

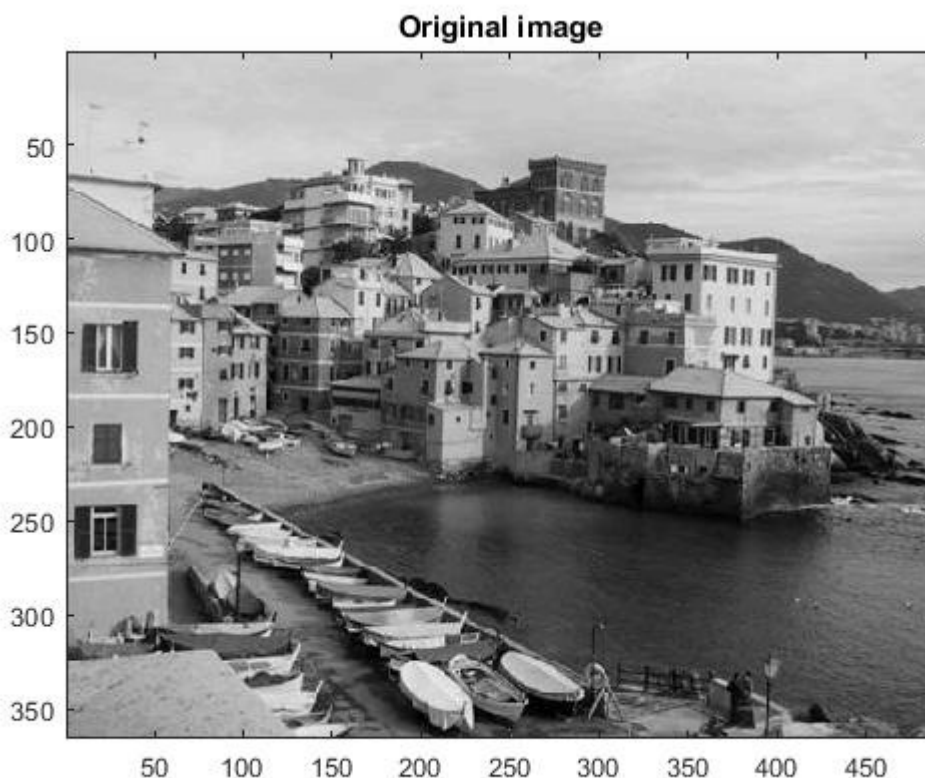
Image warping and bilinear interpolation

The aim of this lab session is a simple manipulation of an image. This manipulation consist in a trasformation of the image with backward warping and interpolation.

In Matlab we imported images as matrices and convert them from rgb to grayscale. Then we use backward warping to find the new value for each pixel of the image. At the end we need an interpolation to evaluate the pixels that have no values after the backward warping in order to avoid the holes.

The passage that we have used for image processing are :

- Conversion from RGB image to black and white image in order to reduced the quantity of data to elaborate.
- Backward Warping , a processing techniques that start from final domain in order to obtain the value in original domain.
- Final Interpolation, that permits an aproximation of the less value after transformation.



Starting from the original image we have perform some transformation like Translation, Rotation and horizontal and vertical shear.

