Szeregi czasowe - Eigenfaces

Sprawozdanie z laboratorium

Wykonali:
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In [19]:
```
from matplotlib import pyplot as plt
from matplotlib.image import imread
import numpy as np
import os
import math
```

In [20]:
```
images_path = 'images/'
images_dir  = os.listdir(images_path)
```

In [21]:
```
# zamiana na rgb
def rgb_to_grayscale(rgb):
    return np.dot(rgb[...,:3], [0.2989, 0.5870, 0.1140])
```

In [22]:
```
# wyświetlenie obrazków
def display_images(images):
    for i in range(images.shape[0]):
        img = images[i].reshape(height,width)
        plt.subplot(math.ceil(images_count / 5), 5, i+1)
        plt.imshow(img, cmap='gray')
        plt.subplots_adjust(right=1.2, top=1.2)
    plt.show()
```

Wczytanie obrazków i zamian na skalę szarości

In [23]:
```
width  = 250
height = 250
images_count = len(images_dir)
images = np.zeros((images_count, height*width))
for i in range(images_count):
    img = rgb_to_grayscale(imread(images_path + images_dir[i]))
    images[i] = np.array(img.flatten('C'), dtype='float64').flatten()

display_images(images)
```

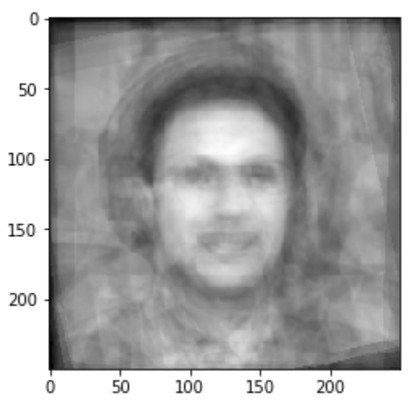
Wyliczenie średniego obrazu

In [24]:
```
mean_face = np.zeros((1, height * width))

for image in images:
    mean_face = mean_face + image

mean_face = mean_face / images.shape[0]

plt.imshow(mean_face.reshape(height, width), cmap='gray')
plt.show()
```



Znormalizowanie pozostałych obrazków (odjęcie średniego obrazu)

In [25]:
```
normalised_images = np.ndarray(shape=images.shape)

for i in range(normalised_images.shape[0]):
    normalised_images[i] = np.subtract(images[i], mean_face)

display_images(normalised_images)
```

In [26]:
```
covariance_matrix = np.cov(normalised_images.transpose())
```

```
---------------------------------------------------------------------------
MemoryError                               Traceback (most recent call last)
<ipython-input-26-6d3ddeba22c9> in <module>
----> 1 covariance_matrix = np.cov(normalised_images.transpose())

C:\ProgramData\Anaconda3\lib\site-packages\numpy\lib\function_base.py in cov(m, y, rowvar, bias, ddof, fweights, aweights)
   2448     else:
   2449         X_T = (X*w).T
-> 2450     c = dot(X, X_T.conj())
   2451     c *= np.true_divide(1, fact)
   2452     return c.squeeze()

MemoryError:
```

Nie można obliczyć macierzy kowariancji z powodu zbyt dużej ilości danych (brak pamięci)

In [ ]:
```

```