t80wozyuv

February 6, 2025

1 PROJECT 1 : IMAGE PROCESSING WITH MATPLOTLIB

[1]:
```
import numpy as np
```

[4]:
```
ones_arr = np.ones((5,5))
```

[5]:
```
ones_arr
```

[5]:
```
array([[1., 1., 1., 1., 1.],
       [1., 1., 1., 1., 1.],
       [1., 1., 1., 1., 1.],
       [1., 1., 1., 1., 1.],
       [1., 1., 1., 1., 1.]])
```

[6]:
```
ones_arr = np.ones((5,5),dtype=int)
```

[7]:
```
ones_arr
```

[7]:
```
array([[1, 1, 1, 1, 1],
       [1, 1, 1, 1, 1],
       [1, 1, 1, 1, 1],
       [1, 1, 1, 1, 1],
       [1, 1, 1, 1, 1]])
```

[8]:
```
zeros_arr = np.zeros((5,5),dtype=int)
```

[9]:
```
zeros_arr
```

[9]:
```
array([[0, 0, 0, 0, 0],
       [0, 0, 0, 0, 0],
       [0, 0, 0, 0, 0],
       [0, 0, 0, 0, 0],
       [0, 0, 0, 0, 0]])
```

[10]:
```
ones_arr * 255
```

[10]:
```
array([[255, 255, 255, 255, 255],
       [255, 255, 255, 255, 255],
       [255, 255, 255, 255, 255],
       [255, 255, 255, 255, 255],
       [255, 255, 255, 255, 255]])
```

[11]:
```
import matplotlib.pyplot as plt
```

[12]:
```
%matplotlib inline
```

[20]:
```
from PIL import Image
```

[21]:
```
horse_img = Image.open(r"C:
 ↪\Users\Sambhaji(Sam)Nanavar\Downloads\pexels-photo-1996333.jpeg")
```

[22]:
```
horse_img
```

[22]:

[26]:
```
elephant_image = Image.open(r"C:
 ↪\Users\Sambhaji(Sam)Nanavar\Downloads\Elephas_maximus_(Bandipur).jpg")
elephant_image
```

[26]:

[28]:
```
type(horse_img)                # type of horse image
```

[28]:
```
PIL.JpegImagePlugin.JpegImageFile
```

[31]:
```
type(elephant_image)           # type of elephant image
```

[31]:
```
PIL.JpegImagePlugin.JpegImageFile
```

[32]:
```
horse_arr = np.asarray(horse_img)     # convert image to array
horse_arr
```

[32]:
```
array([[[15, 17, 29],
        [15, 17, 29],
        [15, 17, 29],
        …,
        [23, 38, 35],
        [19, 34, 31],
        [14, 30, 27]],

       [[15, 17, 29],
        [15, 17, 29],
        [15, 17, 29],
        …,
```

```
        [24, 39, 36],
        [22, 37, 34],
        [20, 36, 33]],

       [[15, 17, 29],
        [15, 17, 29],
        [15, 17, 29],
        …,
        [26, 41, 38],
        [25, 40, 37],
        [24, 40, 37]],

       …,

       [[49, 50, 44],
        [40, 41, 33],
        [35, 34, 29],
        …,
        [14, 30, 29],
        [13, 25, 25],
        [11, 23, 23]],

       [[45, 50, 44],
        [38, 43, 36],
        [33, 35, 30],
        …,
        [11, 25, 25],
        [12, 24, 24],
        [16, 26, 27]],

       [[33, 40, 33],
        [33, 40, 33],
        [33, 38, 32],
        …,
        [12, 26, 26],
        [16, 26, 27],
        [22, 32, 33]]], dtype=uint8)
```

[36]:
```
elephant_arr = np.asarray(elephant_image)    # convert elephant img to arr
elephant_arr
```

