Computer Vision

Lab 8
April 13, 2017

NAME ________________________   NAME ________________________

Try to do the exercise below on your own. Then get together with your neighbor to turn in a single solution. Show me your results. If you don’t finish by the end of today’s class, you may show me during the next class.

Following the procedure in class, perform classification on the Caltech-101 dataset.

1. Train the classifier on 10 training images (selected at random) from each of the three classes: 'airplanes', 'ferry', 'laptop'. Evaluate the classifier on the test images (the test images are the all the rest of the images in those three classes). Compute the average accuracy of the classifier (which is the average along the diagonal of the confusion matrix). Repeat three times and average your results to compute the final accuracy, and give it here:

2. The accuracy of the classifier depends on the number of training images used. Repeat the procedure in step #1, but train with only 5 images from each class, and give the accuracy of the classifier:

3. Repeat the procedure in step #1, but train with 20 images from each class, and give the accuracy of the classifier:

4. As more classes are added, the accuracy of the classifier falls. Repeat the procedure in step #1, but use 10 image classes instead:
   
   $\text{classNames} = \{
   'airplanes', 'ferry', 'laptop', 'anchor', 'ant', ...
   'barrel', 'beaver', 'binocular', 'bonsai', 'brain', ...
   \}$;

5. Look at the image categories in the Caltech-101 database. Pick three categories that seem visually similar to the human eye. You would expect the classifier to have trouble distinguishing between these classes. Train and test the classifier on those three categories. Does the classifier’s accuracy match your intuition?

6. Repeat the previous step, but now pick three categories that seem visually very different to the human eye. You would expect that the classifier could easily distinguish between these classes. Train and test the classifier on those three categories. Does the classifier’s accuracy match your intuition?