Introduction to Machine Learning

Analysis report on **Assignment 7 (b) PCA**

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Question:

To implement PCA on image data for facial recognition.

Dataset :

(Showing the number variants in the dataset)

1.pgm	10.3 kB
2.pgm	10.3 kB
3.pgm	10.3 kB
4.pgm	10.3 kB
5.pgm	10.3 kB
6.pgm	10.3 kB
7.pgm	10.3 kB
8.pgm	10.3 kB
9.pgm	10.3 kB
10.pgm	10.3 kB

(Showing the images of a variant.)

(Showing one image of a variant)

(Showing image of an imposter)

The following steps were taken to use PCA for facial recognition.

Data Preprocessing:

- Images 1-6 of each variant was used for training the model.

- Images from 7-10 of each variant was used for testing the model.
- Images in both the testing and training dataset were converted to grayscale background and resized to total pixels.
- We have used 60% data for training and 40% data for testing.

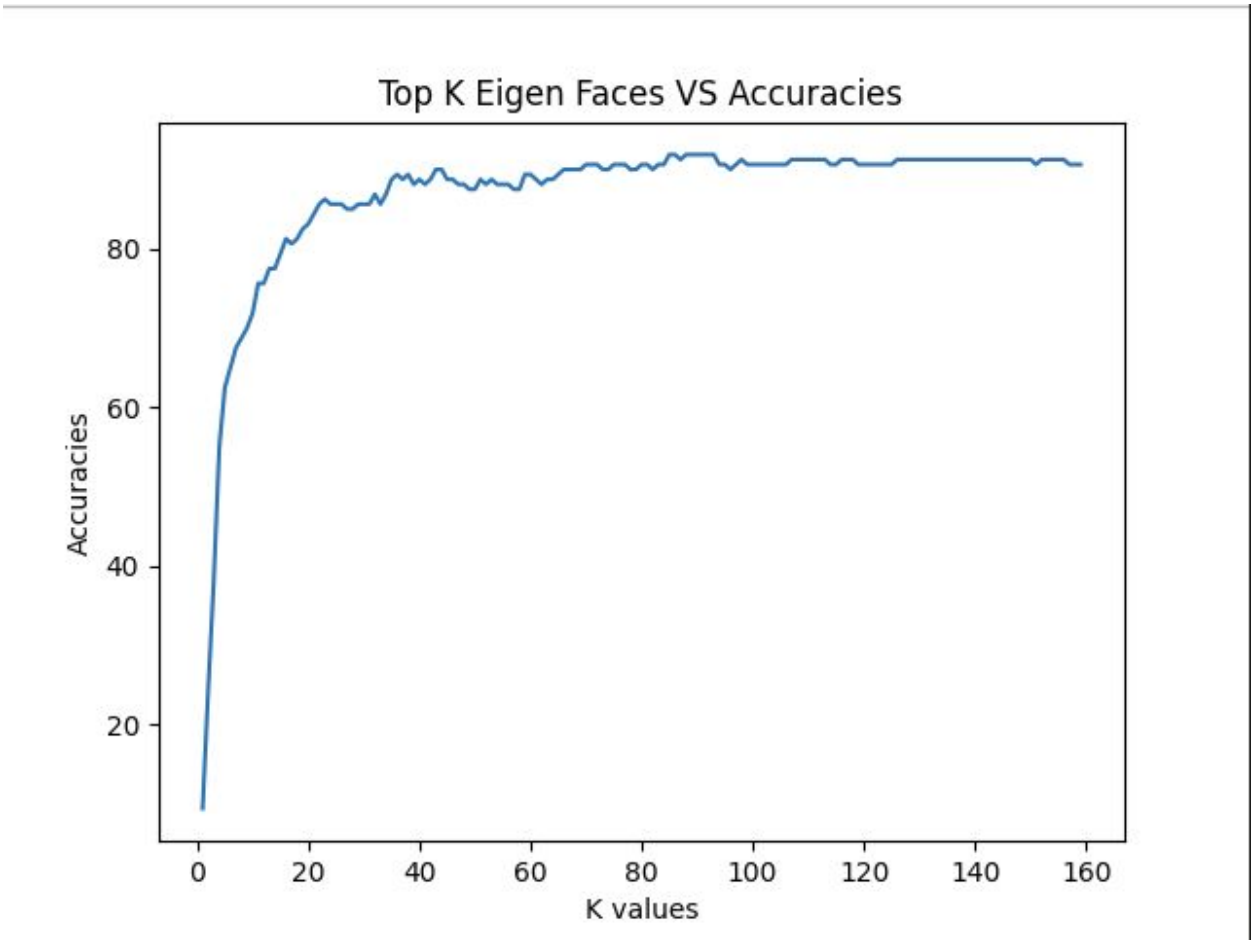
Modelling:
The solution uses the dataset as the input and then predicts the output. Also the solution finds any imposters that might have been added to the dataset.

Analysis:
The algorithm was run for different values of k and then the percentage accuracy recorded.
The results obtained were as follows:

K	Accuracy
1	9.375%
20	83.125%
40	88.75%
60	89.375%
80	90.625%

100	90.625%
120	90.625%
140	91.25%
160	90.625%

The maximum accuracy obtained is : 91.25%
The minimum accuracy obtained is : 9.375%



Upon adding the imposter images, it successfully identified the two imposters.