

# Deep Learning for Computer Vision

## Homework 1

National Taiwan University

B04901136 張家銘

Problem 1:

$$P(x|w1) = \frac{1}{5}, \text{ for } 0 \leq x \leq 5$$
$$0, \text{ otherwise}$$

$$P(x|w2) = \frac{1}{3}, \text{ for } 3 \leq x \leq 6$$
$$0, \text{ otherwise}$$

$$P(x|w1) \times P(w1) = \frac{3}{20}, \text{ for } 0 \leq x \leq 5$$
$$0, \text{ otherwise}$$

$$P(x|w2) \times P(w2) = \frac{1}{12}, \text{ for } 3 \leq x \leq 6$$
$$0, \text{ otherwise}$$

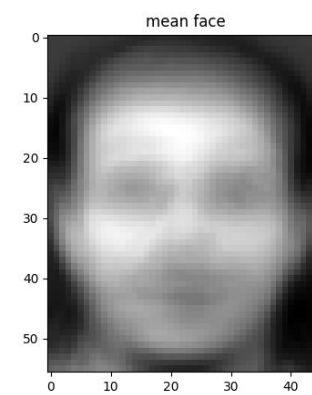
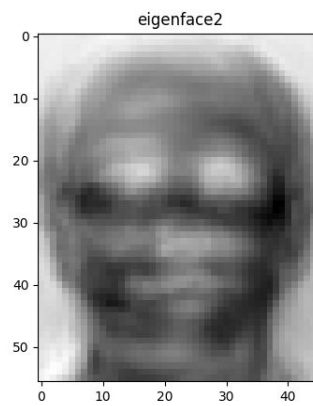
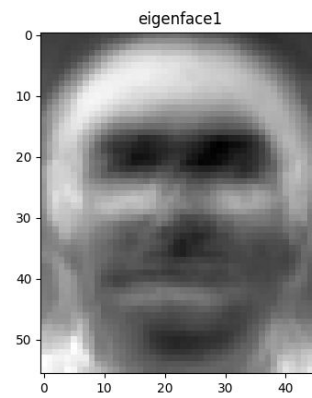
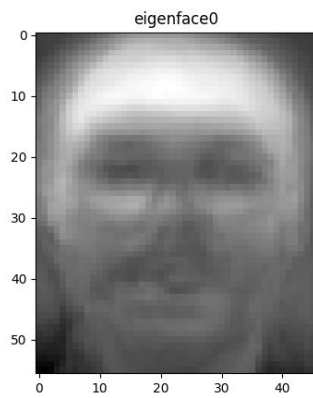
Since  $P(x|w1) \times P(w1) > P(x|w2) \times P(w2)$ , for  $0 \leq x \leq 5$

$P(x|w1) \times P(w1) < P(x|w2) \times P(w2)$ , for  $5 < x \leq 6$

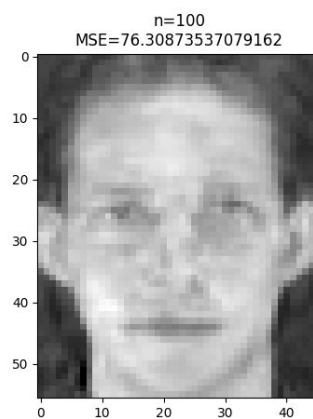
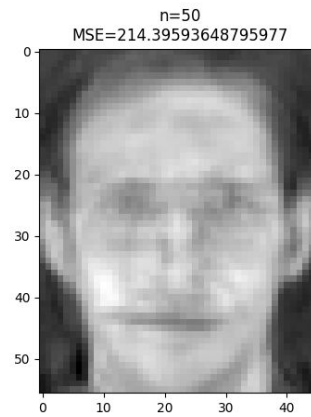
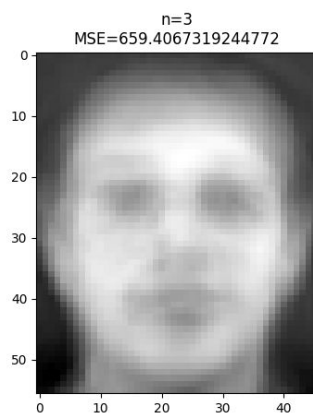
$R1 = [0, 5]$  and  $R2 = (5, 6]$

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

Problem 2:  
problem 2.a



## problem 2.b



## problem 2.c

```
k=1, n=3      | validation accu=0.7041666666666667
k=1, n=50     | validation accu=0.95
k=1, n=159    | validation accu=0.9583333333333334
k=3, n=3      | validation accu=0.6416666666666667
k=3, n=50     | validation accu=0.9041666666666667
k=3, n=159    | validation accu=0.9083333333333333
k=5, n=3      | validation accu=0.5708333333333333
k=5, n=50     | validation accu=0.8208333333333333
k=5, n=159    | validation accu=0.8166666666666667
k=1, n=159    | prediction accu=0.94375
HOMEPC15:40 kevin-MS-7A34@kevin:~/Documents/github/DLCV/hw1$
```

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