ay-conversation-using-pil-np-plt

October 8, 2024

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

[2]:
```
ones_arr = np.ones((5,5))
```

[3]:
```
ones_arr
```

[3]:
```
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.]])
```

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

[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]:
```
zeros_arr =np.zeros((3,3),dtype = int)
```

[7]:
```
zeros_arr
```

[7]:
```
array([[0, 0, 0],
       [0, 0, 0],
       [0, 0, 0]])
```

[8]:
```
ones_arr
```

[8]:
```
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]])
```

[9]:
```
ones_arr * 255
```

[9]:
```
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]])
```

[10]:
```
import matplotlib.pyplot as plt
```

[11]:
```
%matplotlib inline
```

[12]:
```
from PIL import Image #python image library
```

[13]:
```
car_img = Image.open(r"C:
↪\Users\sudar\Pictures\002\audi-e-tron-nfs-heat-4k-ne-3840x2160.jpg")
```

[14]:
```
car_img
```

[14]:

[15]:
```
type(car_img)
```

[15]:
```
PIL.JpegImagePlugin.JpegImageFile
```

[16]:
```
car_arr = np.asarray(car_img)
car_arr
```

```
[16]: array([[[160, 103,  36],
              [151,  96,  40],
              [135,  89,  40],
              …,
              [ 51,  56,  88],
              [ 48,  51, 102],
              [ 45,  59, 108]],

             [[162, 103,  33],
              [145,  87,  39],
              [147,  96,  33],
              …,
              [ 65,  62,  91],
              [ 56,  56,  84],
              [ 67,  62, 102]],

             [[145,  81,  37],
              [154,  88,  28],
              [155,  98,  29],
              …,
              [ 68,  61,  77],
              [ 67,  51,  87],
              [ 52,  45,  86]],

             …,

             [[ 66,  66,  74],
              [ 60,  56,  70],
              [ 67,  54,  61],
              …,
              [213,  90, 197],
              [212,  77, 195],
              [197,  91, 189]],

             [[ 44,  35,  40],
              [ 41,  39,  27],
              [ 41,  39,  50],
              …,
              [203,  92, 186],
              [210,  77, 192],
              [201,  92, 185]],

             [[ 19,  23,  34],
              [ 40,  38,  25],
              [ 40,  35,  32],
              …,
              [198,  90, 175],
```

```
        [191,  95, 202],
        [188,  88, 174]]], dtype=uint8)
```

[17]:
```
type(car_arr)
```

[17]:
```
numpy.ndarray
```

[18]:
```
car_arr.shape
```

[18]:
```
(2160, 3840, 3)
```

[19]:
```
plt.imshow(car_arr)
```

[19]:
```
<matplotlib.image.AxesImage at 0x1732214b290>
```

[20]:
```
car_red = car_arr.copy()
```

[21]:
```
car_red
```

[21]:
```
array([[[160, 103,  36],
        [151,  96,  40],
        [135,  89,  40],
        …,
        [ 51,  56,  88],
        [ 48,  51, 102],
        [ 45,  59, 108]],
```

```
       [[162, 103,  33],
        [145,  87,  39],
        [147,  96,  33],
        …,
        [ 65,  62,  91],
        [ 56,  56,  84],
        [ 67,  62, 102]],

       [[145,  81,  37],
        [154,  88,  28],
        [155,  98,  29],
        …,
        [ 68,  61,  77],
        [ 67,  51,  87],
        [ 52,  45,  86]],

       …,

       [[ 66,  66,  74],
        [ 60,  56,  70],
        [ 67,  54,  61],
        …,
        [213,  90, 197],
        [212,  77, 195],
        [197,  91, 189]],

       [[ 44,  35,  40],
        [ 41,  39,  27],
        [ 41,  39,  50],
        …,
        [203,  92, 186],
        [210,  77, 192],
        [201,  92, 185]],

       [[ 19,  23,  34],
        [ 40,  38,  25],
        [ 40,  35,  32],
        …,
        [198,  90, 175],
        [191,  95, 202],
        [188,  88, 174]]], dtype=uint8)
```

[22]:
```
car_arr == car_red
```

[22]:
```
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]]])
```

[23]:
```
plt.imshow(car_red)
```

[23]: <matplotlib.image.AxesImage at 0x173231fab10>

[24]:
```
car_red.shape
```

[24]: (2160, 3840, 3)

[25]:
```
# R  G  B


plt.imshow(car_red[:,:,0])
```

[25]: <matplotlib.image.AxesImage at 0x17323287440>

[26]:
```
car_red[:,:,0]
```

[26]:
```
array([[160, 151, 135, …,  51,  48,  45],
       [162, 145, 147, …,  65,  56,  67],
       [145, 154, 155, …,  68,  67,  52],
       …,
       [ 66,  60,  67, …, 213, 212, 197],
       [ 44,  41,  41, …, 203, 210, 201],
       [ 19,  40,  40, …, 198, 191, 188]], dtype=uint8)
```

[27]:
```
plt.imshow(car_red[:,:,0], cmap = 'gray')     #https://matplotlib.org/stable/
 ↪gallery/color/colormap_reference.html
                                               # matplotlib colour libery
```

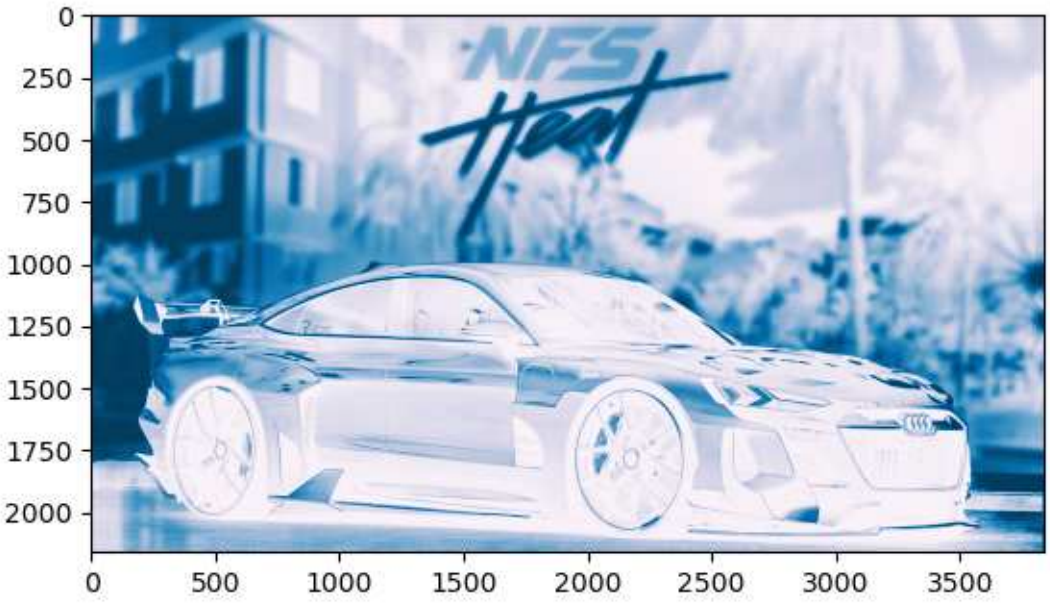
[27]:
```
<matplotlib.image.AxesImage at 0x17323286c00>
```

