image_compression

March 29, 2025

[2]:
```
import numpy as np
import matplotlib.pyplot as plt
from PIL import Image
```

1 import image

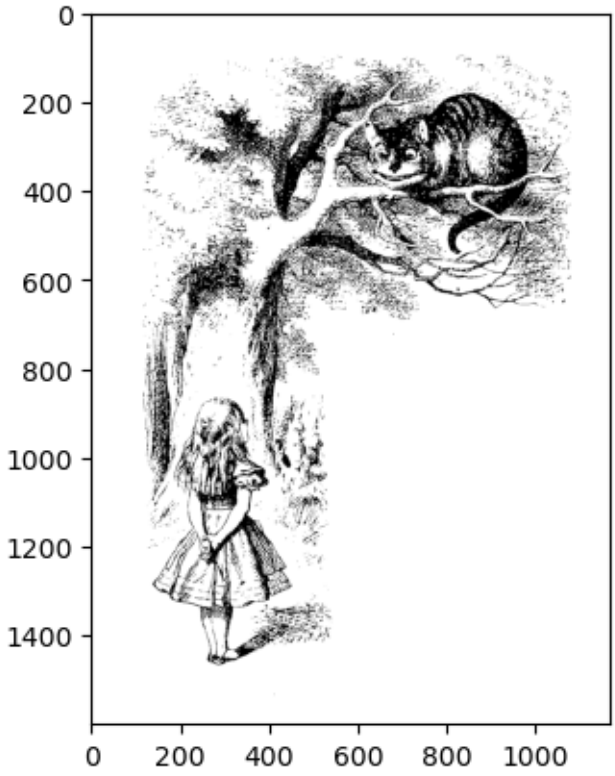
[3]:
```
gif_path = "p5_image.gif"
image = Image.open(gif_path)  #

image_array = np.array(image)
print(image_array.shape)

plt.imshow(image_array, cmap='gray')
```

```
(1600, 1170)
```

[3]:
```
<matplotlib.image.AxesImage at 0x1c8fa60c8c0>
```



2 perform SVD for image compression

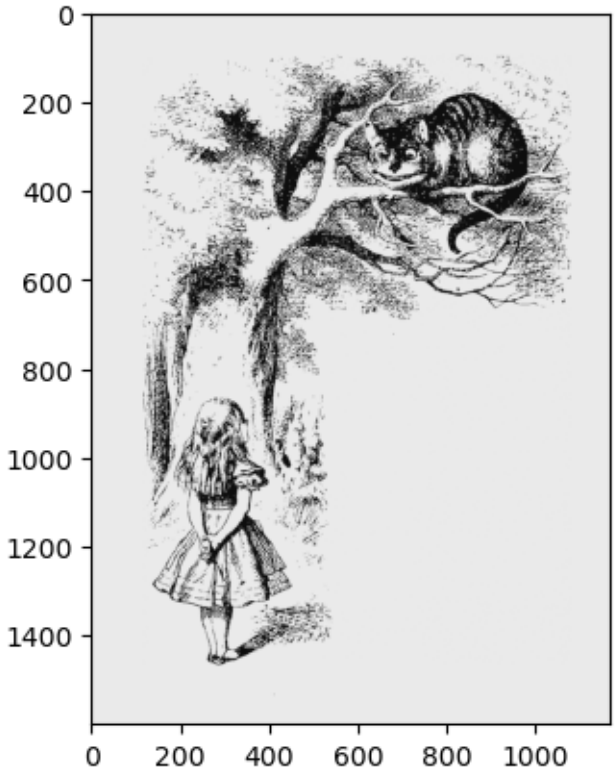
[4]:
```
k = 800

U, s, Vh = np.linalg.svd(image_array)
Uk = U[:, :k]
sk = s[:k]
Vk = Vh[:k, :]
image_array_k = Uk @ np.diag(sk) @ Vk

image_array_k = (image_array_k - np.min(image_array_k)) / (np.
 ↪max(image_array_k) - np.min(image_array_k))


plt.imshow(image_array_k, cmap='gray')
```

[4]:
```
<matplotlib.image.AxesImage at 0x1c8fbae55b0>
```


0
200
400
600
800
1000
1200
1400
0
200
400
600
800
1000