COMPUTATIONAL VISION: Course Presentation

Master in Artificial Intelligence

Department of Mathematics and Computer Science

2019-2020

UNIVERSITAT DE BARCELONA

Computational Vision

- Lecturers:
  - Laura Igual (ligual@ub.edu)
  - Petia Ivanova Radeva (petia.ivanova@ub.edu)
  - Bhalaji Nagarajan (bhalaji10@gmail.com)

- Course schedule and location:
  - Lectures: Tuesday 14:00h -15:30h B3
  - Practicum: Tuesday 15:30h-17:00h IF or 17:00h-18:30h IF

- Office hours: please, ask for a meeting by e-mail to the lecturers.

Organization

- Lectures:
  - Theory concepts
- Practicum:
  - Practice the explained concepts
  - In laboratory
  - Python based projects
- Final Exam:
  - Validate the acquired knowledge.
- All material (slides and practicums) and tasks are available at Campus Virtual (support environment for teaching in UB).

Requirements

- The requirements for the course are based on:
  - linear algebra,
  - vector calculus,
  - statistics, and
  - numerical analysis
- Course does not assume prior imaging experience

Transversal skills

- Communication of the research results in different ways: written, programming, graphic.
- Work, make decisions and reason in group (pairs).
- Critical thinking (application of knowledge to specific problems).
- Identify and analyze the necessary information to a particular task.

General Contents

- The main aspects of computational vision will be reviewed.
- Classical and basic knowledge
- Advanced Computational Vision

Contents:

1. **Image Processing**
2. **Edges detection**
3. **Image Features: HOG**
4. **Image Features: SIFT**
5. **Face detection**
6. **Face recognition**
7. **Image Segmentation**
8. **Video Segmentation**
9. **Texture analysis**
10. **Object Recognition with Bag-of-Words**
11. **Classification with CNNs**
12. **Detection with CNNs**

Practicum

- 6 deliverables about Computational Vision
- Python code
- **Assignments in pairs**

Evaluation

- Continuous assessment based on the practicum deliverables and a final exam.

- Final mark based on:

  60% practicum grade (each delivery 10% of the mark)

  40% final exam grade

- Deliveries with delay will have a penalization of 2 points over 10.

Before starting…

Some questions for you:

- Which is your previous knowledge about computational vision?
- Which is your interest?
- What are you expecting of the course?