Computer Vision

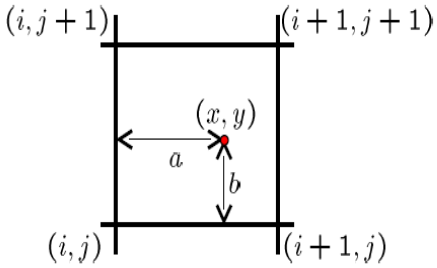
EMARO- *European Master on Advanced Robotics*
Robotics Engineering Master Degree

Lab Session n. 1

Image warping and bilinear interpolation

Given a coordinate transform *(x,y)=h(x',y')* and a source image *f(x',y')*, compute a transformed image *g(x,y) = f(h(x',y'))*.

- Perform backward warping (from the output image to the input image) with a bilinear interpolation, see Fig. 1 (it is also possible to use the function `griddata`).
- Example of transformations, see Fig. 2: 1) translation and rotation (try different angles). 2) To use the data of the file *data.dat* to warp the pixels of the test images.



$$
\begin{aligned}
f(x,y) = \; & (1-a)(1-b) \quad f[i,j] \\
& +a(1-b) \quad f[i+1,j] \\
& +ab \quad f[i+1,j+1] \\
& +(1-a)b \quad f[i,j+1]
\end{aligned}
$$

Fig.1 Bilinear interpolation

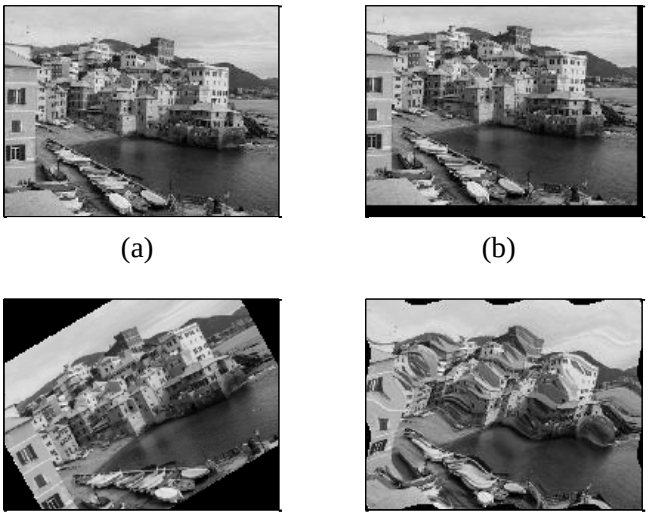


Fig.2 (a) Test image (gray scale). (b) Translation. (c) Rotation. (d) Transformation by using data.dat.

Notes:

- You have to write a report that describes your work and the obtained results (please include the figures). In the report you must indicate all the surnames of the participants (not other names, e.g. the teachers).
- About the code:
  - You have to use relative paths.
  - You have to write and use functions
  - You have to provide us a script to test your code.
- The code must be uploaded as M-files. All the files (M-files, images, and report) have to be compressed in a single file named "surname_labxx.zip/tgz" (all the surnames of the participants have to be indicated), and then the compressed file has to be uploaded.