Computer image processing

Academic Year: (2022 / 2023) **Review date: 03-05-2022**

Department assigned to the subject: Systems Engineering and Automation Department

Coordinating teacher: ARMINGOL MORENO, JOSE MARIA

Type: Compulsory ECTS Credits : 6.0

Year : 1 Semester : 1

OBJECTIVES

With this subject it is tried that the student acquires basic knowledge that allow him to analyze and to desigh computer vision systems.

DESCRIPTION OF CONTENTS: PROGRAMME

1. Introduction
   - Applications
   - Elements
2. Bottom-up design
   - Image preprocessing
   - Edge detection
   - Region segmentation
   - Object description
3. To-down design
   - Rigid models
   - Deformable models
   - Optimization
4. Stereo Vision
   - Perspective projection
   - Camera calibration
   - Image rectification

LEARNING ACTIVITIES AND METHODOLOGY

Skillful classes, individual presentations of the students, individual tutorials and personal work of the student; oriented to the theoretical knowledge acquisition.

ASSESSMENT SYSTEM

Continuous evaluation based on works, participation in class and tests of evaluation of abilities and knowledge.

% end-of-term-examination:	40
% of continuous assessment (assigments, laboratory, practicals…):	60

BASIC BIBLIOGRAPHY

- Duda, R. O., Hart, P. E., and Stork, D. G. Pattern Classification, John Wiley & Sons, 2000
- Gonzalez, R. C. and Woods, R. E. Digital Image Processing, Prentice Hall, 2007
- Jain, R., Rangachar, K., and Schunk, Computer Vision, McGraw-Hill.
- Pratt, W. K Digital Image Processing, Wiley Interscience.
- Russ, J. C. The Image Processing, Handbook CRC.
- Shapiro, L. G. and Stockman Computer Vision, Prentice-Hall.

ADDITIONAL BIBLIOGRAPHY

- Baggio, Daniel Lélis Mastering OpenCV with Practical Computer Vision Projects, Packt Publishing, 2012
- Davies, E. R. Computer and machine vision: theory, algorithms, practicalities, Elsevier, 2012

- Gary Bradski, Adrian Kaehler Learning OpenCV: Computer Vision with the OpenCV Library, O'Reilly Media, 2008

- Margarita N. Favorskaya, Lakhmi C. Jain Computer Vision in Control Systems-2, Springer, 2015

- Nixon, Mark S. Feature extraction & image processing for computer vision, Academic Press, 2012

BASIC ELECTRONIC RESOURCES

- . Awesome Computer Vision On Github: http://https://github.com/jbhuang0604/awesome-computer-vision#books

- Carnegie Mellon University . The Computer Vision Homepage: www.cs.cmu.edu/~cil/vision.html

- Richard Szeliski . Computer Vision: Algorithms and Applications: //http://szeliski.org/Book/

- Stanford . Stanford Computer Vision Lab: http://vision.stanford.edu/