[36]:
```
array([[[ 62,  68,  22],
        [ 69,  76,  22],
        [ 75,  84,  17],
        …,
        [ 61,  67,  33],
        [ 61,  66,  34],
```

```
        [ 59,  62,  31]],

       [[ 70,  77,  23],
        [ 74,  82,  25],
        [ 83,  93,  20],
        …,
        [ 56,  61,  31],
        [ 56,  60,  33],
        [ 60,  63,  36]],

       [[ 78,  85,  33],
        [ 81,  89,  29],
        [ 85,  96,  20],
        …,
        [ 56,  60,  35],
        [ 55,  59,  34],
        [ 57,  59,  35]],

       …,

       [[159, 168, 101],
        [130, 142,  70],
        [122, 138,  63],
        …,
        [146, 164,  80],
        [154, 174,  85],
        [146, 165,  76]],

       [[166, 175, 108],
        [129, 140,  71],
        [126, 140,  65],
        …,
        [130, 145,  62],
        [151, 170,  81],
        [153, 172,  83]],

       [[169, 178, 113],
        [150, 161,  92],
        [146, 160,  85],
        …,
        [151, 167,  79],
        [165, 184,  94],
        [165, 181,  93]]], dtype=uint8)
```

[37]:
```
type(horse_arr)                # check the type of array
```

[37]:
```
numpy.ndarray
```

[38]:
```
type(elephant_arr)                # check the type of elephant array
```

[38]:
```
numpy.ndarray
```

[39]:
```
horse_arr.shape
```

[39]:
```
(2334, 3502, 3)
```

[40]:
```
elephant_arr.shape       # height , wearth, dim(red,gree,blue)
```

[40]:
```
(1732, 2598, 3)
```

[41]:
```
plt.imshow(horse_arr)
```

[41]:
```
<matplotlib.image.AxesImage at 0x20ac10c1d00>
```

[42]:
```
horse_red = horse_arr.copy()
```

[43]:
```
horse_red
```

[43]:
```
array([[[15, 17, 29],
        [15, 17, 29],
        [15, 17, 29],
        …,
```

```
        [23, 38, 35],
        [19, 34, 31],
        [14, 30, 27]],

       [[15, 17, 29],
        [15, 17, 29],
        [15, 17, 29],
        …,
        [24, 39, 36],
        [22, 37, 34],
        [20, 36, 33]],

       [[15, 17, 29],
        [15, 17, 29],
        [15, 17, 29],
        …,
        [26, 41, 38],
        [25, 40, 37],
        [24, 40, 37]],

       …,

       [[49, 50, 44],
        [40, 41, 33],
        [35, 34, 29],
        …,
        [14, 30, 29],
        [13, 25, 25],
        [11, 23, 23]],

       [[45, 50, 44],
        [38, 43, 36],
        [33, 35, 30],
        …,
        [11, 25, 25],
        [12, 24, 24],
        [16, 26, 27]],

       [[33, 40, 33],
        [33, 40, 33],
        [33, 38, 32],
        …,
        [12, 26, 26],
        [16, 26, 27],
        [22, 32, 33]]], dtype=uint8)
```

[44]:
```
horse_red == horse_arr
```

```
[44]: array([[[ True,  True,  True],
              [ True,  True,  True],
              [ True,  True,  True],
              …,
              [ True,  True,  True],
              [ True,  True,  True],
              [ True,  True,  True]],

             [[ True,  True,  True],
              [ True,  True,  True],
              [ True,  True,  True],
              …,
              [ True,  True,  True],
              [ True,  True,  True],
              [ True,  True,  True]],

             [[ True,  True,  True],
              [ True,  True,  True],
              [ True,  True,  True],
              …,
              [ True,  True,  True],
              [ True,  True,  True],
              [ True,  True,  True]],

             …,

             [[ True,  True,  True],
              [ True,  True,  True],
              [ True,  True,  True],
              …,
              [ True,  True,  True],
              [ True,  True,  True],
              [ True,  True,  True]],

             [[ True,  True,  True],
              [ True,  True,  True],
              [ True,  True,  True],
              …,
              [ True,  True,  True],
              [ True,  True,  True],
              [ True,  True,  True]],

             [[ True,  True,  True],
              [ True,  True,  True],
              [ True,  True,  True],
              …,
              [ True,  True,  True],
```

```
        [ True,  True,  True],
        [ True,  True,  True]]])
```

