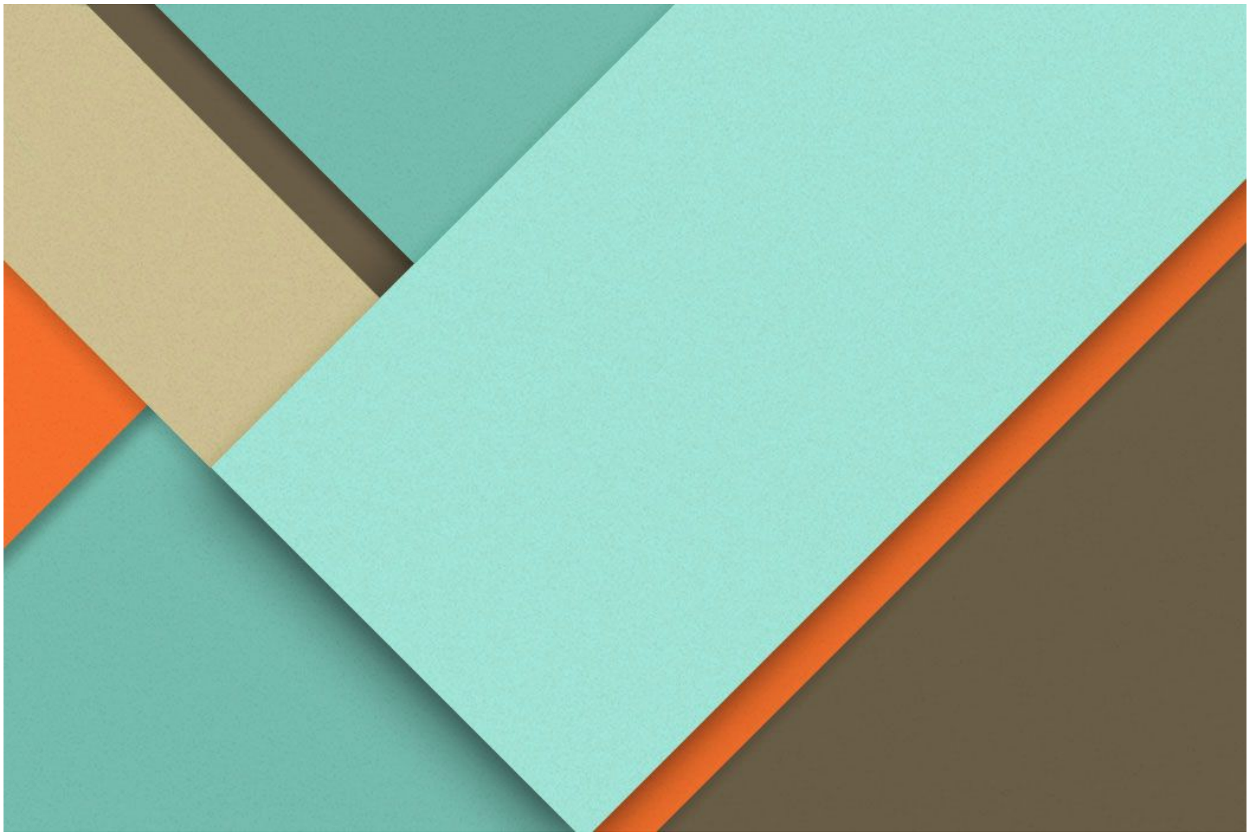


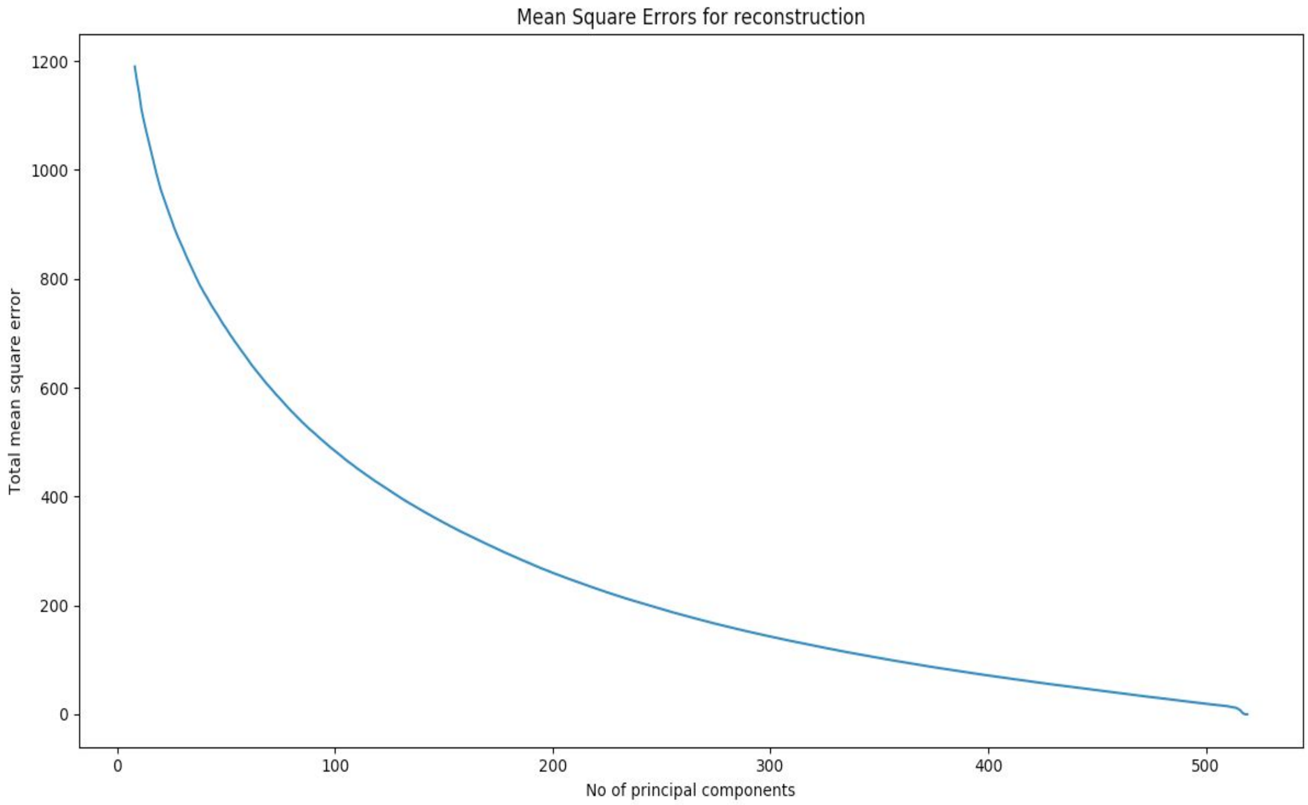
SMAI Mini Project -1

30.10.2018

-Yahnit Sirineni
-20161033

Mean Square Error Vs No. of Principal Components

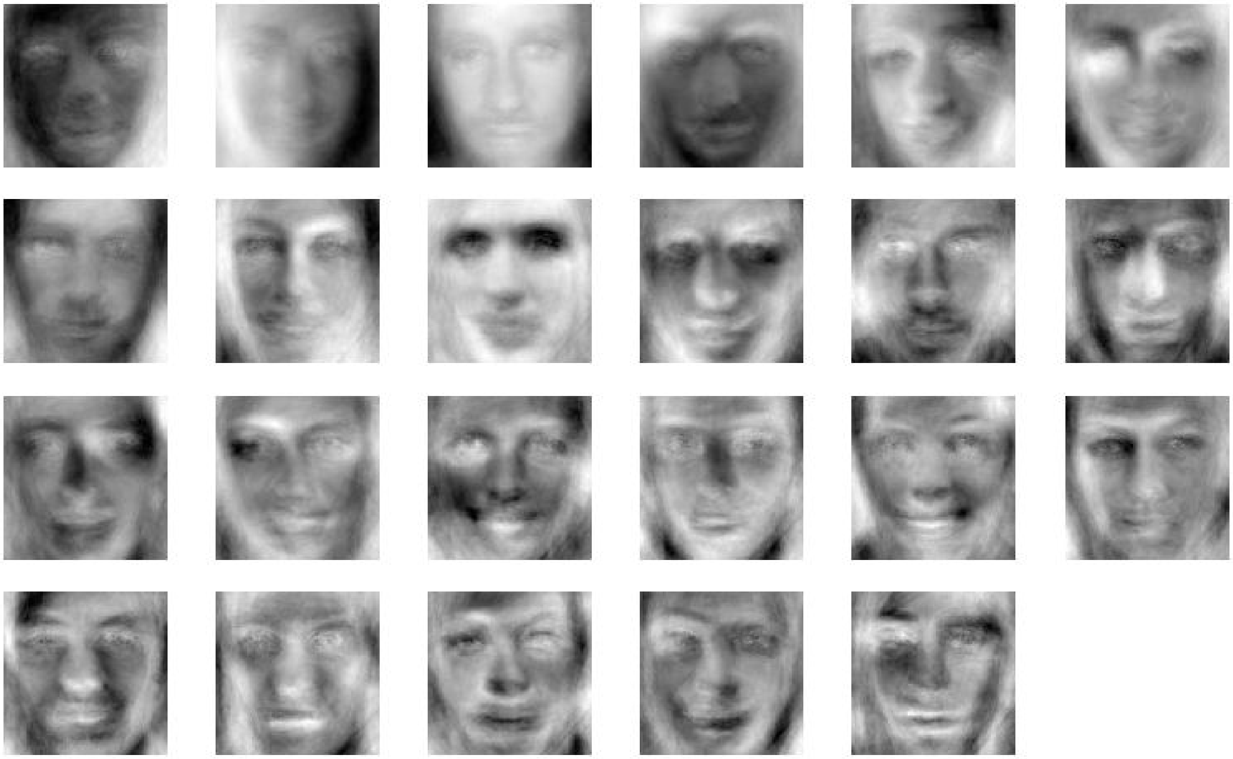
This graph shows the total mean square error over all train images Vs the number of principal components used to reconstruct.



- Here, we can observe that the mean square error decreases as we increase the number of principal components.
- When the No. of Principal components reaches the number of train images(N=520), the mean square error becomes 0 as there is no loss in data.

No. of Principal Components with less than 20% Error

23 principal components are required such that the reconstructed images will have mean squared error less than 20% over all the train images. These 23 principal components are displayed as reconstructed images.



We can observe some base structures of faces in these 23 eigen faces.

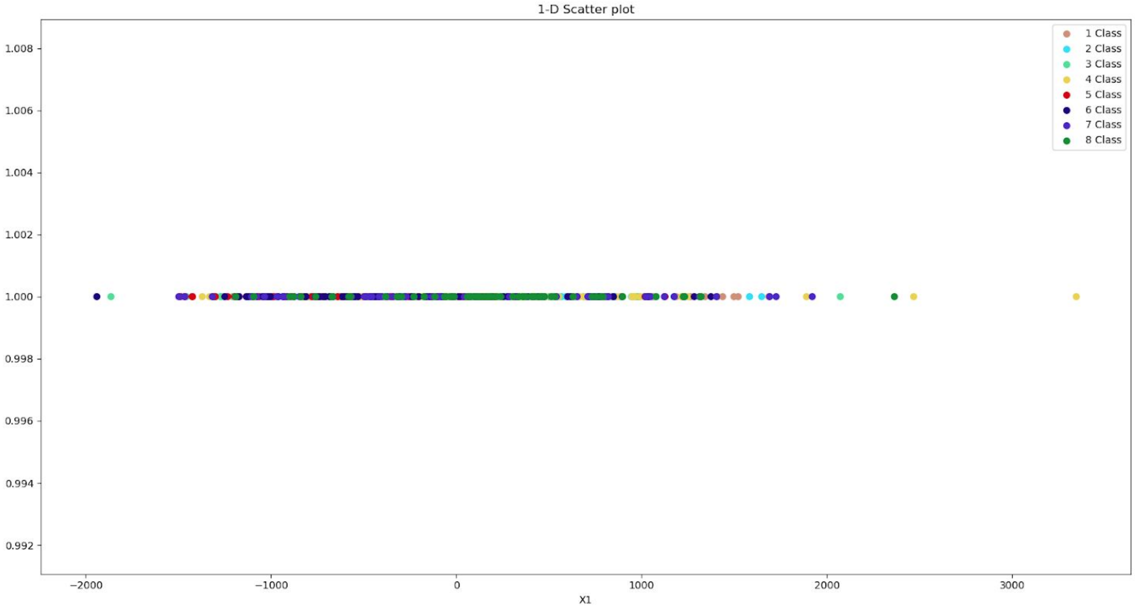
Due to memory constraints, I have downsampled the images by converting it to grayscale and then resizing it to 32 X 32.

Scatter Plots

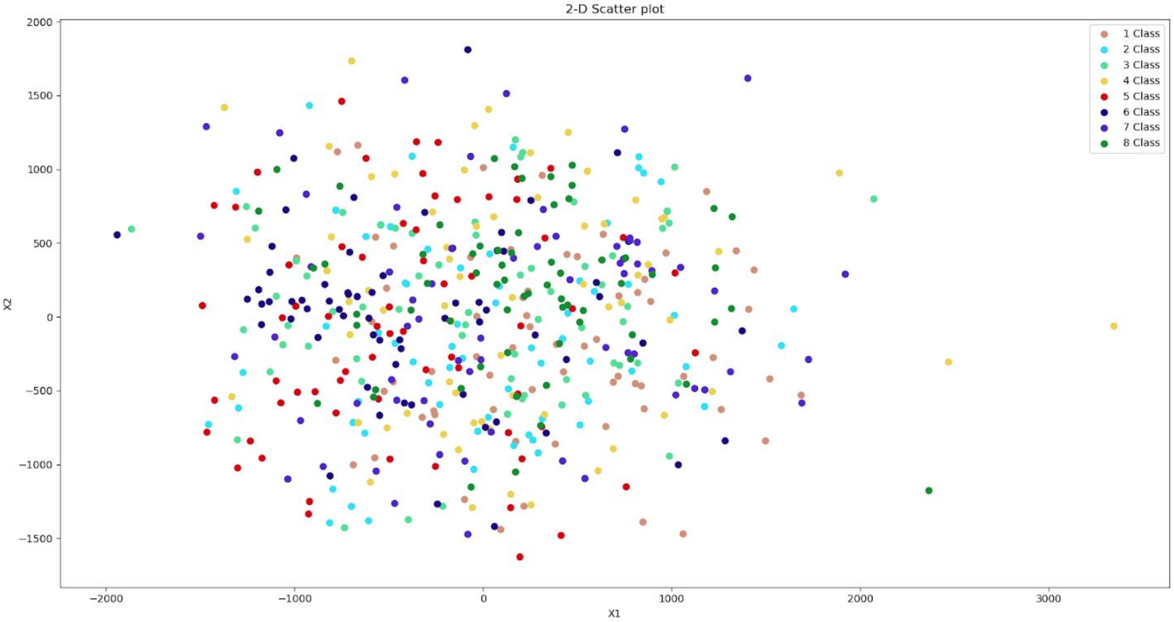
I have used the scatter plots to see how the images are clustered in 1D, 2D and 3D space.

Below are the respective scatter plots.

