PIV Project - Part I

This work is to be done by every student. In other words, groups do not matter here, you should be able to do this part autonomously and quickly.

In the situation we live in, with loose connection with professors and between students themselves, it is imperative to make sure that each one of you learns the basics and stimulated to fulfill all your potential.

The objective of this part is to get familiar with subjects like image representation, feature detection and matching, image transformations and possibly with background subtraction techniques.

The purpose of lab classes is to guide you on this task and to reinforce the teaching of main techniques you learn in class or in textbooks. We will also guide you through some of matlab functions that are helpful for the job but the implementation and coding is all up to you and "out of class".

In the first week of November you should have this part done and show me (I'll post how we are going to do it). However if you finish this earlier, show me when you do. This is a pass/fail evaluation not a fully graded evaluation. Of course it will have impact on your final grade, more noticeable in the extremes (really good and really bad).

Regarding this, remember that knowledge, skills and overcoming the disadvantage of being a student in "corona mode" should be your focus. How many mark points will this give you in the final grade is not yet defined (it's the first time I do this!). The idea is to be qualitative and differentiate between group members if I see idleness.
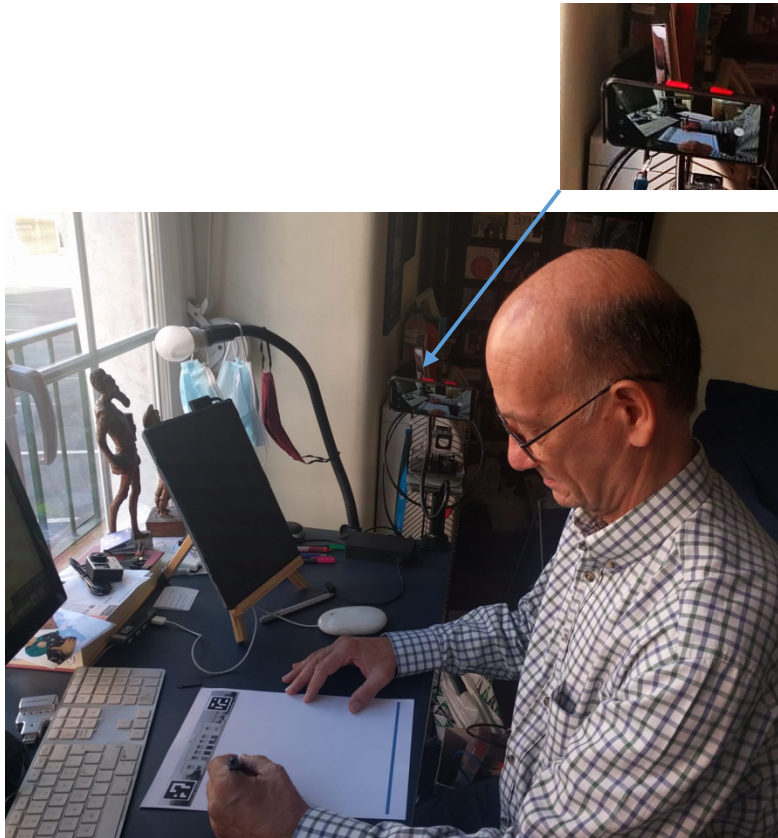
I'm in the process of setting office hours (via zoom) so that you can talk to me every week outside class.

One final recommendation: Please read the book ! It's all there !

Good luck
Joao P. Costeira

Few € scanner

Imagine the setup shown in the figure below where a person is writing on a A4 page and a camera is capturing the scene:


Acquiring a sequence of images from the camera (a video), the objective is to produce a sequence of output images with the sheet of paper corrected by the projective transformation between the table plane and the camera plane.

 In short, the goal is to map images from the camera to the table coordinate system (eventually scaled)!

Specifically, the input of your program will be the following:

- A template (an image) of the A4 sheet where the writing will occur. You know the template in advance and can customize any technique to help detecting it. The Aruco codes (similar to QR codes) are incidental, you do not have to use them…but you can ☺

- A video with a person writing
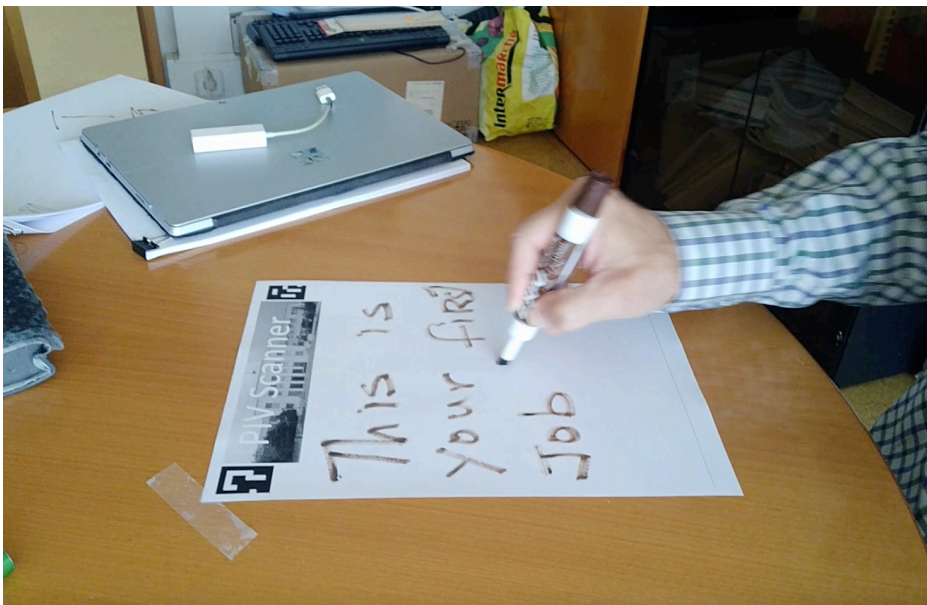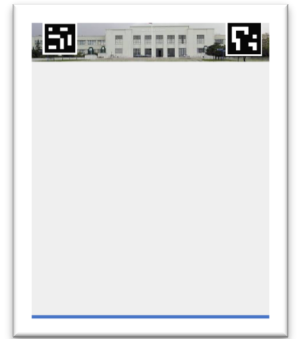
- The output is a sequence (an output video, final format to be defined later) with the image of the camera cropped and corrected, as shown on the side figure.

  LET'S GET STARTED !