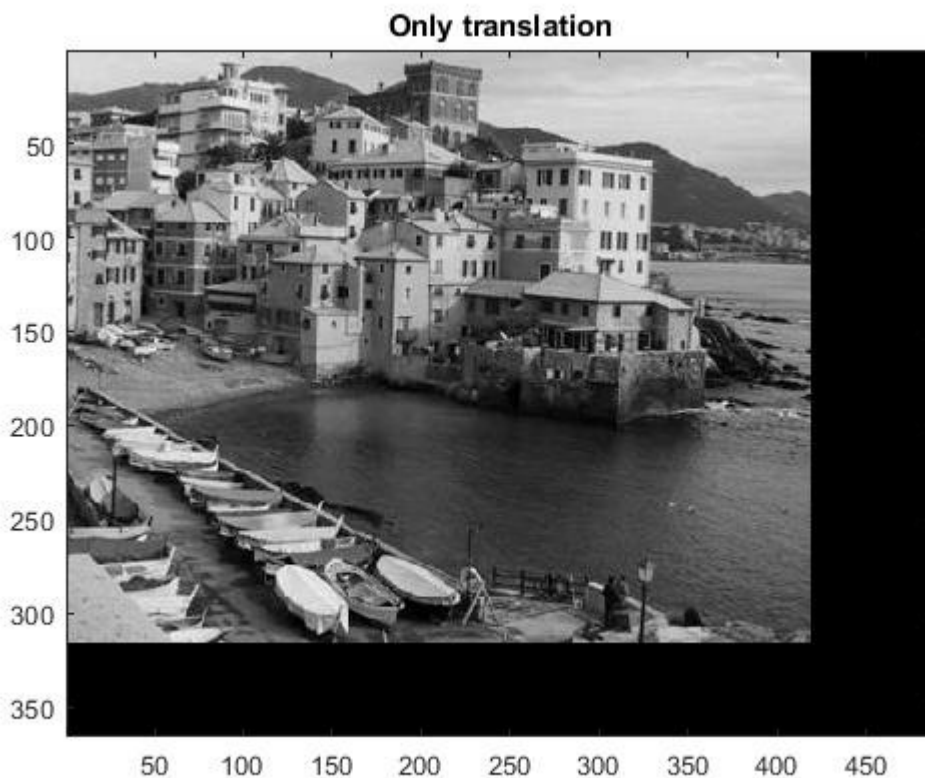
With our code is possible to perform a sequence of different transformation using the function implemented from us.

Generally, for each transformation we have perform a backward warping of the image and then we have centered it by a manipulation of the image matrix dimension of rows and columns.

Then we have applied the transformation function with original image as input in order to obtain an output image with desired effect.

Using the griddata function we are able to interpolates the surface at the desired points , specifies as parameters in input of the function, and return as output the interpolated values.

TRANSLATION



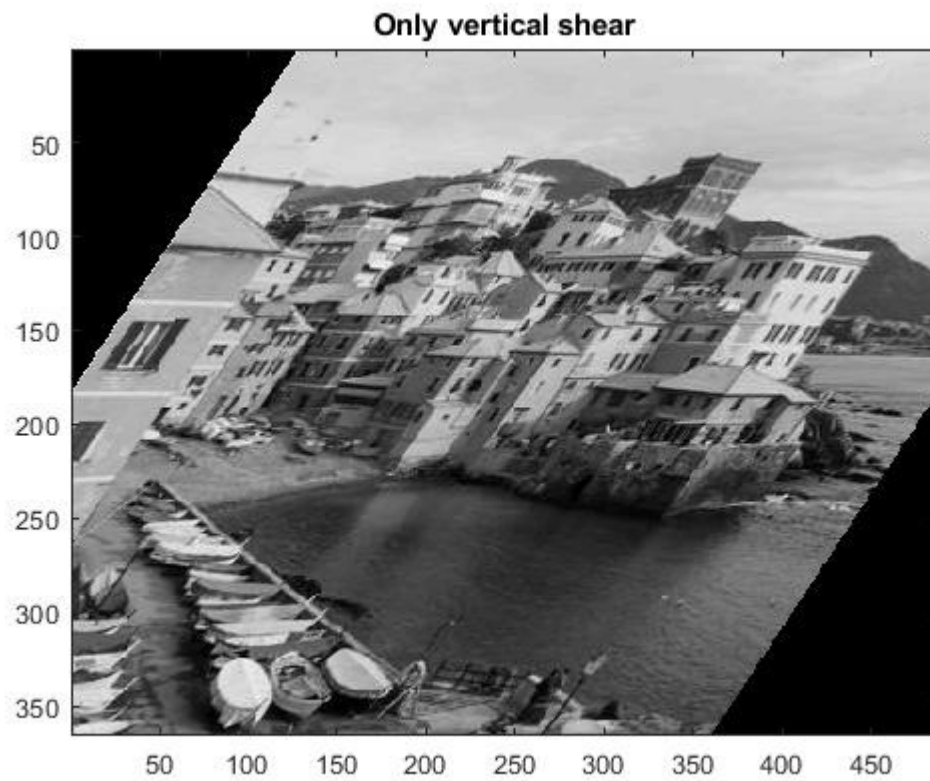
The function `translation()` changes the position of the image by the selection of two coefficient value for the translation along X and Y axes.

ROTATION



The function `rotation()` permits a centered rotation of the image . The input angle must be expressed in radiant.

