised and unsupervised learning, and reinforcement learning. They understand engineering examples that discuss the statistical side of machine learning. In addition, students will be able to apply new skills to any engineering problem requiring a machine learning approach. There will be one problem to be solved by students (defined, defined, implemented and tested) in the course projects.</p> <p>Artificial Intelligence aims to make computer systems more "intelligent" to solve complex problems and provide more natural and effective services to people. Artificial intelligence is a source of innovative IT ideas and techniques and is widely used in many information systems. The course provides a comprehensive introduction to the mathematical methods used in artificial intelligence, from statistics and statistical modeling, to decision making in uncertainty, to machine learning and deep learning.</p> <p>The first part of the course will reveal statistical data learning statistics, which are a toolkit for understanding data. These tools essentially cover two classes: supervised learning and unsupervised learning. Basically, supervised learning refers to predicting outcomes based on one or more inputs. One or more estimators make such a forecast. The choice of the estimator (s) is closely related to the nature of the data. On the other hand, unsupervised learning provides a relationship or pattern in data with no supervised outcome.</p> <p>The second part of the theory described in the course presents the theory of decision making. This theory discusses how to represent knowledge, including incomplete and uncertain knowledge about the real world; how to logically justify this knowledge using probabilities; how to use these models and inference methods to decide what to do, especially by making plans; and how to reason and make decisions in the face of uncertainty about the world.</p> <p>The final part deals with Machine Learning, which describes both symbolic and statistical learning methods, as well as reinforcement learning, deep learning, and multi-agent learning to generate the knowledge required by the reasoning and / or decision components of intelligent agents or systems. Here, the methods and algorithms for providing machine learning will be analyzed and the theory of artificial intelligence will be revealed and analyzed.</p> <p>Students will use all the knowledge gained in the lesson to develop artificial intelligence software that will be embedded in learning to engineer a student's profile. Different student profiles generate a wide variety of different AI applications implemented by students in their projects. The course will include a presentation of a joint discussion of each project.</p>		
Język / Language		
Angielski/ English		
ECTS	4	Prowadzący/ Lecturer
		dr hab. inż. Jordi Mongay Batalla
Forma zaliczenia / Examination		Egzamin/ Exam
Wykład / Lecture		30
Projekt/ Project		30