python™

第五節 Contrast enhancement

1

Contrast

影像處理

2

Equalization

處理技巧

3

進階

Equalization

處理技巧

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^^

課程檔案下載


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學員專區
講師專區
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電腦分校課程劃位
外語真人課程劃位
美語分校課程劃位
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教學平台測試
學習諮詢
常見問題
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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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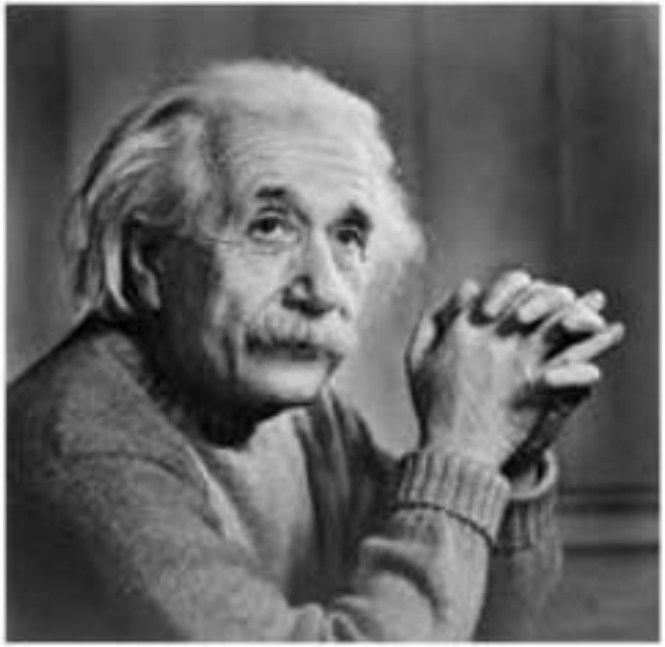
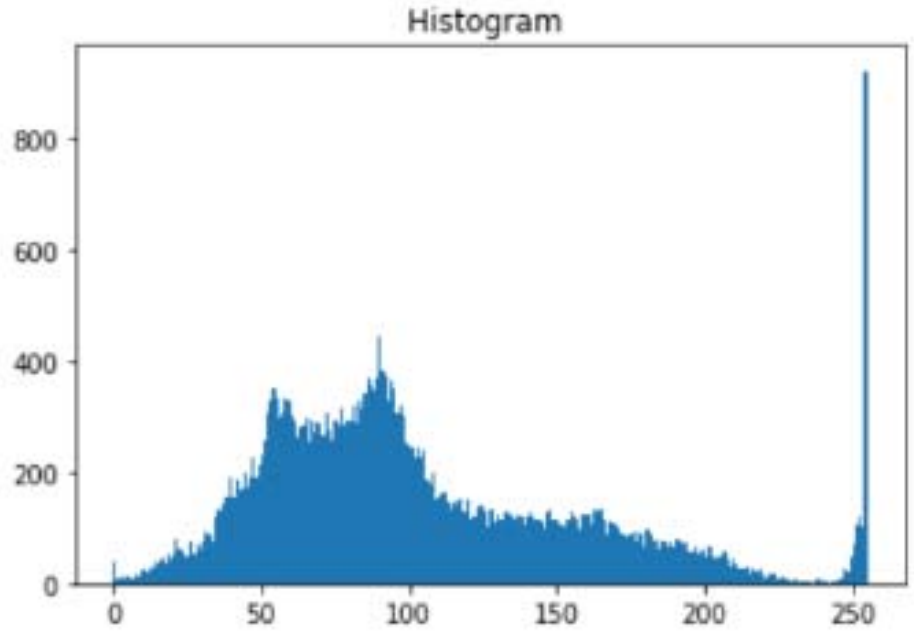
您正在觀看蘇世宗的螢幕
查看選項
原始大小
請求遠端控制
共同註記
退出全螢幕
5 查看選項/共同註記/筆（連連看）
滑鼠
文字
筆
箭頭
擦除
格式
撤銷
重做
清除
與會者 (15)
查找參會者
張 張齡月 (我)
婷 婷婷
解除靜音
舉手
2 共享螢幕（指導演練；點評作品）
老師須先停止共享螢幕
才能請學生共享螢幕
1 聊天
解除靜音
啟動視訊
邀請
與會者
共享螢幕
聊天
錄影
4 解除靜音
3 與會者/舉手

