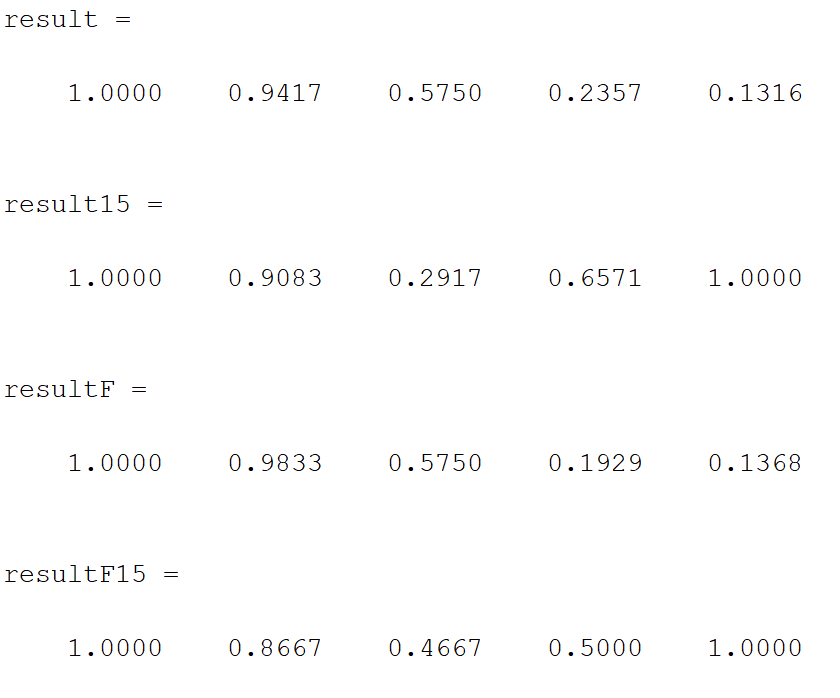
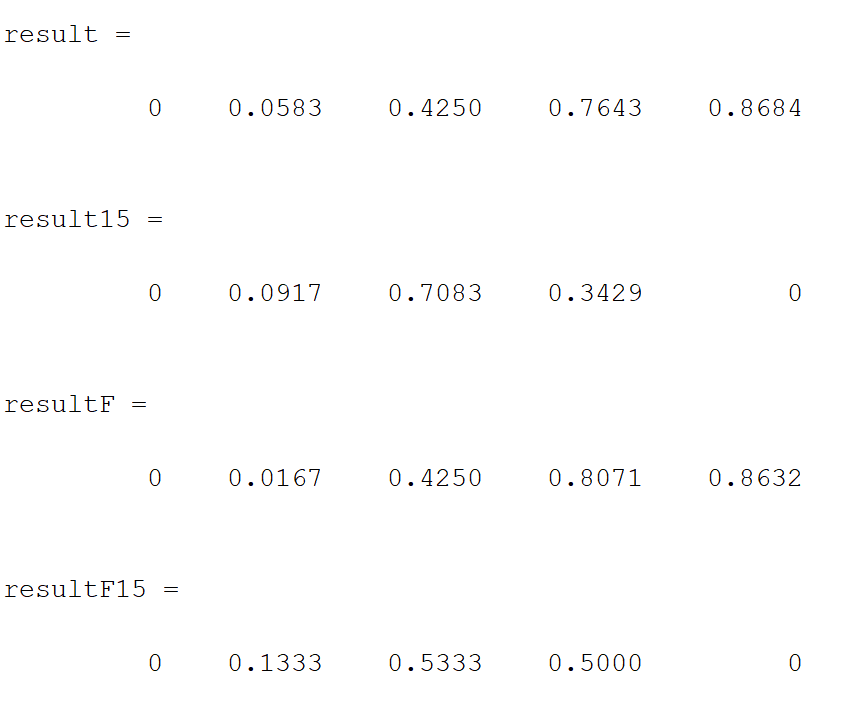
Michael Chan

