

```

1 import sys
2 import cv2
3 import numpy as np
4
5
6 def run():
7     filename = sys.argv[-1]
8     img = cv2.imread(filename, 0)
9     name = filename.split('.')[0]
10
11     noise_cnt = 12
12     noised_imgs = np.array(range(noise_cnt), object)
13     for i in range(noise_cnt):
14         noised_imgs[i] = add_gaussian_noise(img, 20)
15         cv2.imwrite(name + "_noise_" + str(i) + ".png", noised_imgs[i])
16
17     avarage_img = average_imgs(noised_imgs)
18     cv2.imwrite(name + "_noise_removed.png", avarage_img)
19
20
21 def add_gaussian_noise(img: np.ndarray, strength: int) -> np.ndarray:
22     height, width = img.shape
23     noised_img = np.zeros((height, width), np.float64)
24     for h in range(height):
25         for w in range(width):
26             noise = strength * np.random.normal()
27             noised_img[h][w] = img[h][w] + noise
28     return noised_img
29
30
31 def average_imgs(imgs: np.ndarray) -> np.ndarray:
32     height, width = imgs[0].shape
33     length = len(imgs)
34     avarage_img = np.zeros((height, width), np.float64)
35     for h in range(height):
36         for w in range(width):
37             sum = 0
38             for i in range(length):
39                 sum += imgs[i][h][w]
40             if sum / length > 255:
41                 avarage_img[h][w] = 255
42             else:
43                 avarage_img[h][w] = sum / length
44     return avarage_img
45
46
47 run()

```

A black and white photograph of a woman with long, dark hair, wearing a wide-brimmed straw hat with a veil. She is looking over her shoulder towards the camera. The background is blurred, showing what appears to be a car wheel and some architectural elements.

A black and white photograph of a woman with long, dark, wavy hair. She is wearing a light-colored, wide-brimmed hat with a dark band. She is looking over her right shoulder towards the camera. She is wearing a dark, possibly leather, jacket. The background is out of focus, showing some vertical lines and a curved shape, possibly part of a car or a building.

A black and white photograph of a woman with long, dark, wavy hair. She is wearing a light-colored, wide-brimmed hat with a sheer veil that covers her eyes. She is looking back over her right shoulder towards the camera with a slight smile. The background is dark and out of focus, showing some vertical lines.