[45]:
```
plt.imshow(horse_red)
```

[45]:
```
<matplotlib.image.AxesImage at 0x20ac1346ff0>
```

[46]:
```
horse_red.shape
```

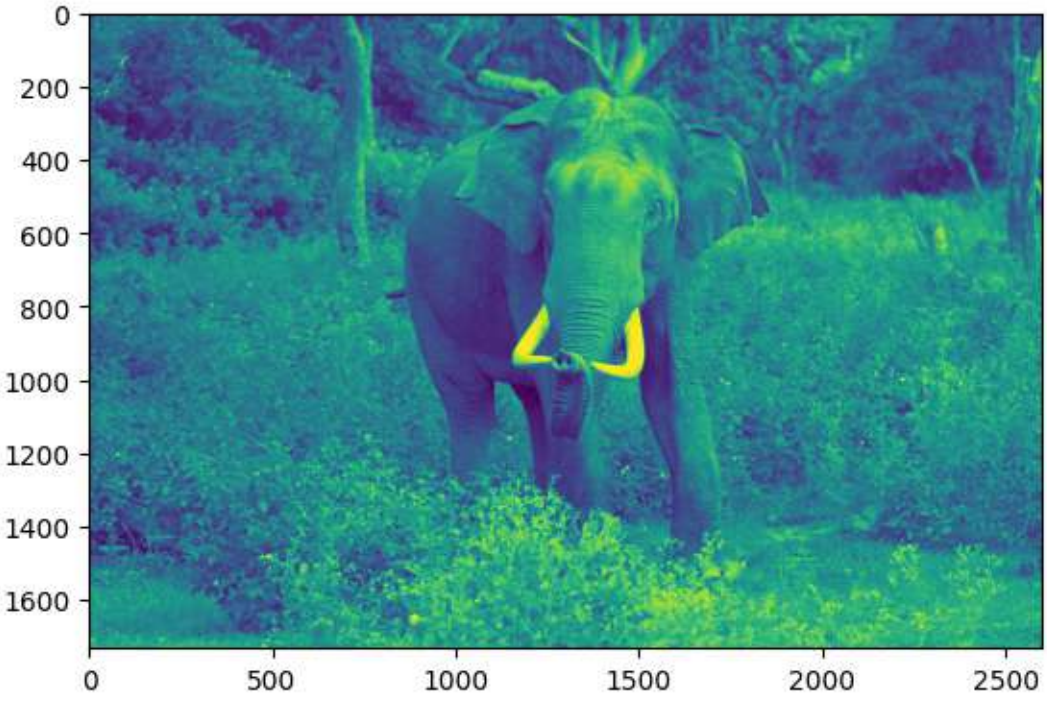
[46]:
```
(2334, 3502, 3)
```

[47]:
```
plt.imshow(horse_red[:,:,0])
```

[47]:
```
<matplotlib.image.AxesImage at 0x20ac1347e90>
```

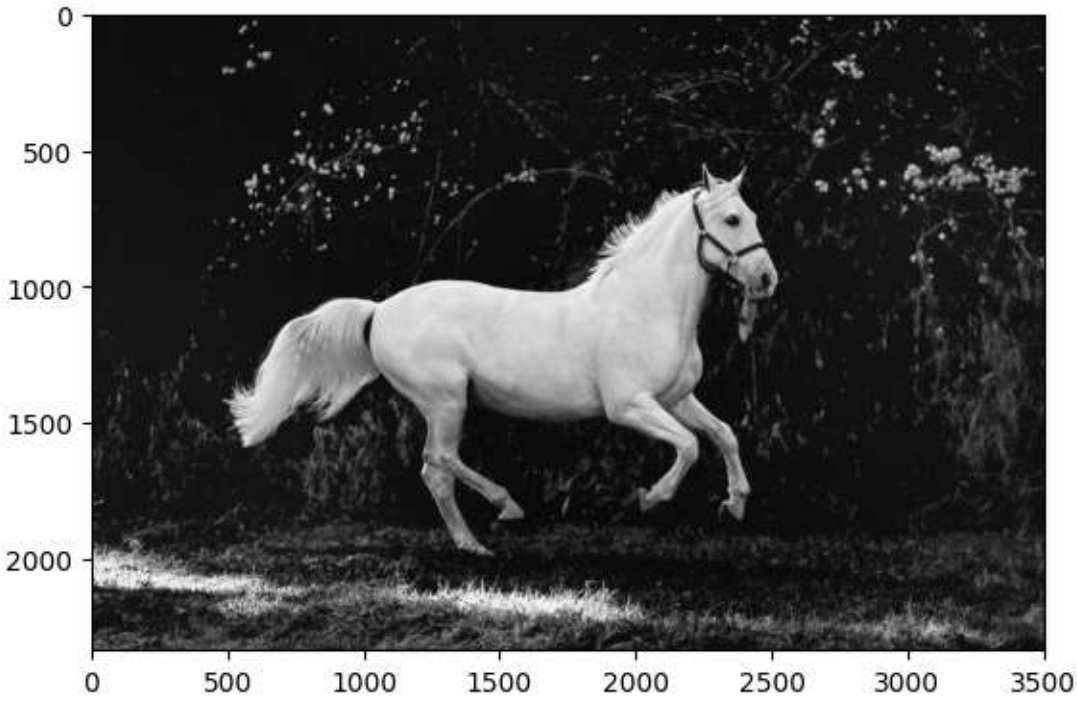
[49]:
```
plt.imshow(elephant_arr[:,:,0])
```