Accuracies for N=30 and C=10



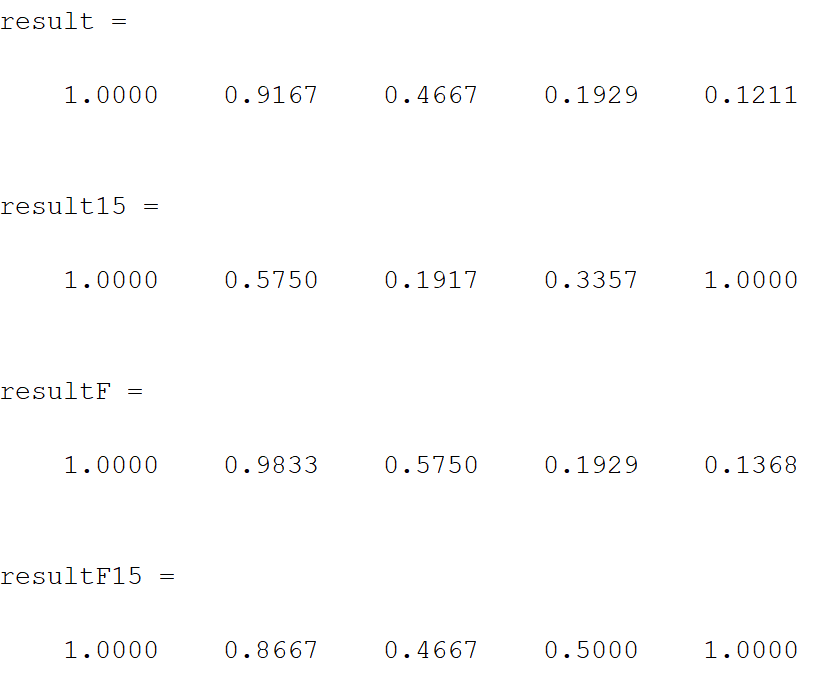
|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Set 1 Accuracy | Set 2 Accuracy | Set 3 Accuracy | Set 4 Accuracy | Set 5 Accuracy |
| Eigenfaces trained on subset 1  N=30 | 1.00 | 0.9417 | 0.5750 | 0.2357 | 0.1316 |
| Eigenfaces trained on subset 1 and 5  N=30 | 1.00 | 0.9083 | 0.2917 | 0.6571 | 1.00 |
| Fisherfaces trained on subset 1  C=10 | 1.00 | 0.9833 | 0.5750 | 0.1929 | 0.1368 |
| Fisherfaces trained on subset 1 and 5  C=10 | 1.00 | 0.8667 | 0.4667 | 0.50 | 1.00 |

Error Rates for N=30 and C=10



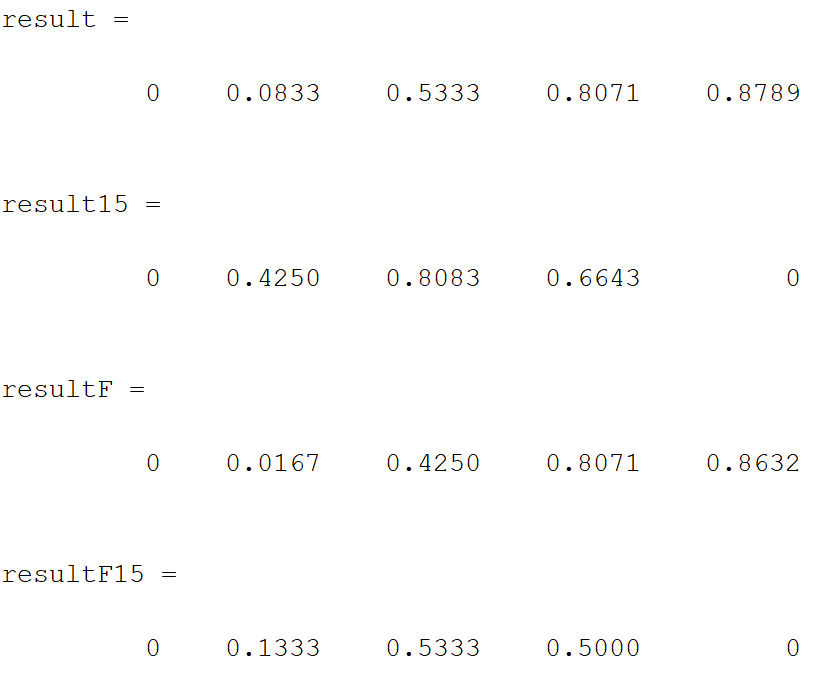
|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Set 1 Error | Set 2 Error | Set 3 Error | Set 4 Error | Set 5 Error |
| Eigenfaces trained on subset 1  N = 30 | 0 | 0.0583 | 0.4250 | 0.7643 | 0.8684 |
| Eigenfaces trained on subset 1 and 5  N = 30 | 0 | 0.0917 | 0.7083 | 0..8071 | 0 |
| Fisherfaces trained on subset 1  C= 10 | 0 | 0.0167 | 0.4250 | 0.8071 | 0.1368 |
| Fisherfaces trained on subset 1 and 5  C = 10 | 0 | 0.1333 | 0.5333 | 0.500 | 0 |

Accuracies for N=9 and C=31



|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Set 1 Accuracy | Set 2 Accuracy | Set 3 Accuracy | Set 4 Accuracy | Set 5 Accuracy |
| Eigenfaces trained on subset 1  N = 9 | 1.0 | 0.9167 | 0.4667 | 0.1929 | 0.1211 |
| Eigenfaces trained on subset 1 and 5  N = 9 | 1.0 | 0.5750 | 0.1917 | 0.3357 | 1.0 |
| Fisherfaces trained on subset 1  C= 31 | 1.0 | 0.9833 | 0.5750 | 0.1929 | 0.1368 |
| Fisherfaces trained on subset 1 and 5  C = 31 | 1.0 | 0.8667 | 0.4667 | 0.5 | 1.0 |

Error Rate for N=9 and C=31

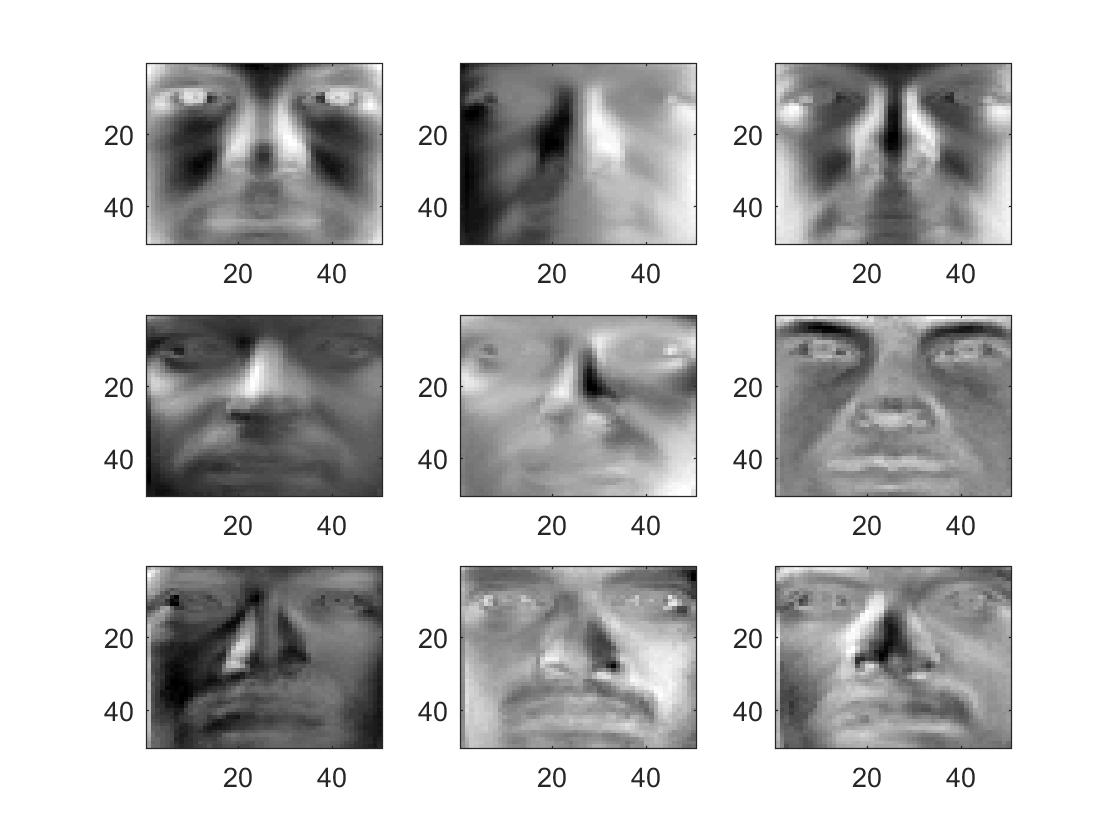


|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Set 1 Error | Set 2 Error | Set 3 Error | Set 4 Error | Set 5 Error |
| Eigenfaces trained on subset 1  N = 9 | 0 | 0.0833 | 0.5333 | 0.8071 | 0.8789 |
| Eigenfaces trained on subset 1 and 5  N = 9 | 0 | 0.4250 | 0.8083 | 0.6643 | 0 |
| Fisherfaces trained on subset 1  C= 31 | 0 | 0.0167 | 0.4250 | 0.8071 | 0.8632 |
| Fisherfaces trained on subset 1 and 5  C = 31 | 0 | 0.1333 | 0.5333 | 0.500 | 0 |