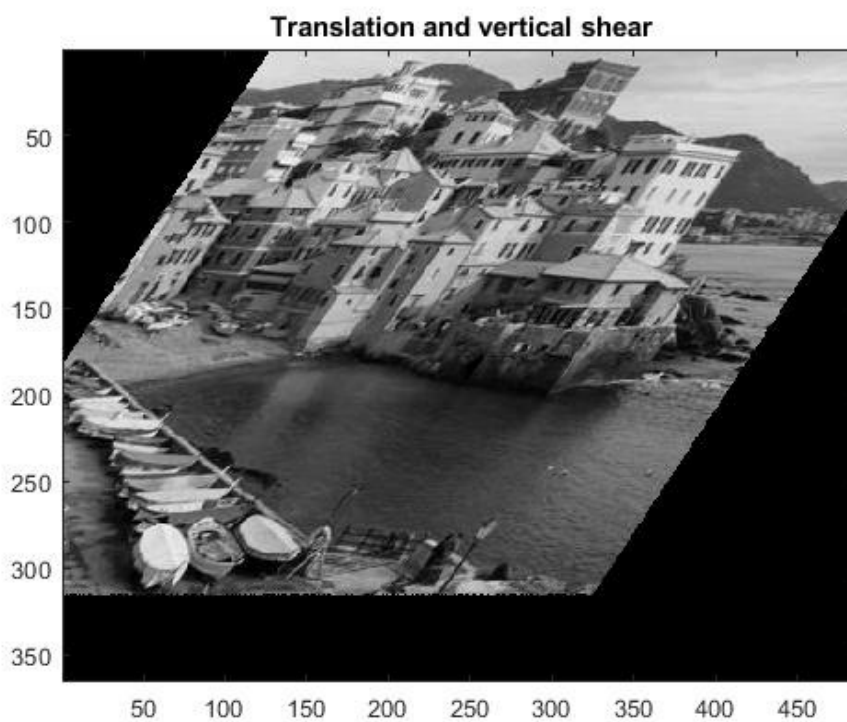
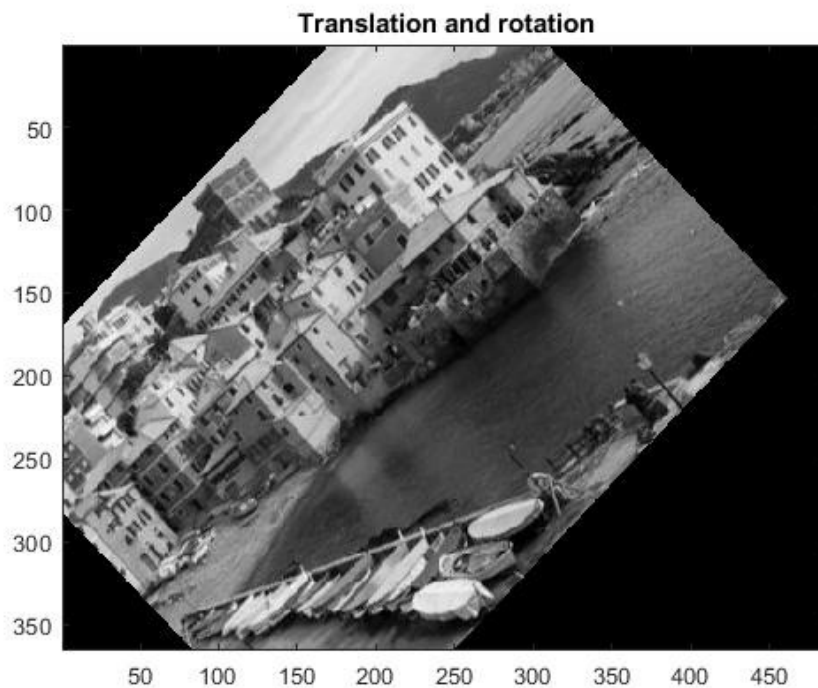
SHEAR



The function `shear()` makes this effect after the multiplication of a selected value coefficient and the pixels values along axes X or Y.

Along axe X it is possible to obtain a horizontal shear ,otherwise a vertical shear.

EFFECT COMBINATION



The structure of our code permits more complex manipulation of the same image using more effects in sequence.