

Kernel support vector matrix

No applied PCA

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1 Kernel SVM accuracy with degree 1, no pca: 75.4
2 Kernel SVM accuracy with degree 3, no pca: 77.60000000000001
3 Kernel SVM accuracy with degree 5, no pca: 78.25
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Applied PCA

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1 Kernel SVM accuracy with degree 1, pca: 58.8
2 Kernel SVM accuracy with degree 3, pca: 71.1
3 Kernel SVM accuracy with degree 5, pca: 67.65
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From these logs we can see that applying PCA reduced the accuracy of the:

- SVM with degree = 1 by 16.4
- SVM with degree = 3 by 6.5
- SVM with degree = 5 by 10.6

This is quite interesting as degree decides how flexible the decision boundary is. The higher the degree, the more flexible it becomes. Still, the one with best accuracy is the one with degree 3. This means that the one with degree 1 was too strict, so it didn't get the correct outputs, while degree 5 was somewhat too accepting. This can be since it was 196 components which can be small, so it's hard to get all the good outputs through while staying away from the bad ones.

With no PCA, the accuracy of all Kernel SVM's were quite similar. The one with degree 1 got the lowest, while degree 5 got the highest. This was expected as it was working with 784 feature vectors on degree 5, which had more flexibility and would therefore accept more.

Conclusion

With the use of PCA, the best degree to work on is 3 and 5. You will reduce the components a good amount while keeping the most important components. Degree 1 will just be too strict, while the two other will have a good flow of accepting good and denying bad ones.