Abstract

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Multiclass Object Recognition using Object-based and Local Image Features Extractors

This thesis is concerned with enhancing the recognition of visual objects in scene images. Image recognition is an important task in manipulating large databases and it is embedded in the core of most of the computer vision applications. Most object recognition systems have used either global local extractors to capture the image features and sometimes have worked on combining both features extractors together. In this thesis, different feature extraction techniques are examined like global Zernike Moment (ZM) and local Speeded up Robust Features (SURF). It is shown how combining both techniques to make use of both object's shape and local information has enriched the recognition process and enhanced its results. The proposed approach first detects interest objects instead of working on the entire image. Second, the object-based features are extracted using both ZM and SURF descriptors. Then a compact representation of the image features is accomplished using bag of words (BoW). Support Vector Machine (SVM) classifier is trained on the extracted features using a one versus all scheme which is also used to validate the recognition accuracy. The experiments are tested on two benchmark datasets COREL 1000, and Caltech 101. Using this combined features extraction method, the derived results outperform the other published results on the same databases. The results show that, 81.6% recognition accuracy was reached on the Caltech-101 dataset and 90.8% correctness on the COREL 1000. Accordingly, 8% increase of performance on Caltech-101 was achieved compared to the most recent work on the same dataset.