**Eigenface Algorithm**

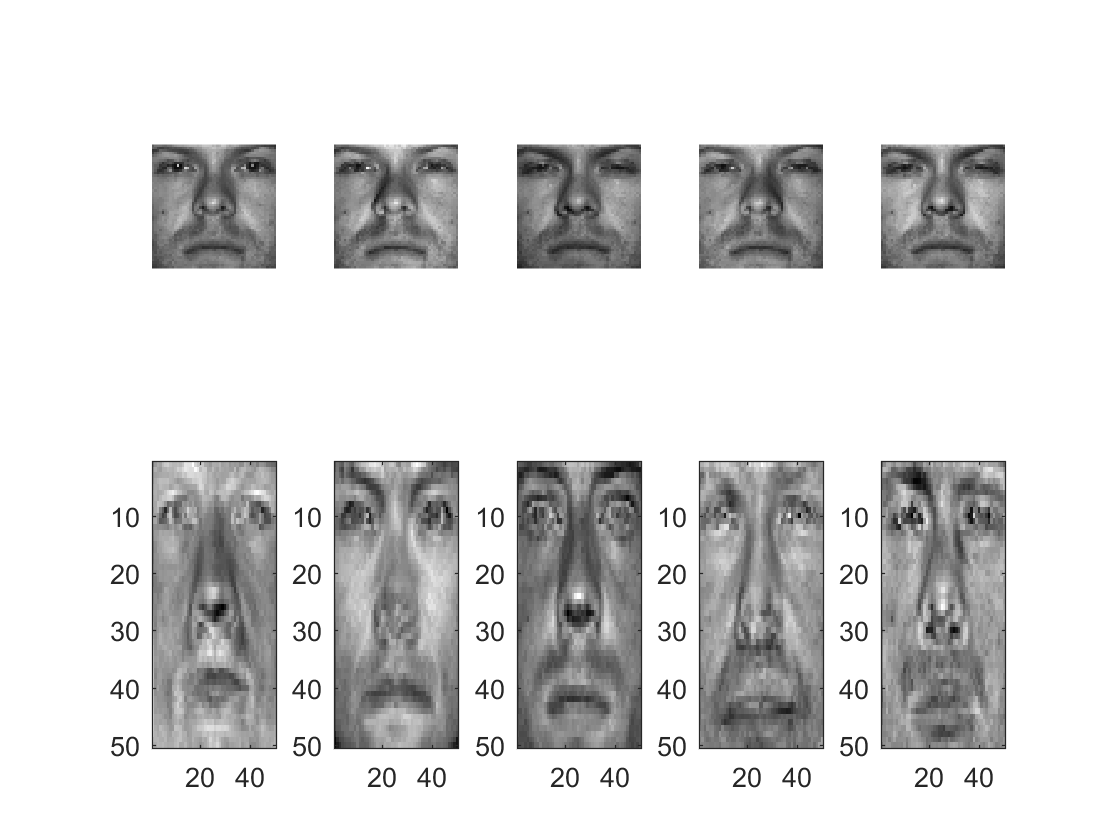
1. Find mean face
2. Subtract mean from each column of subset
3. Now that data is preprocessed, solve for eigenvectors of the preprocessed data.
4. Now that we have the largest eigenvectors of the data, reduce it to k eigenvectors.
5. We now have our the top eigenfaces for the subset, to project it onto our eigenspace w, we use the equation
6. We can then apply the ureduce to any new subset x to test on
7. Then we compare the training eigenspace and the test eigenspace against each other using nearest neighbors algorithm.