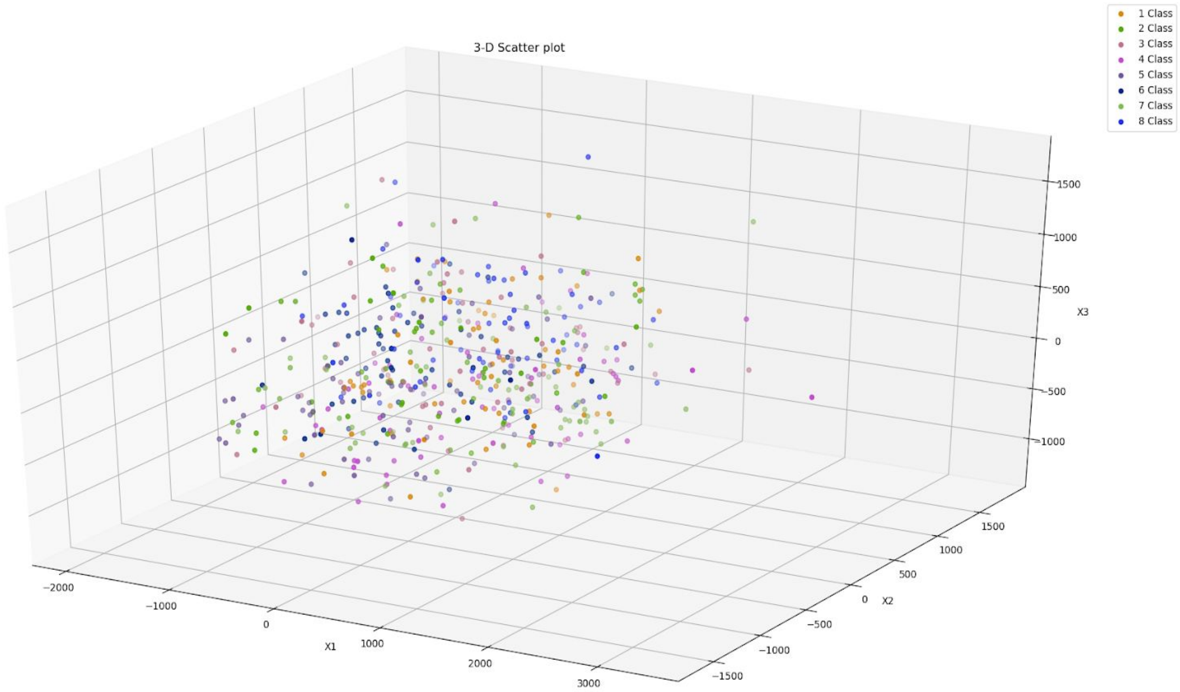
1D scatter plot:



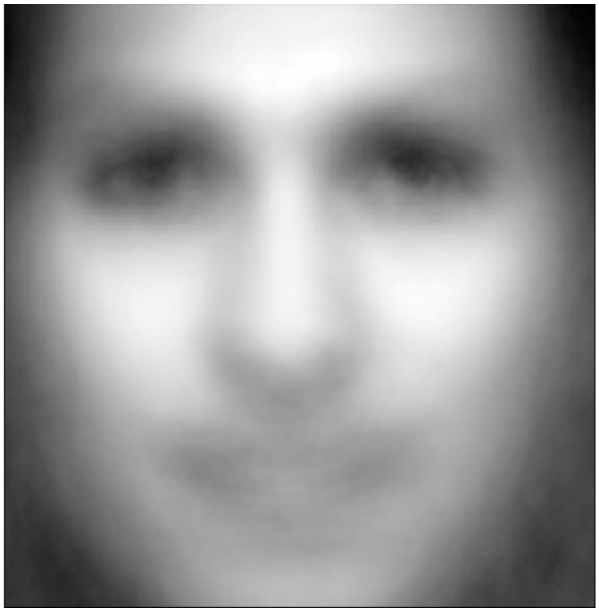
2D scatter plot:

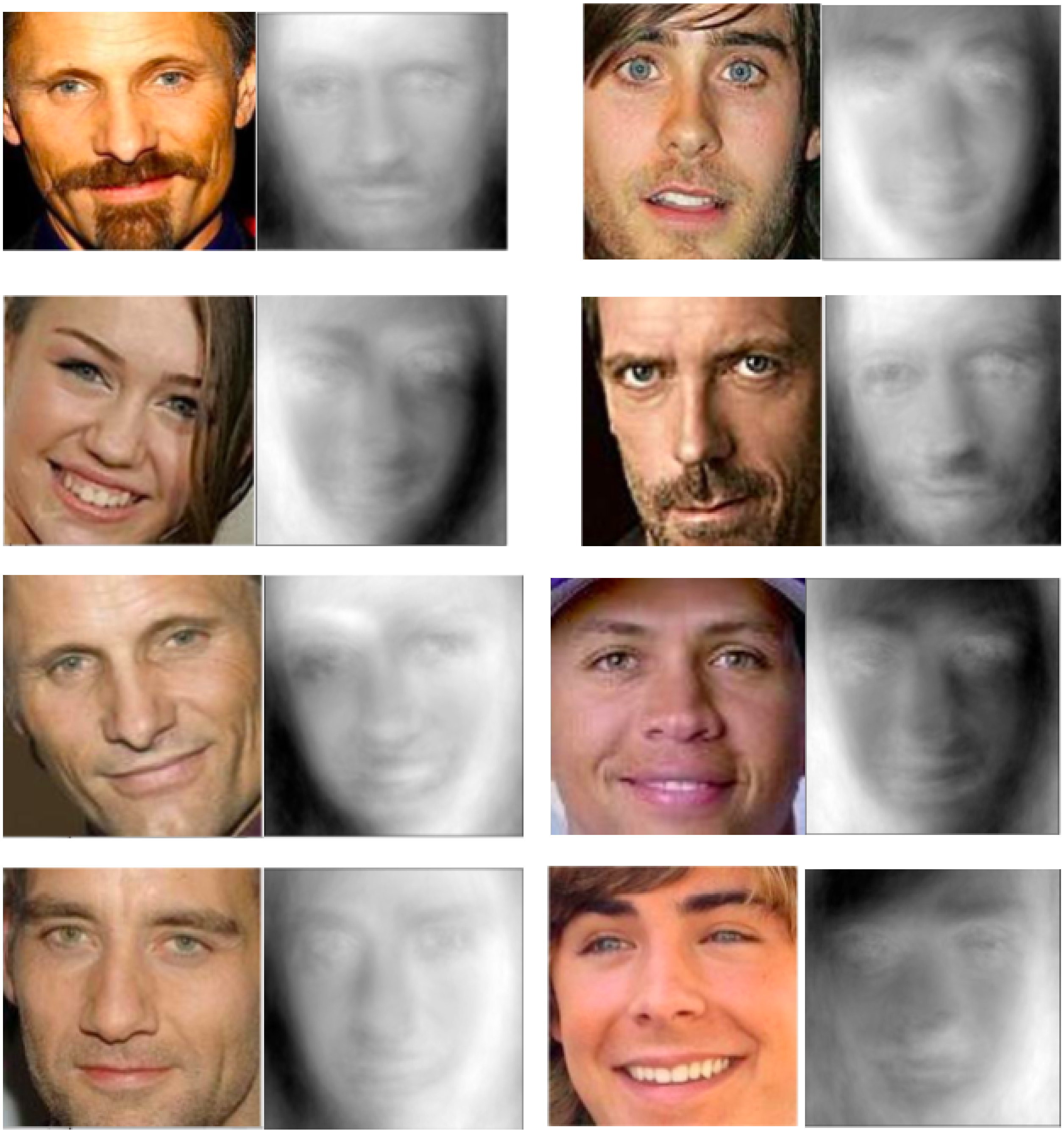


3D scatter plot:



Mean Eigen Face



Reconstructed Images using Principal Components