

Image Processing

August 13, 2025

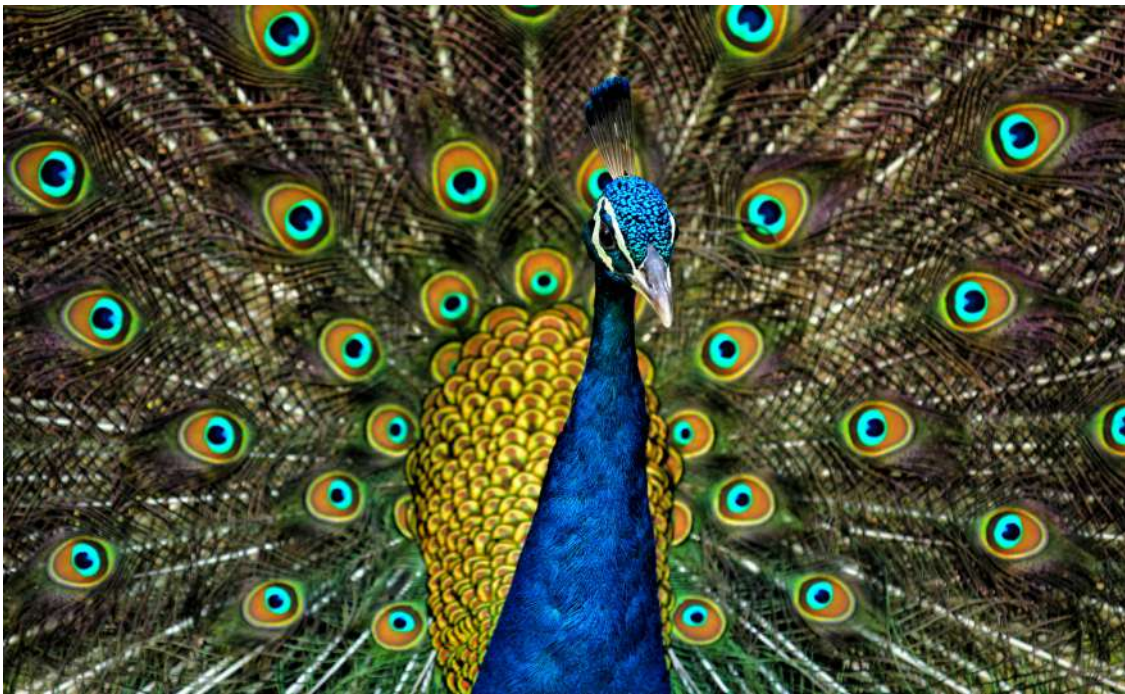
```
[14]: import matplotlib.pyplot as plt
```

```
[15]: %matplotlib inline
```

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

```
[38]: peacock_img = Image.open(r'/Users/manishuxuid/Desktop/FSDS/Peacock_Plumage.jpg')  
      peacock_img
```

[38]:



```
[39]: Nature_img = Image.open(r'/Users/manishuxuid/Desktop/FSDS/FSDS Notes/Nature.  
      ↪jpg')  
      Nature_img
```

[39]:



```
[41]: Tiger_img = Image.open(r'/Users/manishuxuid/Desktop/FSDS/FSDS Notes/Tiger.jpg')  
Tiger_img
```

[41]:



```
[42]: type(Tiger_img)
```

```
[42]: PIL.WebImagePlugin.WebImageFile
```

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

```
[45]: Tiger_arr = np.asarray(Tiger_img)
      Tiger_arr
```

```
[45]: array([[[ 66,  73,  53],
             [ 66,  73,  53],
             [ 66,  73,  53],
             ...,
             [170, 140,  98],
             [172, 140,  96],
             [170, 139,  93]],

            [[ 73,  80,  60],
             [ 73,  80,  60],
             [ 73,  80,  60],
             ...,
             [167, 135,  93],
             [167, 135,  91],
             [166, 135,  88]],

            [[ 82,  90,  69],
             [ 82,  90,  69],
             [ 82,  90,  69],
             ...,
             [161, 127,  86],
             [161, 128,  84],
             [160, 127,  81]],

            ...,

            [[152, 123,  78],
             [158, 129,  84],
             [163, 133,  91],
             ...,
             [188, 156, 114],
             [195, 163, 121],
             [197, 165, 124]],

            [[167, 141,  93],
             [161, 135,  89],
             [157, 130,  84],
             ...,
             [172, 143, 100],
             [180, 151, 108],
```



```

[187, 158, 115]],
[[164, 137, 89],
 [153, 127, 79],
 [151, 124, 78],
 ...,
 [164, 135, 92],
 [173, 144, 101],
 [182, 152, 110]]], dtype=uint8)

