CMSC 471: HOMEWORK 4

Image Recognition

README and REPORT

[\*\*INCOMPLETE, haven't reached the 90% yet, I think I may need a larger training set. Som bugs in K-Means and SVM. Will complete before semester. \*\*\*]

Implementation using Matlab.

(Taken from a previous homework from another class but trying to apply to this homework.)

**TO RUN:** Make sure you can access the files in Matlab

simply type evalCode in the command line:

>> evalCode

Implementation outline:

**GOAL:** given an image of a dollar sign, heart, smiley, hash, or hat, my program will be able identify which of these the image contains.

**METHOD:**

K-nearest neighbor(kNN) and Support Vector Machines(SVM)

There is a function called KNN, which resizes the image to a fixed [n n 3] and makes it a vector of size [1 nxnx3]. The results are evaluated using kNN classifier (param.classifer='knn'), and SVM classifier (param.classifier='svm').

Implemented is also a “bag of words” model where patches from the image are used as features (inside computerFeatures.m).

To implement this, take patches from each image of a [2r+1 2r+1] dimension. Started with r =8 with a space of 12 between each patch.

Then learn a dictionary over the local features. Take some of the data images and run them through to get features from them. Cluster them using k-means.

To test this, provide an image:

extract local features from it and then assign them to the nearest dictionary items.

The two functions provided in trainClassifier.m and makePredictions.m can be used to train and test using kNN and SVM classifiers. SVM uses a function called primal+svm() which optimizes for margin and classification loss.