THE3

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I. Introduction

This report includes the discussions about CENG499 Machine Learning THE3 Homework

II. Discussion

A. Cluster Means

For every K, we have found K colors that are representing the dataset. If we divide dataset to K groups, we can represent each group with each color. As K increases, the max and min color is almost the same but transition is getting slow.

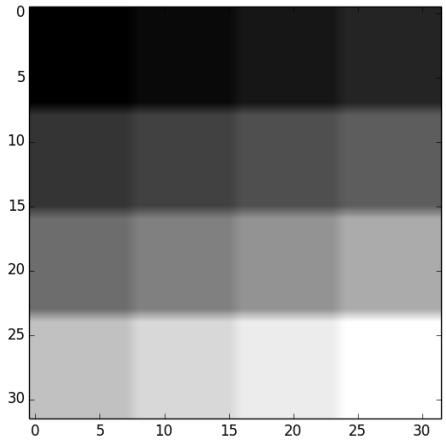

Fig. 1. K=16

B. Principle components

These are the simplest 16 images we can sum all 165 images up.

C. Discussion on the effects of the value of K

As K increases, detail is increasing but computation times are also increasing.

D. Recommendation for choosing best K

Elbow method can be used for Kmeans.

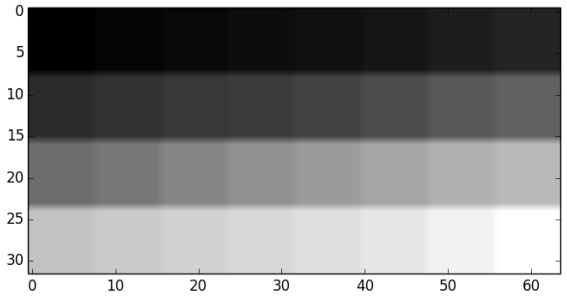

Fig. 2. K=32

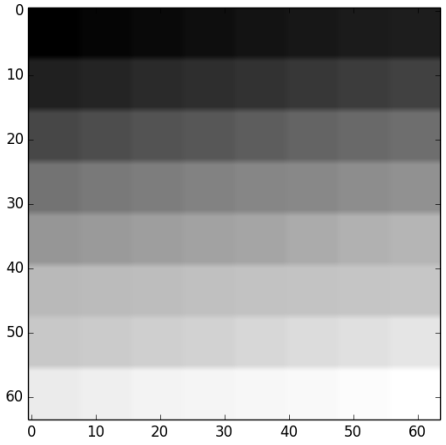

Fig. 3. K=64

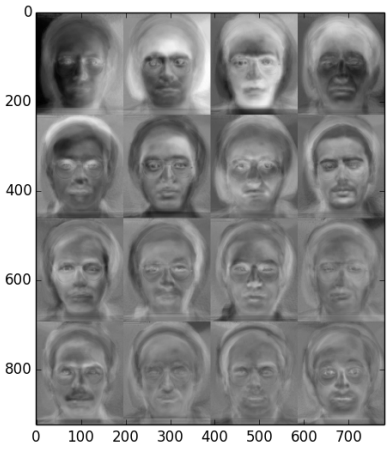

Fig. 4. First 16 Principle Components

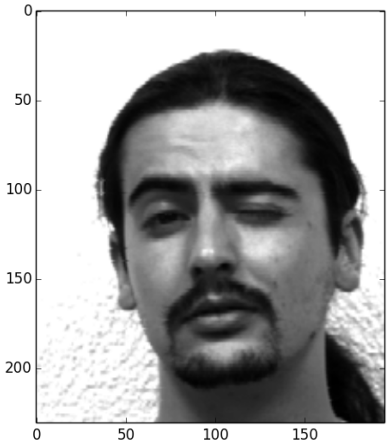

Fig. 5. First Image Original

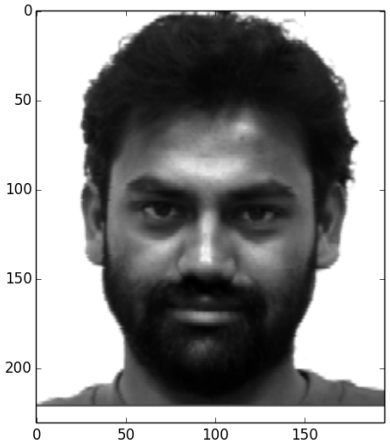

Fig. 6. Second Image Original

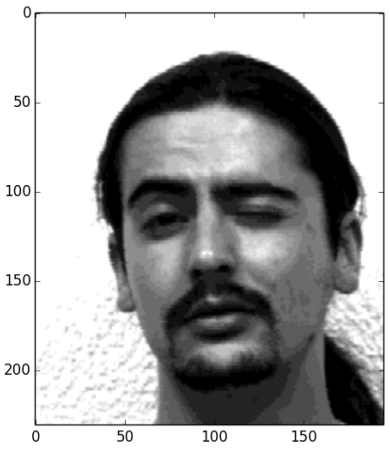

Fig. 7. First Image Kmeans K=16

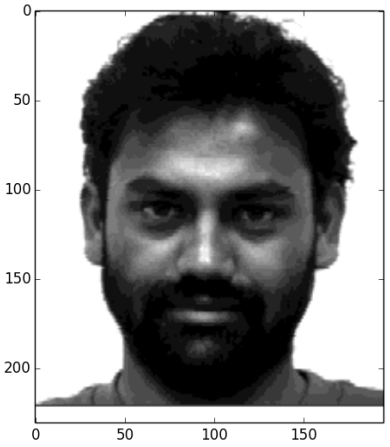

Fig. 8. Second Image Kmeans K=16

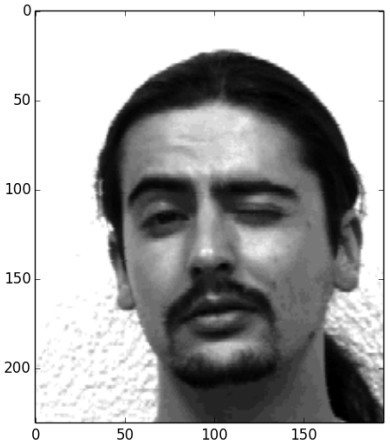

Fig. 9. First Image Kmeans K=32