```

```
[46]: type(Tiger_arr)
```

```
[46]: numpy.ndarray
```

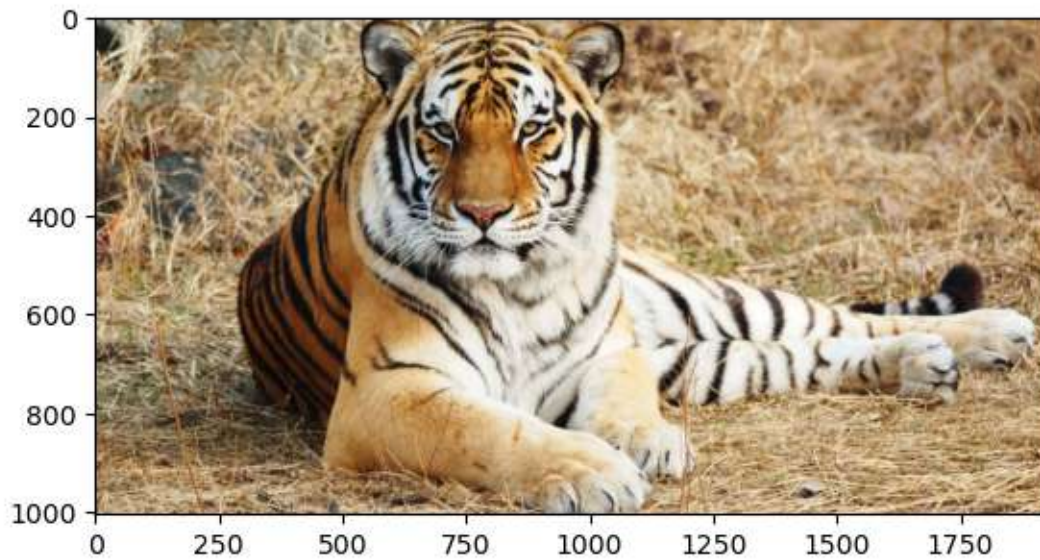
```
[47]: Tiger_arr.shape
```

```
[47]: (1004, 1928, 3)
```

```
[51]: plt.imshow(Tiger_arr)
```

```
[51]: <matplotlib.image.AxesImage at 0x12c6b3390>
```

```
[52]: plt.show()
```



```
[57]: Tiger_red = Tiger_arr.copy()
Tiger_red
```

```

[57]: array([[[ 66,  73,  53],
               [ 66,  73,  53],
               [ 66,  73,  53],
               ...,
               [170, 140,  98],
               [172, 140,  96],
               [170, 139,  93]],

             [[ 73,  80,  60],
               [ 73,  80,  60],
               [ 73,  80,  60],
               ...,
               [167, 135,  93],
               [167, 135,  91],
               [166, 135,  88]],

             [[ 82,  90,  69],
               [ 82,  90,  69],
               [ 82,  90,  69],
               ...,
               [161, 127,  86],
               [161, 128,  84],
               [160, 127,  81]],

             ...,

             [[152, 123,  78],
               [158, 129,  84],
               [163, 133,  91],
               ...,
               [188, 156, 114],
               [195, 163, 121],
               [197, 165, 124]],

             [[167, 141,  93],
               [161, 135,  89],
               [157, 130,  84],
               ...,
               [172, 143, 100],
               [180, 151, 108],
               [187, 158, 115]],

             [[164, 137,  89],
               [153, 127,  79],
               [151, 124,  78],
               ...,
               [164, 135,  92],

```

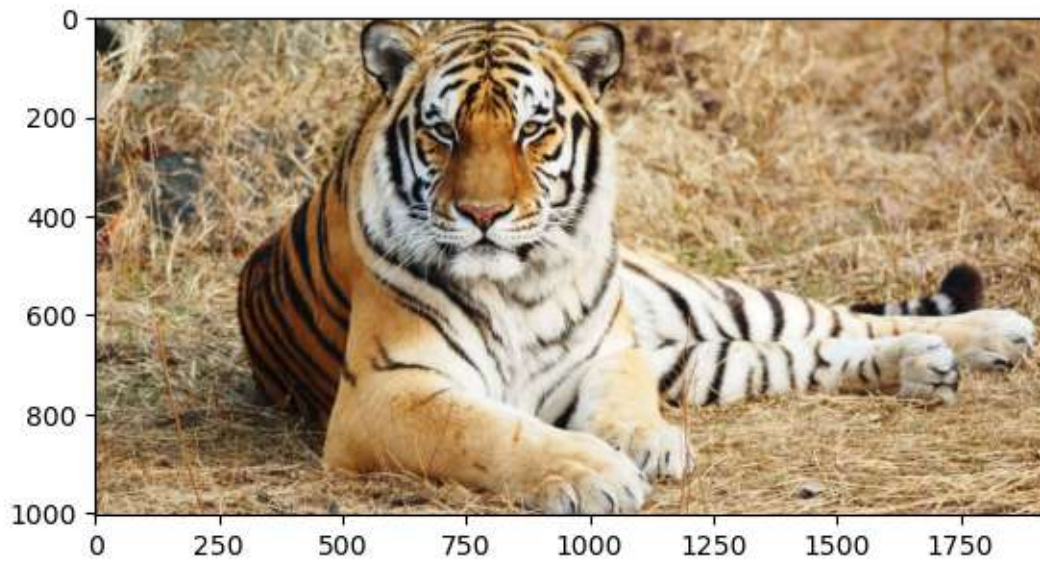
```
[173, 144, 101],  
[182, 152, 110]]], dtype=uint8)
```

```
[58]: Tiger_arr == Tiger_red
```

```
[58]: 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]]],  
          dtype=bool)
```

