U.PORTO
FEUP FACULDADE DE ENGENHARIA
UNIVERSIDADE DO PORTO

MASTER IN INFORMATICS AND COMPUTING ENGINEERING | 5TH YEAR
EIC0104 | COMPUTER VISION | 2017/2018

PROJECT NO. 1

Reading time in analog clocks and watches

Summary

The objective of this work is to develop an application to read the time in an analog clock or watch, using computer vision techniques applied to images similar to those in figures 1 and 2.
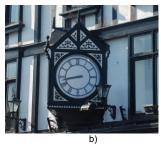

a)   b)   a)   b)

Fig. 1 – clocks   Fig. 2 – watches

General aims

To apply the theoretical knowledge about Image Processing and Analysis, acquired in the Computer Vision course, namely, feature detection and segmentation techniques, using OpenCV library as development tool.

Specific aims

The program must:
- allow the acquisition of a clock (or watch) color image, using a computer connected camera, or the selection of a pre-acquired image;
- segment the acquired image, isolating the background of the clock display and the hours and minutes hands;
- determine the time (hours and minutes) given by the hands of the clock and show the corresponding integer values.

You may use some simplifying assumptions such as:
- the image of the clock (or watch) is acquired in almost frontal view;
- the clock is circular and occupies a significant portion of the image;
- the display is in vertical position (the 12 hours and 6 hours markers are in the same column);
- the clock has just two hands: hours and minutes;
- the hands are approximately rectangular objects;
- the clock display is not significantly occluded by other objects;
- the clock display and hands are uniform in color;
- the are no other circular objects in the scene background.

Possible improvements (optional): remove one or more of the above referred simplifying assumptions, for example, dealing with non-frontal views or square clocks, deal with clocks/watches that have the seconds hand, … .

The work must be done by groups of 3 students.

Project report and delivery

A short report (max. 3 pages) must be delivered, including:
- any additional specifications (if needed);
- the description of the proposed algorithm;
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- relevant comments about the efficacy of the used methods, describing the main problems that were encountered and any proposed solutions;
- the status of the proposed solution and the degree of fulfillment of the aims.

The code, with significant comments, must be presented in annex.

The work must be submitted at the Computer Vision page, in Moodle, until the end of 2017/Nov/3rd.