



Univerza v Mariboru

Medicinska fakulteta

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Ime predmeta:	Metode umetne inteligence							
Course title:	Artificial Intelligence Methods							
Študijski program in stopnja Study programme and cycle	Študijska smer Study option			Letnik Year of study	Semester Semester			
Biomedicinska tehnologija/3. stopnja				2	3 ali 4			
Biomedical Technology/3rd Degree								
Vrsta predmeta (obvezni ali izbirni) / Course type (compulsory or elective)				Izbirni Elective				
Univerzitetna koda predmeta / University course code:								
Predavanja Lectures	Seminar Seminar	Vaje Tutorial			Klinične vaje Clinical training	Druge oblike študija Other forms of study	Samost. delo Individual work	ECTS
15	30	AV	LV	RV			135	6
Nosilec predmeta / Course coordinator:				izr. prof. dr. Damjan STRNAD				
Jeziki /Languages:		Predavanja / Lectures:		Slovenščina/Slovene				
		Vaje / Tutorial:						
Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:				Prerequisites for enrolling in the course or for performing study obligations:				
Vsebina (kratek pregled učnega načrta):				Content (syllabus outline):				
Uvod v umetno inteligenco Predstavitev znanja in sklepanje z logiko Mehka logika in verjetnostno sklepanje Uvod v strojno učenje: vrste strojnega učenja, klasifikacija in regresija, gradnja in vrednotenje modelov Nadzorovano učenje: umetne nevronske mreže Okrepitveno učenje				Introduction to artificial intelligence Knowledge representation and inference in logic Fuzzy logic and probabilistic reasoning Introduction to machine learning: types of machine learning, classification and regression, model building and evaluating Supervised learning: artificial neural networks Reinforcement learning				
Temeljni literatura in viri / Reading materials:								
<ul style="list-style-type: none">Norvig, P., Russell, S., Artificial Intelligence: A Modern Approach, 4. izdaja, Pearson, 2021Aggarwal, C. C., Neural Networks and Deep Learning: A Textbook, 2. izdaja, Springer, 2023Sutton, R. S., Barto, A. G., Reinforcement Learning: An Introduction, 2. izdaja, Bradford Books, 2018								
Cilji in kompetence:				Objectives and competences:				

Cilj predmeta je seznaniti študente z osnovnimi metodami umetne inteligence in strojnega učenja.		The objective is to acquaint the students with basic methods of artificial intelligence and machine learning.
Predvideni študijski rezultati:		Intended learning outcomes:
Znanje in razumevanje: <ul style="list-style-type: none"> • pojasniti način predstavitve znanja in sklepanja s predikatno logiko • opisati metode za sklepanje z negotovim znanjem, njihove prednosti in slabosti • opisati oblike strojnega učenja in primere nalog, ki jih z njim rešujemo • pojasniti delovanje osnovnih klasifikacijskih in regresijskih modelov strojnega učenja • razumeti arhitekturo, učenje in delovanje umetnih nevronske mreže • opisati princip in osnovne metode okrepitevenega učenja 		Knowledge and understanding: <ul style="list-style-type: none"> • explain how to represent knowledge and reason with predicate logic • describe methods for reasoning with uncertain knowledge, their advantages and disadvantages • describe the types of machine learning and tasks solved with it • explain how basic machine learning classification and regression models work • understand the architecture, training and operation of artificial neural networks • describe the principle and basic methods of reinforcement learning
Prenosljive/ključne spretnosti in drugi atributi: <ul style="list-style-type: none"> • Spretnosti komuniciranja: pisno izražanje in pri seminarju in ustni zagovor. • Uporaba informacijske tehnologije: uporaba programskih orodij za strojno učenje. • Spretnosti računanja: reševanje računskih problemov. • Reševanje problemov: načrtovanje in izvedba seminarske naloge. 		Transferable/key competences and other abilities: <ul style="list-style-type: none"> • Communication skills: written expression and seminar and oral defence. • Use of information technology: use of software tools for machine learning. • Numeracy skills: solving computational problems. • Problem solving: planning and carrying out a seminar assignment.
Metode poučevanja in učenja:		Learning and teaching methods:
Predavanja/konzultacije Seminarji (uporaba programskih orodij, seminarsko poročilo) Samostojno delo		Lectures/consultations Seminars (use of program tools, seminar report) Individual work
Načini ocenjevanja:	Delež (v %) / Share (in %)	Assessment methods:
Način (pisni izpit, ustno izpraševanje, naloge, projekt)		Method (written or oral exam, coursework, project):
Ustni izpit	50 %	Oral exam
Seminarska naloga	50 %	Seminar paper
Reference nosilca / Course coordinator's references:		