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

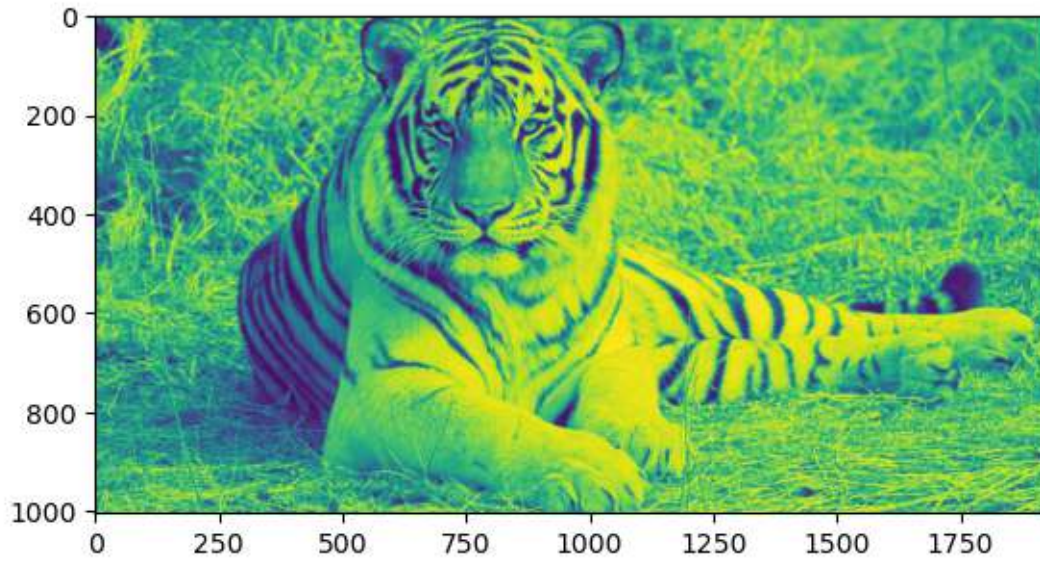
```
[60]: plt.imshow(Tiger_red)  
plt.show()
```



```
[61]: Tiger_red.shape
```

```
[61]: (1004, 1928, 3)
```

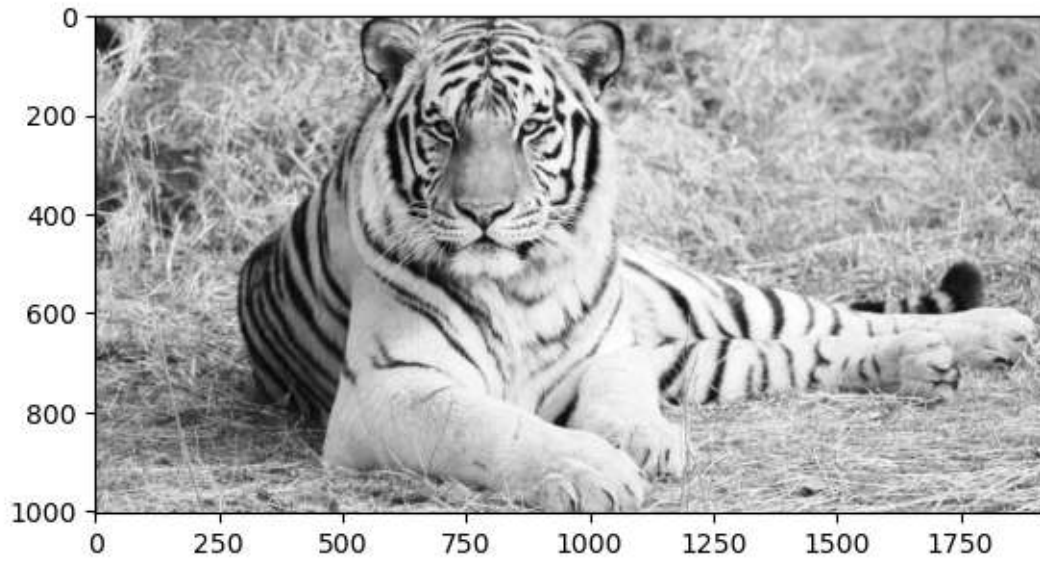
```
[63]: plt.imshow(Tiger_red[:, :, 0])  
plt.show()
```



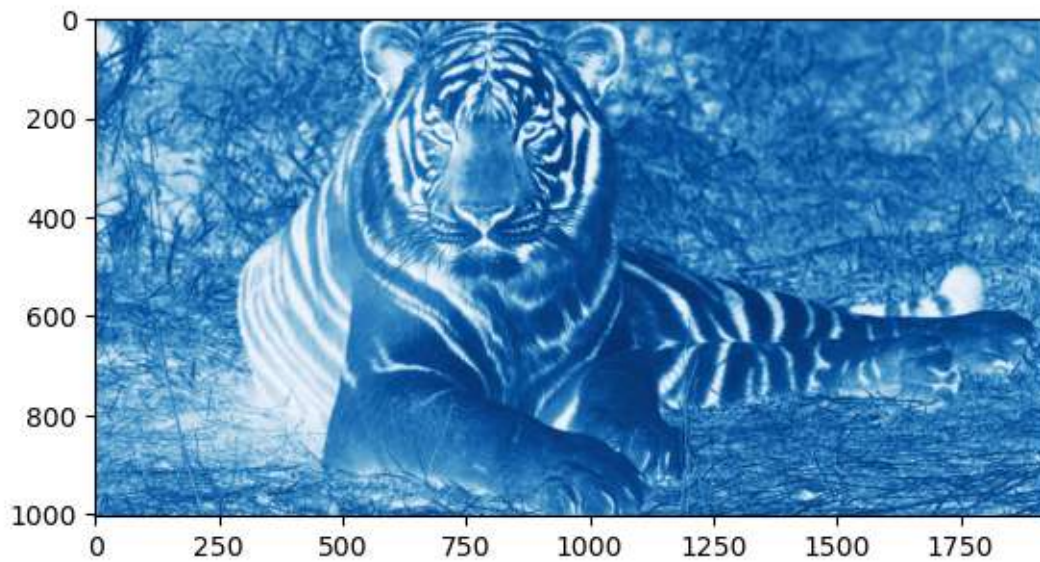
```
[64]: (Tiger_red[:, :, 0])
```

```
[64]: array([[ 66,  66,  66, ..., 170, 172, 170],  
          [ 73,  73,  73, ..., 167, 167, 166],  
          [ 82,  82,  82, ..., 161, 161, 160],  
          ...,  
          [152, 158, 163, ..., 188, 195, 197],  
          [167, 161, 157, ..., 172, 180, 187],  
          [164, 153, 151, ..., 164, 173, 182]], dtype=uint8)
```

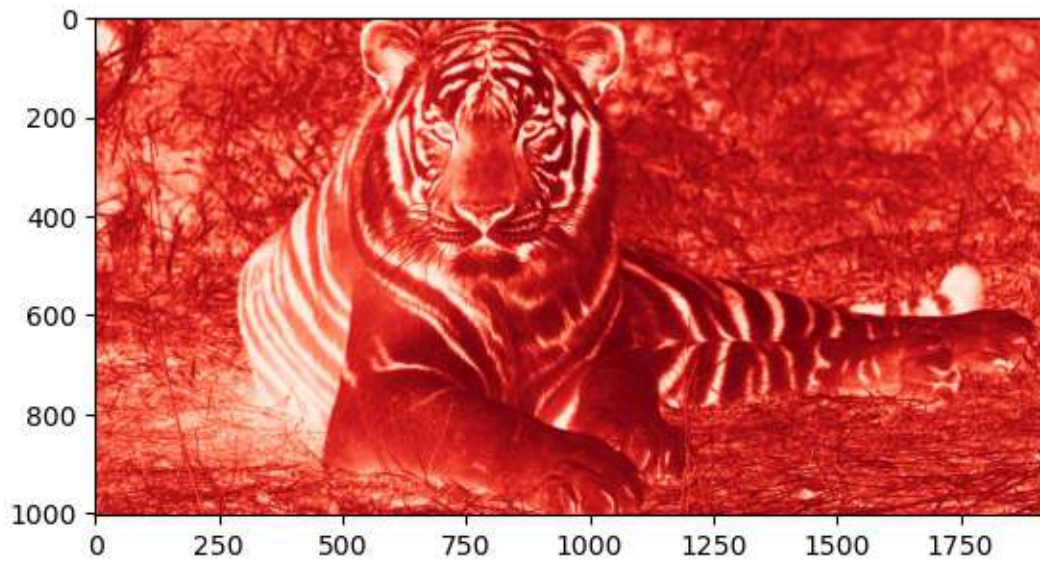
```
[66]: plt.imshow(Tiger_red[:, :, 0], cmap = 'gray')  
plt.show()
```

