Classifying natural scenes using Spatial Pyramid Matching

Problem-

We want to categorize the images on the basis of their semantic category or as containing a certain object. For example, we want to know whether a picture was taken on the bank of a river or mountain or some famous tourist spot or kitchen etc. 'Bag of Features' method is a very popular and common method used in Computer Vision for Image Matching. But this method does not perform very well for this particular problem, as 'Bag of Features' method represents an image just as an order less collection of local features. While a holistic approach is a better option for this particular problem of semantic categorization of natural scenes because of the nature of the problem.

Proposed approach uses a kernel-based recognition method that works by computing rough geometric correspondence on a global scale using an efficient approximation technique.

Proposed Approach-

Pre-processing:
SIFT descriptors approach will be used for extracting the features out of the given image.

Algorithm for Recognition:
Given a test image, it will be repeatedly sub-divided and then the histogram of the features is computed at higher resolution in order to get fine descriptors. Then spatial pyramid matching technique will be used to match the histogram of the features at all the levels with the test images using spatial kernel.

Learning Algorithm Used:

Multi class classification will be done with SVM using one-versus all classifier and we will also experiment with other machine learning algorithms like AdaBoost etc.

Dataset-

Caltech 101 (Image Database) will be used for training and testing the scene classification algorithm.

References-

- ➢ Beyond Bags of Features: Spatial Pyramid Matching for Recognizing Natural Scene Categories. Svetlana Lazebnik, Cordelia Schmid, and Jean Ponce. CVPR, 2006
- ➢ http://www.vision.caltech.edu/Image_Datasets/Caltech101/

Team-

Imroz Qamar	2011CS1011
Kumar Harshad	2011CS1013
Naresh Kumar	2011CS1018
Naveen Kumar	2011CS1020