COMPUTATIONAL VISION: Course Presentation

Master in Artificial Intelligence

Department of Mathematics and Computer Science

2022-2023

UNIVERSITAT DE BARCELONA

Computational Vision

- Lecturers:
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- Course schedule:
    - Tuesday 14h-15:30h B3
      - Group 1: Tuesday 15:30h-17h IF
      - Group 2: Tuesday 17h-18:30h IF

Organization

- Theoretical classes:
  - Presentations introducing theoretical concepts, questions about the material, do questionnaires, …
- Practicum:
  - Python based projects
- Material:
  - Presentations introducing theoretical concepts, videos, readings, exercises and practicums.
- Final Exam:
  - Validate the acquired knowledge.
- All material and tasks will be available at Campus Virtual (support environment for teaching at 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:

- Image Processing
- Edges detection
- Image Features: HOG
- Image Features, matching based on SIFT
- Face detection & Face recognition
- Bag-of-Words
- Classification with CNNs
- Detection with CNNs
- Hand-crafted Image Segmentation
- Semantic and instance Segmentation
- GANs and Transformers

Practicum

- 5 Deliverables about Computational Vision
- Python code in Google Colab
- **Assignments in pairs**

Evaluation

- Continuous assessment based on the practicum deliverables, exams and project.

- Final mark based on:
  - 60% practicum grade
  - 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?
- ….

Go to: *Socrative.com*

- Choose Student Login
- Room Name: COMPUTERVISION
- Enter your name: It can be anonymous.