

# Image Manipulation with Pillow:

In [24]:

```
1 import matplotlib.pyplot as plt
2 import numpy as np
3 from PIL import Image, ImageEnhance, ImageFilter
4 from utils import plot_histogram
```

Load an image

In [7]:

```
1 impath = '//Users//omniaelmenshawy//Desktop///segment-123218654
```

In [8]:

```
1 img = Image.open(impath)
```

In [9]:

```
1 img
```

Out [9]:



A Pillow image has several attribute, such as size, name or mode

In [10]:

```
1 print(f'Our image is a {img.mode} image, of dimensions {img.size}')
```

Our image is a RGB image, of dimensions (1920, 1280) and located at //Users//omniaelmenshawy//Desktop///segment-12321865437129862911\_3480\_000\_3500\_000\_with\_camera\_labels\_2.png

```
In [11]: 1 img_rgb = img.convert('RGB')
```

```
In [12]: 1 img_rgb
```

Out[12]:



## Convert an image

```
In [13]: 1 # convert to grayscale
2 img_gray = img.convert('L')
```

In [14]: 1 img\_gray

Out [14]:



In [15]: 1 # convert to hsv. PNG does not support HSV color model and we c  
2 img\_hsv = img.convert('HSV')

### Color thresholding

```
In [16]: 1 img_rgb
```

Out [16]:



```
In [17]: 1 imarr = np.array(img_hsv)
```

```
In [18]: 1 hue = imarr[..., 0]
```

```
In [19]: 1 red_hue = (hue > 230).astype(np.uint8)
```

We can use this to mask the rgb image

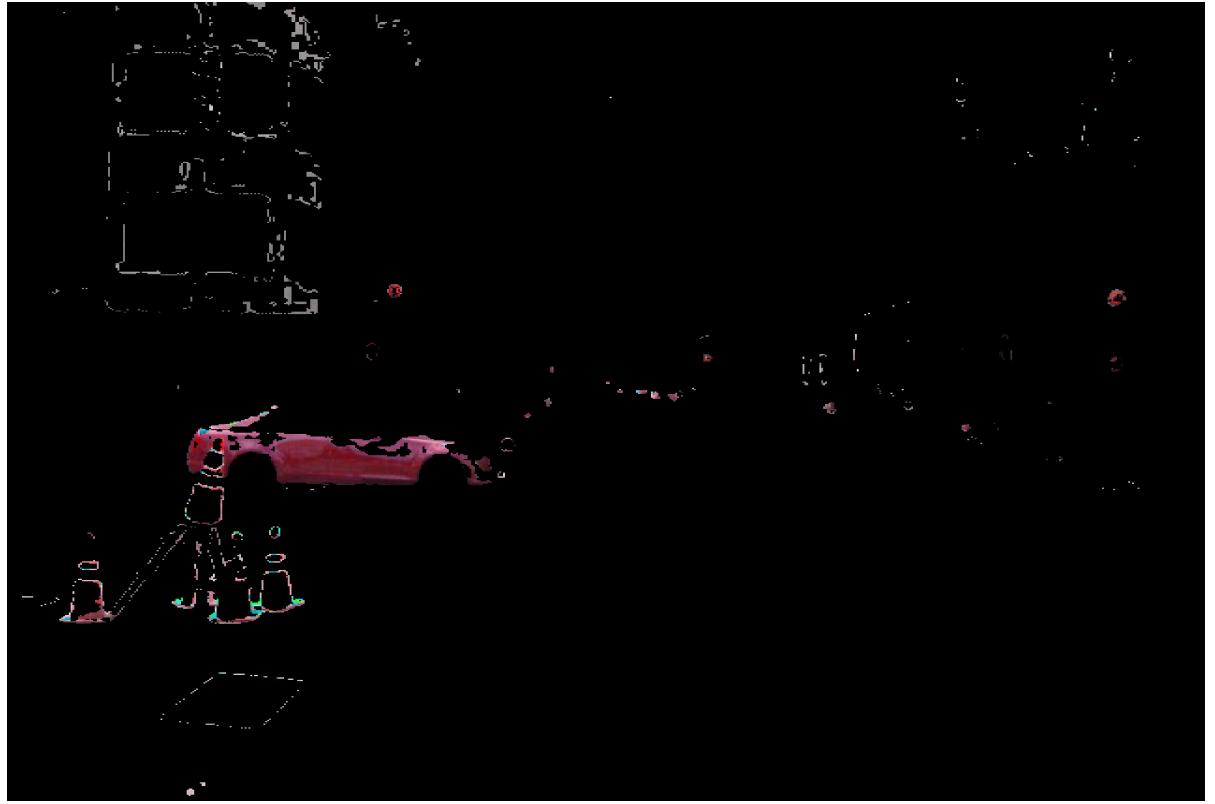
```
In [20]: 1 masked_rgb = np.array(img_rgb * np.stack([red_hue]*3, axis=2))
```

And we can convert this array back to a Pillow image

```
In [21]: 1 # we use this to emphasize the colors and make the object more  
2 masked_rgb *= 2
```

In [22]: 1 Image.fromarray(masked\_rgb)

Out [22]:



## Image Contrast

In [25]: 1 impath = '//Users//omniaelmenshawy//Desktop//segment-123049077

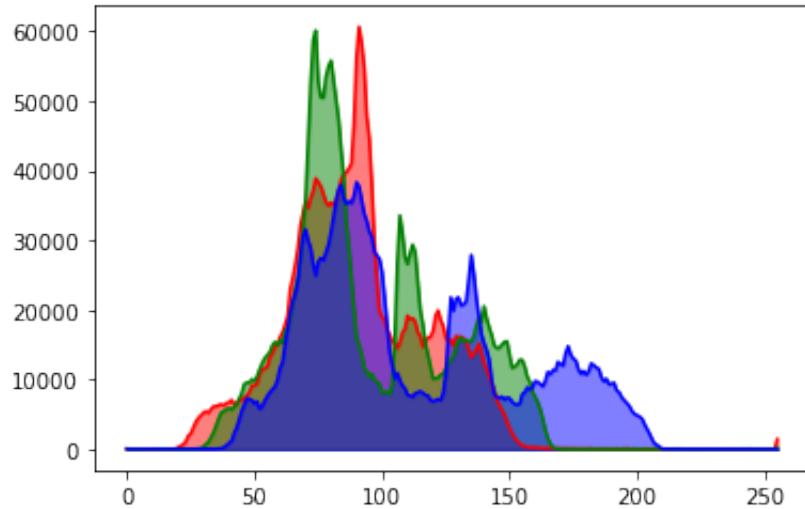
In [26]: 1 img = Image.open(impath)

In [27]: 1 img

Out [27]:



In [28]: 1 plot\_histogram(img)



In [29]: 1 enhancer = ImageEnhance.Contrast(img)

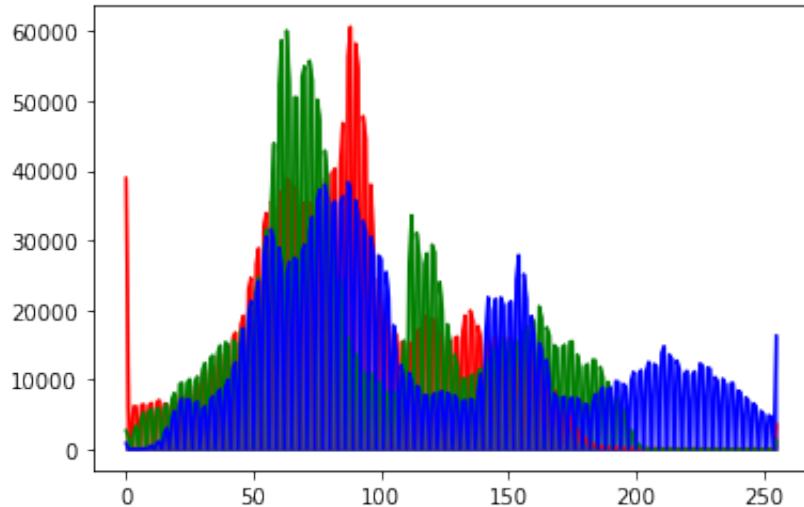
In [30]: 1 img\_contrat = enhancer.enhance(1.5)

```
In [31]: 1 img_constrat
```

Out [31]:



```
In [32]: 1 plot_histogram(img_constrat)
```



## Filtering:

```
In [33]: 1 impath = 'segment-12251442326766052580_1840_000_1860_000_with_c
```

```
In [34]: 1 img = Image.open(impath)
```

In [35]: 1 img

Out [35]:



In [37]: 1 img.filter(ImageFilter.SMOOTH)

Out [37]:



In [38]: 1 img.filter(ImageFilter.BLUR)

Out [38]:



In [39]: 1 img.filter(ImageFilter.SHARPEN)

Out [39]:



