

Karta przedmiotu oferowanego w Szkole Doktorskiej nr 3
– semestr letni 2020/2021

1. TYTUŁ
[PL] Inteligentne systemy informacyjne [ENG] Intelligent Information Systems
2. JĘZYK WYKŁADOWY PRZEDMIOTU ORAZ PUNKTY ECTS:
angielski, 4 ECTS
3. WYMIAR GODZIN, FORMA PROWADZONYCH ZAJĘĆ:
30, Wykład (WYK), Projekt (PRO)
4. DANE WYKŁADOWCY
Prof. Mieczysław Muraszkiewicz
5. DYSCYPLINA NAUKOWA
Informatyka techniczna i telekomunikacja
6. JEDNOSTKA PROWADZĄCA
Szkoła doktorska nr 3
7. JEDNOSTKA REALIZUJĄCA
103000 - Wydział Elektroniki i Technik Informacyjnych
8. TYP PRZEDMIOTU:
Obieralny
9. SPOSÓB WERYFIKACJI EFEKTÓW UCZENIA SIĘ:
Egzamin

10. OPIS SKRÓCONY PRZEDMIOTU:

The lecture is intended as a path leading from the morphology of the classical information system, i.e. determining its components with the greatest possible accuracy, and then leading by searching for the answer to the question: which of the individual components can be equipped with "intelligence" using knowledge representation methods and techniques, artificial intelligence and related fields to - as a result - lead to the development of a map of the architecture of a generic information system with the indication of those places where, how and to what extent "intelligent" components can be introduced to the system. The motto of the lecture is R. Hamming's saying: "The purpose of computing is insight, not numbers." The lecture is accompanied by projects that are a practical development of its content.

11. OPIS PRZEDMIOTU:

Lecture (30 hours):

1. Introduction. Intelligence (2 hours)
2. Basic concepts: data, information, knowledge, system, information system (4 hours)
3. Knowledge representation (3 hours)
4. Naive Bayes Classifier (2 hours)
5. Classical logic as a method of knowledge representation. Information system in logic (6 hours)
6. Information systems in non-classical logic (2 hours)
7. Semantic Webs (2 hours)
8. Semantic atoms (2 hours)
9. Frames and scripts (2 hours)
10. Ontologies (3 hours)
11. Neural networks (2 hours)

Project:

The lecture is accompanied by a project that includes either planning and execution of a simple experiment using a selected technique(s) discussed in the lecture or another technique(s) in the field of artificial intelligence and related fields, or creating a simple "intelligent" application that could be integrated with a classical information system. Examples of projects are: conducting an experiment of factual/text data mining, development of a parser for a certain language of semantic atoms, implementation of a search mechanism in a certain class of semantic networks, development of a program for identifying user preferences based on the analysis of his queries. There are no prerequisites for the development tools to be used for carrying out the design/implementation work.

12. LITERATURA

- Barr A., Feigenbaum E. A., The Handbook of Artificial Intelligence, vol. I, II, III, William Kaufmann Inc, 1981.
- Brachman R., Levesque H. (editors): Readings in Knowledge Representation, Morgan Kaufmann, 1985.
- Brachman R., Levesque H.: Knowledge Representation and Reasoning, Morgan Kaufmann, 2004.
- Cichosz P.: Systemy uczące się. Warszawa, WNT, 2001.
- Cichosz P.: Data Mining Algorithms. Explained Using R. Wiley, 2015.
- Gelfond M., Kahl Y., Knowledge Representation, Reasoning, and the Design of Intelligent Agents: The Answer-Set Programming Approach, Cambridge University Press, 2014.
- van Harmelen F., Lifschitz V., Porter B. (edytorzy), Handbook of Knowledge Representation, Elsevier, 2008.

Jakus G., Milutinovic V., Omerovic S., Concepts, Ontologies, and Knowledge Representation, Springer, 2013.

Lemos N.: An Introduction to the Theory of Knowledge, Cambridge University Press, 2007.

Muraszkiewicz M., Rybiński H.: Bazy danych, Wydawnictwo Akademickie, 1993.

Parsaye K., Chignell M., Khoshafian S., Wong H, Intelligent Databases. Object Oriented, Deductive Hypermedia Technologies, Wiley, 1989.

Russel S., Norvig P.: Artificial Intelligence. A Modern Approach. Pearson Education Inc., 2010.

Sowa J.F.: Knowledge Representation: Logical, Philosophical, and Computational Foundations, Brooks Cole Publishing Co., Pacific Grove, 2000.

Tarski A., Wprowadzenie do logiki, Philomath, 1996.

Ullman J. D: Podstawowy wykład z systemów baz danych, WNT, 2001.

13. EFEKTY UCZENIA SIĘ:

KNOWLEDGE

W01 - knows the definitions of key concepts in the field of intelligent information systems (data, information, knowledge, knowledge representation method, inference, answering questions, knowledge discovery, intelligent information system)

W02 - knows the main methods of knowledge representation used for modeling the real world and designing and implementing intelligent information systems

W03 - knows the principles and rules of designing intelligent information systems

W04 - knows the methods of assessing intelligent information systems

SKILLS

u01 - can analyze information needs and adjust the knowledge representation method to it

u02 - knows how to implement knowledge representation methods or modify their existing implementations

u03 - can assess the quality of an intelligent information system based on the effectiveness of answering queries

SOCIAL COMPETENCE

k01 - uses appropriate methods of oral and written communication in the field of formulating intelligent information systems tasks

k02 - effectively cooperates in a team on research work and/or intelligent information systems implementation