**Top 9 Eigenvectors after training on subset 1**

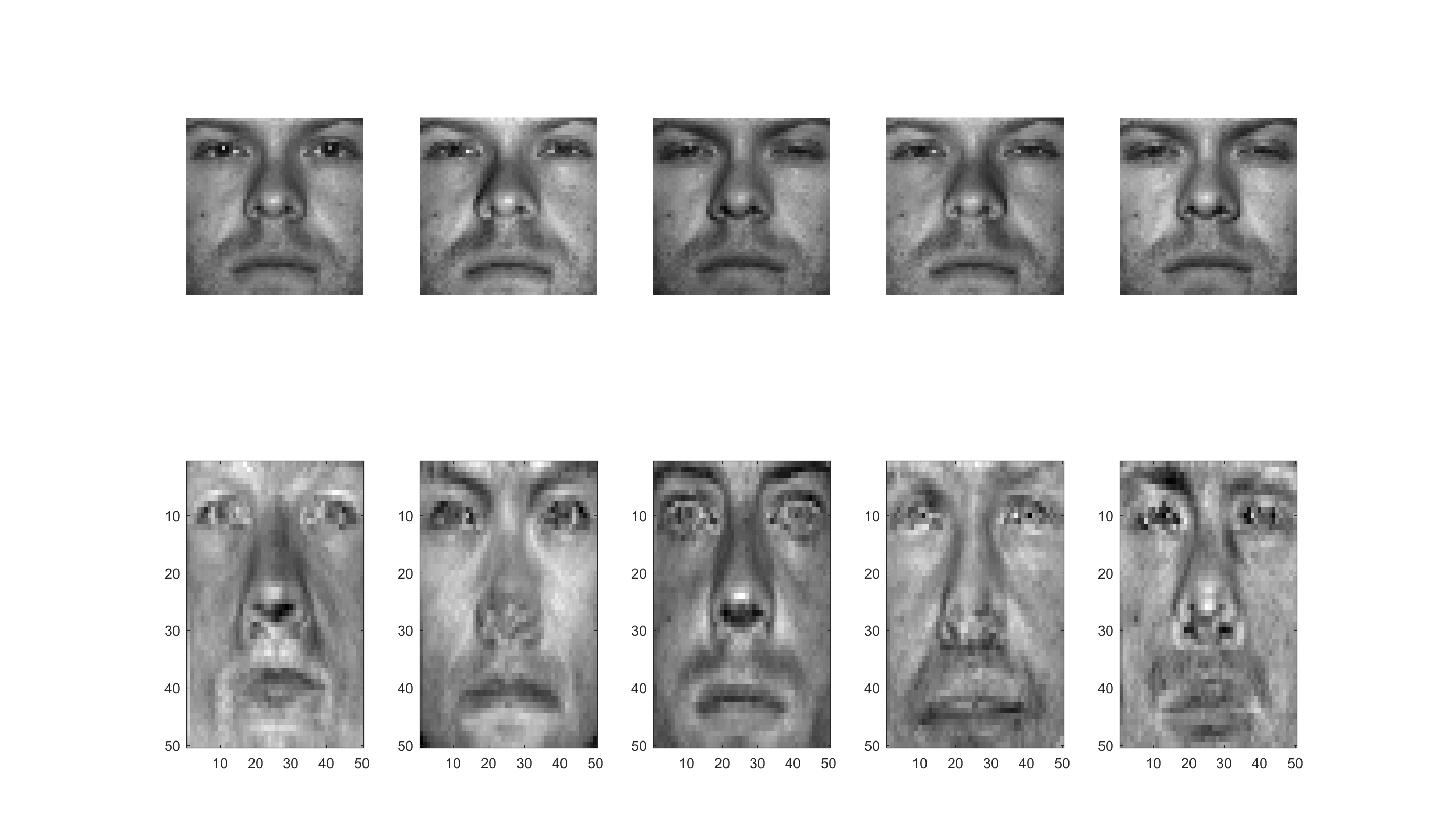


**Reconstructed Eigenfaces**

D = 9



D = 30



**Fisherfaces Algorithm**

1. Do the eigenface algorithm as shown above. We ended with our eigenspace w.
2. FLD requires us to calculate the different scatters of the data. First, we calculate the scatter of each individual class.

Where = the local mean of the class i and is the subset for class i.

1. Now that we have the scatter of each individual class, we can then calculate for the within class scatter using the equation
2. In addition to this, we also need to calculate our between class scatter, which requires the mean of the whole dataset.
3. Now that we have Sw and Sb, we then solve the generalize eigenvector problem associated through the use of Sw and Sb.
4. Now that we have the FLD of the data, we can now compute Wopt by applying our FLD to our PCA.

**Extra:**

**Accuracies when cutting out the top 3 eigenvectors for Eigenfaces**

