69309 - Motion capture and characterisation

Información del Plan Docente

Academic Year	2016/17
Academic center	110 - Escuela de Ingeniería y Arquitectura
Degree	547 - Master's in Biomedical Engineering
ECTS	3.0
Course	1
Period	Second semester
Subject Type	Optional
Module	---

1.Basic info

1.1.Recommendations to take this course

1.2.Activities and key dates for the course

2.Initiation

2.1.Learning outcomes that define the subject

2.2.Introduction

3.Context and competences

3.1.Goals

3.2.Context and meaning of the subject in the degree

3.3.Competences

3.4.Importance of learning outcomes

4.Evaluation

5.Activities and resources

5.1.General methodological presentation

The teaching methodology is structured in three levels: theorical classes where the main subject contents are presented and discussed, student participation is encouraged; also lab sessions using motion capture hardware and software and development of practical tasks based on a real application or specific research activity are proposed.

5.2.Learning activities

There will be the following activities:

A01 Theorical classes with the active involvement of the student (21 hours). The main course contents are presented. This activity will take place in the classroom using a slideshow presentation program.

A03 Lab sessions (7 hours). Lab sessions will be developed in small groups. For these activities will be used human motion capture systems that are available in the Department of Design and Manufacturing Engineering at the Escuela de Ingeniería y Arquitectura (EINA).

A05 Development of practical task s. The practical task will be done between two or three students. With this task the students have to show that they have assimilated the contents presented in the other activities. Students should present a report of their practical task and defend it before teachers.

A06 Tutorship . Students may solve any questions they might have about unclear contents of the course.

A08 Assesment . The student will take an exam and a report derived from the development of practical tasks will be evaluated.

5.3.Program

1. Introduction to human motion capture

2. Mechanical basics

3. Human motion capture systems

4. Optical human motion capture systems

5. Human motion capture systems based on inertial sensors

6. Biomechanical model and reconstruction of the movement

7. Dynamic

8. Simulation and 3D animation software of human motion

9. Musculoskeletal models

10. Applications

5.4.Planning and scheduling

The course calendar is defined by the EINA calendar.

5.5.Bibliography and recomended resources

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LISTADO DE URLs:

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Collins MM, Scholar M. Validation of a Protocol for Motion Analysis. [http://forms.gradsch.psu.edu/diversity/mcnair/2003/collins.pdf]

"Comparison meeting of motion analysis systems'02" Clinical Gait Analysis Forum of Japan, 2002. [http://www.gait-analysis.jp/comparison2002/protocol/protocol_eng.html]

"Comparison meeting of motion analysis systems'99" Clinical Gait Analysis Forum of Japan, 1999 [http://www.gait-analysis.jp/comparison99/comp99.html]

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Horn, B.K.P., 2000, Tsai's Camera Calibration Method Revisited [http://people.csail.mit.edu/bkph/articles/Tsai_Revisited.pdf]

INSHT. Datos antropométricos de la población laboral española. 2011 [http://www.insht.es/InshtWeb/Contenidos/Documentacion/TextosOnline/Rev_INS

Marín Zurdo J. J., et al. Proceedings of the Sixth International Conference on Occupational Risk Prevention. Mondelo, P., et al ed., 2008. "Move-Human Sensors: Sistema Portátil de Captura de Movimiento Humano basado en Sensores Inerciales para el Análisis de Lesiones Musculoesqueléticas y utilizable en entornos reales". ISBN 84-934256-5-6 [http://www.prevencionintegral.com/en/canal-orp/papers/orp-2008/move-human-se

Marín Zurdo, J. J.; Boné Pina, M.J, and Benito Gil, C. "Evaluación de Riesgos de Manipulación Repetitiva a Alta Frecuencia Basada en Análisis de Esfuerzos Dinámicos en las Articulaciones sobre Modelos Humanos Digitales". Ciencia & Trabajo, 2013, vol. 15, no. 47. pp. 86-93 [http://www.cienciaytrabajo.cl/cyt/Paginas/Evaluaci%C3%B3n-de-Riesgos-de-Mar

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