Vision-based computation of parking lot accupancy

Summary

A problem faced in major metropolitan areas is to find an available slot in a parking lot. A simple but expensive way to solve this problem is by using a network of specialized sensors that are placed in each parking slot. The objective of this work is to find a way to address the problem of finding parking slots available in a specific parking lot, using computer vision techniques applied to images similar to those in figures 1 and 2.

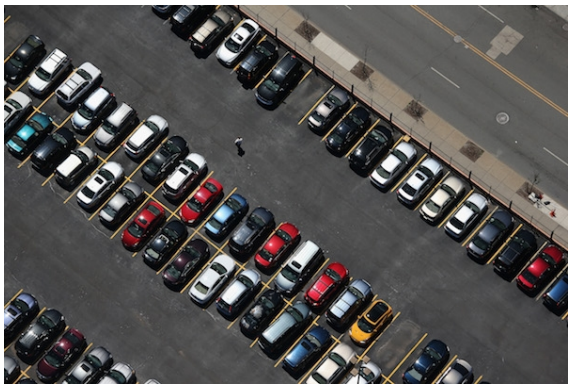

Fig. 1 – Parking lot (top view)

Fig. 2 – Parking lot (slanted view)

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 parking lot image, using a computer connected camera, or the selection of a pre-acquired image;
- the segmentation of the image and detection of the cars, signaling their position on the image.

Possible improvement (optional):

- to signal the position of the empty car slots, on the image.

Note: some simplifying assumptions will be admitted, such as, 1) the view is from top, so that there are no occlusions, 2) the slots are aligned along straight, parallel lines (like in fig.1), or other reasonable ones.

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;
- 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 2016/Oct/29th.