[49]: <matplotlib.image.AxesImage at 0x20ac13a0950>



[50]:
```
plt.imshow(horse_red[:,:,0],cmap="gray")
```

[50]: <matplotlib.image.AxesImage at 0x20ac1437c20>



[51]:
```
plt.imshow(elephant_arr[:,:,0],cmap="gray")
```

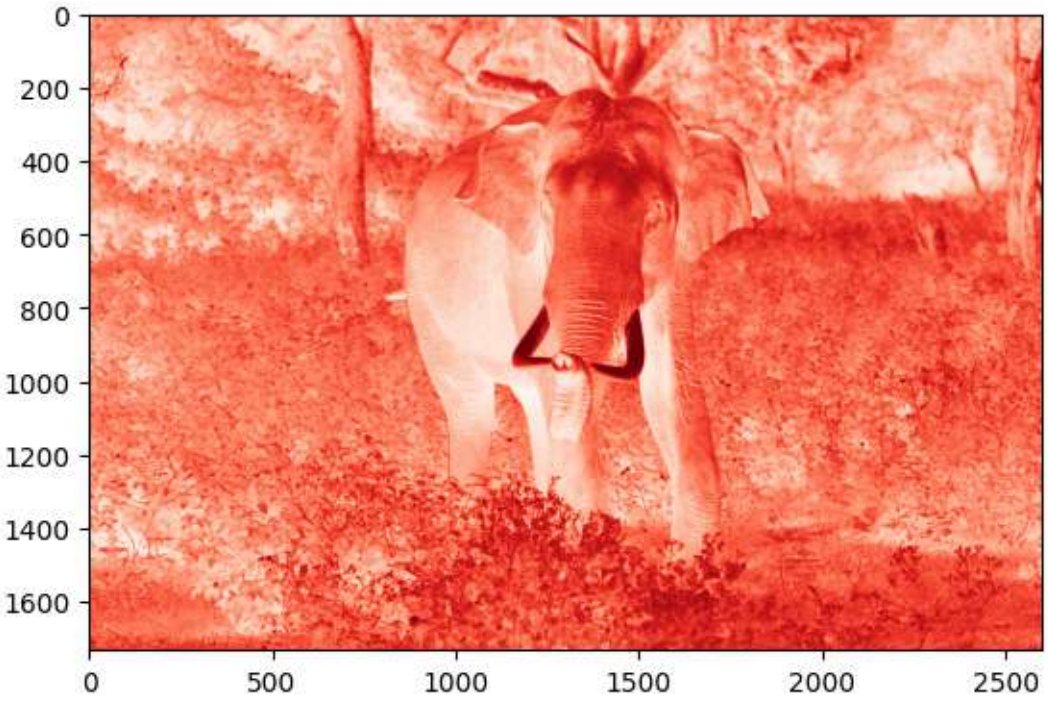
[51]: <matplotlib.image.AxesImage at 0x20ac13925a0>

[52]:
```
plt.imshow(horse_red[:,:,0],cmap="Reds")
```

[52]: <matplotlib.image.AxesImage at 0x20ad72b1760>

[53]:
```
plt.imshow(elephant_arr[:,:,0],cmap="Reds")
```

[53]:
```
<matplotlib.image.AxesImage at 0x20ad732fb30>
```



[54]:
```
horse_arr[:,:,0]      # if we hange the value in np array the image will change
```

