

Statement

Objective

Design, develop and experiment with an algorithm to join three adjacent images to build a panoramic view.

Materials

The problem is going to be solved, preferably, using the programming environment used during the subject (Python and OpenCV).

Results

The submission must be a PDF document with the answers of the questions below. You should also submit all the source code used to solve the problem with instructions to execute it.

Submission dates

Two deadlines:

- 2nd February 2024 – Ordinary evaluation
- 18th February 2024 – Extraordinary evaluation (To be confirmed)

The problem

We have an old camera and we want to construct a panoramic view from the images took from it.

We need an algorithm which took as input three horizontal adjacent images. And its output is going to be a single image with the three images joined building the panoramic view.

The algorithm should have a well defined constraints, when input image accomplish them, it should always work.

Figure 1 shows an example of three possible input images and figure 2 shows a possible correct output of the algorithm.



Figure 1: Input images example.



Figure 2: Output example.

Questions

1. Algorithm design (2 points)

- 1.1. Which are the mandatory algorithm inputs? And optional ones?
- 1.2. What is the expected output of the algorithm?
- 1.3. What technique are you going to use to solve the problem? Which constraints is it going to have? Think about alternative techniques that could work.

2. Algorithm implementation (3 points)

- 2.1. Which technologies are you going to use to implement the algorithm? Justify your answer.
- 2.2. Show the algorithm implementation function.
- 2.3. Deploy an executable source code.

The code will be executed to evaluate the results with the teacher images.

The source code must include instructions to install and execute it. Remember to specify all the dependencies with its correct version number.

3. Experimentation (3 points)

- 3.1. Identify the tuneable parameters and inner algorithms. Test how the results change varying it and analyse the results.
- 3.2. How could you improve the algorithm results?

4. Conclusions (2 points)

- 4.1. State clearly the algorithm constraints
- 4.2. Did you liked the practice? What have you learnt?
- 4.3. State any conclusions you have got.

Rules

Rules that must match your practice:

1. Cite all used bibliography or webpages.
2. Use your own images. Are not allowed to share images between students.
3. All practices must be solved individually.
4. Source code must be clean and commented when required.
5. Answers should relate to what has been learned in theory.
6. Too similar practices will be considered copy and will be rated by 0.
7. Longer doesn't mean better.
8. Presentation will have a strong weight in the final mark.