Contrast enhancement

Contrast

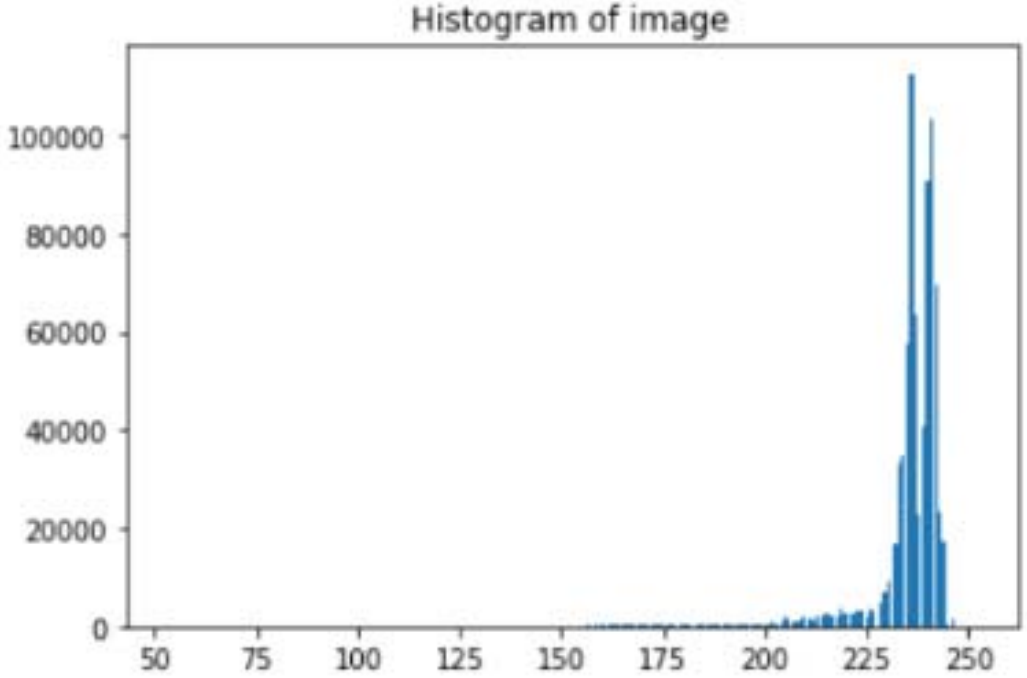
Histograms for contrast enhancement





Contrast


Low contrast image - light


Histogram of image
100000
80000
60000
40000
20000
0
50
75
100
125
150
175
200
225
250

Enhance contrast

- Contrast stretching
- Histogram equalization

Types

- Histogram equalization
- Adaptive histogram equalization
- Contrast Limited Adaptive Histogram Equalization (CLAHE)

Low contrast image

Contrast stretching

Histogram equalization

Adaptive equalization

Histogram equalization

Original

Histogram Equalization

Histogram equalization

Original

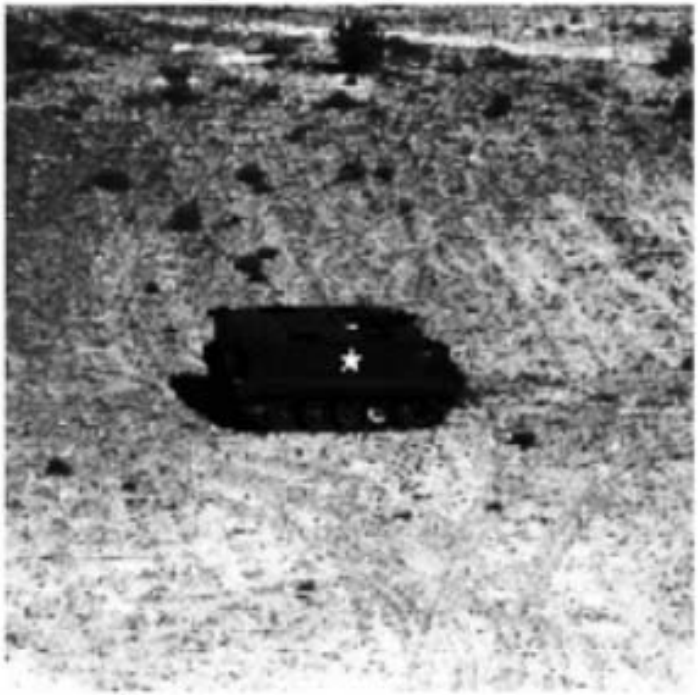
Histogram equalization

```
from skimage import exposure


# Obtain the equalized image
image_eq = exposure.equalize_hist(image)


# Show original and result
show_image(image, 'Original')
show_image(image_eq, 'Histogram equalized')
```

Histogram equalization

Original

Histogram Equalization



Adaptive Equalization

- Contrastive Limited Adaptive Histogram Equalization

Original

Adaptive Equalization

Contrastive Limited Adaptive Equalization

Original

Histogram Equalization

Adaptive Equalization

CLAHE in scikit-image

```
from skimage import exposure

# Apply adaptive Equalization
image_adapteq = exposure.equalize_adapthist(image, clip_limit=0.03)


# Show original and result
show_image(image, 'Original')
show_image(image_eq, 'Adaptive equalized')
```

CLAHE in scikit-image

Original

Adaptive Equalization

練習時間

Contrast enhancement.ipynb

jupyter Contrast enhancement Last Checkpoint: 5 hours ago (autosaved) Logout

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Run Code

練習

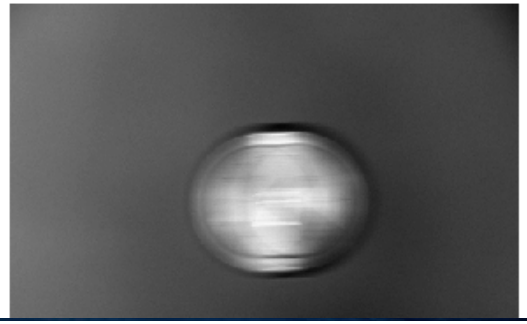
What's the contrast of this image? Black and white clock hanging and moving Histogram of the clock's image

The histogram tell us.

Just as we saw previously, you can calculate the contrast by calculating the range of the pixel intensities i.e. by subtracting the minimum pixel intensity value from the histogram to the maximum one.

You can obtain the maximum pixel intensity of the image by using the np.max() method from NumPy and the minimum with np.min() in the console.

The image has already been loaded as clock_image, NumPy as np and the show_image() function.



練習時間

Contrast enhancement.ipynb

jupyter Contrast enhancement Last Checkpoint: 5 hours ago (autosaved)

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練習

Medical images You are trying to improve the tools of a hospital by pre-processing the X-ray images so that doctors have a higher chance of spotting relevant details. You'll test our code on a chest X-ray image from the National Institutes of Health Chest X-Ray Dataset X-ray chest image

Image loaded as chest_xray_image. First, you'll check the histogram of the image and then apply standard histogram equalization to improve the contrast. Remember we obtain the histogram by using the hist() function from Matplotlib, which has been already imported as plt.

練習時間

Contrast enhancement.ipynb

jupyter Contrast enhancement Last Checkpoint: 5 hours ago (autosaved)

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Run Code

練習

Aerial image In this exercise, we will improve the quality of an aerial image of a city. Which has low contrast and therefore we can not detail very well the objects and figures in it.

Aerial image, airport taken from the air Image loaded as image_aerial. For this we will use the normal or standard technique of Histogram Equalization.

練習時間

Contrast enhancement.ipynb

jupyter Contrast enhancement Last Checkpoint: 5 hours ago (autosaved)

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Trusted Python 3

Run Code

練習

Let's add some impact and contrast Have you ever wanted to enhance the contrast of your photos so that they appear more dramatic?

In this exercise, you'll increase the contrast of a cup of coffee. Something you could share with your friends on social media. Don't forget to use #ImageProcessingDatacamp as hashtag!

Even though this is not our Sunday morning coffee cup, you can still apply the same methods to any of our photos.

Cup of coffee A function called show_image(), that displays an image using Matplotlib, has already been defined. It has the arguments image and title, with title being 'Original' by default.

Original

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