

Implementation Notes

- I was unclear as to whether lda_projection was a new method to be developed to replace the one in example classification or was it just the implementation of the Fischer Projection method, hence have done both.
- Implemented Fischer Projection function to return the top n^{th} eigenvectors for use, have tried with $n=2$ and $n=5$ to better understand the trends dimensionality reduction can have on accuracy.
- Implemented Leave One Subject Out Validation in Loop as specified and taken the average of the accuracies.
- Implemented KNN as the traditional classifier.

Key Findings

The brief initially required me to take only the top 2 eigenvectors, i.e., reduce the dimensionality to only 2 dimensions. This caused a massive drop in the accuracy of KNN with projection as compared to without

Accuracy with projection test: 31.59885791860014

Accuracy with projection train: 67.14843345023402

Accuracy without projection test: 67.97093554543827

Accuracy without projection train: 96.33676029928107

However, when I increase the dimensionality to 5 -> I get increasingly better accuracy

Accuracy with projection test: 58.004236559877256

Accuracy with projection train: 94.13183423835854

Accuracy without projection test: 67.97093554543827

Accuracy without projection train: 96.33676029928107

Since the wanted class count is 46, I can have up to 45 LDA dimensions and they should have good accuracy.