Deep Learning for Computer Vision

Homework 1

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Problem 1:

$$P(x|w1) = \begin{cases} \frac{1}{5} & , for\ 0 \le x \le 5 \\ 0 & , otherwise \end{cases}$$

$$P(x|w2) = \begin{cases} \frac{1}{3} & , for\ 3 \le x \le 6 \\ 0 & , otherwise \end{cases}$$

$$P(x|w1) \times P(\omega 1) = \begin{cases} \frac{3}{20} & , for\ 0 \le x \le 5 \\ 0 & , otherwise \end{cases}$$

$$P(x|w2) \times P(\omega 2) = \begin{cases} \frac{1}{12} & , for\ 3 \le x \le 6 \\ 0 & , otherwise \end{cases}$$

Since $P(x|w1) \times P(\omega 1) > P(x|w2) \times P(\omega 2) \quad , for\ 0 \le x \le 5$

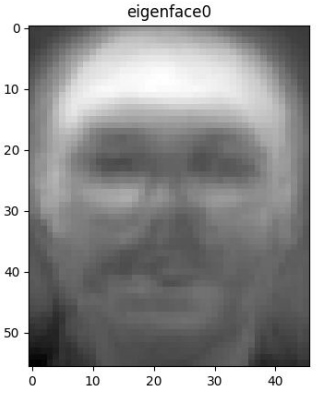
$P(x|w1) \times P(\omega 1) < P(x|w2) \times P(\omega 2) \quad , for\ 5 < x \le 6$

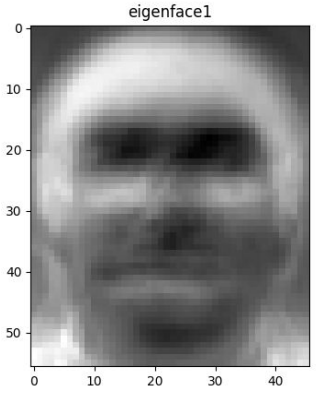
$R1 = [0, 5]$ *and* $R2 = (5, 6]$

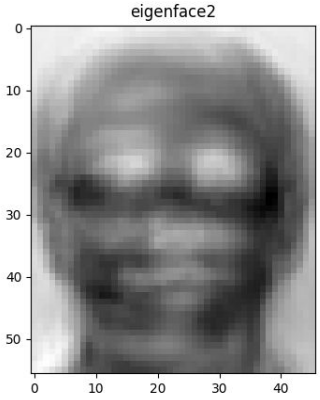
$$\text{Error} = \int_0^5 P(x|w2) \times P(\omega 2)dx + \int_5^6 P(x|w1) \times P(\omega 1)dx = \frac{1}{6}$$

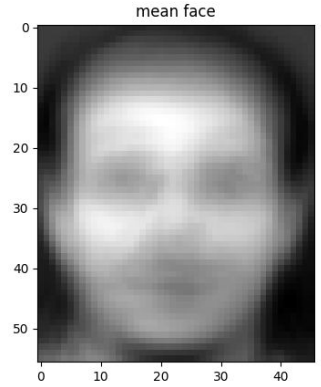
Problem 2:

problem 2.a

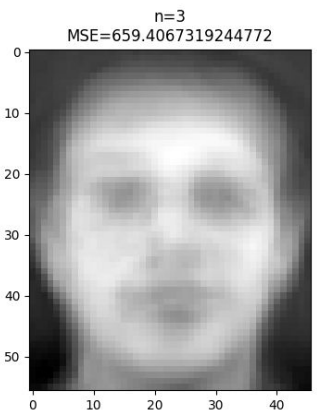


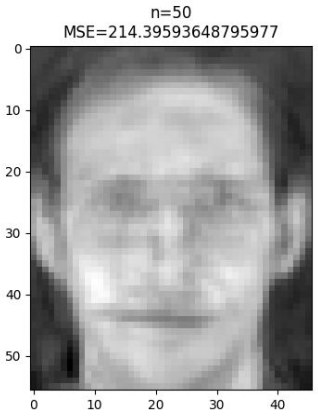


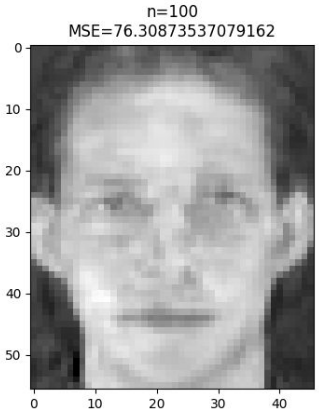


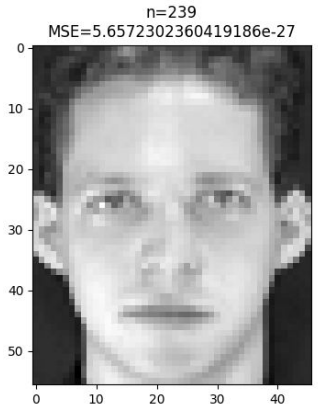


problem 2.b









problem 2.c

```
k=1, n=3        | validation accu=0.6666666666666666
k=1, n=50       | validation accu=0.9291666666666667
k=1, n=159      | validation accu=0.9333333333333333
k=3, n=3        | validation accu=0.5958333333333333
k=3, n=50       | validation accu=0.8583333333333333
k=3, n=159      | validation accu=0.8666666666666667
k=5, n=3        | validation accu=0.5041666666666667
k=5, n=50       | validation accu=0.7708333333333334
k=5, n=159      | validation accu=0.7541666666666667
k=1, n=159      | prediction accu=0.94375
 HOMEPC22:38 kevin-MS-7A34@kevin:~/Documents/github/DLCV/hw1$
```

I choose k=1 and n=159 because it’s validation accuracy is the smallest.