STRNAD, Damjan, KOHEK, Štefan, BENES, Bedrich, KOLMANIČ, Simon, ŽALIK, Borut. A framework for multi-objective optimization of virtual tree pruning based on growth simulation. Expert systems with applications. [Print ed.]. Dec. 2020, vol. 162, str. 1-10. ISSN 0957-4174. <https://dk.um.si/IzpisGradiva.php?id=81216>, DOI: 10.1016/j.eswa.2020.113792. [COBISS.SI-ID 27215363], [JCR, SNIP, WoS do 29. 7. 2022: št. citatov (TC): 4, čistih citatov (CI): 3, čistih citatov na avtorja (CIAu): 0.60, Scopus do 8. 10. 2023: št. citatov (TC): 6, čistih citatov (CI): 5, čistih citatov na avtorja (CIAu): 1.00]

kategorija: 1A1 (Z, A', A1/2); uvrstitev: SCIE, Scopus, MBP (COMPENDEX, INSPEC, PUBMED); tip dela je verificiral OSICT

točke: 29.35, št. avtorjev: 5

STRNAD, Damjan, KOHEK, Štefan, NERAT, Andrej, ŽALIK, Borut. Efficient representation of geometric tree models with level-of-detail using compressed 3D chain code. IEEE transactions on visualization and computer graphics. 1 Nov. 2020, vol. 26, iss. 11, str. 3177-3188. ISSN 1077-2626. DOI: 10.1109/TVCG.2019.2924430. [COBISS.SI-ID 22440214], [JCR, SNIP, WoS do 16. 4. 2023: št. citatov (TC): 2, čistih citatov (CI): 1, čistih citatov na avtorja (CIAu): 0.25, Scopus do 2. 5. 2023: št. citatov (TC): 2, čistih citatov (CI): 1, čistih citatov na avtorja (CIAu): 0.25]

kategorija: 1A1 (Z, A', A1/2); uvrstitev: SCIE, Scopus, MBP (COMPENDEX, INSPEC, MEDLINE, METADEX, PUBMED); tip dela je verificiral OSICT

točke: 30.6, št. avtorjev: 4

STRNAD, Damjan, HORVAT, Štefan, MONGUS, Domen, IVAJNŠIČ, Danijel, KOHEK, Štefan. Detection and Monitoring of Woody Vegetation Landscape Features Using Periodic Aerial Photography. Remote sensing. 2023, vol. 15, iss. 11, [article no.] 2766, 18 str., ilustr. ISSN 2072-4292. DOI: 10.3390/rs15112766. [COBISS.SI-ID 154247939], [JCR, SNIP, WoS, Scopus]

financer: ARRS, Program, P2-0041, SI; ARRS, Projekt, L7-2633, SI; Slovenian Research Agency and the Slovenian Ministry of Agriculture, Forestry, and Food through research project V4-2018

kategorija: 1A1 (Z, A', A1/2); uvrstitev: SCIE, Scopus, MBP (CAB, COMPENDEX, DOAJ, GEOREF, INSPEC, METADEX, PUBMED); tip dela je verificiral OSICT

točke: 23.57, št. avtorjev: 5