A method of Parking space detection based on image segmentation and LBP

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Abstract

The article was written by (Lixia and Dalin 2012) and cited 16 times according to Google Scholar. It presents a method for detecting occupancy level using a combination of mean shift areas weighted count and LBP code histogram classification through SVM and Markov Random Fields.

Hypothesis

Using mean shift segmentation and then LBP code histogram classification using a SVM for texture detection can achieve more than 97% occupancy level detection rate.

Evidence and Results

1439 parking spot images were used for training the LBP-based SVM classifier. Then, 1225 test images. Results are presented in a table containing detection rate (TPR), missing rate (FNR) and virtual rate. It is not clear from context what do *virtual rate* means.

Contribution

The most important contribution of this paper is that it demonstrate how to learn a threshold of a number of segments using mean shift segmentation.

A second contribution is the use of LBP histograms to generate a feature code that can be used as input into other classifiers, in this case an SVM.

Weaknesses

This paper is badly written. It depends on pre annotated rectangular areas. These areas are then classified into vacant or occupied.

For the first part, the method must learn a threshold g for each parking space and lighting conditions it encounters. Similar gray levels are assumed between all the parking spots in the camera view.

Finally, the authors mention that occlusions by temporary objects like other vehicles on the traffic lane harm the detection accuracy.

Future Work

The authors propose using vehicle tracking in parking spots to overcome occlusions.

References

Lixia, Wang and Jiang Dalin (Nov. 2012). "A Method of Parking Space Detection Based on Image Segmentation and LBP". In: *2012 Fourth International Conference on Multimedia Information Networking and Security*. IEEE. DOI: 10.1109/mines.2012.27. URL: https://doi.org/10.1109%2Fmines.2012.27.