Computer Vision

EMARO- *European Master on Advanced Robotics*

Robotics Engineering *Master Degree*

Lab Session n. 4

The following items are the steps that you have to do in this lab session:

Color-based segmentation

1. Display the 6 images in grayscale and split them in the three RGB channels and in the three HSV channels.
2. Note the variation of the RGB components and of the Hue one in the area of the dark car that turns on the left for the 6 images.
3. Select in the image "ur_c_s_03a_01_L_0376.png" the area corresponding to the dark car that turns on the left, e.g. area [390:400,575:595]. In this area compute the mean value (*m*) and the standard deviation (*s*) of the Hue component.
4. Segment the dark car in the 6 images by thresholding the Hue component (e.g. in the range between *m-s* and *m+s*).
5. Display (i) the binary images corresponding to the segmentation and the related centroid and bounding box; (ii) the centroid and bounding box overlapped on the color image (tips: *regionprops()* function needs a logical matrix; display the bounding box of the blob with the highest area; see Fig.1).
6. Repeat the steps 2-5 for the red car on the street (tips: to chose the corresponding area; hue range >0.97 and <1 (why?); to try the hue range between *m-s* and *m+s*).

Blob detection

- Compute the Laplacian responses for the two highlighted sunflowers in Fig.2 and show them as a function of the scales. Then, compute the characteristic scale (and its value in pixels) for the two selected objects. Tips: see slides 34-35; see *blobs_detection.m*; parameters: starting standard deviation 1, number of scales 10, standard deviation increment sigma=1.5*sigma.

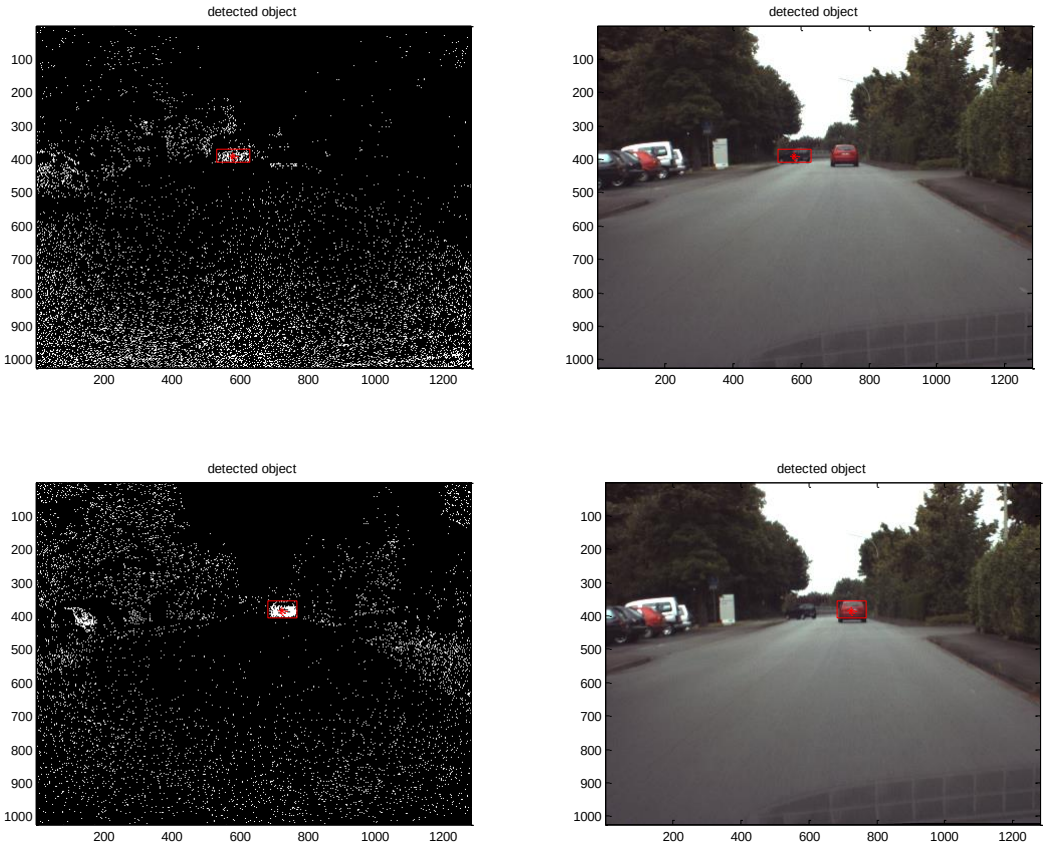

Fig.1: Segmentation examples.

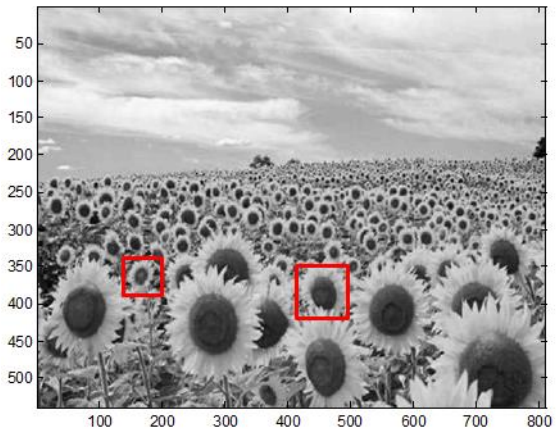

Fig.2: Sunflowers.