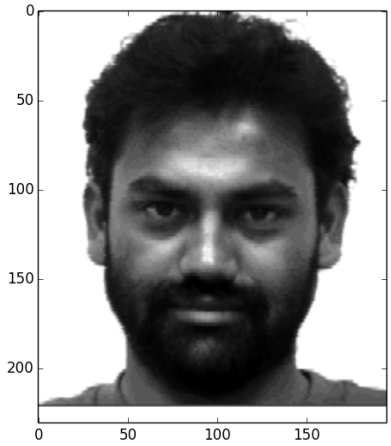

Fig. 10. Second Image Kmeans K=32

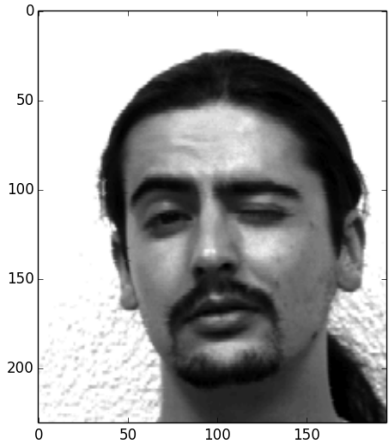

Fig. 11. First Image Kmeans K=64

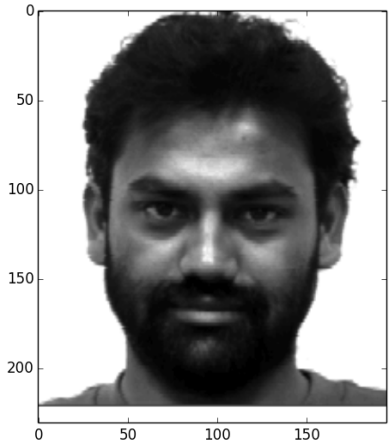

Fig. 12. Second Image Kmeans K=64

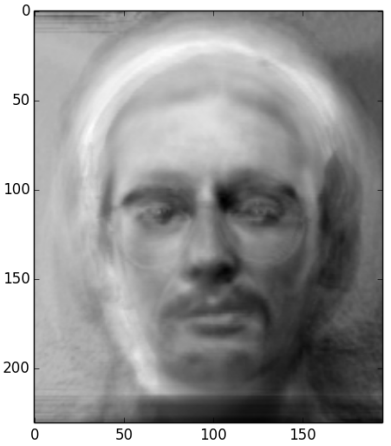

Fig. 13. First Image PCA K=16

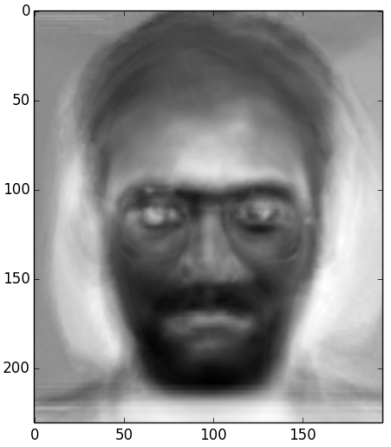

Fig. 14. Second Image PCA K=16

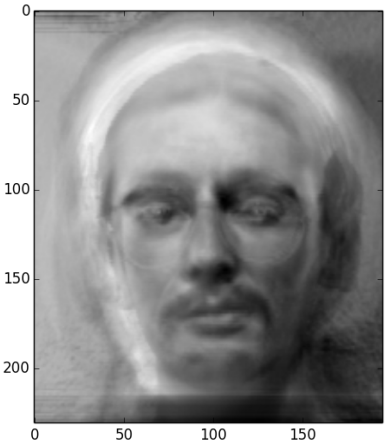

Fig. 15. First Image PCA K=32

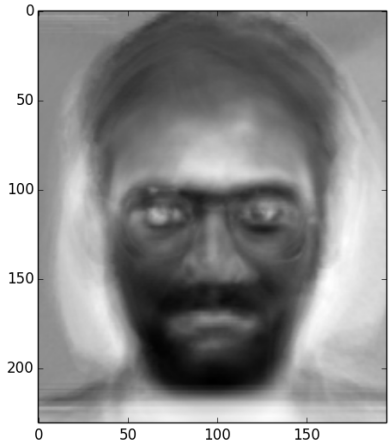

Fig. 16. Second Image PCA K=32

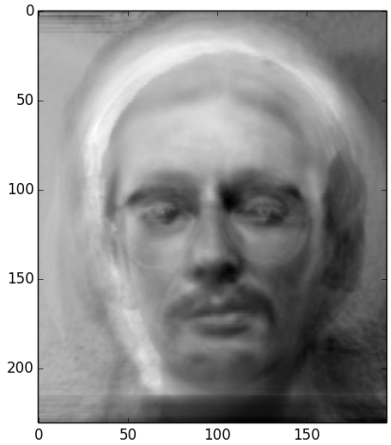

Fig. 17. First Image PCA K=64

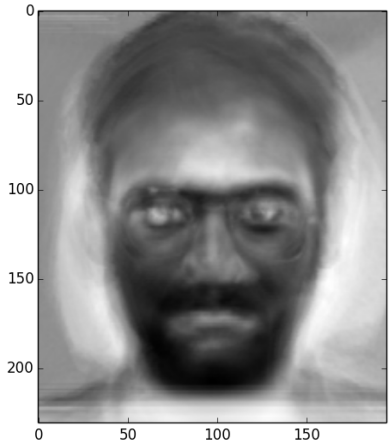

Fig. 18. Second Image PCA K=64