Homework #0 Report

Deep Learning for Computer Vision

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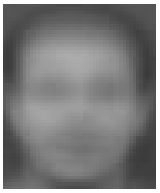
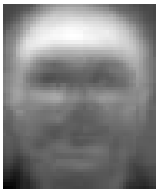
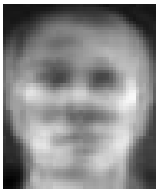
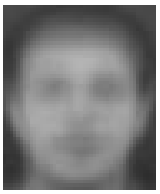
1. Mean face and first four eigen faces.

mean face	1st eigen face	2nd eigen face	3rd eigen face	4th eigen face
				

2. $\text{Person}_8\text{Image}_1$ reconstructed face with first $n = 3, 50, 170, 240, 345$ eigenfaces.

$n = 3$	$n = 50$	$n = 170$	$n = 240$	$n = 345$
				

3. Mean squared error between the reconstructed image and the original image.

$n = 3$	$n = 50$	$n = 170$	$n = 240$	$n = 345$
1566.35	134.03	39.85	21.48	3.04

4. k-nearest neighbors algorithm to classify the testing set images.
   Mean of recognition rate on valid set for different hyperparameters:

	$n = 3$	$n = 50$	$n = 170$
$k = 1$	0.727	0.966	0.966
$k = 3$	0.616	0.9	0.894
$k = 5$	0.541	0.808	0.8

5. recognition rate of the testing set.
   Accroding to 4., we can tell that it performed best at $n = 50,\ k = 1$

recognition rate on test set	0.916