COMPUTATIONAL VISION: Course Presentation

Master in Artificial Intelligence

Department of Mathematics and Computer Science

2023-2024

UNIVERSITAT DE BARCELONA

Computational Vision

- Lecturers:
  - Laura Igual (ligual@ub.edu)
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  - Alfons Marques (amarquescancio@gmail.com)

- 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 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.