

# COMPUTATIONAL VISION: Course Presentation

Master in Artificial Intelligence

Department of Mathematics and Computer Science

2023-2024



UNIVERSITAT DE  
BARCELONA

# Computational Vision

- Lecturers:

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- Course schedule:

- Tuesday 14h-15:30h B3
  - Group 1: Tuesday 15:30h-17h IF - Carles
  - Group 2: Tuesday 17h-18:30h IF - Alfons

# 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:

1. Image Processing
2. Edges detection
3. Image Features: HOG
4. Image Features, matching based on SIFT
5. Face detection & Face recognition
6. Bag-of-Words
7. Classification with CNNs
8. Detection with CNNs
9. Hand-crafted Image Segmentation
10. Semantic and instance Segmentation

# Laboratories

- Python notebooks in Google Colab.
- Assignments in pairs.
- 5 Deliverables every 2 laboratories
  - Deliverables with a questionnaire.
  - Mark: 60% notebook + 40% questionnaire
- Deliverable 6: Presentation of a CV topic/paper.



# Tentative Deliverable Calendar

- Deliverable 1: P1 + P2. Deadline: 9/10/2023
- Questionnaire 1: 10/10/2023.
- Deliverable 2: P3 + P4. Deadline: 23/10/2023
- Questionnaire 2: 24/10/2023.
- Deliverable 3: P5 + P6. Deadline: 6/11/2023
- Questionnaire 3: 7/11/2023.
- Deliverable 4: P7 + P8. Deadline: 20/11/2023
- Questionnaire 4: 21/11/2023.
- Deliverable 5: P9 + P10. Deadline: 11/1/2024
- Questionnaire 5: 12/1/2024.

# Presentations

- Deliverable 6 is the study and presentation of a technical CV topic/paper.
- The last two classes will be devoted to the presentations.
- We will publish the schedule.

# Evaluation

- Continuous assessment based on the laboratory deliverables, exams.
- Final mark based on:
  - 60% practicum grade (10% every deliverable)
  - 40% final exam grade (16/01/2024 14h)
- Deliveries with delay will have a penalization of 2 points over 10.

# Before starting...

Some questions for you:

- Which is your previous knowledge about computer vision?
- Which are your interests?
- What are you expecting of the course?
- ....

**Go to:** *Socrative.com*

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