Universidad Zaragoza

Academic Year/course: 2024/25

69170 - Advanced Computer Vision

Syllabus Information

Academic year: 2024/25
Subject: 69170 - Advanced Computer Vision
Faculty / School: 110 - Escuela de Ingeniería y Arquitectura
Degree: 615 - Máster Universitario en Robótica, Gráficos y Visión por Computador / Robotics, Graphics and Computer Vision
ECTS: 3.0
Year: 1
Semester: Second semester
Subject type: Optional
Module:

1. General information

The objective of the course is to study recent techniques and applications in the field of computer vision, with special emphasis on advanced machine learning techniques applied to computer vision or innovative visual perception systems.

2. Learning results

The student will be able to:

- Know and apply advanced machine learning techniques in computer vision.
- Understand and model non-conventional perception systems identifying the most appropriate for each application.
- Know and use multimodal deep learning architectures adapted to non-conventional perception modalities.
- Understand the operation of synthetic image and video generation models and systems for computer vision.
- Understand and identify the problems associated with data acquisition and curation in real computer vision applications.
- Understand and identify which computer vision systems can be applied in different real problems and the associated limitations or problems.
- Synthetically present the proposed technical and/or scientific results.
- Evaluate relevant literature sources.

3. Syllabus

- Advanced computer vision techniques:
    - Recent deep learning techniques and architectures applied in computer vision (e.g., visual transformers, NERFs, ...).
    - Synthetic data generation for computer vision (generative models, simulation environments, ...).
    - New technologies and perception systems (e.g., event cameras, omnidirectional, hyperspectral, ...).
- Recent applications of computer vision: examples and use cases in different fields of application, from industry to health applications.

4. Academic activities

The course consists of 3 ECTS credits that correspond to an estimated student dedication of 75 hours distributed as follows:

- Lecture. 15h
- Problem solving and case studies. 6 h
- Laboratory practice: 9 h
- Study and performance of practical application or research work: 42 h.
- Evaluation tests: 3 h

5. Assessment system

Both the continuous and global evaluation will consists of the following assessment activities:

P2 [70%] - Directed work. Works, exercises, and reports of laboratory practices and course work, in which the knowledge and skills acquired in the course will be put into practice.

P3 [30%] - Oral presentations and debates. Oral presentations of the works, exercises, practices and/or discussions proposed in class will be valued.

To pass the course it will be necessary to pass the P2 test with at least a grade of 5 out of 10 points, and the P3 test with a

grade of at least 5 out of 10 points. In this case, the final grade will be calculated according to the following formula: 0.7*P2+0.3*P3.

If P2 or P3 is not passed, the final grade will be the minimum of P2 and P3.

6. Sustainable Development Goals

8 - Decent Work and Economic Growth
9 - Industry, Innovation and Infrastructure