69317 - Computer vision perception

Información del Plan Docente

Academic Year	2017/18
Faculty / School	110 - Escuela de Ingeniería y Arquitectura
Degree	547 - Master's in Biomedical Engineering
ECTS	3.0
Year	1
Semester	Second semester
Subject Type	Optional
Module	---

1.General information

1.1.Introduction

1.2.Recommendations to take this course

1.3.Context and importance of this course in the degree

1.4.Activities and key dates

2.Learning goals

2.1.Learning goals

2.2.Importance of learning goals

3.Aims of the course and competences

3.1.Aims of the course

3.2.Competences

4.Assessment (1st and 2nd call)

4.1.Assessment tasks (description of tasks, marking system and assessment criteria)

5.Methodology, learning tasks, syllabus and resources

5.1.Methodological overview

The methodology followed in this course is oriented towards achievement of the learning objectives. A wide range of teaching and learning tasks are implemented, such as lectures where the main contents are presented and discussed; computer lab sessions, practical tasks, and specific research activities.

Students are expected to participate actively in the class throughout the semester.

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5.2.Learning tasks

The course includes the following learning tasks:

- **A01 Theoretical classes with the active involvement of the student (18 hours)**. The main course contents are presented.
- **A03 Computer lab sessions (24 hours)**. Different lab sessions are carried out. Notes for each lab session where the different activities are planned will be available before the session. In the following days after the lab session, the student should finish a lab report. Each student selects one of the practical exercises for a more detailed study. The student has to write a 5-page report of the selected excise including these sections: Introduction, theoretical basis, experiments, discussion, conclusions, and bibliography.
- **A05 Reading research publications (10 hours)**. Each student selects a research publication from a list of popular and influential articles in computer vision. Then the student has to make a 10-minute talk to orally present the selected article.
- **A06 Tutorials (3 hours)**. Students may ask any questions they might have about unclear contents of the course.
- **A08 Assessment (2 hours)**. The student will take an exam and submit several reports derived from the computer lab sessions and the practical tasks.
- **Individual study (18 hours).** Time devoted to study theoretical contents and to make self evaluation exercises.

5.3.Syllabus

The course will address the following topics:

Theory

1. Image acquisition.
2. Feature detection and matching.
3. Feature-based image alignment.
4. Structure from motion.
5. Computer vision and Augmented Reality.
6. Visual recognition.

Lab sessions

1. Bundle adjustment.
2. Uncalibrated geometry and robust matching.
3. Visual classification.
4. Structure from motion and Augmented Reality.

5.4.Course planning and calendar

Further information concerning the timetable, classroom, office hours, assessment dates and other details regarding this course, will be provided on the first day of class or please refer to the EINA website.

5.5.Bibliography and recommended resources

- **BB** OpenCV essentials : acquire, process, and analyze visual content to build full-fledged imaging applications using OpenCV / Oscar Deniz Suarez ... [et al.] . - 1st ed. Birmingham : Packt, 2014
- **BB** Szeliski, Richard. Computer vision : algorithms and applications / Richard Szeliski London : Springer, cop. 2011
- **BC** Forsyth, David A.. Computer vision : a modern approach / David A. Forsyth, Jean Ponce . - 2nd ed. Upper Saddle River : Prentice Hall, 2012
- **BC** Hartley, Richard. Multiple view geometry in computer vision / Richard Hartley, Andrew Zisserman . - 2nd ed. Cambridge : Cambridge University Press, 2003