Advanced Color Image Processing

Curso 2016-2017
(Fecha última actualización: 11/07/16)

MÓDULO	MATERIA	CURSO	SEMESTRE	CRÉDITOS	TIPO
	Advanced Color Image Processing		2º	5	Optional

PROFESORES*	DIRECCIÓN COMPLETA DE CONTACTO PARA TUTORÍAS (Dirección postal, teléfono, correo electrónico, etc.)
Eva M. Valero, Luis Gómez Robledo, Fco. Javier Romero Mora, José Antonio Díaz Navas (University of Granada)	http://directorio.ugr.es/static/Personal/*/valerob_at_ugr.es
	HORARIO DE TUTORÍAS*

MASTER EN EL QUE SE IMPARTE	
Máster E+ Color in Science and Industry COSI	

PRERREQUISITOS Y/O RECOMENDACIONES (si procede)

Image Processing. Wavelets calculus. Statistics. Fourier Calculus. Matlab/C++/OpenCV knowledge.

BREVE DESCRIPCIÓN DE CONTENIDOS (SEGÚN MEMORIA DE VERIFICACIÓN DEL GRADO)

It emphasizes advanced principles of image processing, with focusing in scientific as well as technical applications. We expect to cover topics such as advanced color image processing, fuzzy logic applied to image processing problems, applications of wavelets, multiscale representation of images, compression image standards, PDE applied to image processing, computational photography and 3D reconstruction.

Programming assignments will use MATLAB and the MATLAB Image Processing Toolbox, though the use of other computer languages and/or software packages will be accepted. Additional seminars will be organized to introduce specific tools or applications to enlarge the covering of image processing and analysis.

COMPETENCIAS GENERALES Y ESPECÍFICAS

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

OBJETIVOS (EXPRESADOS COMO RESULTADOS ESPERABLES DE LA ENSEÑANZA)
● This course is a graduate-level course to the advanced digital image processing.

TEMARIO DETALLADO DE LA ASIGNATURA
Topics to be taught (may be modified): • Advance color image processing: denoising, edge detection, texture analysis, color constancy. • Fuzzy logic applied to color and gray scale image processing. • Multiscale image representation: gaussian pyramid, laplacian pyramid, wavelets decomposition. • Wavelets applications: smoothing, denoising, edge detection, texture analysis. • Image compression: JPEG, JPEG2000. • Partial differential equations applied to image processing: variational and PDE methods, smoothing, noise removal, edge detection, inpainting. • Computational photography: super resolution, HDR imaging. • 3D Reconstruction. **Practical Laboratory Sessions:** Matlab, C++, OpenCV, Java and GPU programming laboratory topics in order to implement and master basic issues explained in the lectures.

BIBLIOGRAFÍA
Reference books: • The Essential Guide to Image Processing, Edited by Alan Bovik, Academic Press, (2009). • Color Image Processing: Methods and Applications (Image Processing), by Rastislav Lukac & Kostantinos N. Plataniotis, CRC (2006). • Insight to wavelets: from theory to practice, by K.P. Soman, K.I. Ramachandran, N.G. Resmi, PHI Learning Pvt. Ltd., (2010). • Still Image and Video Compression With Matlab, by K. S. Thyagarajan, Jonh Wiley & Sons, (2011). • Super-Resolution Imaging, Edited by Subhasis Chaudhuri, Kluwer Academic Publishers, (2002). • Computational Photography: Methods and Applications, Edited by Rastislav Lukac, CRC Press, (2011). • Anisotropic Diffusion in Image Processing, by Joachim Weickert, B.G. Teubner Stuttgart (2008).

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.)

final exam (50%), homework/lab reports (50%).

INFORMACIÓN ADICIONAL