

## Introduction to AR on planar patterns.

### Introduction

This practical course uses OpenCv to illustrates a simple planar AR process . The core of such algorithm is decomposed by :

1. detect interest points on both reference pattern and current image ;
2. describe interest points ;
3. match interest points ;
4. compute by a robust algorithm dealing with matches, a planar geometric transformation between the reference pattern and the current image ;
5. warp the AR image to superimpose within the real image.

### 1 Compute an Homography

The core of the program is given into the file `main_match_obj_im.cpp`. You have to complete this file at places where appears the comment : `// .. To be complete by student`

1. You have to compute the homography between the matches by using the RANSAC algorithm. A function is already defined into opencv library to do that. You just have to implement this function (see opencv documentation for function `findHomography(...)`)
2. You have to warp the AR image (that has to have the same size than the object image) using the above estimated Homography. A specific function is also defined in opencv (see opencv documentation for function `warpPerspective(...)`).
3. Check that your modifications are correct by testing your program. You have to display same windows than figure 1.

### 2 Improvements

1. Modify the program to compute an affine transformation. Compare to the homography.
2. Modify the program to change the AR image by the video file `IMG_1377.mp4` (according to your device, you can also try a webcam).
3. Modify the program to compute a confidence score to the homography estimation
4. Test several descriptors (binary and non-binary ones) and conclude on the execution time

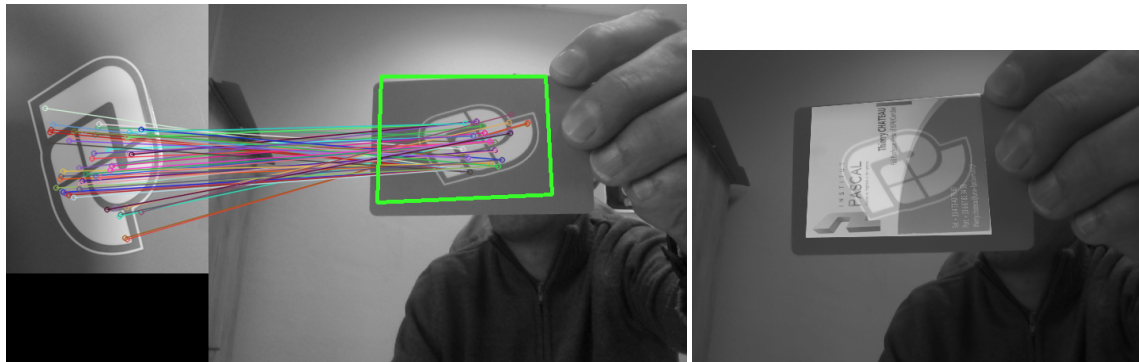


FIGURE 1 – The left screenshot shows the matching result and the output of the homography (in green). The right screenshot shows the result of the AR process