cv-1-1

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[ ]:
```python
import cv2
import numpy as np
import matplotlib.pyplot as plt

class Image_filter:
    def __init__(self, img_path):
        self.img_path = img_path
        self.img = self.load_image()

    def load_image(self):
        img = cv2.imread(self.img_path, cv2.IMREAD_GRAYSCALE)
        if img is None:
            print("Error: Unable to load the image. Please check the file path.
 ↪")
        return img

    def display_image(self, image, title):
        plt.figure(figsize=(8, 8))
        plt.imshow(image, cmap='gray')
        plt.title(title)
        plt.axis('off')
        plt.show()

    def Sobel_Filter(self):
        sobelx = cv2.Sobel(self.img, cv2.CV_64F, 1, 0, ksize=3)
        sobely = cv2.Sobel(self.img, cv2.CV_64F, 0, 1, ksize=3)
        sobel = np.sqrt(sobelx**2 + sobely**2)
        return sobel

    def Median_Filter(self):
        return cv2.medianBlur(self.img, 5)

    def Gaussian_Filter(self):
        return cv2.GaussianBlur(self.img, (5, 5), 0)

    def Averaging_Filter(self):
        return cv2.blur(self.img, (5, 5))
```

```
    def apply_filter(self, choice):
        filters = {
            1: ('Sobel Filter', self.Sobel_Filter),
            2: ('Median Filter', self.Median_Filter),
            3: ('Gaussian Filter', self.Gaussian_Filter),
            4: ('Averaging Filter', self.Averaging_Filter)
        }
        if choice in filters:
            filter_name, filter_func = filters[choice]
            result = filter_func()
            self.display_image(result, filter_name)
        else:
            print("Invalid choice. Please select a number between 1 and 4.")



img_path = 'img2.jfif'
image_filter = Image_filter(img_path)


if image_filter.img is not None:
    image_filter.display_image(image_filter.img, 'Original Image')

while True:
    print("Choose a filter:")
    print("1. Sobel Filter")
    print("2. Median Filter")
    print("3. Gaussian Filter")
    print("4. Averaging Filter")

    try:
        choice = int(input("Enter which filter you want to choose: "))
        image_filter.apply_filter(choice)
    except ValueError:
        print("Invalid input. Please enter a number.")
```

Original Image

```
Choose a filter:
1. Sobel Filter
2. Median Filter
3. Gaussian Filter
4. Averaging Filter
Enter which filter you want to choose: 1
```

Sobel Filter

```
Choose a filter:
1. Sobel Filter
2. Median Filter
3. Gaussian Filter
4. Averaging Filter
Enter which filter you want to choose: 2
```

Median Filter

```
Choose a filter:
1. Sobel Filter
2. Median Filter
3. Gaussian Filter
4. Averaging Filter
Enter which filter you want to choose: 3
```

Gaussian Filter

```
Choose a filter:
1. Sobel Filter
2. Median Filter
3. Gaussian Filter
4. Averaging Filter
Enter which filter you want to choose: 4
```


```
Choose a filter:
1. Sobel Filter
2. Median Filter
3. Gaussian Filter
4. Averaging Filter
```

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