LAB 5

In this lab we provide a panoramic image from a collection of images taken from the same point, but by rotating horizontally the camera. It's also given as input a threshold and the field of view of the camera.

panoramic_utils.h

In the provided class I have added another static function called `cylindricalProj_BGR` that has same behaviour as the `cylindricalProj` but it projects colored images into the cylinder.

PanoramicImage.h & PanoramicImge.cpp

As requested by the exercise, I have created a class that allows to compute a panoramic image from a file list of images, the field of view with which these images have been taken and a ratio that define the minimum distance threshold among the matches distance.

To class constructor only load the images set and save the field of view parameter.

To compute and get the panoramic image it's possible to use `composeWithSIFT` and `composeWithORB`, these functions compose the image by extracting the feature points with the 2 different indicated methods.

Note that every time one of these two functions are called, the previous result is lost. Also, the two functions differentiate by the created features detector.

During the composition procedure, the y-axis translations are neglected as suggested by the professor during the lab lecture (and also because the camera is only rotating about the vertical axis)

Once the panoramic image is computed, it is also possible to access to it by using the function `getImage` that returns the last computed panoramic image (that is stored as member class variable).

It has been also considered the case when the images are taken in counterclockwise direction and it has been teste this functionality by manually reversing the images order in the directory "data".

main.cpp

In the main, as usual, there are implemented the user input checks to allow a correct program running and the program shows first the panoramic image computed with SIFT and after the one computed with ORB.

RESULTS

The results among the two features extract methods are very similar and this leads me to say that results among using ORB and SIFT detector are pretty much the same.

Unfortunately the panoramic image composing procedure it's not really good because it's noticeable that the resulting image is not continuous and there are some point that are not perfectly match among the pairs of images (this could be the reason of the "discontinuity" effect resulting into the final composed image).

I think this is due to the fact that the union of the images is computed by using the average of the x-axis translations among the pairs of images, then to improve the result it should be adopted another kind of method to combine the images pairs.

In the following page there are the results of each dataset for each kind of extraction method.

The slicing/discontinuity effect is very noticeable in the automatic data set.
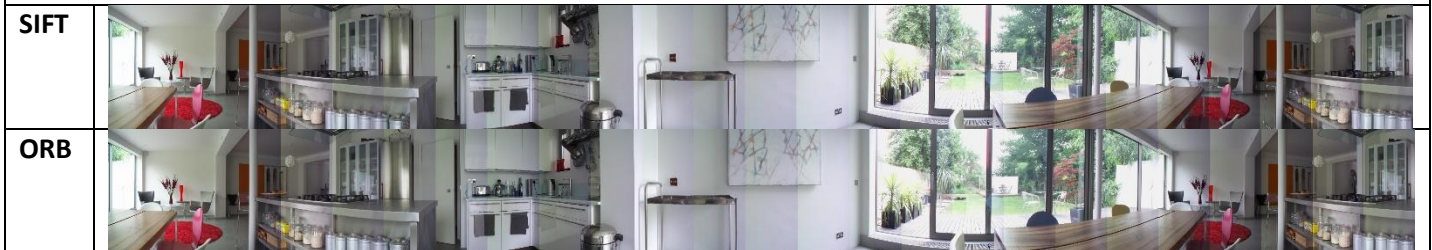
automatic	
SIFT	
ORB	

data	
SIFT	
ORB	

dolomites	
SIFT	
ORB	

kitchen	
SIFT	
ORB	

manual	
SIFT	
ORB	

reverse_data	
SIFT	
ORB	