CAP6617 Project

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13 December 2016

Choice of dataset: To run the linear classifier, we restricted the dataset to the training set of the Kaggle images because they were labeled. I'm not masochistic enough to go through each image and label them cat or dog in the test file.
The training set were chosen using a uniform distribution via the matlab datasample() method.
We're using 12,000 out of the 25,000 samples due to the processing time (Each run of the classifier takes 30 min) that have been resized to 250 $\times$ 250. For the extra credit, we threw in 4,500 images of birds, removing the images which don't have rgb fields.

1 Results using trained CNN and linear Kernal SVM

1.1 20% training

1. kFold CV accuracy: 0.9112 Test Set accuracy: 0.9153
2. kFold CV accuracy: 0.9146 Test Set accuracy: 0.9189
3. kFold CV accuracy: 0.9021 Test Set accuracy: 0.9087
4. kFold CV accuracy: 0.9158 Test Set accuracy: 0.9197
5. kFold CV accuracy: 0.9129 Test Set accuracy: 0.9173

Average: Crossvalidation Accuracy: 0.9113; Test Set Accuracy: 0.9160

1.2 15% training

1. kFold CV accuracy: 0.9061 Test Set accuracy: 0.9075
2. kFold CV accuracy: 0.9050 Test Set accuracy: 0.9089
3. kFold CV accuracy: 0.8956 Test Set accuracy: 0.9088
4. kFold CV accuracy: 0.9044 Test Set accuracy: 0.9129
5. kFold CV accuracy: 0.9033 Test Set accuracy: 0.9101

Average: Crossvalidation Accuracy: 0.9029; Test Set Accuracy: 0.9097

1.3 10% training

1. kFold CV accuracy: 0.8992 Test Set accuracy: 0.8910
2. kFold CV accuracy: 0.8883 Test Set accuracy: 0.8979
3. kFold CV accuracy: 0.9100 Test Set accuracy: 0.8952
4. kFold CV accuracy: 0.8758 Test Set accuracy: 0.8975
5. kFold CV accuracy: 0.9100 Test Set accuracy: 0.8870

Average: Crossvalidation Accuracy: 0.8967; Test Set Accuracy: 0.8937

1.4 5% training

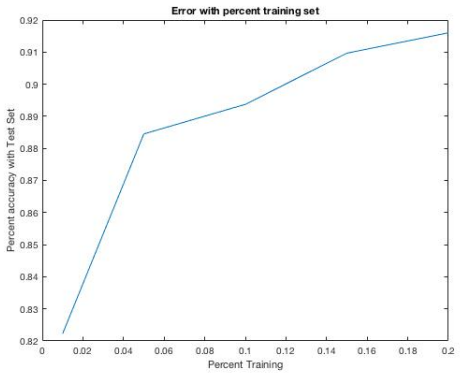
1. kFold CV accuracy: 0.8850 Test Set accuracy: 0.8660
2. kFold CV accuracy: 0.8883 Test Set accuracy: 0.8844
3. kFold CV accuracy: 0.9033 Test Set accuracy: 0.8939
4. kFold CV accuracy: 0.8750 Test Set accuracy: 0.8929
5. kFold CV accuracy: 0.8950 Test Set accuracy: 0.8854

Average: Crossvalidation Accuracy: 0.8893; Test Set Accuracy: 0.8845

1.5 1% training

1. kFold CV accuracy: 0.7917 Test Set accuracy: 0.8144
2. kFold CV accuracy: 0.8417 Test Set accuracy: 0.8158
3. kFold CV accuracy: 0.8583 Test Set accuracy: 0.8216
4. kFold CV accuracy: 0.8250 Test Set accuracy: 0.7739
5. kFold CV accuracy: 0.8417 Test Set accuracy: 0.8854

Average: Crossvalidation Accuracy: 0.8317; Test Set Accuracy: 0.8222



2 Results using trained CNN and linear Kernal SVM with additional Bird dataset

2.1 20% training

1. kFold CV accuracy: 0.9015 Test Set accuracy: 0.8981
2. kFold CV accuracy: 0.9045 Test Set accuracy: 0.8992
3. kFold CV accuracy: 0.8976 Test Set accuracy: 0.9076
4. kFold CV accuracy: 0.9106 Test Set accuracy: 0.9038
5. kFold CV accuracy: 0.9121 Test Set accuracy: 0.9170

Average: Crossvalidation Accuracy: 0.9053; Test Set Accuracy: 0.9052

2.2 15% training

1. kFold CV accuracy: 0.8893 Test Set accuracy: 0.8916
2. kFold CV accuracy: 0.9156 Test Set accuracy: 0.8952
3. kFold CV accuracy: 0.8937 Test Set accuracy: 0.8895
4. kFold CV accuracy: 0.8958 Test Set accuracy: 0.9012
5. kFold CV accuracy: 0.8945 Test Set accuracy: 0.8977

Average: Crossvalidation Accuracy: 0.8978; Test Set Accuracy: 0.8950

2.3 10% training

1. kFold CV accuracy: 0.8885 Test Set accuracy: 0.8673
2. kFold CV accuracy: 0.8927 Test Set accuracy: 0.8721
3. kFold CV accuracy: 0.9006 Test Set accuracy: 0.8768
4. kFold CV accuracy: 0.8758 Test Set accuracy: 0.8801
5. kFold CV accuracy: 0.8964 Test Set accuracy: 0.8845

Average: Crossvalidation Accuracy: 0.8908; Test Set Accuracy: 0.9052

2.4 5% training

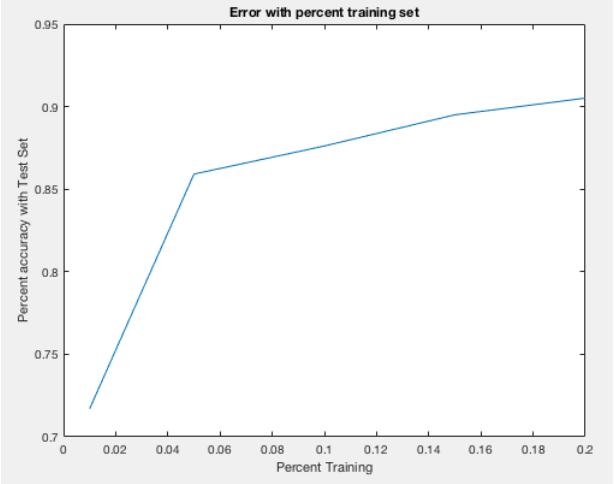
1. kFold CV accuracy: 0.8679 Test Set accuracy: 0.8378
2. kFold CV accuracy: 0.8679 Test Set accuracy: 0.8536
3. kFold CV accuracy: 0.8691 Test Set accuracy: 0.8539
4. kFold CV accuracy: 0.8836 Test Set accuracy: 0.8686
5. kFold CV accuracy: 0.8945 Test Set accuracy: 0.8718

Average: Crossvalidation Accuracy: 0.8766; Test Set Accuracy: 0.8591

2.5 1% training

1. kFold CV accuracy: 0.7455 Test Set accuracy: 0.6479
2. kFold CV accuracy: 0.7939 Test Set accuracy: 0.5924
3. kFold CV accuracy: 0.8121 Test Set accuracy: 0.7011
4. kFold CV accuracy: 0.8667 Test Set accuracy: 0.6079
5. kFold CV accuracy: 0.7333 Test Set accuracy: 0.5936

Average: Crossvalidation Accuracy: 0.7903; Test Set Accuracy: 0.6286



3 Code and Files

Code on Jennifer's github: http://www.vision.caltech.edu/visipedia/CUB-200-2011.html
Birds Dataset ripped from caltech
Datasets: https://www.dropbox.com/s/hz1h63s8ru5ug1p/Datasets.zip?dl=0
Just for funsies:
I put in the PANDADOG (click here) to see what would happen, and it reads back correctly as a dog. Which probably means that all pandas will read back as dogs, even though this is actually a dog, seriously though, look at the pandadog, it's super cute.