GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	, PG_00030018
Field of study	Mathematics

Date of commencement of studies	October 2022	Academic year of realisation of subject	2023/2024
Education level	second-cycle studies	Subject group	Optional subject group
Mode of study	Full-time studies	Mode of delivery	blended-learning
Year of study	2	Language of instruction	Polish
Semester of study	3	ECTS credits	2.0
Learning profile	general academic profile	Assessment form	assessment

Conducting unit	Department of Theoretical Physics and Quantum Information -> Faculty of Applied Physics and Mathematics

Name and surname of lecturer (lecturers)	Subject supervisor	Jakub Cieślak
	Teachers	Jakub Cieślak

Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	30.0	0.0	0.0	45
	E-learning hours included: 15.0						

Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan	Participation in consultation hours	Self-study	SUM
	Number of study hours	45	5.0	0.0	50

Subject objectives	The aim of the course is to acquaint students with the principles of computer vision.

Learning outcomes	Course outcome	Subject outcome	Method of verification
	K7_U02	The student knows how to verify and evaluate the quality of machine learning models.	[SU2] Assessment of ability to analyse information
	K7_W08	The student knows how to use sophisticated machine learning python libraries.	[SW1] Assessment of factual knowledge
	K7_U11	The student knows how to build machine learning models.	[SU4] Assessment of ability to use methods and tools
	K7_K02	The student is able to logically connect the area of computer vision with other related areas like image processing and data analysis (machine learning).	[SK4] Assessment of communication skills, including language correctness
	K7_W12	The student is able to implement computer vision methods in Python environment.	[SW2] Assessment of knowledge contained in presentation

Subject contents	1. Image binarization.
	2. Digital image categorization - clustering methods: kmeans, hierarchical.
	3. Image classification: k-NN, CART, ensemble methods.
	4. CBIR

Prerequisites and co-requisites	

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Written test (10 points) and laboratory problems solution (15 points). These two parts are equivalent.	50.0%	100.0%

Recommended reading	Basic literature	A. Geron, "Hands-On Machine Learning with Scikit-Learn and TensorFlow", O'Reilly, 2017. R. Szeliński, Computer Vision: Algorithms and Applications, Springer, 2010 G. Bradski, A. Kaehler, Learning OpenCV, O'Reilly Media, 2008 D.A. Forsyth, J. Ponce, Computer Vision: A Modern Approach, Prentice Hall, 2002
	Supplementary literature	R. Hartley, A. Zisserman, Multiple View Geometry in Computer Vision, 2nd Edition, Cambridge University Press, 2004 R.O. Duda, P.E. Hart, D.G. Stork, Pattern Classification (2nd Edition), Wiley-Interscience, 2000
	eResources addresses	Adresy na platformie eNauczanie: Widzenie Komputerowe 2023/2024 semestr zimowy - Moodle ID: 33760 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=33760

Example issues/ example questions/ tasks being completed	Automatic image categorizations based on clustering algorithms. Building CBIR system.

Work placement	Not applicable