python™

第二章 NumPy for images

1

影像處理

搭配Numpy

2

認識

Flip技術

3

熟悉

Histrogram

同學，歡迎你參加本課程

- 請關閉你的FB 、Line等溝通工具，以免影響你上課。
- 考量頻寬，請預設關閉麥克風、攝影機，若有需要再打開。
- 隨時準備好，老師會呼叫你的名字進行互動。
- 如果有緊急事情，你必需離開線上教室，請用聊天室私訊給老師，以免老師癡癡呼喚你的名字。
- 先倒好水、上個洗手間，準備上課囉^^

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那是因為
你還沒學過Python!
線上老師LIVE直播教學．搶先看
巨匠電腦真人課程

ZOOM 學員操作說明


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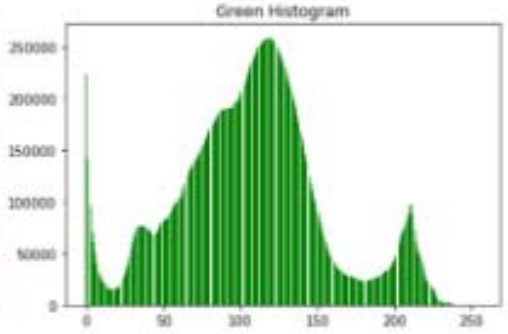
您正在觀看蘇世宗的螢幕
查看選項
原始大小
請求遠端控制
共同註記
退出全螢幕
5 查看選項/共同註記/筆（連連看）
滑鼠
文字
筆
箭頭
擦除
格式
撤銷
重做
清除
與會者 (15)
查找參會者
張 張齡月 (我)
婷 婷婷
解除靜音
舉手
2 共享螢幕（指導演練；點評作品）
老師須先停止共享螢幕
才能請學生共享螢幕
1 聊天
解除靜音
啟動視訊
邀請
與會者
共享螢幕
聊天
錄影
4 解除靜音
3 與會者/舉手

NumPy for images

- Fundamentals of image processing techniques
  - Flipping
  - Extract and analyze features

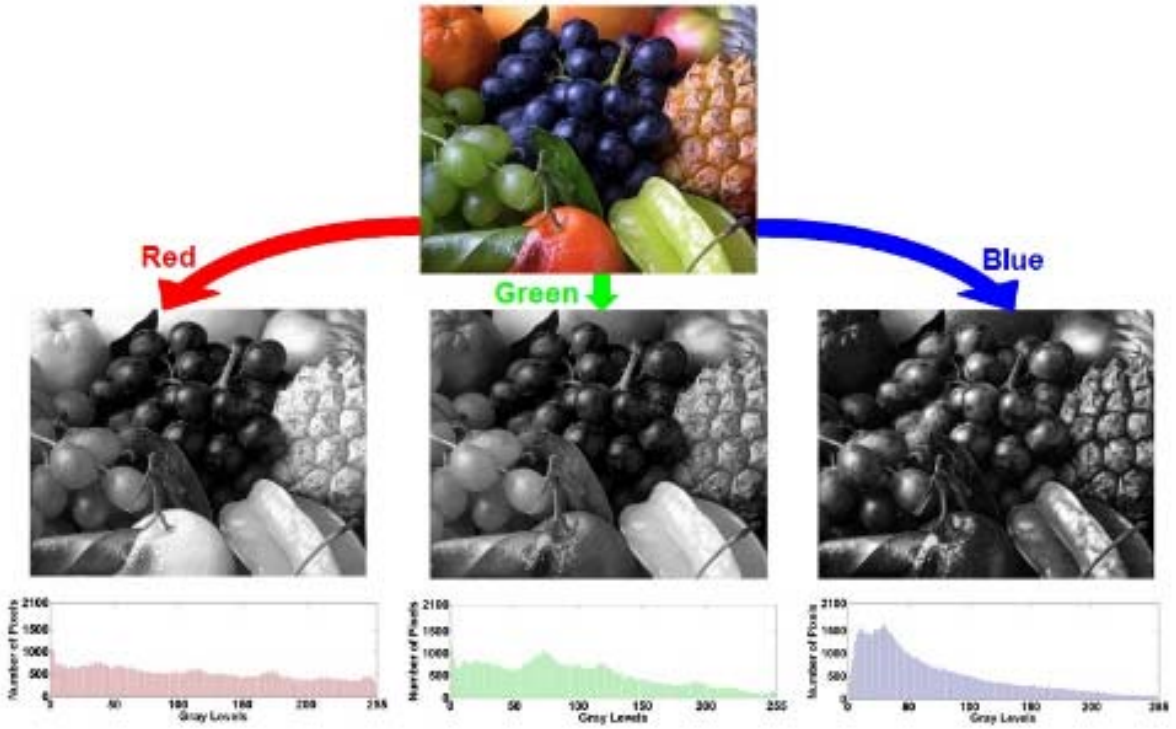


Images as NdArrays

```
# Loading the image using Matplotlib
madrid_image = plt.imread('/madrid.jpeg')

type(madrid_image)
```

