Universida_de_Vigo

Subject Guide 2023 / 2024

IDENTIFYING DATA
Image description and modeling

Subject	Image description and modeling
Code	V05M185V01102
Study programme	Máster Universitario en Visión por Computador

Descriptors	ECTS Credits		Choose	Year	Quadmester
	6		Mandatory	1st	1st

Teaching language	English
Department	
Coordinator	Fernández Álvarez, Antonio
Lecturers	Fernández Álvarez, Antonio
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Web	http://guiadocente.udc.es/guia_docent/index.php?centre=614&ensenyament=614535&assignatura=614535004&any_academic=2020_21&idioma=cast&any_academic=2020_21
General description	The aim of this course is to become familiar with the fundamental characteristics of the digital image and its forms of representation, the description of visual content through local features of colour, shape and texture, and the practical application of these concepts to problems of image processing and analysis.

Training and Learning Results

Code	
A1	CB6 Possess and understand knowledge that provides a basis or opportunity to be original in the development and/or application of ideas, often in a research context
A2	CB7 Students should be able to apply their acquired knowledge and problem-solving skills in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their area of study
B1	Capacity for analysis and synthesis of knowledge
B3	Ability to develop computer vision systems depending on the existent needs and apply the most suitable technological tools
C1	To know and apply the concepts, methodologies and technologies of image processing
D1	To practice the profession with a clear awareness of its human, economic, legal and ethical dimensions and with a clear commitment to quality and continuous improvement
D2	Capacity for teamwork, organization and planning

Expected results from this subject

Expected results from this subject	Training and Learning Results
To know the fundamental characteristics of digital image and its forms of representation	A1 A2 B1 B3 C1 D1 D2
Description of visual content through local characteristics of colour, shape and texture	A1 A2 B1 B3 C1 D1 D2

To apply image modelling and representation techniques to image processing and analysis problems	A1 A2 B1 B3 C1 D1 D2

Contents

Topic	
Image representation and modeling	Space-frequency, orientation and phase, space-scale
Wavelets and filter banks	- Wavelets - Filter banks
Image coding and reconstruction	- Coding - Reconstruction
Image descriptors	- Colour - Shape - Texture
Applications	- Image modelling applications - Image description applications

Planning

	Class hours	Hours outside the classroom	Total hours
Lecturing	10	20	30
Case studies	4	16	20
Laboratory practical	16	32	48
Project based learning	10	40	50
Objective questions exam	2	0	2

*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

Methodologies

	Description
Lecturing	Participatory lessons with the aim of learning the theoretical content of the subject
Case studies	Elaboration and presentation of selected state-of-the-art methodologies related to the subject
Laboratory practical	Analysis and resolution of practical cases with the aim of strengthening the practical application of the theoretical content. Practice in computer classrooms, learning based on the resolution of practical cases, autonomous work and independent study of the students, and group work and cooperative learning.
Project based learning	Learning based on the resolution of practical cases, autonomous work and independent study of the students, and group work and cooperative learning.

Personalized assistance

Methodologies	Description
Case studies	Individualized advice during case studies
Laboratory practical	Resolution of doubts during laboratory practices
Project based learning	Individualized advice during research projects

Assessment

	Description	Qualification	Training and Learning Results			
Case studies	Elaboration and presentation of works on selected state-of-the-art methodologies	15	A1 A2	B1 B3	C1	D1 D2
Laboratory practical	Analysis and resolution of practical cases with the aim of strengthening the practical application of theoretical content	40	A1 A2	B1 B3	C1	D1 D2
Project based learning	Resolution of practical cases of application of the subject through autonomous work of the student, and using the techniques learned during the course	20	A1 A2	B1 B3	C1	D1 D2
Objective questions exam	Continuous self-evaluation tests during the course. Evaluation by examination at the end of the course as an alternative.	25	A1 A2	B1 B3	C1	D1 D2

Other comments on the Evaluation

The evaluation corresponding to the objective test may be passed by means of the tests scheduled during the course or by means of the final exam.

Sources of information

Basic Bibliography

Bovik, Alan, **The essential guide to image processing**, 1, Elsevier, 2009

Bovik, Alan, **Handbook of image and video processing**, 2, Elsevier, 2005

Mallat, Stephane, **A wavelet tour of signal processing: The sparse way**, 3, Elsevier, 2009

Nixon, Mark S.; Aguado, Alberto S., **Feature extraction and image processing for computer vision**, 3, Elsevier, 2012

Sonka, M.; Hlavac, V.; Boyle, R., **Image Processing, Analysis, and Machine Vision**, 3, Thomson Learning, 2009

Forsyth, David A.; Ponce, Jean, **Computer Vision: A Modern Approach**, 2, Pearson, 2012

Szeliski, Richard, **Computer Vision: Algorithms and Applications**, 1, Springer, 2010

Petrou, Maria; García-Sevilla, Pedro, **Image processing: Dealing with texture**, 1, Wiley, 2006

9. Mirmehdi, M.; Xie, X.; Suri, J., **Handbook of texture analysis**, 1, Imperial College Press, 2008

Complementary Bibliography

Recommendations

Subjects that are recommended to be taken simultaneously

Fundamentals of machine leaming for computer vision/V05M185V01103

Fundamentals of image analysis and processing/V05M185V01101