



第一章

Make images come alive with scikit-image

1

影像處理
技術說明

2

認識
scikit-image

3

熟悉**RGB**
與 **Grayscale**

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

巨匠電腦線上真人

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最新消息



您好! [登出](#)

程式語言 好難學?

那是因為
你還沒學過 Python!

(線上老師 **LIVE** 直播教學 · 搶先看)

點數卡產品兌換

APCS檢測專區

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登出

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巨匠電腦真人課程

ZOOM 學員操作說明

The screenshot shows the Zoom interface with several key areas highlighted for student use:

- Annotation Menu:** A dropdown menu is open, showing options like '原始大小' (Original Size), '請求遠端控制' (Request Remote Control), '共同註記' (Annotate), and '退出全螢幕' (Exit Full Screen). The '共同註記' option is highlighted with an orange box and labeled with a circled '5'.
- Toolbar:** The bottom toolbar contains icons for '游鼠' (Cursor), '文字' (Text), '筆' (Pen), '橡皮' (Eraser), '格式' (Format), '撤銷' (Undo), '重做' (Redo), and '清除' (Clear). The '筆' icon is highlighted with an orange box and labeled with a circled '5'.
- Participants Window:** A window titled '與會者 (15)' (Participants (15)) is open, showing a list of participants. The '舉手' (Raise Hand) button is highlighted with an orange box and labeled with a circled '3'.
- Bottom Bar:** The bottom bar contains icons for '解除靜音' (Unmute), '啟動視訊' (Start Video), '邀請' (Invite), '與會者' (Participants), '共享螢幕' (Share Screen), '聊天' (Chat), and '錄影' (Record). The '聊天' icon is highlighted with an orange box and labeled with a circled '1'.
- Annotations:**
 - A circled '2' points to the '共享螢幕' (Share Screen) icon, with the text: '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'.
 - A circled '4' points to the '解除靜音' (Unmute) icon, with the text: '解除靜音'.
 - A circled '3' points to the '與會者' (Participants) icon, with the text: '與會者/舉手'.

5 查看選項/共同註記/筆 (連連看)

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

3 與會者/舉手

4 解除靜音

What is image processing?

Operations on images and videos to:

- Enhance an image
- Extract useful information
- Analyze it and make decisions



What is image processing?

Operations to on images and videos to:

- Enhance an image
- Extract useful information
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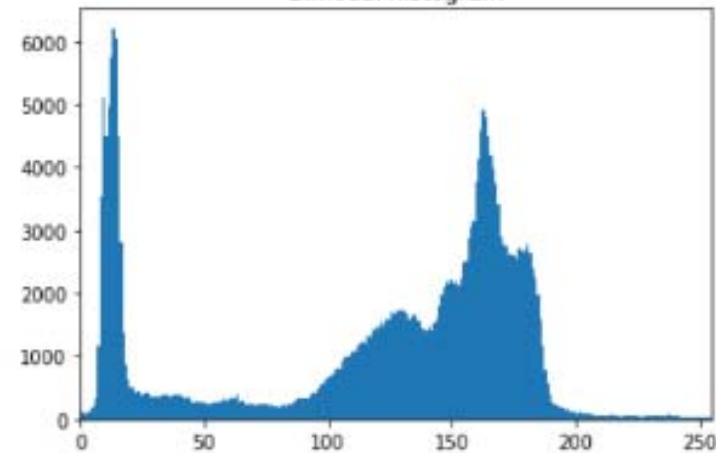
Original Image



Thresholded Image

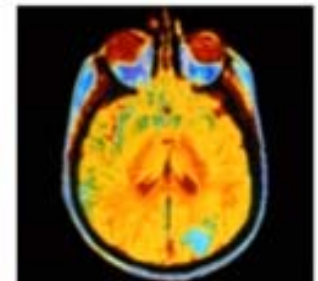


Bimodal histogram



Applications

- Medical image analysis
- Artificial intelligence
- Image restoration and enhancement
- Geospatial computing
- Surveillance
- Robotic vision
- Automotive safety
- And many more...



Purposes

1. Visualization:
 - Objects that are not visible
2. Image sharpening and restoration
 - A better image
3. Image retrieval
 - Seek for the image of interest
4. Measurement of pattern
 - Measures various objects
5. Image Recognition
 - Distinguish objects in an image

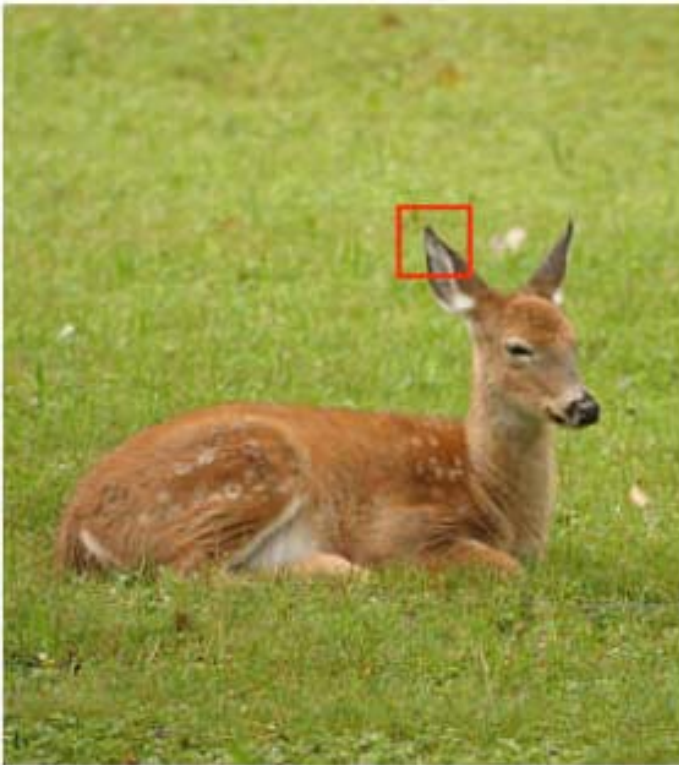
Intro to scikit-image

- Easy to use
- Makes use of Machine Learning
- Out of the box complex algorithms

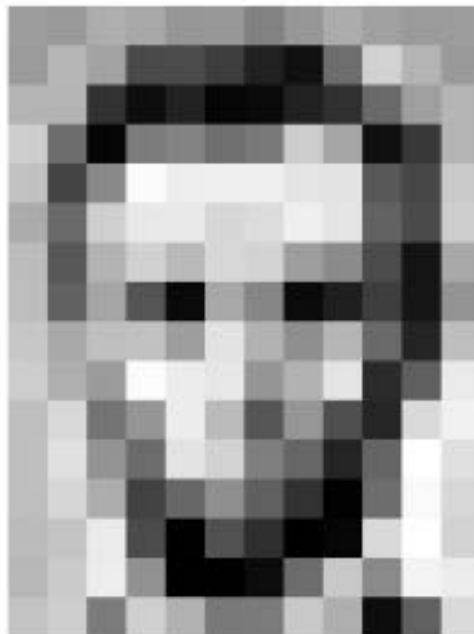


scikit-image
image processing in python

What is an image?



What is an image?



| | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 157 | 153 | 174 | 168 | 150 | 152 | 129 | 151 | 172 | 161 | 155 | 156 |
| 155 | 182 | 163 | 74 | 75 | 62 | 33 | 17 | 110 | 210 | 180 | 154 |
| 180 | 180 | 50 | 14 | 34 | 6 | 10 | 33 | 48 | 106 | 159 | 181 |
| 205 | 109 | 5 | 124 | 131 | 111 | 120 | 204 | 166 | 15 | 56 | 180 |
| 194 | 68 | 137 | 251 | 237 | 239 | 239 | 228 | 227 | 87 | 71 | 201 |
| 172 | 106 | 207 | 233 | 233 | 214 | 220 | 239 | 228 | 98 | 74 | 206 |
| 188 | 88 | 179 | 209 | 185 | 215 | 211 | 188 | 139 | 75 | 20 | 169 |
| 189 | 97 | 155 | 84 | 10 | 168 | 134 | 11 | 31 | 62 | 22 | 148 |
| 199 | 168 | 191 | 193 | 158 | 227 | 178 | 143 | 182 | 106 | 36 | 190 |
| 205 | 174 | 155 | 252 | 236 | 231 | 149 | 179 | 228 | 43 | 96 | 234 |
| 190 | 216 | 116 | 149 | 236 | 187 | 86 | 150 | 79 | 38 | 218 | 241 |
| 190 | 224 | 147 | 108 | 227 | 210 | 127 | 102 | 36 | 101 | 255 | 224 |
| 190 | 214 | 173 | 66 | 103 | 143 | 96 | 50 | 2 | 108 | 249 | 215 |
| 187 | 196 | 235 | 75 | 1 | 81 | 47 | 0 | 6 | 217 | 255 | 211 |
| 183 | 202 | 237 | 145 | 0 | 0 | 12 | 108 | 200 | 138 | 243 | 236 |
| 195 | 206 | 123 | 207 | 177 | 121 | 123 | 200 | 175 | 13 | 96 | 218 |

| | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 157 | 153 | 174 | 168 | 150 | 152 | 129 | 151 | 172 | 161 | 155 | 156 |
| 155 | 182 | 163 | 74 | 75 | 62 | 33 | 17 | 110 | 210 | 180 | 154 |
| 180 | 180 | 50 | 14 | 34 | 6 | 10 | 33 | 48 | 106 | 159 | 181 |
| 205 | 109 | 5 | 124 | 131 | 111 | 120 | 204 | 166 | 15 | 56 | 180 |
| 194 | 68 | 137 | 251 | 237 | 239 | 239 | 228 | 227 | 87 | 71 | 201 |
| 172 | 106 | 207 | 233 | 233 | 214 | 220 | 239 | 228 | 98 | 74 | 206 |
| 188 | 88 | 179 | 209 | 185 | 215 | 211 | 188 | 139 | 75 | 20 | 169 |
| 189 | 97 | 155 | 84 | 10 | 168 | 134 | 11 | 31 | 62 | 22 | 148 |
| 199 | 168 | 191 | 193 | 158 | 227 | 178 | 143 | 182 | 106 | 36 | 190 |
| 205 | 174 | 155 | 252 | 236 | 231 | 149 | 179 | 228 | 43 | 96 | 234 |
| 190 | 216 | 116 | 149 | 236 | 187 | 86 | 150 | 79 | 38 | 218 | 241 |
| 190 | 224 | 147 | 108 | 227 | 210 | 127 | 102 | 36 | 101 | 255 | 224 |
| 190 | 214 | 173 | 66 | 103 | 143 | 96 | 50 | 2 | 108 | 249 | 215 |
| 187 | 196 | 235 | 75 | 1 | 81 | 47 | 0 | 6 | 217 | 255 | 211 |
| 183 | 202 | 237 | 145 | 0 | 0 | 12 | 108 | 200 | 138 | 243 | 236 |
| 195 | 206 | 123 | 207 | 177 | 121 | 123 | 200 | 175 | 13 | 96 | 218 |