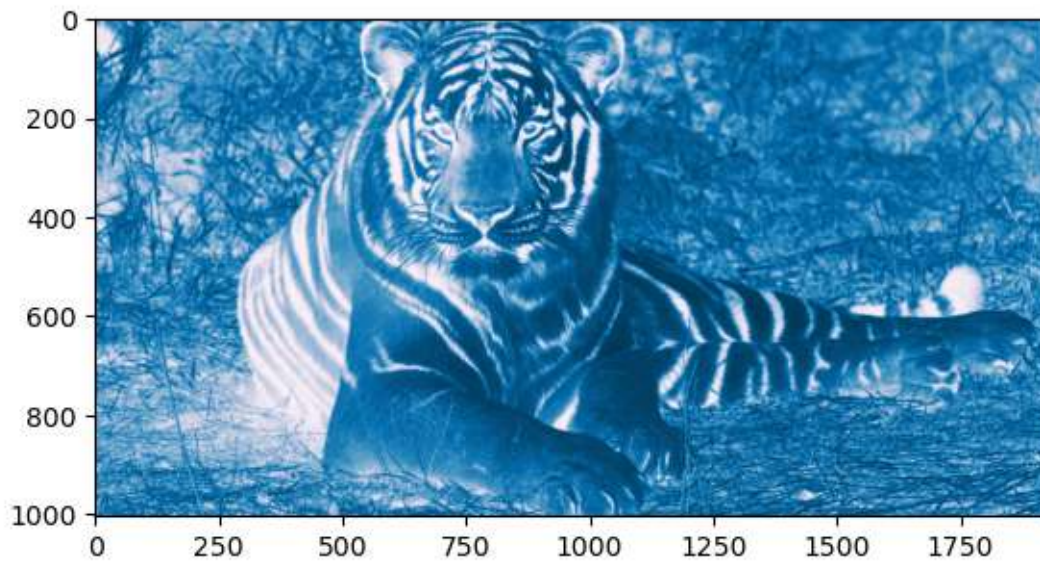
```
[69]: plt.imshow(Tiger_red[:, :, 0], cmap = 'Blues')  
plt.show()
```



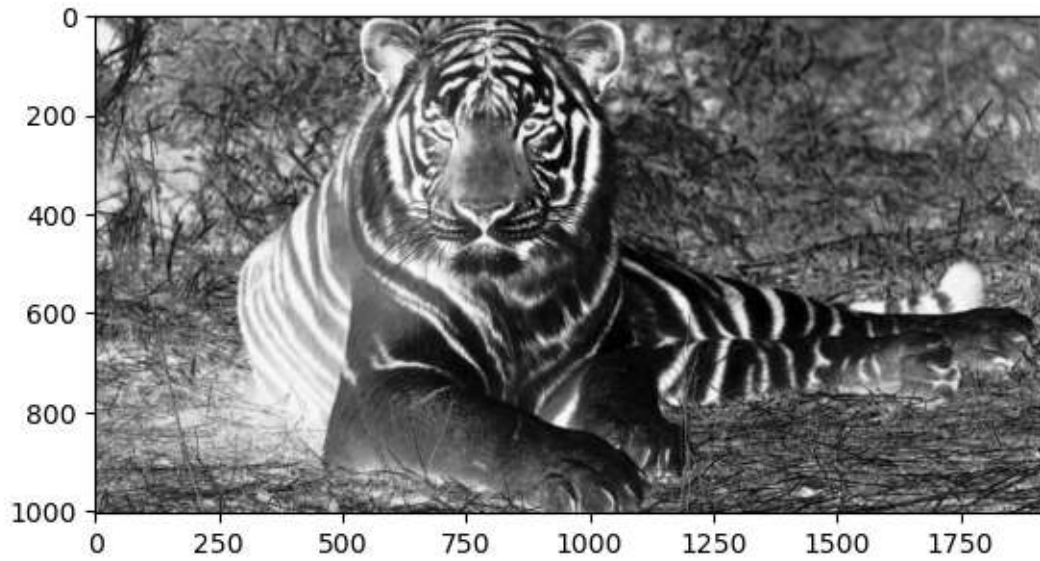
```
[70]: plt.imshow(Tiger_red[:, :, 0], cmap = 'Reds')  
plt.show()
```



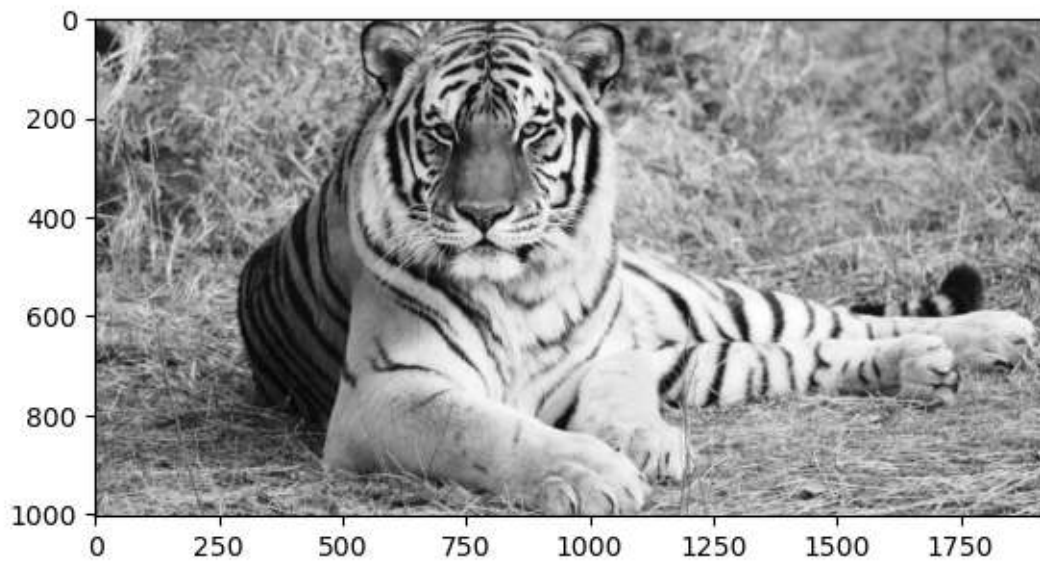
```
[71]: plt.imshow(Tiger_red[:, :, 0], cmap = 'PuBu')  
plt.show()
```



```
[72]: plt.imshow(Tiger_red[:, :, 0], cmap = 'Greys')  
plt.show()
```



```
[74]: plt.imshow(Tiger_red[:, :, 1], cmap = 'grey')
      plt.show()
```



```
[75]: (Tiger_red[:, :, 0])
```

```
[75]: array([[ 66,  66,  66, ..., 170, 172, 170],
            [ 73,  73,  73, ..., 167, 167, 166],
            [ 82,  82,  82, ..., 161, 161, 160],
```



```
...,
[152, 158, 163, ..., 188, 195, 197],
[167, 161, 157, ..., 172, 180, 187],
[164, 153, 151, ..., 164, 173, 182]], dtype=uint8)
```

```
[76]: (Tiger_red[:, :, 1])
```

```
[76]: array([[ 73,  73,  73, ..., 140, 140, 139],
[ 80,  80,  80, ..., 135, 135, 135],
[ 90,  90,  90, ..., 127, 128, 127],
...,
[123, 129, 133, ..., 156, 163, 165],
[141, 135, 130, ..., 143, 151, 158],
[137, 127, 124, ..., 135, 144, 152]], dtype=uint8)
```