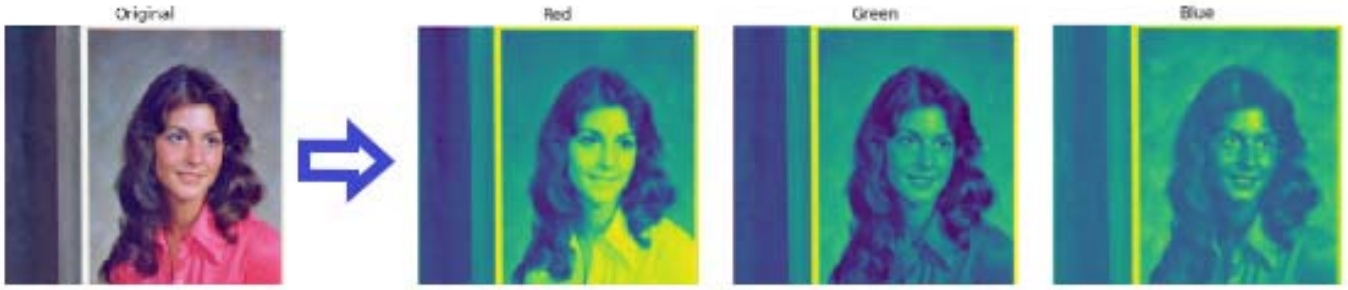
```
<class 'numpy.ndarray'>
```

Colors with NumPy



Colors with NumPy

```
# Obtaining the red values of the image
red = image[:, :, 0]

# Obtaining the green values of the image
green = image[:, :, 1]

# Obtaining the blue values of the image
blue = image[:, :, 2]
```



Colors with NumPy


```
plt.imshow(red, cmap="gray")
plt.title('Red')
plt.axis('off')
plt.show()
```

Shapes

```
# Accessing the shape of the image
madrid_image.shape
```

```
(426, 640, 3)
```

Sizes

```
# Accessing the shape of the image
madrid_image.size
```

```
817920
```

Flipping images: vertically

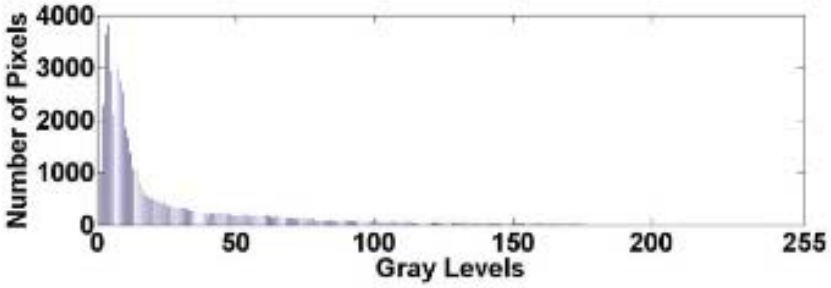
```
# Flip the image in up direction
vertically_flipped = np.flipud(madrid_image)

show_image(vertically_flipped, 'Vertically flipped image')
```

Vetically flipped image

Flipping images: horizontally

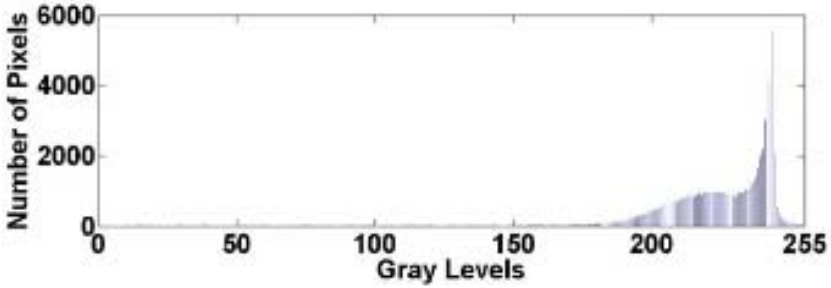
```
# Flip the image in left direction
horizontally_flipped = np.fliplr(madrid_image)

show_image(horizontally_flipped, 'Horizontally flipped image')
```

What is a histogram?



(a)

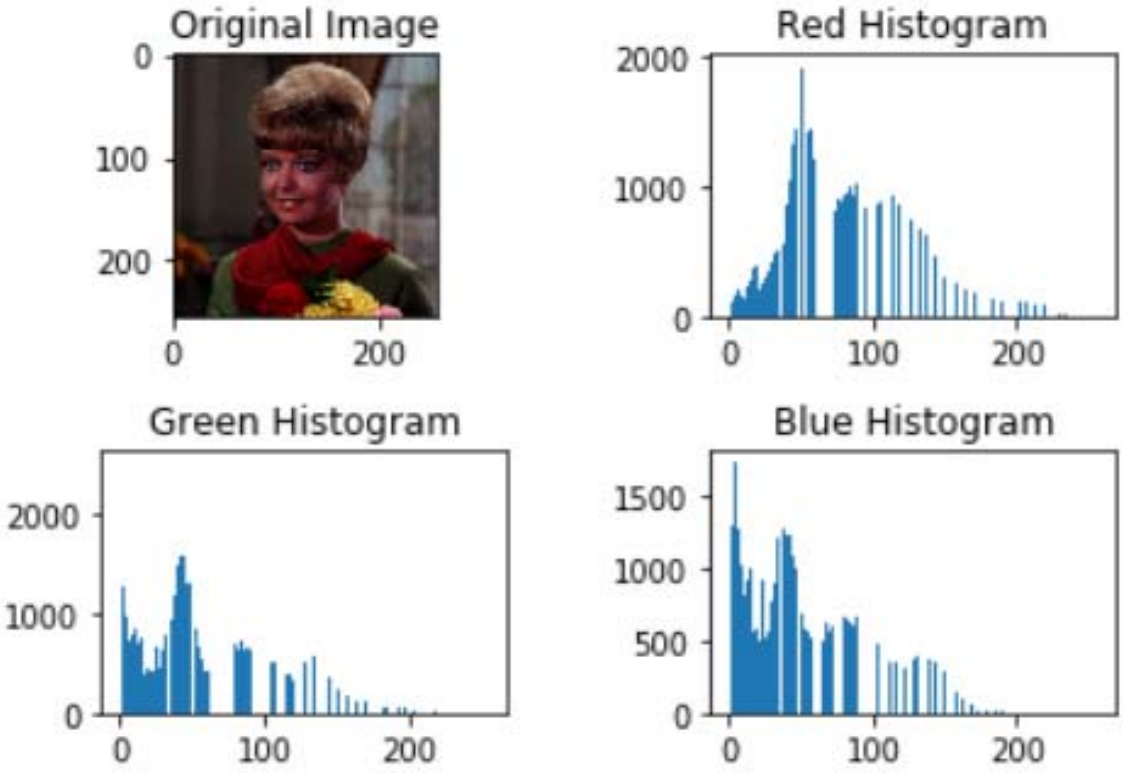
(b)



(a)

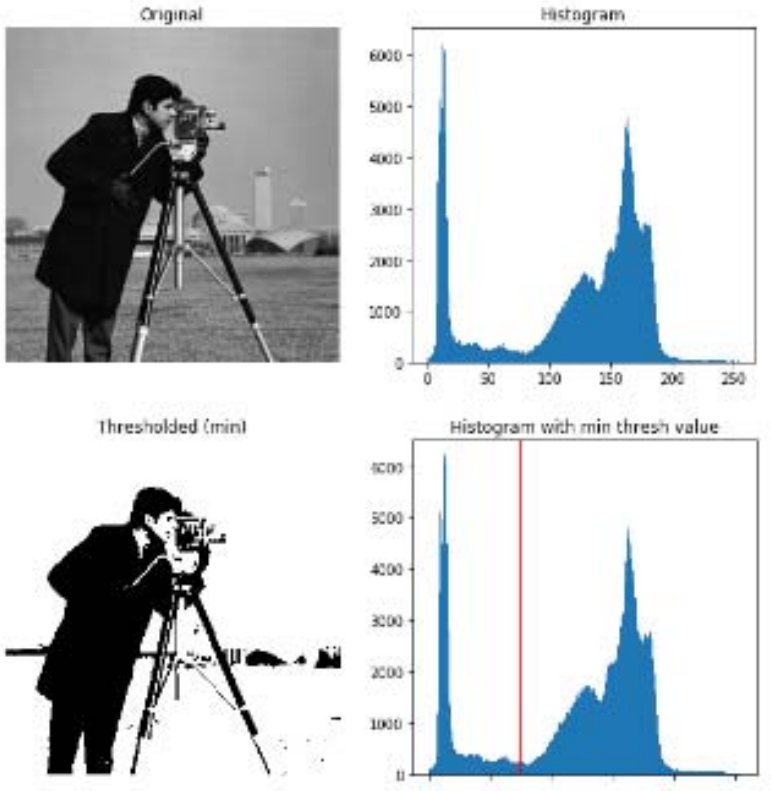
(b)

Color histograms

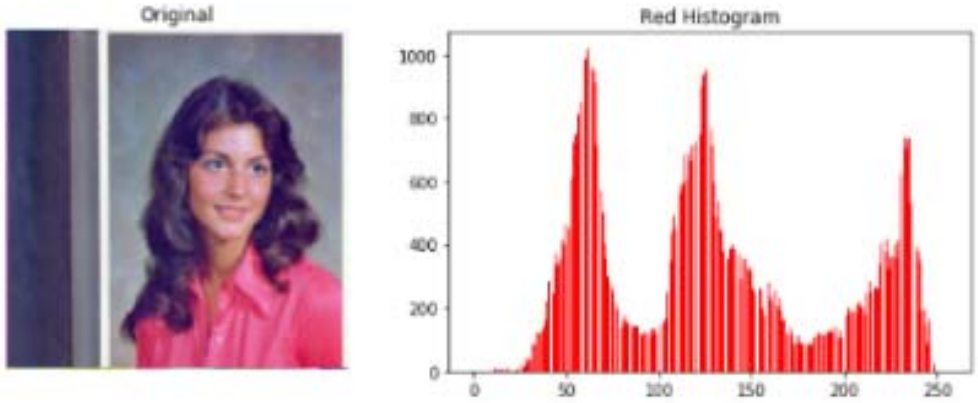


Applications of histograms

- Analysis
- Thresholding
- Brightness and contrast
- Equalize an image



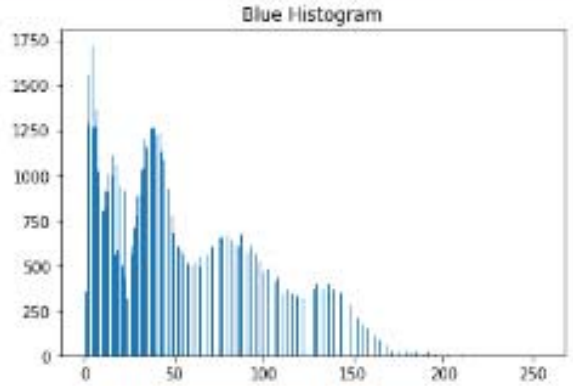
Histograms in Matplotlib




```
# Red color of the image
red = image[:, :, 0]


# Obtain the red histogram
plot.hist(red.ravel(), bins=256)
```

Visualizing histograms with Matplotlib

```
blue = image[:, :, 2]

plt.hist(blue.ravel(), bins=256)
plt.title('Blue Histogram')
plt.show()
```



練習時間

numpy with image.ipynb

jupyter numpy with image (autosaved)

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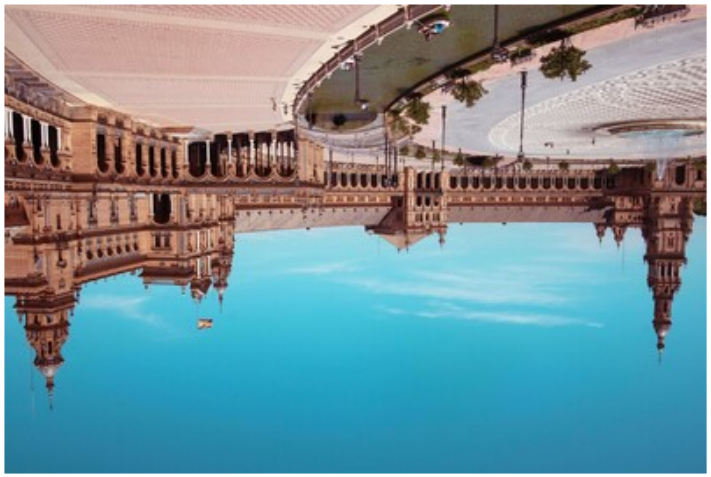
Run Code

練習

Flipping out As a prank, someone has turned an image from a photo album of a trip to Seville upside-down and back-to-front! Now, we need to straighten the image, by flipping it.

City of Seville upside-down Image loaded as flipped_seville. Using the NumPy methods learned in the course, flip the image horizontally and vertically. Next, compare both the original flipped image and the now corrected image, using the show_image() function to display them.

NumPy is already imported as np.



練習時間

numpy with image.ipynb

jupyter numpy with image (autosaved)

Logout

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Run Code

練習

Histograms In this exercise, you will analyze the amount of red in the image. To do this, the histogram of the red channel will be computed for the image shown below:

Woman smiling Image loaded as image. Extracting information from images is a fundamental part of image enhancement. This way you can balance the red and blue to make the image look colder or warmer.

You will use hist() to display the 256 different intensities of the red color. And ravel() to make these color values an array of one flat dimension.

Matplotlib is preloaded as plt and Numpy as np.

Remember that if we want to obtain the green color of an image we would do the following:

green = image[:, :, 1]

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