Report

November 11, 2021

1 Results

I try four experiments: 1. color_space = “bgr”: Before adjustment, Accuracy:0.9836757669575007, Precision:0.9835133598635588,Recall:0.9835133598635588,F-1:0.9835133598635588 After adjustment, Accuracy:0.9797525309336333, Precision:0.9817351598173516,Recall:0.9772727272727273,F-1:0.979498861047836

Although, the accuracy,precision, recall and F-1 are high, but the test_video is not accurate.

2. color_space=“hsv”,hist_features=True,spatial_features=True: Before adjustment, Accuracy:0.9932451449479314, Precision:0.9903900508762012,Recall:0.9960204661739624,F-1:0.9931972789115646 After adjustment, Accuracy:0.9966254218222722, Precision:0.9954648526077098,Recall:0.9977272727272727,F-1:0.996594778660613

The test_video can’t recognize the car at all.

3. color_space=“yuv”,hist_features=True,spatial_features=True,channels=[0,2],block_norm=“L2”: Before adjustment, Accuracy:0.9904306220095693, Precision:0.9954049396898335,Recall:0.9852188743604321 1:0.9902857142857144 After adjustment, Accuracy:0.9887514060742407, Precision:0.9953917050691244,Recall:0.9818181818181818,F-1:0.9885583524027459

The result is not good

Brief comment: the svm is highly based on the parameters,so choosing the correct color_space is very important.

4. color_space = “ycrcb”,hog_bins=15,hist_features=True,spatial_features=True,x_overlap=0.7: Before adjustment, Accuracy:0.9969040247678018, Precision:0.997155858930603,Recall:0.9965889710062535, 1:0.9968723343758885After adjustment, Accuracy:0.9988751406074241, Precision:0.9977324263038548,Recall:1.0,F-1:0.9988649262202043

This time, it detects the car.

2 Questions

(1) Yes, it can. SVM based dimensionality reduction and classification of hyperspectral data has been proposed. When svm is applied to detect the outliers, it is considered as the unsupervised learning.

(2)

a. SVM works relatively well when there is a clear margin of separation between classes.

b. SVM is more effective in high dimensional spaces.

c. SVM is effective in cases where the number of dimensions is greater than the number of samples.

d. SVM is relatively memory efficient.

So when there is a clear margin of separation, SVM works well.

(3) a.SVM algorithm is not suitable for large data sets.

b. SVM does not perform very well when the data set has more noise i.e. target classes are overlapping.

c. In cases where the number of features for each data point exceeds the number of training data samples, the SVM will underperform.

d. As the support vector classifier works by putting data points, above and below the classifying hyperplane there is no probabilistic explanation for the classification.

So SVM doesn't perform well when we have large data set because the required training time is higher and when the data set has more noise i.e. target classes are overlapping

(4) When there is a clear margin of separation between classes and the number of dimensions is greater than the number of samples, SVM is a good candidate.

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