Face recognition

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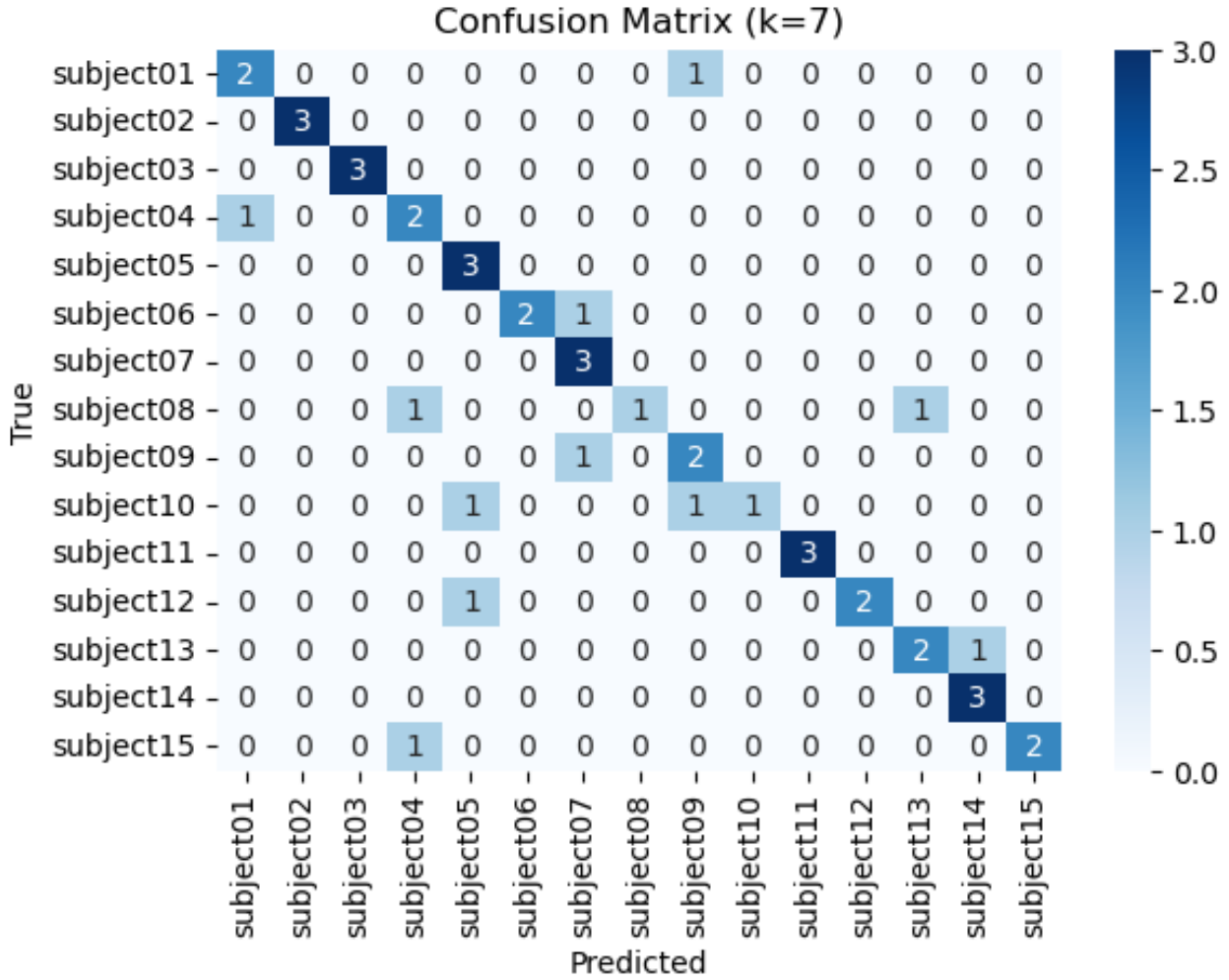
Project aim

Results

- PCA
- Confusion matrix
- K-cross fold validation
- Performance metrics
- Classification Report
- summary

Confusion matrix



K-fold cross validation

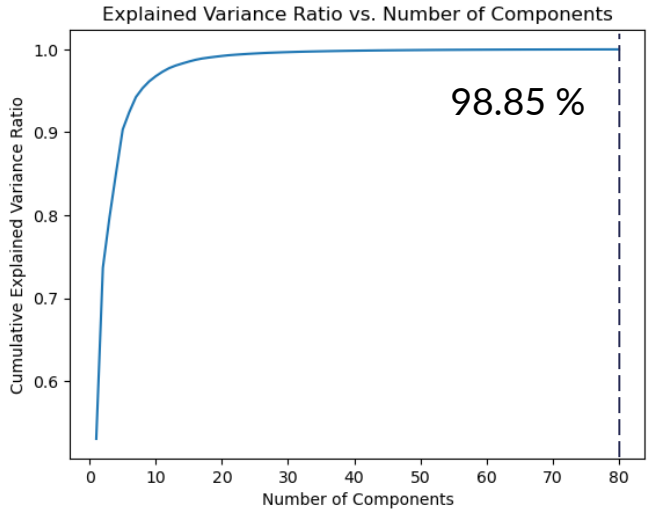
Iteration 1	**Test**	**Training**	**Training**	**Training**	**Training**
Iteration 2	**Training**	**Test**	**Training**	**Training**	**Training**
Iteration 3	**Training**	**Training**	**Test**	**Training**	**Training**
Iteration 4	**Training**	**Training**	**Training**	**Test**	**Training**
Iteration 5	**Training**	**Training**	**Training**	**Training**	**Test**

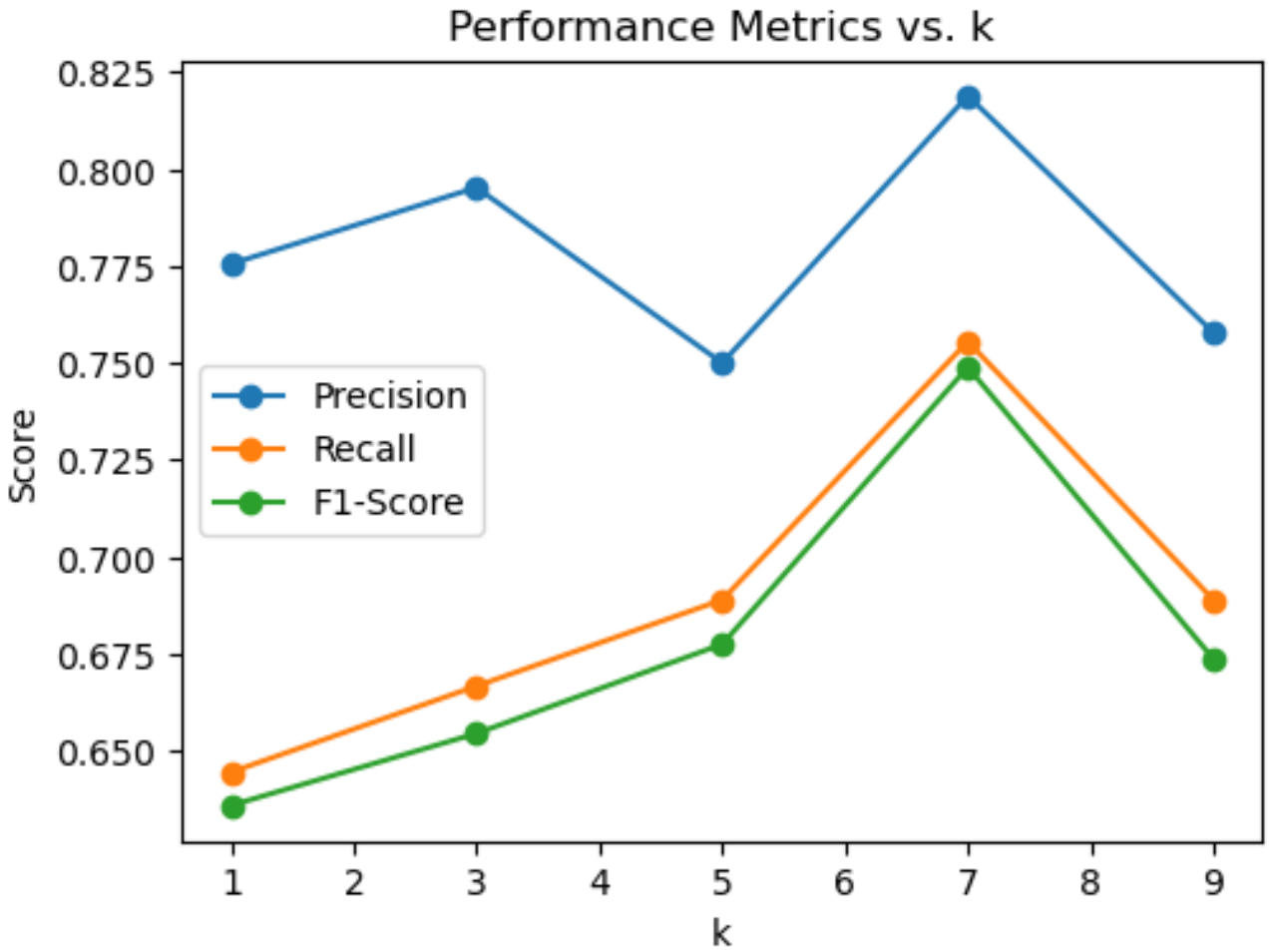
$$accuracy = \frac{TP + TN}{TP + TN + FP + FN}$$

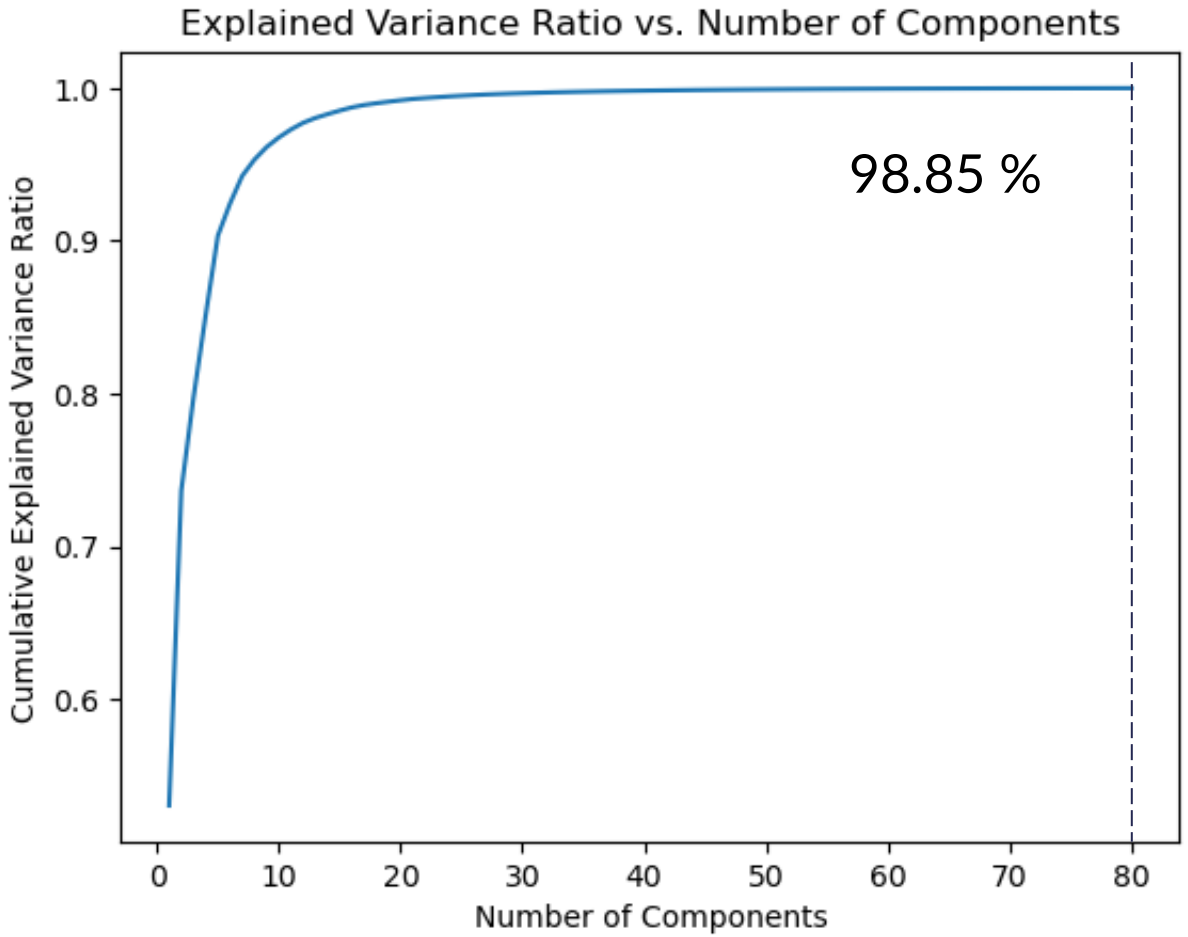
Overall accuracy: 71.99 %

KNN – performance metrics

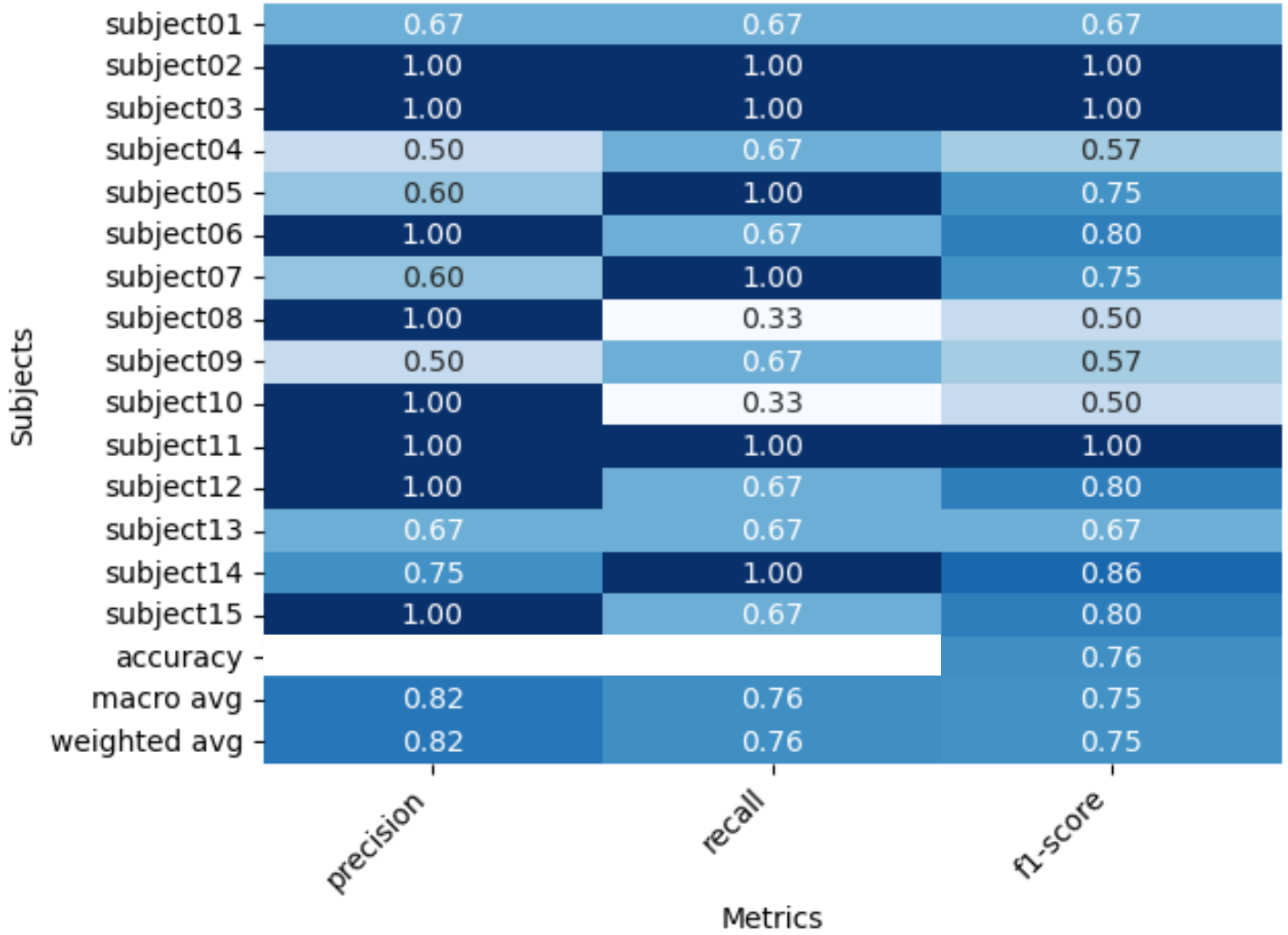
- $precision = \frac{TP}{TP+FP}$
- $recall = \frac{TP}{TP+FN}$
- $f1 - score = \frac{precision * recall}{precision+recall}$



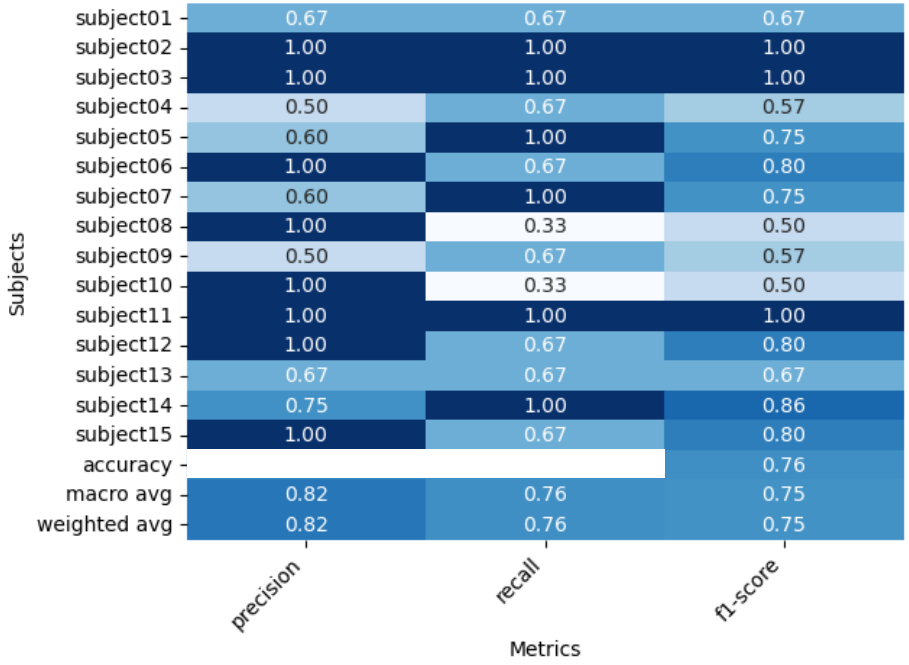


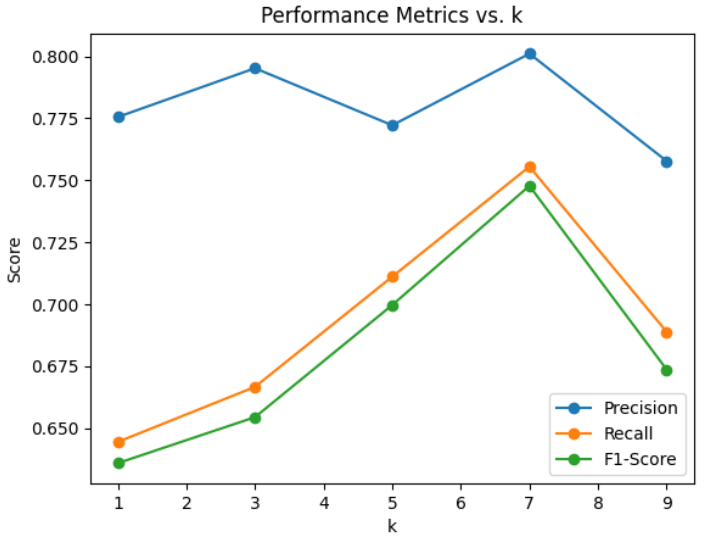

Explained Variance Ratio vs. Number of Components
Cumulative Explained Variance Ratio
1.0
0.9
0.8
0.7
0.6
98.85 %
0
10
20
30
40
50
60
70
80
Number of Components

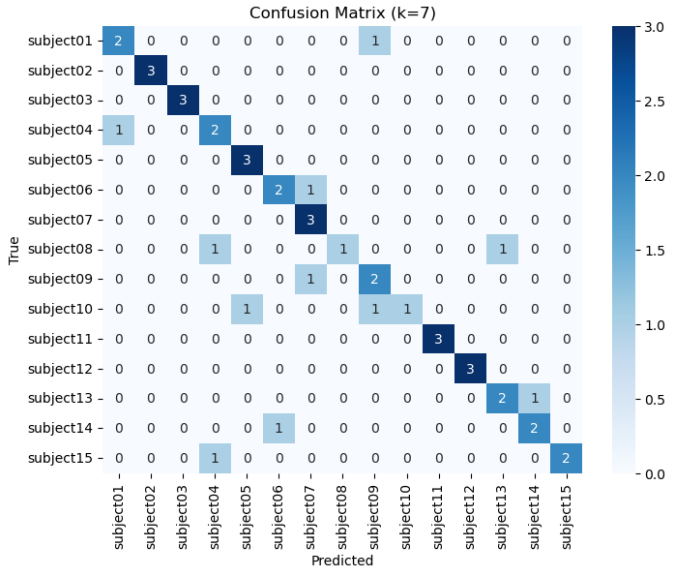
Classification Report



Summing up the plots





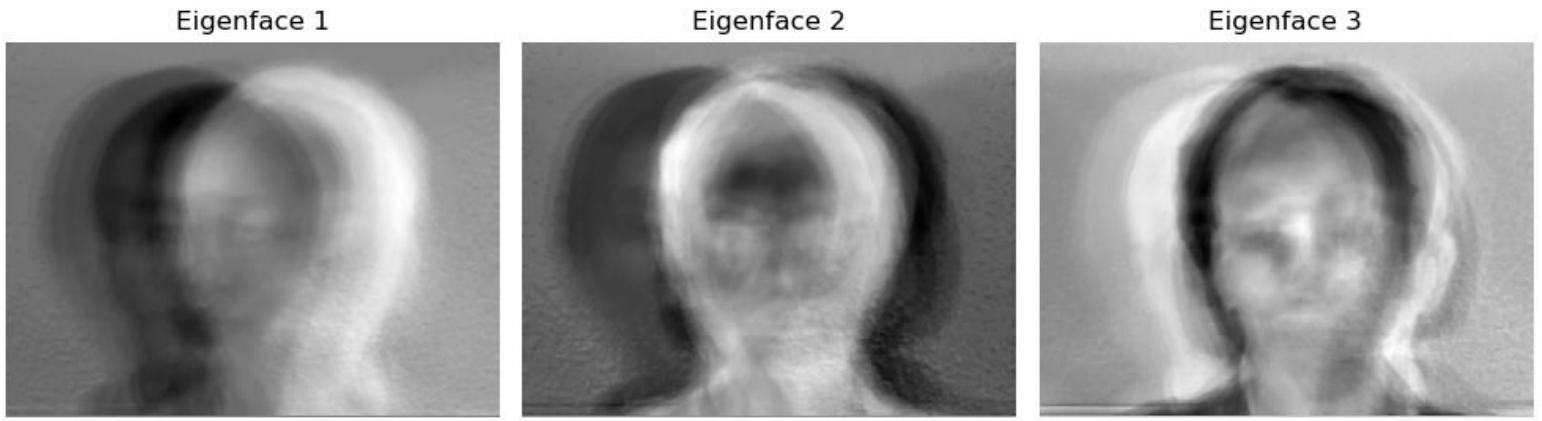


Conclusion

- Error analysis
- Possibilities for improvement

Error analysis

- Data set
  - Size → too small
  - Distribution into training and test set
  - People not centered



Eigenfaces 1-3 of our training set.

Error analysis

- KNN classifier
  - Emotion & lighting conditions

Subject 10 left light

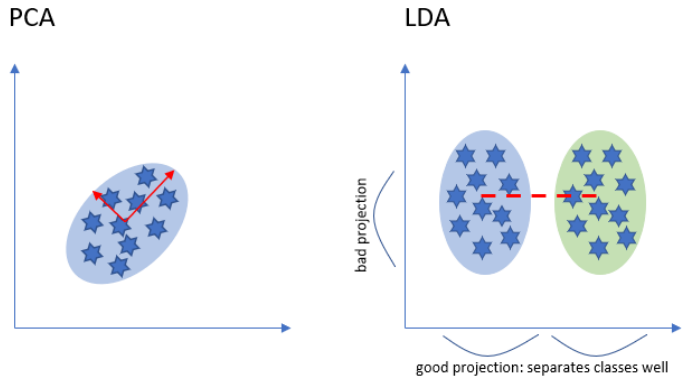
Error analysis

- KNN classifier
  - Emotion & lighting conditions

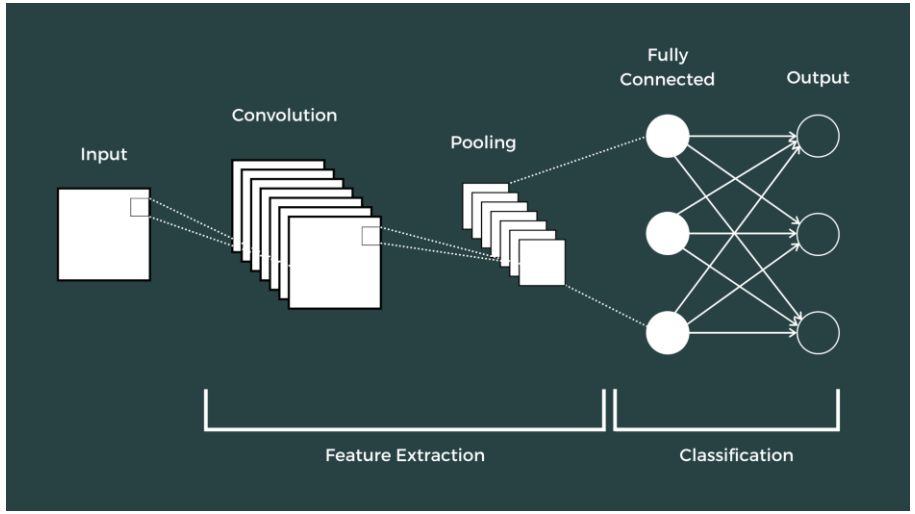
Subject 10 glasses

Possibilities for improvement

- LDA instead of PCA



- CNN instead of KNN



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