[54]:
```
array([[15, 15, 15, …, 23, 19, 14],
       [15, 15, 15, …, 24, 22, 20],
       [15, 15, 15, …, 26, 25, 24],
       …,
       [49, 40, 35, …, 14, 13, 11],
       [45, 38, 33, …, 11, 12, 16],
       [33, 33, 33, …, 12, 16, 22]], dtype=uint8)
```

[55]:
```
horse_arr[:,:,1]
```

[55]:
```
array([[17, 17, 17, …, 38, 34, 30],
       [17, 17, 17, …, 39, 37, 36],
       [17, 17, 17, …, 41, 40, 40],
       …,
       [50, 41, 34, …, 30, 25, 23],
```

```
        [50, 43, 35, …, 25, 24, 26],
        [40, 40, 38, …, 26, 26, 32]], dtype=uint8)
```

[70]:
```
horse_red[:,:,2]
```

[70]:
```
array([[0, 0, 0, …, 0, 0, 0],
       [0, 0, 0, …, 0, 0, 0],
       [0, 0, 0, …, 0, 0, 0],
       …,
       [0, 0, 0, …, 0, 0, 0],
       [0, 0, 0, …, 0, 0, 0],
       [0, 0, 0, …, 0, 0, 0]], dtype=uint8)
```

[71]:
```
horse_red[:,:,2] = 0
```

[72]:
```
horse_red
```

[72]:
```
array([[[15,  0,  0],
        [15,  0,  0],
        [15,  0,  0],
        …,
        [23,  0,  0],
        [19,  0,  0],
        [14,  0,  0]],

       [[15,  0,  0],
        [15,  0,  0],
        [15,  0,  0],
        …,
        [24,  0,  0],
        [22,  0,  0],
        [20,  0,  0]],

       [[15,  0,  0],
        [15,  0,  0],
        [15,  0,  0],
        …,
        [26,  0,  0],
        [25,  0,  0],
        [24,  0,  0]],

       …,

       [[49,  0,  0],
        [40,  0,  0],
        [35,  0,  0],
        …,
```

```
        [14,  0,  0],
        [13,  0,  0],
        [11,  0,  0]],

       [[45,  0,  0],
        [38,  0,  0],
        [33,  0,  0],
        …,
        [11,  0,  0],
        [12,  0,  0],
        [16,  0,  0]],

       [[33,  0,  0],
        [33,  0,  0],
        [33,  0,  0],
        …,
        [12,  0,  0],
        [16,  0,  0],
        [22,  0,  0]]], dtype=uint8)
```

[73]:
```
plt.imshow(horse_red)
```

[73]:
```
<matplotlib.image.AxesImage at 0x20ac46cc590>
```

[83]:
```
horse_red[:,:,1] = 0
```

[84]:
```
horse_red
```

[84]:
```
array([[[15,  0,  0],
        [15,  0,  0],
        [15,  0,  0],
        …,
        [23,  0,  0],
        [19,  0,  0],
        [14,  0,  0]],

       [[15,  0,  0],
        [15,  0,  0],
        [15,  0,  0],
        …,
        [24,  0,  0],
        [22,  0,  0],
        [20,  0,  0]],

       [[15,  0,  0],
        [15,  0,  0],
        [15,  0,  0],
        …,
        [26,  0,  0],
        [25,  0,  0],
        [24,  0,  0]],

       …,

       [[49,  0,  0],
        [40,  0,  0],
        [35,  0,  0],
        …,
        [14,  0,  0],
        [13,  0,  0],
        [11,  0,  0]],

       [[45,  0,  0],
        [38,  0,  0],
        [33,  0,  0],
        …,
        [11,  0,  0],
        [12,  0,  0],
        [16,  0,  0]],

       [[33,  0,  0],
```

```
        [33,  0,  0],
        [33,  0,  0],
        …,
        [12,  0,  0],
        [16,  0,  0],
        [22,  0,  0]]], dtype=uint8)
```

[80]:
```
plt.imshow(horse_red)
```

[80]:
```
<matplotlib.image.AxesImage at 0x20ad97d60f0>
```

[81]:
```
horse_img          # original image
```

[81]:

[ ]: