CV2016Spring–Assigment #1

Due: Monday, May 2, 2016

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1 Assignment requirement

For this assigment, you will implement recognition through features extraction and classification. You need to select at least two features extraction methods from Scale-invariant feature transform (SIFT), Speeded Up Robust Features (SURF), Local Binary Patterns (LBP), Shi-Tomasi Corner Detection, Histogram of Oriented Gradient (HOG), color histogram and edge detector. Then, you should choose at least one classifier from Random forest, Naive Bayesian Model (NBM), Adaboost, K-Nearest Neighbor algorithm (KNN), Support Vector Machine (SVM) and Neural Network to classify your images. Other efficient methods are also permitted.

2 Tips

The whole framework of the implementation for recognition is shown in Figure 1, it may serve as a reference for your assignment.

2.1 Step1: Dataset

The Stanford Dogs dataset contains images of 120 breeds of dogs from around the world. The dataset can be downloaded from the website[1]. Firstly, you should choose at least 20 breeds of dogs as experiment dataset. Secondly, our dataset will be divided into the train set and test set (about 4:1). Thirdly, you should input the train set and test set respectively.

[1] `http://vision.stanford.edu/aditya86/ImageNetDogs/`

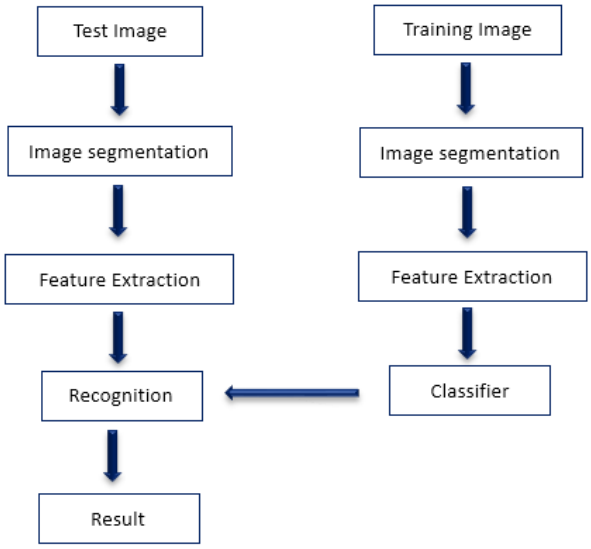

Figure 1: Framework of recognition

2.2 Step2: Image segmentation

Input The input image.

Output The image after segmentation.

Implementation Separate the target and the background (Ideally).

Hint Image thresholding segmentation can be tried.

2.3 Step3: Feature extraction

Input The output image from step2.

Output The feature matrix.

Implementation Extract different kind of features through different feature extraction methods. These features are stored in a matrix.

2.4 Step4: Classification (Use SVM as an example)

Input The feature matrix of train set from step3.

Output Classifier (Optimal hyperplane).

2.5 Step5: The evaluation of our method (Use SVM as an example)

Input The classifier from step4 and the feature matrix of test set from step3.

Output The evaluation of our method and the accuracy rate of recognition.

3 Submission instructions

3.1 What to hand in?

- Your code (C/C++/Matlab/Python)
- A report containing the following:
  - Your name at the top
  - A brief explanation of your implementation strategy (in English)

3.2 Where to hand in?

Submit to ouceecv@163.com in form of a followup below my assignment note.