Computer Vision

Academic Year: (2019 / 2020) **Review date: 09-05-2018**

Department assigned to the subject:

Coordinating teacher: GONZALEZ DIAZ, IVAN

Type: Electives ECTS Credits : 6.0

Year : 1 Semester : 2

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Digital Image Processing, Video Processing or similar.

OBJECTIVES

In this course students will acquire knowledge about Computer Vision (Computer Vision), a subfield of artificial intelligence that combines techniques from various fields such as image processing, pattern recognition and statistical learning . To this end, the course will begin revisiting the traditional field of image processing, to then study modern methods for automatic image acquisition, processing , analysis and understanding.

Therefore, taking the Human Visual System (HVS) as reference , the processing pipeline is organized into three levels:

1. Low Vision : working with pixels
2. Vision average : from pixels to segments, from motion vectors to object trajectories .
3. High Level Vision : understanding the content of images.

DESCRIPTION OF CONTENTS: PROGRAMME

The course consists of the following chapters:

1.- Introduction to Computer Vision
2.- Image Formation and Image Models
3.- Basic Image Processing
4.- Feature Detection and Matching (I)
5.- Dense Motion Estimation and Parameterization
6.- Geometric Camera Models and Stereoscopic Vision
7.- Image Segmentation
8.- Object Tracking
9.- Image Retrieval
10.- Image Classification & Object Detection

LEARNING ACTIVITIES AND METHODOLOGY

The course will combine lectures with lab sessions where students will experiment with the techniques seen in theory, as well as apply them to problems of interest.

ASSESSMENT SYSTEM

Continuous assessment based on the following aspects :

- Evaluation of laboratory and presentation / study scientific articles on topics of interest (40%).
- Development of a final project related to the subject of the course (60%).

% end-of-term-examination:	0
% of continuous assessment (assigments, laboratory, practicals…):	100

BASIC BIBLIOGRAPHY

- Forsyth, Ponce Computer Vision: A Modern Approach, Pearson, 2012
- Ian Goodfellow, Yoshua Bengio, Aaron Courville Deep Learning, The MIT Press, Cambrigde,

Massachussetts, London, England, 2016

- Richard Hartley & Andrew Zisserman Multiple View Geometry in Computer Vision, Cambridge University Press, 2003
- Richard Szeliski Computer Vision: Algorithms and Applications, Springer-Verlag, 2011