

MÓDULO	MATERIA	CURSO	SEMESTRE	CRÉDITOS	TIPO
	Data Analysis and Statistics		1º	5	Mandatory
PROFESORES*			DIRECCIÓN COMPLETA DE CONTACTO PARA TUTORÍAS (Dirección postal, teléfono, correo electrónico, etc.)		
Pedro A. Garcia, Francisco J. Cortijo Bon (University of Granada)			http://directorio.ugr.es/static/Personal/*/pagina_at_ugr.es http://directorio.ugr.es/static/Personal/*/cb_at_decsai.ugr.es		
			HORARIO DE TUTORÍAS*		
MASTER EN EL QUE SE IMPARTE					
Máster EM Color in Informatics and Media Technology CIMET					
PRERREQUISITOS Y/O RECOMENDACIONES (si procede)					
BSc level basics in statistics and mathematics, Image analysis and processing course (1st semester)					
BREVE DESCRIPCIÓN DE CONTENIDOS (SEGÚN MEMORIA DE VERIFICACIÓN DEL GRADO)					
This course develops understanding of use of statistical analysis for multidimensional data. It also give fundamentals to understand data analysis from raw measurement values to higher level decision making in color and image context. The course develops basic understanding for difference between analysis with or without <i>a priori</i> data as well as ways to evaluate results. The methods will be learned in practical sessions, where they will be programmed and tested with real data. The course is practice oriented, where students learn basics of data analysis useful in color, color image and spectral image analysis and processing. In lectures basics of methods are lectures and					

* Consulte posible actualización en Acceso Identificado > Aplicaciones > Ordenación Docente.



in practical session, their usage is practices. The aim is not to get deep theoretical understanding and derivation of methods.

COMPETENCIAS GENERALES Y ESPECÍFICAS

On completion of this course the students will be able to:

- Understand principles how multidimensional statistical methods differ from one dimensional method.
- Program some basic clustering and classification methods and test their validity.
- Program some basic Neural networks methods and test their validity.
- Extract features from raw, measured values of data to be analysed.
- Understand the distribution of information in statistical analysis and meaning in data representation.
- To apply basic statistical and data analysis methods to color and image data.

OBJETIVOS (EXPRESADOS COMO RESULTADOS ESPERABLES DE LA ENSEÑANZA)

TEMARIO DETALLADO DE LA ASIGNATURA

Topics to be taught (may be modified):

- Basics of multidimensional statistical analysis.
- Principal component analysis, non-negative matrix factorization.
- Data classification: Bayesian classifier, k-NN classifier, basics of neural networks.
- Data clustering: k-means clustering, Self-Organizing map.
- Spectrum estimation and reconstruction: PCA, polynomial, classification/clustering based method.
- Classification and clustering validity testing: leave-one-out, ground truth.

Practical Laboratory Sessions:

- Write spectral color and image data reading and writing routines by Matlab
- Produce PCA component images and reconstruct spectral images from PCA eigenimages
- Realize some classification methods by Matlab
- Realize some clustering methods by Matlab
- Realize some Neural networks and fuzzy-means methods by Matlab
- make simple tests of spectral image segmentation, spectral image categorization etc. using learned methods

BIBLIOGRAFÍA

Literature and study materials: Handouts of the material covered in the lectures will be distributed.

Reference textbooks:



Sergios Theodoridis, Konstantinos Koutroumbas. "Pattern Recognition", third edition. Academic Press.

Anany Levitin, "Introduction to the Design & Analysis of Algorithms", Addison Wesley, 2003.

Additional Textbook

R.O.Duda, P.E. Hart, and D.G. Storck: Pattern Classification. 2nd ed., Wiley, 2001.

ENLACES RECOMENDADOS

METODOLOGÍA DOCENTE

Teaching methods: Lectures and lab classes, and homework exercises.

EVALUACIÓN (INSTRUMENTOS DE EVALUACIÓN, CRITERIOS DE EVALUACIÓN Y PORCENTAJE SOBRE LA CALIFICACIÓN FINAL, ETC.)

INFORMACIÓN ADICIONAL



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