

INSTITUTO SUPERIOR DE ENGENHARIA DE LISBOA
MESTRADO EM ENGENHARIA INFORMÁTICA E DE COMPUTADORES
MESTRADO EM ENGENHARIA INFORMÁTICA E MULTIMÉDIA
SISTEMAS BIOMÉTRICOS / BIOMETRIC SYSTEMS

Part II - Laboratory 1 - 2024/2025 (November, 5)

1. Open CV and Python configuration

Install Open CV using the instructions on the following pages:

- https://docs.opencv.org/4.x/da/df6/tutorial_py_table_of_contents_setup.html
- https://docs.opencv.org/4.x/d5/de5/tutorial_py_setup_in_windows.html

Configure the use of OpenCV with a Python IDE of your choice.

2. Image databases (a few examples)

- **Image Processing Place web page**, <http://www.imageprocessingplace.com/>,
http://www.imageprocessingplace.com/root_files_V3/image_databases.htm;
- **The Waterloo fractal coding and analysis group, Waterloo Bragzone**, <http://links.uwaterloo.ca/oldwebsite/bragzone.base.html>;
- **Yale University Image DataBases**, <https://guides.library.yale.edu/c.php?g=295868&p=6662351>

3. Image basics

- (a) Write the `image_information` function such that, from an input grayscale image file, it makes the following DIP actions:
 - (i) shows the image and its histogram;
 - (ii) computes the image contrast;
 - (iii) computes the entropy and the average intensity;
- (b) Report some experimental results of the `image_information` function, for three images at your choice, selected from the image databases mentioned above.

4. Logical and Arithmetic Operations

- (a) Write a function to apply the AND, and the OR logical operations between two input images. The output is the image resulting from the operation.
- (b) Write a function that sums two input images. The output is the image resulting from the operation.
- (c) Report some experimental results on three different images at your choice.

5. Thresholding functions

- (a) Write a function to perform image binarization over the input image. The output is the resulting binary image.
- (b) Report some experimental results on three different images at your choice.