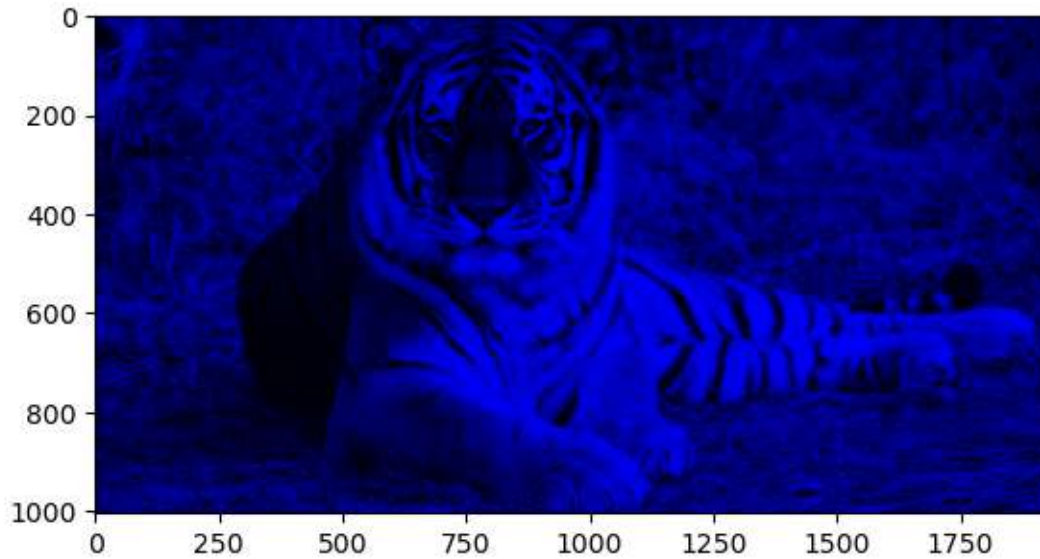
```
[77]: (Tiger_red[:, :, 2])
```

```
[77]: array([[ 53,  53,  53, ...,  98,  96,  93],
[ 60,  60,  60, ...,  93,  91,  88],
[ 69,  69,  69, ...,  86,  84,  81],
...,
[ 78,  84,  91, ..., 114, 121, 124],
[ 93,  89,  84, ..., 100, 108, 115],
[ 89,  79,  78, ...,  92, 101, 110]], dtype=uint8)
```

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

```
[83]: 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)
```

```
[85]: plt.imshow(Tiger_red)
plt.show()
```

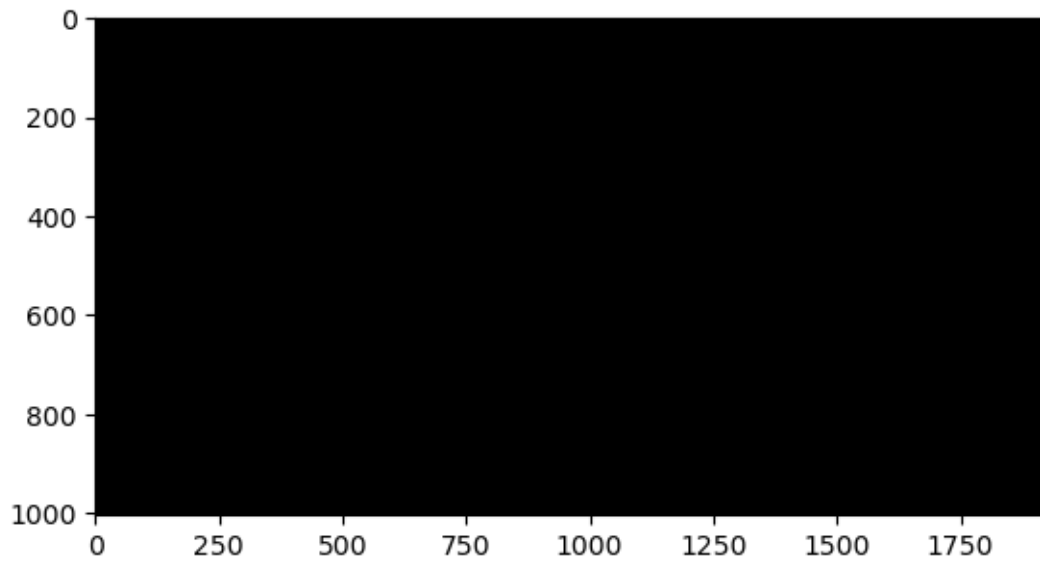
```
[86]: (Tiger_red[:, :, 2])
```

```
[86]: array([[ 53,  53,  53, ...,  98,  96,  93],
           [ 60,  60,  60, ...,  93,  91,  88],
           [ 69,  69,  69, ...,  86,  84,  81],
           ...,
           [ 78,  84,  91, ..., 114, 121, 124],
           [ 93,  89,  84, ..., 100, 108, 115],
           [ 89,  79,  78, ...,  92, 101, 110]], dtype=uint8)
```

```
[87]: Tiger_red[:, :, 2] = 0
      Tiger_red[:, :, 2]
```

```
[87]: 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)
```

```
[88]: plt.imshow(Tiger_red)
      plt.show()
```



```
[90]: Tiger_red
```

```
[90]: 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]],

          [[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]],

[[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)

```

[89]: Tiger_img

[89]:



```
[93]: arr1 = np.asarray(Tiger_img)
      arr1
```

```
[93]: array([[ 66,  73,  53],
             [ 66,  73,  53],
             [ 66,  73,  53],
             ...,
             [170, 140,  98],
             [172, 140,  96],
             [170, 139,  93]],

          [[ 73,  80,  60],
             [ 73,  80,  60],
             [ 73,  80,  60],
             ...,
             [167, 135,  93],
             [167, 135,  91],
             [166, 135,  88]],

          [[ 82,  90,  69],
             [ 82,  90,  69],
             [ 82,  90,  69],
             ...,
             [161, 127,  86],
             [161, 128,  84],
             [160, 127,  81]],

          ...,

          [[152, 123,  78],
             [158, 129,  84],
             [163, 133,  91],
             ...,
             [188, 156, 114],
             [195, 163, 121],
             [197, 165, 124]],

          [[167, 141,  93],
             [161, 135,  89],
             [157, 130,  84],
             ...,
             [172, 143, 100],
             [180, 151, 108],
             [187, 158, 115]],

          [[164, 137,  89],
             [153, 127,  79],
```



```
[151, 124, 78],  
...,  
[164, 135, 92],  
[173, 144, 101],  
[182, 152, 110]]], dtype=uint8)
```

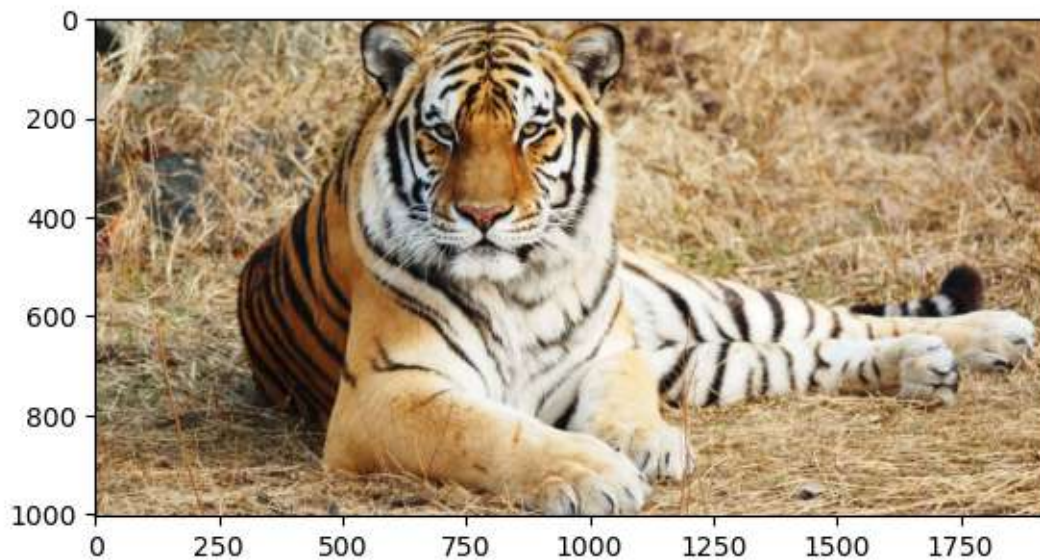
```
[94]: type(arr1)
```

```
[94]: numpy.ndarray
```

```
[95]: arr1.shape
```

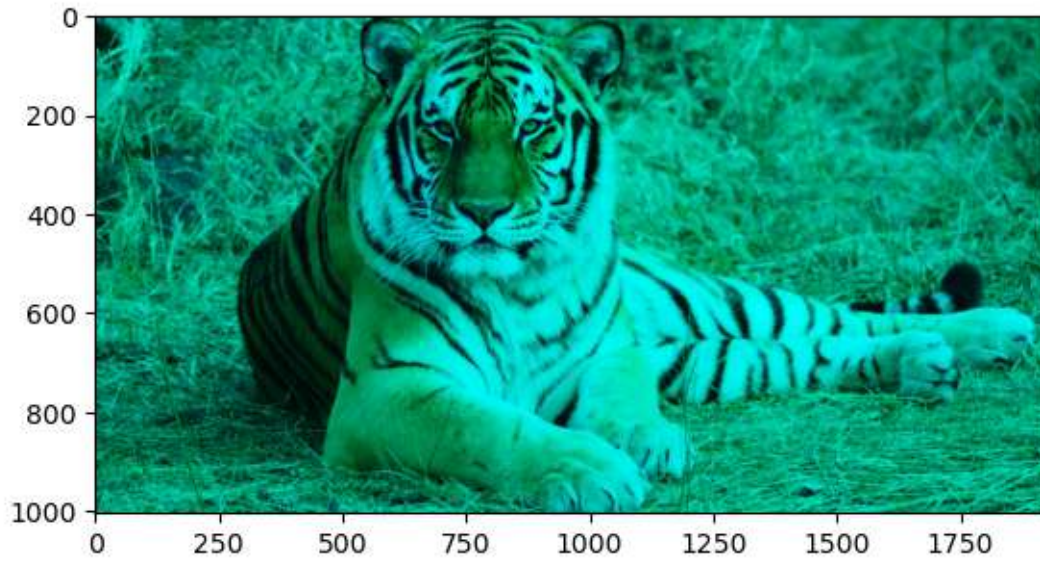
```
[95]: (1004, 1928, 3)
```

```
[97]: plt.imshow(arr1)  
plt.show()
```



```
[98]: Tiger_img1 = arr1.copy()
```

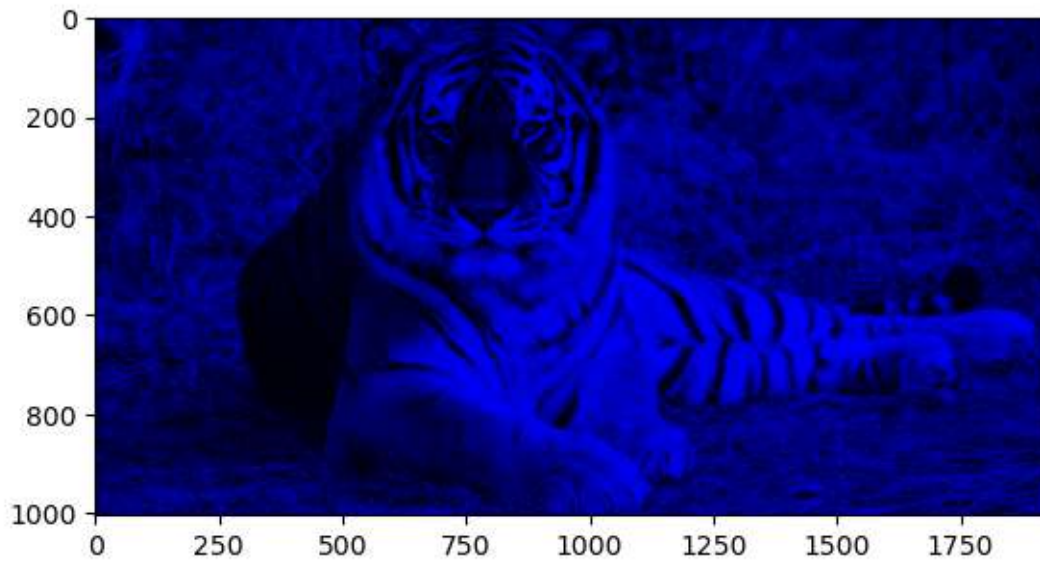
```
[100]: Tiger_img1[:, :, 0] = 0  
plt.imshow(Tiger_img1)  
plt.show()
```



```
[101]: Tiger_img1[:, :, 1]
```

```
[101]: array([[ 73,  73,  73, ..., 140, 140, 139],
             [ 80,  80,  80, ..., 135, 135, 135],
             [ 90,  90,  90, ..., 127, 128, 127],
             ...,
             [123, 129, 133, ..., 156, 163, 165],
             [141, 135, 130, ..., 143, 151, 158],
             [137, 127, 124, ..., 135, 144, 152]], dtype=uint8)
```

```
[102]: Tiger_img1[:, :, 1] = 0
plt.imshow(Tiger_img1)
plt.show()
```



[]:

[]:

[]: