

1 Eigenfaces

Eigenfaces are an orthogonal basis set from which all the faces can be constructed. They are blurry depictions of faces that each highlight a certain type of feature. They are used in facial characterization and recognition applications.

The idea is that anyone's face can be reconstructed from a suitable linear combination of eigenfaces. Your face would be 7% Face A, 3.4% Face B, and so on, while someone else's face would have a different combination of those same eigenfaces.

Eigenfaces are constructed by training on a set of real faces. By matrix manipulation, it is possible to mathematically identify "features", and assign a strength level to each feature for a given face. The goal is to create the minimum number of eigenfaces that can adequately represent the entire training set (hence it is a type of Principal Component Analysis). If the training set is sufficiently diverse, the resulting set of eigenfaces should be able to represent all faces.



Figure 1

References

Face Recognition using eigenfaces technique:

<https://medium.com/@devalshah1619/face-recognition-using-eigenfaces-technique-f221d505d4f7>

http://www.vision.jhu.edu/teaching/vision08/Handouts/case_study_pca1.pdf

The figure 2 in next page gives the flowchart of the algorithm of eigenfaces:

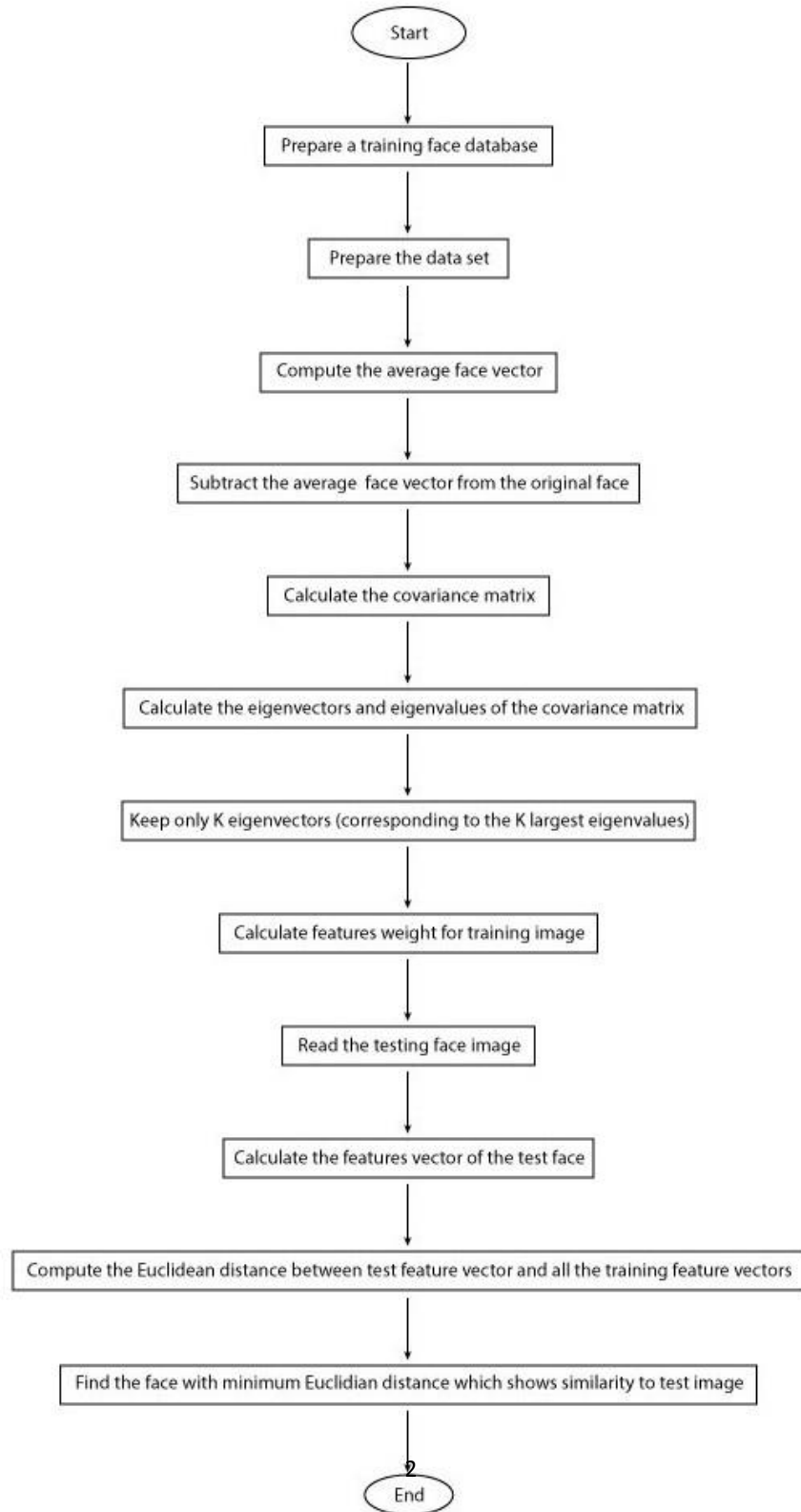


Figure 2