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Assignment 3 Report

Object detection is a computer technology related to computer vision and image processing that deals with detecting instances of semantic objects of a certain class (such as humans, buildings, or cars) in digital images and videos.

Dataset

The categories chosen are **bonsai, Faces_easy** and **Motorbikes.**

Motorbikes : 798 images
Faces_easy : 435 images
Bonsai : 128 images
Total Number of images : 1361
Training set : 680
Testing set : 681

Classifiers Used :

I have used Naive Bayes, Decision trees and SVM classifier and compared the results as mentioned below. It is seen that SVM performs better than the other two classifiers.

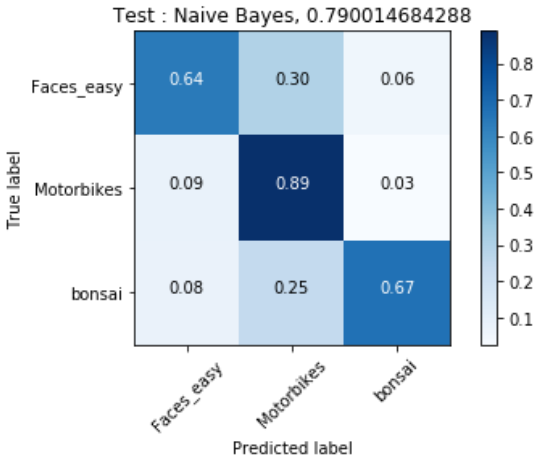
K Variation :

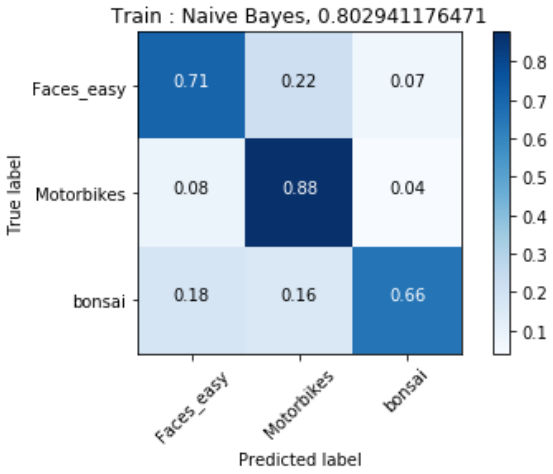
I have used 3 values of k viz 8, 16 and 24 and seen that 24 gives best results with accuracy 93.24%.

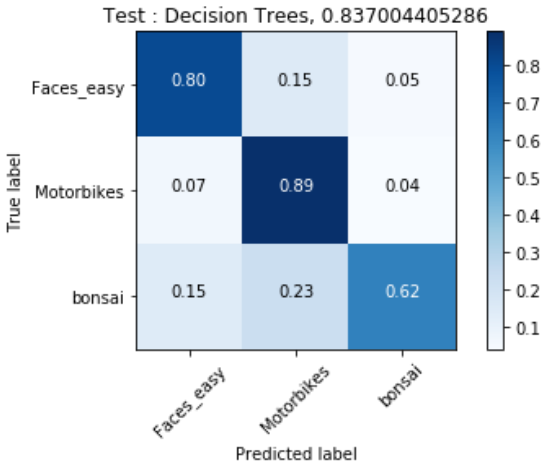
Conclusion :

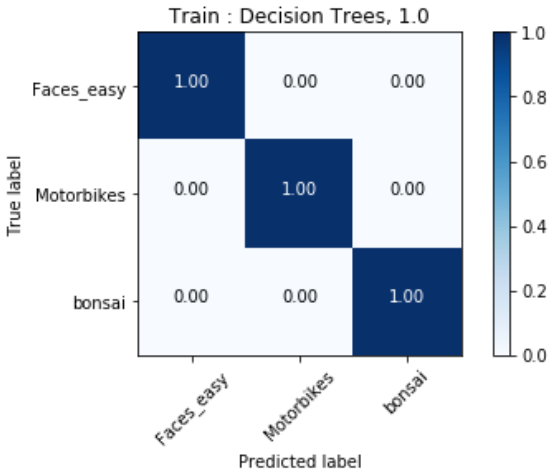
SVM performs better than other classifiers with a best accuracy of 93.24%

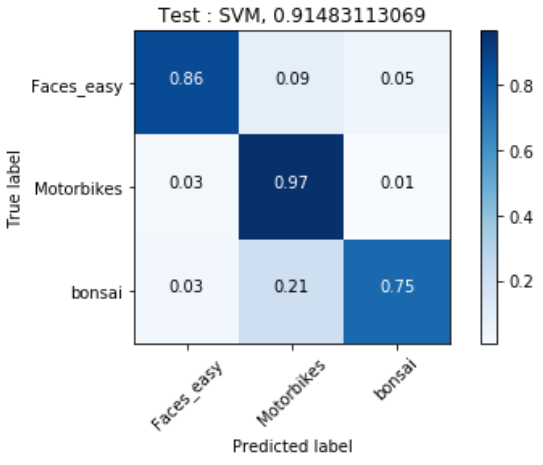
K = 8

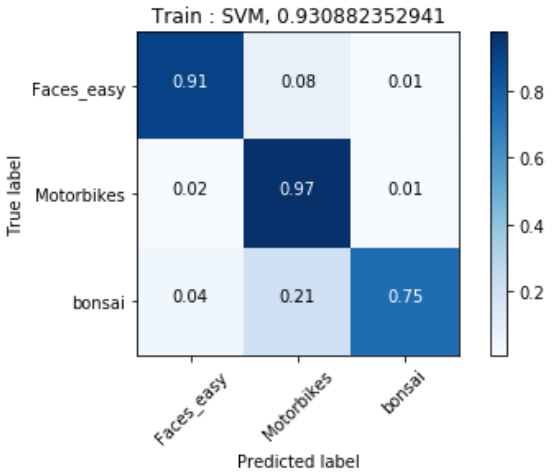

Test : Naive Bayes, 0.790014684288
Faces_easy
Motorbikes
bonsai
True label
0.64 0.30 0.06
0.09 0.89 0.03
0.08 0.25 0.67
Faces_easy
Motorbikes
bonsai
Predicted label
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1


Train : Naive Bayes, 0.802941176471
Faces_easy
Motorbikes
bonsai
True label
0.71 0.22 0.07
0.08 0.88 0.04
0.18 0.16 0.66
Faces_easy
Motorbikes
bonsai
Predicted label
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1

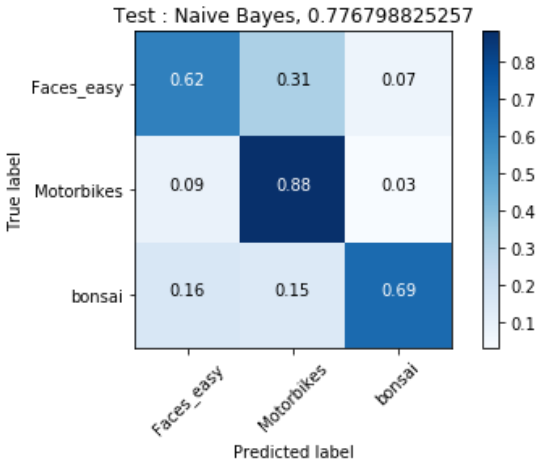

Test : Decision Trees, 0.837004405286
Faces_easy
Motorbikes
bonsai
True label
0.80 0.15 0.05
0.07 0.89 0.04
0.15 0.23 0.62
Faces_easy
Motorbikes
bonsai
Predicted label
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1

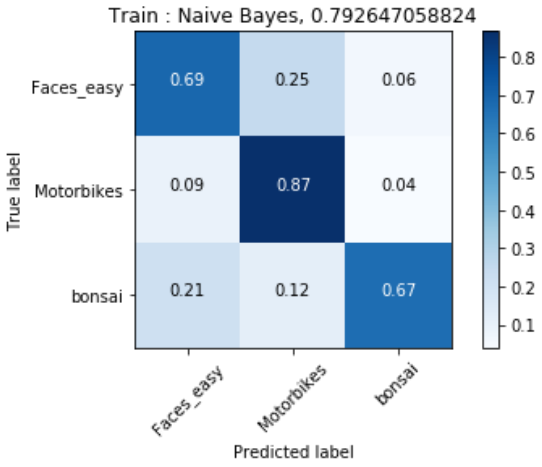

Train : Decision Trees, 1.0
Faces_easy
Motorbikes
bonsai
True label
1.00 0.00 0.00
0.00 1.00 0.00
0.00 0.00 1.00
Faces_easy
Motorbikes
bonsai
Predicted label
1.0
0.8
0.6
0.4
0.2
0.0

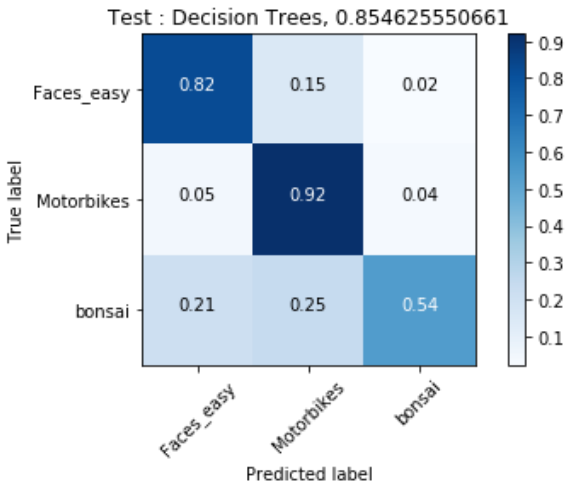

Test : SVM, 0.91483113069
Faces_easy
Motorbikes
bonsai
True label
0.86 0.09 0.05
0.03 0.97 0.01
0.03 0.21 0.75
Faces_easy
Motorbikes
bonsai
Predicted label
0.8
0.6
0.4
0.2

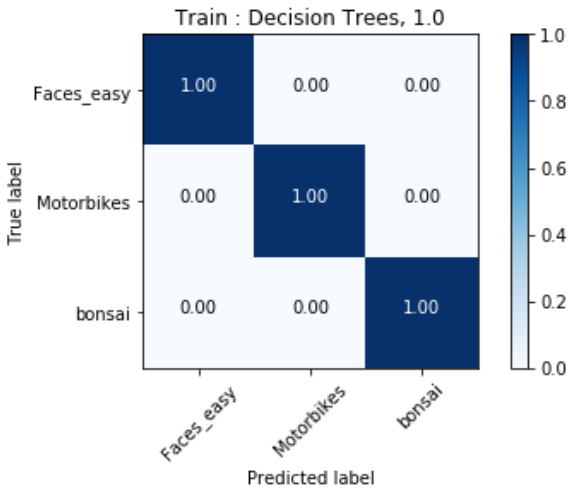

Train : SVM, 0.930882352941
Faces_easy
Motorbikes
bonsai
True label
0.91 0.08 0.01
0.02 0.97 0.01
0.04 0.21 0.75
Faces_easy
Motorbikes
bonsai
Predicted label
0.8
0.6
0.4
0.2

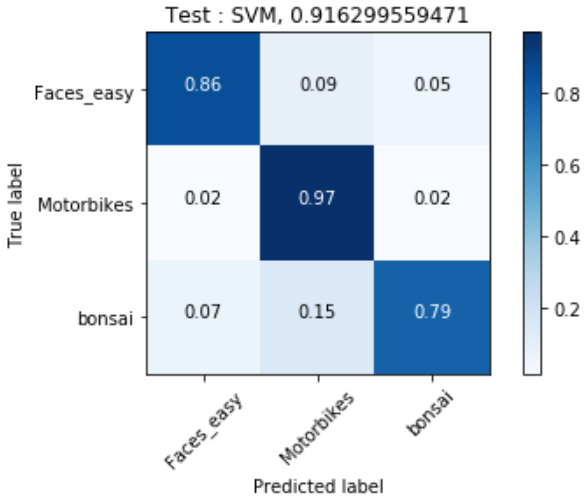
K = 16

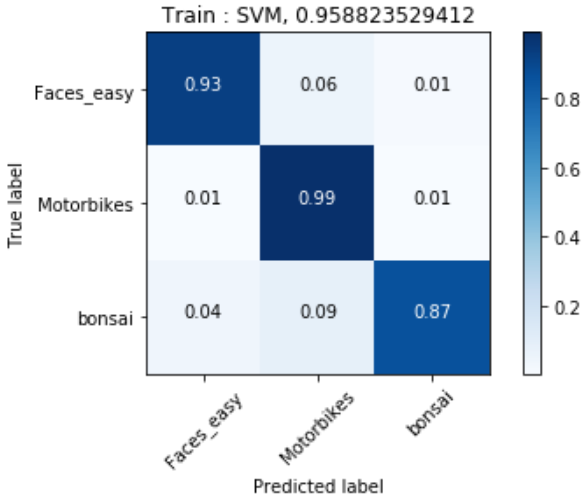

Test : Naive Bayes, 0.776798825257
Faces_easy
Motorbikes
bonsai
True label
0.62 0.31 0.07
0.09 0.88 0.03
0.16 0.15 0.69
0.8 0.7 0.6 0.5 0.4 0.3 0.2 0.1
Faces_easy
Motorbikes
bonsai
Predicted label


Train : Naive Bayes, 0.792647058824
Faces_easy
Motorbikes
bonsai
True label
0.69 0.25 0.06
0.09 0.87 0.04
0.21 0.12 0.67
0.8 0.7 0.6 0.5 0.4 0.3 0.2 0.1
Faces_easy
Motorbikes
bonsai
Predicted label

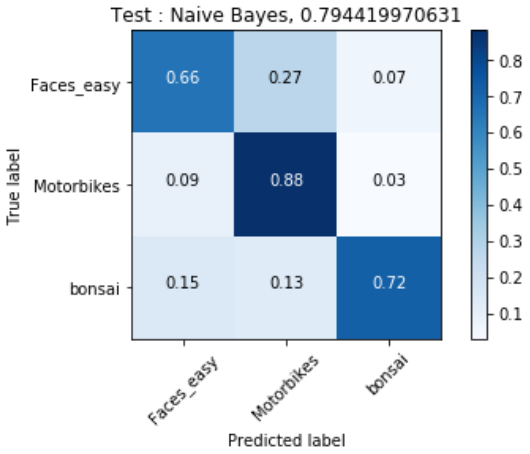

Test : Decision Trees, 0.854625550661
Faces_easy
Motorbikes
bonsai
True label
0.82 0.15 0.02
0.05 0.92 0.04
0.21 0.25 0.54
0.9 0.8 0.7 0.6 0.5 0.4 0.3 0.2 0.1
Faces_easy
Motorbikes
bonsai
Predicted label

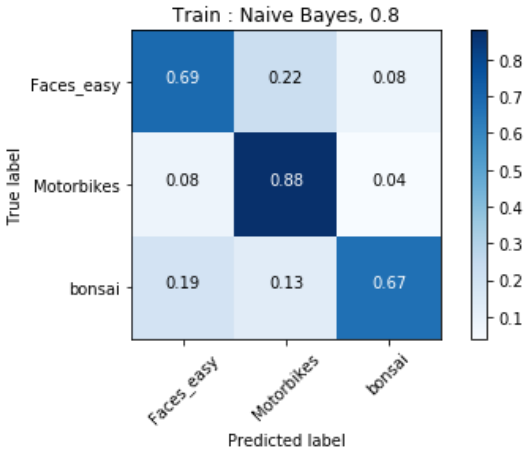

Train : Decision Trees, 1.0
Faces_easy
Motorbikes
bonsai
True label
1.00 0.00 0.00
0.00 1.00 0.00
0.00 0.00 1.00
1.0 0.8 0.6 0.4 0.2 0.0
Faces_easy
Motorbikes
bonsai
Predicted label

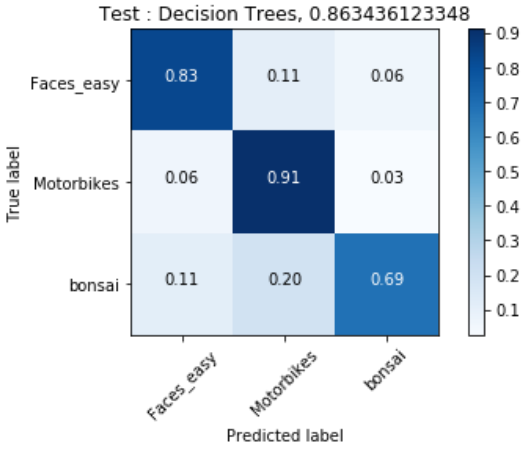

Test : SVM, 0.916299559471
Faces_easy
Motorbikes
bonsai
True label
0.86 0.09 0.05
0.02 0.97 0.02
0.07 0.15 0.79
0.8 0.6 0.4 0.2
Faces_easy
Motorbikes
bonsai
Predicted label

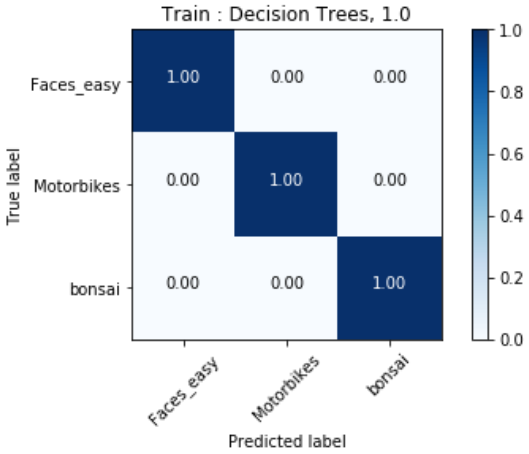

Train : SVM, 0.958823529412
Faces_easy
Motorbikes
bonsai
True label
0.93 0.06 0.01
0.01 0.99 0.01
0.04 0.09 0.87
0.8 0.6 0.4 0.2
Faces_easy
Motorbikes
bonsai
Predicted label

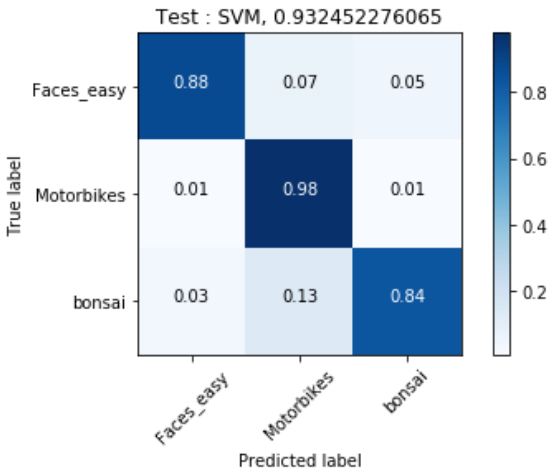
K = 24

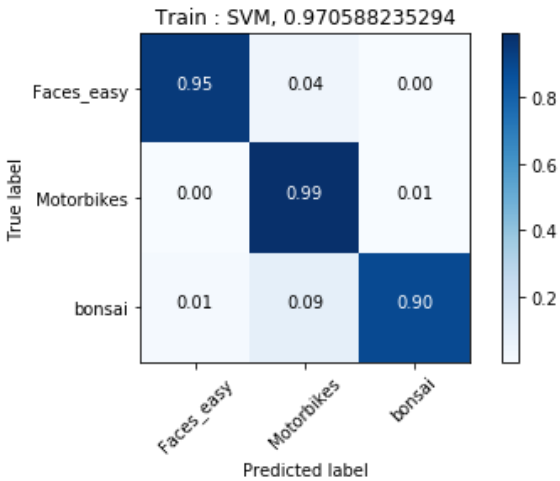

Test : Naive Bayes, 0.794419970631
Faces_easy
Motorbikes
bonsai
True label
0.66 0.27 0.07
0.09 0.88 0.03
0.15 0.13 0.72
Faces_easy
Motorbikes
bonsai
Predicted label
0.8 0.7 0.6 0.5 0.4 0.3 0.2 0.1


Train : Naive Bayes, 0.8
Faces_easy
Motorbikes
bonsai
True label
0.69 0.22 0.08
0.08 0.88 0.04
0.19 0.13 0.67
Faces_easy
Motorbikes
bonsai
Predicted label
0.8 0.7 0.6 0.5 0.4 0.3 0.2 0.1


Test : Decision Trees, 0.863436123348
Faces_easy
Motorbikes
bonsai
True label
0.83 0.11 0.06
0.06 0.91 0.03
0.11 0.20 0.69
Faces_easy
Motorbikes
bonsai
Predicted label
0.9 0.8 0.7 0.6 0.5 0.4 0.3 0.2 0.1


Train : Decision Trees, 1.0
Faces_easy
Motorbikes
bonsai
True label
1.00 0.00 0.00
0.00 1.00 0.00
0.00 0.00 1.00
Faces_easy
Motorbikes
bonsai
Predicted label
1.0 0.8 0.6 0.4 0.2 0.0


Test : SVM, 0.932452276065
Faces_easy
Motorbikes
bonsai
True label
0.88 0.07 0.05
0.01 0.98 0.01
0.03 0.13 0.84
Faces_easy
Motorbikes
bonsai
Predicted label
0.8 0.6 0.4 0.2


Train : SVM, 0.970588235294
Faces_easy
Motorbikes
bonsai
True label
0.95 0.04 0.00
0.00 0.99 0.01
0.01 0.09 0.90
Faces_easy
Motorbikes
bonsai
Predicted label
0.8 0.6 0.4 0.2