[28]:
```
plt.imshow(car_red[:,:,0], cmap = 'bwr')
```

[28]:
```
<matplotlib.image.AxesImage at 0x1732212ddc0>
```

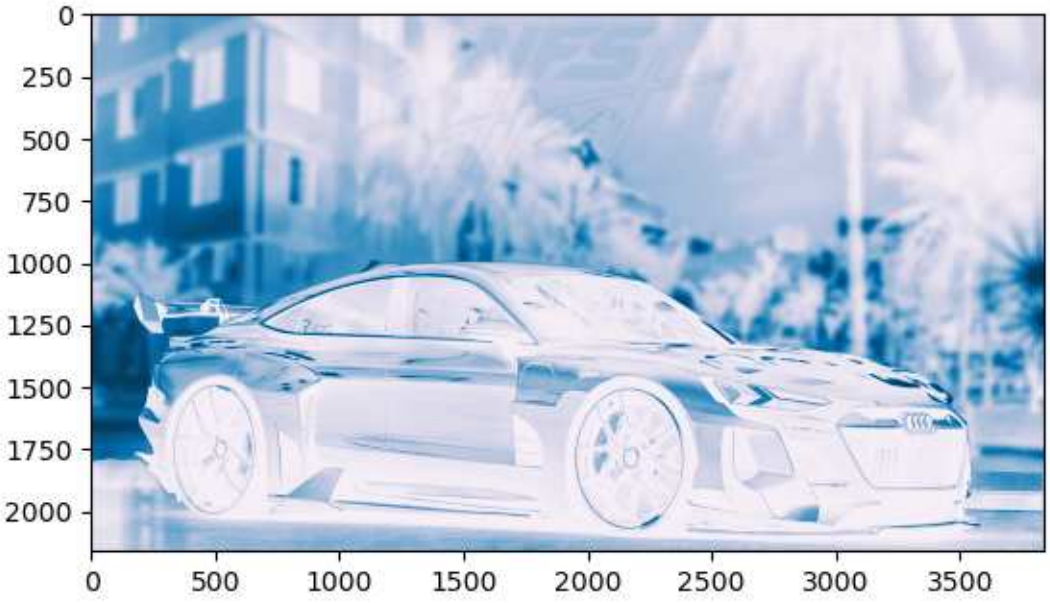
[29]:
```
plt.imshow(car_red[:,:,0], cmap = 'PuBu')
```

[29]: <matplotlib.image.AxesImage at 0x1732338d220>



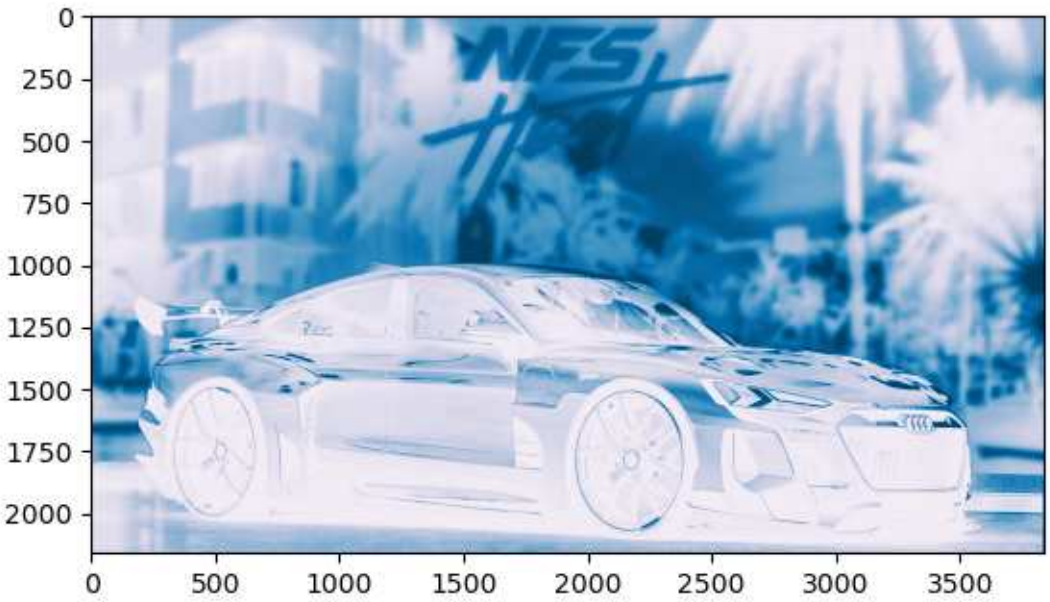
[30]:
```
plt.imshow(car_red[:,:,1], cmap = 'PuBu')
```

[30]: <matplotlib.image.AxesImage at 0x17323b42120>



[31]:
```
plt.imshow(car_red[:,:,2], cmap = 'PuBu')
```

[31]:
```
<matplotlib.image.AxesImage at 0x17323bc0980>
```



[32]:
```
car_red[:,:,0]
```

[32]:
```
array([[160, 151, 135, …,  51,  48,  45],
       [162, 145, 147, …,  65,  56,  67],
       [145, 154, 155, …,  68,  67,  52],
       …,
       [ 66,  60,  67, …, 213, 212, 197],
       [ 44,  41,  41, …, 203, 210, 201],
       [ 19,  40,  40, …, 198, 191, 188]], dtype=uint8)
```

[33]:
```
car_red[:,:,1]
```

[33]:
```
array([[103,  96,  89, …,  56,  51,  59],
       [103,  87,  96, …,  62,  56,  62],
       [ 81,  88,  98, …,  61,  51,  45],
       …,
       [ 66,  56,  54, …,  90,  77,  91],
       [ 35,  39,  39, …,  92,  77,  92],
       [ 23,  38,  35, …,  90,  95,  88]], dtype=uint8)
```

[34]:
```
car_red[:,:,2]
```

[34]:
```
array([[ 36,  40,  40, …,  88, 102, 108],
       [ 33,  39,  33, …,  91,  84, 102],
       [ 37,  28,  29, …,  77,  87,  86],
       …,
       [ 74,  70,  61, …, 197, 195, 189],
       [ 40,  27,  50, …, 186, 192, 185],
       [ 34,  25,  32, …, 175, 202, 174]], dtype=uint8)
```

[35]:
```
car_red[:,:,1] = 0
```

[36]:
```
car_red[:,:,1]
```

[36]:
```
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)
```

[37]:
```
plt.imshow(car_red)
```

[37]:
```
<matplotlib.image.AxesImage at 0x17323c69dc0>
```

[38]:
```
car_red[:,:,2]
```

[38]:
```
array([[ 36,  40,  40, …,  88, 102, 108],
       [ 33,  39,  33, …,  91,  84, 102],
       [ 37,  28,  29, …,  77,  87,  86],
       …,
       [ 74,  70,  61, …, 197, 195, 189],
       [ 40,  27,  50, …, 186, 192, 185],
       [ 34,  25,  32, …, 175, 202, 174]], dtype=uint8)
```

[39]:
```
car_red[:,:,2] = 0
```

[40]:
```
car_red[:,:,2]
```

[40]:
```
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)
```

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

[41]:
```
<matplotlib.image.AxesImage at 0x17323cdf6e0>
```

[42]:
```
car_arr
```

```
[42]: array([[[160, 103,  36],
              [151,  96,  40],
              [135,  89,  40],
              …,
              [ 51,  56,  88],
              [ 48,  51, 102],
              [ 45,  59, 108]],

             [[162, 103,  33],
              [145,  87,  39],
              [147,  96,  33],
              …,
              [ 65,  62,  91],
              [ 56,  56,  84],
              [ 67,  62, 102]],

             [[145,  81,  37],
              [154,  88,  28],
              [155,  98,  29],
              …,
              [ 68,  61,  77],
              [ 67,  51,  87],
              [ 52,  45,  86]],

             …,

             [[ 66,  66,  74],
              [ 60,  56,  70],
              [ 67,  54,  61],
              …,
              [213,  90, 197],
              [212,  77, 195],
              [197,  91, 189]],

             [[ 44,  35,  40],
              [ 41,  39,  27],
              [ 41,  39,  50],
              …,
              [203,  92, 186],
              [210,  77, 192],
              [201,  92, 185]],

             [[ 19,  23,  34],
              [ 40,  38,  25],
              [ 40,  35,  32],
              …,
              [198,  90, 175],
```

```
            [191,  95, 202],
            [188,  88, 174]]], dtype=uint8)
```

[43]:
```
car_red
```

[43]:
```
array([[[160,   0,   0],
        [151,   0,   0],
        [135,   0,   0],
        …,
        [ 51,   0,   0],
        [ 48,   0,   0],
        [ 45,   0,   0]],

       [[162,   0,   0],
        [145,   0,   0],
        [147,   0,   0],
        …,
        [ 65,   0,   0],
        [ 56,   0,   0],
        [ 67,   0,   0]],

       [[145,   0,   0],
        [154,   0,   0],
        [155,   0,   0],
        …,
        [ 68,   0,   0],
        [ 67,   0,   0],
        [ 52,   0,   0]],

       …,

       [[ 66,   0,   0],
        [ 60,   0,   0],
        [ 67,   0,   0],
        …,
        [213,   0,   0],
        [212,   0,   0],
        [197,   0,   0]],

       [[ 44,   0,   0],
        [ 41,   0,   0],
        [ 41,   0,   0],
        …,
        [203,   0,   0],
        [210,   0,   0],
        [201,   0,   0]],
```

```
       [[ 19,   0,   0],
        [ 40,   0,   0],
        [ 40,   0,   0],
        …,
        [198,   0,   0],
        [191,   0,   0],
        [188,   0,   0]]], dtype=uint8)
```

[44]:
```
car_img
```

[44]:

[45]:
```
arr1 = np.asarray(car_img)
```

[46]:
```
arr1
```

[46]:
```
array([[[160, 103,  36],
        [151,  96,  40],
        [135,  89,  40],
        …,
        [ 51,  56,  88],
        [ 48,  51, 102],
        [ 45,  59, 108]],

       [[162, 103,  33],
        [145,  87,  39],
        [147,  96,  33],
        …,
```

```
        [ 65,  62,  91],
        [ 56,  56,  84],
        [ 67,  62, 102]],

       [[145,  81,  37],
        [154,  88,  28],
        [155,  98,  29],
        …,
        [ 68,  61,  77],
        [ 67,  51,  87],
        [ 52,  45,  86]],

       …,

       [[ 66,  66,  74],
        [ 60,  56,  70],
        [ 67,  54,  61],
        …,
        [213,  90, 197],
        [212,  77, 195],
        [197,  91, 189]],

       [[ 44,  35,  40],
        [ 41,  39,  27],
        [ 41,  39,  50],
        …,
        [203,  92, 186],
        [210,  77, 192],
        [201,  92, 185]],

       [[ 19,  23,  34],
        [ 40,  38,  25],
        [ 40,  35,  32],
        …,
        [198,  90, 175],
        [191,  95, 202],
        [188,  88, 174]]], dtype=uint8)
```

[47]:
```
type(arr1)
```

[47]:
```
numpy.ndarray
```

[48]:
```
arr1.shape
```

[48]:
```
(2160, 3840, 3)
```

[49]:
```
plt.imshow(arr1)
```

[49]: <matplotlib.image.AxesImage at 0x17323b61eb0>

[50]:
```
car_img1 = arr1.copy()
```

[51]:
```
car_img1[:,:,0] = 0
```

[52]:
```
plt.imshow(car_img1)
```

[52]: <matplotlib.image.AxesImage at 0x17323d5cfb0>

[53]:
```
car_img1[:,:,1]
```

[53]:
```
array([[103,  96,  89, …,  56,  51,  59],
       [103,  87,  96, …,  62,  56,  62],
       [ 81,  88,  98, …,  61,  51,  45],
       …,
       [ 66,  56,  54, …,  90,  77,  91],
       [ 35,  39,  39, …,  92,  77,  92],
       [ 23,  38,  35, …,  90,  95,  88]], dtype=uint8)
```

[54]:
```
plt.imshow(car_img1)
```

[54]:
```
<matplotlib.image.AxesImage at 0x17323e80e90>
```


0
250
500
750
1000
1250
1500
1750
2000
0
500
1000
1500
2000
2500
3000
3500

[ ]: