OBJECT LOCALISATION USING LOCAL IMAGE FEATURES

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ABSTRACT

The recognition of an object and object categories is one of the most challenging problems in computer vision. However, recognising an object of a given category and assigning the proper category label is still a challenging problem. This work is intended to predict the bounding box of an object. A binary histogram based on object centroids is proposed to determine the bounding box of an object.

1. INTRODUCTION

Object detection has been approach in many different ways in the literature. Either parts of the object or the whole object have to be classified in some way. Bounding box estimation can also be posed as an object part identification problem. This has been done using different features.

Here, an image is characterized by a binary histogram - foreground and background. Each histogram describes that a particular image patch is best matched with the foreground or background. Each histogram entry consists of associated vectors which store the geometrical relationships from object centroids.

2. METHODOLOGY

In our approach ...

- Speeded-Up Robust Feature (SURF) [1] descriptor is used to extract the features.
- Geometrical relationship is computed by using object centroid and location of the interest points in each training images.
- Resource Allocating Codebook (RAC) [2] method is used to cluster the descriptors.
- Binary histogram is constructed for the foreground and background of the object.

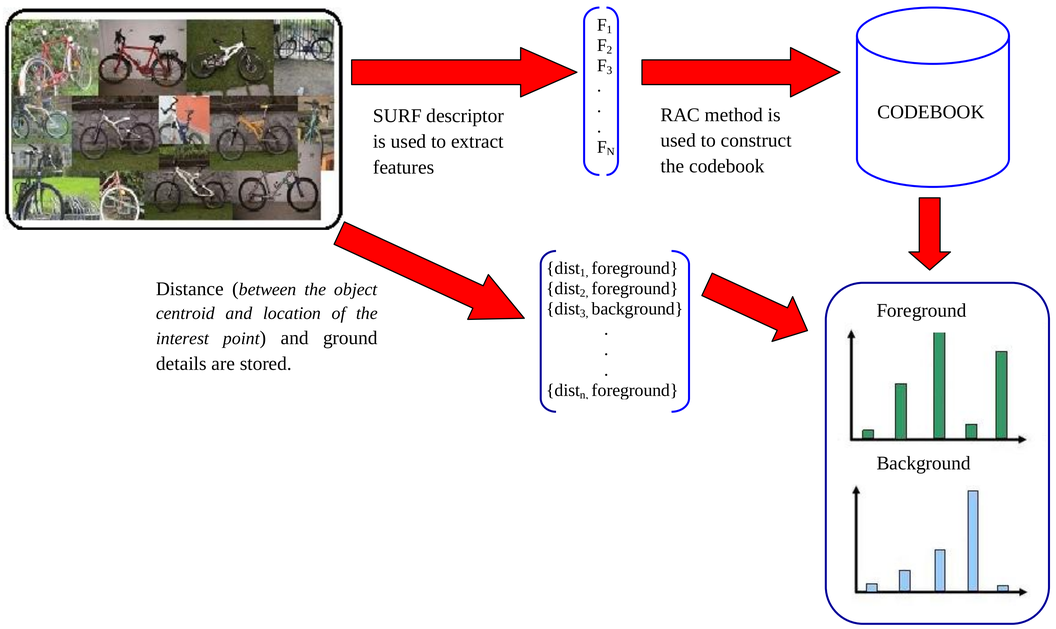

Figure 1: *Training Procedure*

3. DATASET

TUGraz-bike dataset [3] is used for this experiment. This image class includes total of 228 images. In our experiment, first 150 images are selected as training set and others are testing sets.

4. EXPERIMENTAL SETUP

In this proposed approach involves ...

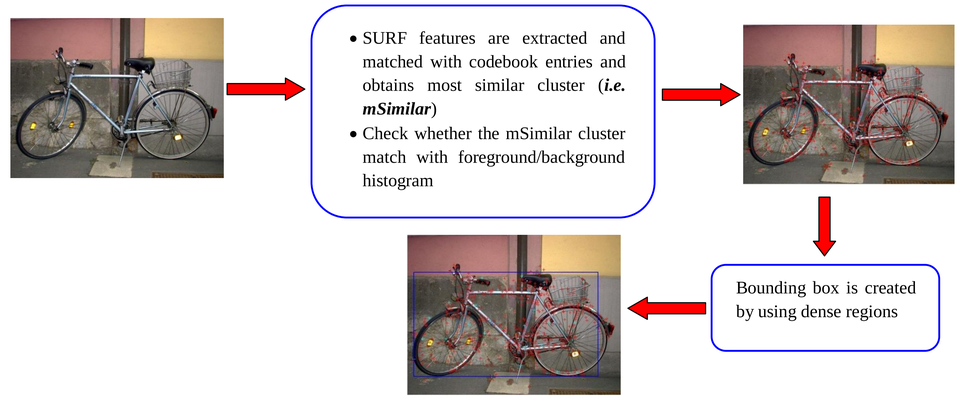

Figure 2: *Testing Procedure*

5. EVALUATION CRITERIA AND EXPERIMENTAL RESULTS

- Set Intersection technique is used as performance evaluator for the object detection tasks.
- The means of average precision and standard deviation of the detection performance is 71.3781 ± 4.9548.
- Some of the experimental results are,

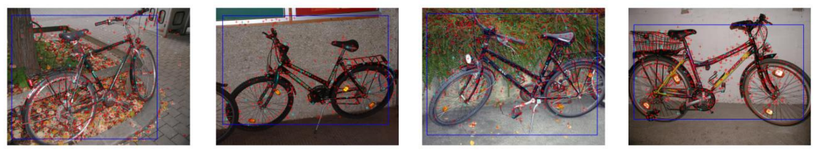

Figure 3: *Experimental results*

6. CONCLUSION

Based on our experimental results...

- Appropriate learning algorithms which learn enough distinctive information to separate the objects from the background have to generalise to increase the performance.

References

[1] H. Bay, A. Ess, T. Tuytelaars, and L. V. Gool, *SURF: Speeded Up Robust Features*, In Computer Vision and Image Understanding, volume 110, pp. 346-359, 2008.

[2] A. Ramanan and M. Niranjan, *A one-pass resource-allocating codebook for patch-based visual object recognition*, In IEEE International Workshop on Machine Learning for Signal Processing (MLSP), pp. 35-40, 2010.

[3] The TU Graz-02 database. http://www.emt.tugraz.at/ pinz/data/GRAZ 02/.