Report of Laboratory 5 (Computer Vision)
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The following report talks about keypoints, descriptors and matching to create a panoramic image given a sequence of unstitched images.

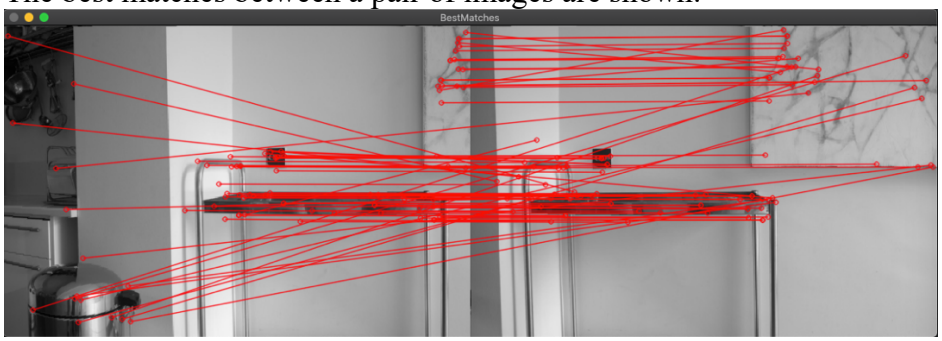
The program requires as input the path of the folder from which to take the images to form the panoramic image, the extension of these images and half the value of the field of view of the camera used.

The structure of the program is as follows:

- The folder "*include*" which includes the head files necessary for the algorithm.
- In the "*src*" folder there is the "Main.cpp" file in which inputs are first requested and then an instance of the "PanoramicImage" class is created, which performs the actual calculation; the class "PanoramicImage.cpp", in which the constructor and the methods defined in the head file "PanoramicImage.h" are implemented

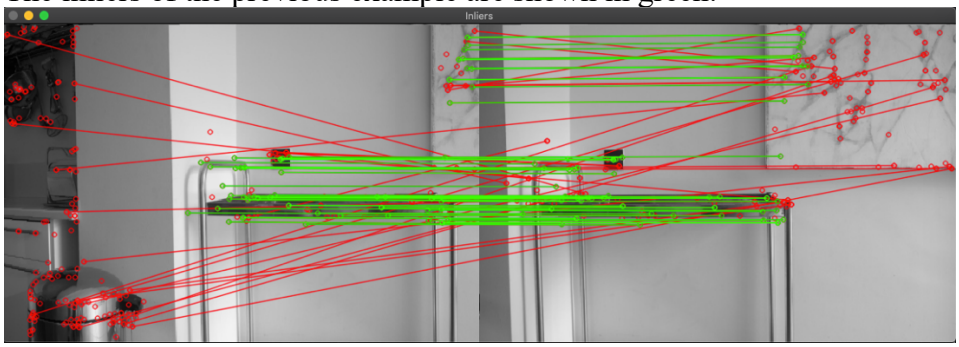
The method in which the calculation of the panoramic image is performed is *computeProjection*, in which the keypoints and descriptors are calculated for each consecutive image pair, using the SIFT algorithm; the matches of the desciptors are calculated through BFMatcher and from these, only the best matches are extracted, ie those with a distance less than the *distThreshold * min value*; in this case it was chosen as the value of distThreshold equal to 10.

The best matches between a pair of images are shown:



At this point, the inliers are calculated through findHomography and the RANSAC algorithm.

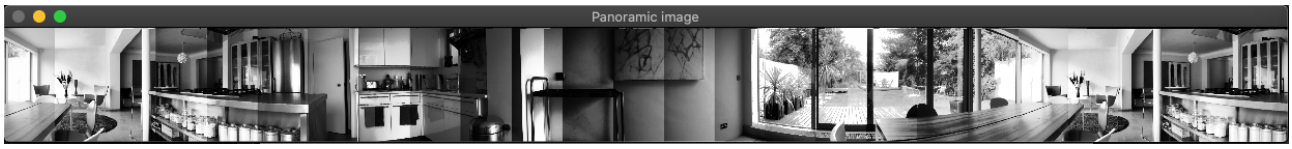
The inliers of the previous example are shown in green:



During the algorithm, in addition, the transactions in x and y are calculated for each pair of consecutive images that are saved, in two vectors dx and dy, necessary to recreate the entire final image.

The results obtained are the following:

Kitchen. Field of view: 66°. (half FoV=33°)



Dolomites. Field of view: 54°. (half FoV=27°)

Dataset_lab_19_automatic. Field of view: 66°. (half FoV=33°)

Dataset_lab_19_manual. Field of view: 66°. (half FoV=33°)