h_da
HOCHSCHULE DARMSTADT
UNIVERSITY OF APPLIED SCIENCES
fbi
FACHBEREICH INFORMATIK

Modulbeschreibung

Introduction to artificial intelligence

Module numbers:	30.2666 [PVL 30.2667]
Language:	english
Study programme:	Bachelor 2021 - Wahlpflicht S_5/6-Katalog - 4. Semester Bachelor KMI 2021 - 4. Semester Bachelor dual KITS 2021 - 6. Semester Bachelor dual KoSI 2021 - Wahlpflicht S_5/6-Katalog - 6. Semester Bachelor 2007
Type of course:	V+P = Lecture+Practical
Weekly hours:	3+1
Credit Points:	5
Exam:	written exam
PVL (e.g. Practical):	not graded (Successful participation in the practical.)
Prerequisite for booking:	The modules "Mathematik 1", "Mathematik 2", and "Programmieren 2" must be passed successfully.
Learning objectives:	The students • know the different areas of Artificial Intelligence and their corresponding basic approaches and strategies • understand how AI applications are structured in principle • know for each of these areas the basic methods and algorithms The students • are able to use the appropriate technologies for given problems in order to solve non-trivial problems • can estimate where AI solutions are appropriate The students • can adapt methods to develop and realize proposals for solutions • can develop a critical view of progression in AI against the background of philosophical foundations and ethical questions as well as recognize and assess risks and possible technological consequences of the development of systems with AI technologies
Content:	The lecture provides an overview of the areas of AI with references to in-depth courses. The following content is covered: • Machine learning (ML): Basic ML procedures based on prominent examples such as artificial neural networks or decision trees; Metrics / evaluation procedures for measuring the quality of ML predictions. Relation to symbolic and non-symbolic AI • Representation and processing of knowledge: basic procedures, e.g. Ontologies and linked data; Query languages and reasoning. Relation to symbolic and non-symbolic AI • Natural language processing (NLP): Application areas of NLP such as document classification, machine translation or human-machine communication, as well as current technologies for their implementation; Relation to symbolic and non-symbolic AI. • Computer vision: areas of application such as object recognition on images, as well as current technologies for implementing them; Relation to non-symbolic AI. • Cross-cutting issues: philosophical foundations and ethical questions of AI; Opportunities and risks of autonomous systems; Bias in AI applications; Effects of AI applications on society and working life. All content is practiced in the practical.
Literature:	• Bernhard G Humm: Applied Artificial Intelligence - An Engineering Approach. Second Edition. Leanpub, Victoria, British Columbia, Canada, 2016. leanpub.com/AAI • Russel, S. / Norvig, P. Artificial Intelligence: A Modern Approach (Pearson Series in Artificial Intelligence), 4. ed, 2020. Further literature: • Christopher M. Bishop. 2006. Pattern Recognition and Machine Learning (Information Science and Statistics). Springer-Verlag, Berlin, Heidelberg. • Gareth James, Daniela Witten, Trevor Hastie, Robert Tibshirani: An Introduction to Statistical Learning. New York, NY, USA : Springer New York Inc., 2001 (Springer Series in Statistics, vol. 103) • Ian Goodfellow, Yoshua Bengio and Aaron Courville "Deep Learning", MIT Press 2016 • Jurafsky, Daniel / Martin, James. 2014. Speech and Language Processing. An Introduction to Natural Language Processing, 2nd ed. Pearson India.
Responsibility:	Gunter Grieser