RGB channels

RGB



Red channel



Green channel



Blue channel



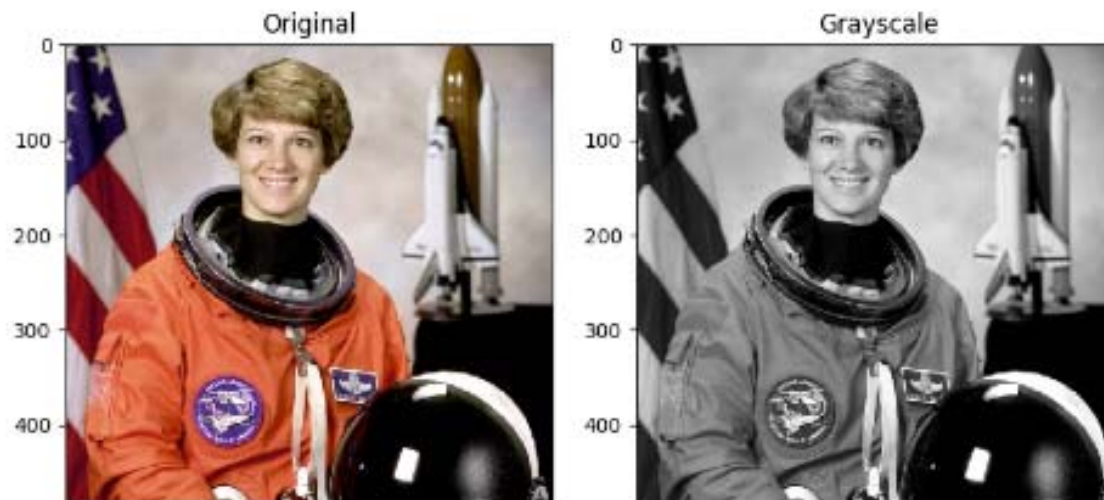
Grayscaled images



| | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|
| 230 | 229 | 232 | 234 | 235 | 232 | 148 |
| 237 | 236 | 236 | 234 | 233 | 234 | 152 |
| 255 | 255 | 255 | 251 | 230 | 236 | 161 |
| 99 | 90 | 67 | 37 | 94 | 247 | 130 |
| 222 | 152 | 255 | 129 | 129 | 246 | 132 |
| 154 | 199 | 255 | 150 | 189 | 241 | 147 |
| 216 | 132 | 162 | 163 | 170 | 239 | 122 |

RGB vs Grayscale

```
from skimage import color  
grayscale = color.rgb2gray(original)  
rgb = color.gray2rgb(grayscale)
```



Visualizing images in the course

Don't worry about Matplotlib!

```
def show_image(image, title='Image', cmap_type='gray'):  
    plt.imshow(image, cmap=cmap_type)  
    plt.title(title)  
    plt.axis('off')  
    plt.show()
```

Visualizing images in the course

```
from skimage import color  
grayscale = color.rgb2gray(original)  
  
show_image(grayscale, "Grayscale")
```


Grayscale




練習時間

Make images come alive with scikit-image.ipynb




 jupyter

Make images come alive with scikit-image (autosaved)

 Logout

File Edit View Insert Cell Kernel Widgets Help Trusted Python 3



In []: 1

練習

Is this gray or full of color? Whats the main difference between the images shown below?


Image of coffee next to coins image These images have been preloaded as `coffee_image` and `coins_image` from the `scikit-image` data module using:

```
coffee_image = data.coffee() coins_image = data.coins()
```


Choose the right answer that best describes the main difference related to color and dimensional structure.

In the console, use the function `shape()` from NumPy, to obtain the image shape (Height, Width, Dimensions) and find out. NumPy is already imported as `np`.

Coffee





Coins
















練習時間

Make images come alive with scikit-image.ipynb



 jupyter Make images come alive with scikit-image (unsaved changes)  Logout

File Edit View Insert Cell Kernel Widgets Help Trusted | Python 3 


        Run    Code 

練習

In this exercise you will load an image from scikit-image module data and make it grayscale, then compare both of them in the output.

We have preloaded a function `show_image(image, title='Image')` that displays the image using Matplotlib. You can check more about its parameters using `?show_image()` or `help(show_image)` in the console.

Rocket

A photograph of a rocket on a launch pad at night. The rocket is white and stands vertically in the center. It is flanked by two tall, yellow metal service towers. The launch pad is illuminated by several bright lights at the base, creating a glow. The sky is dark blue.

問卷

<http://www.pcschoolonline.com.tw>

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學員專區

講師專區



> 課程檔案下載：

學員的「上課教材」，下載檔案為壓縮檔 ([解壓縮操作步驟](#))。
如無法觀看上課教材，請安裝 [PDF閱讀軟體](#)。

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課程檔案下載

自107年1月1日起，課程錄影檔由180天改為365天(含)內無限次觀看 (上課隔日18:00起)。

問卷

| 上課日期 | 課程名稱 | 課程節次 | 教材下載 | | |
|------------------------|----------------------|------|----------------------|----------------------|----------------------|
| 2017/12/27 2000 ~ 2200 | 線上真人-ZBrush 3D動畫造型設計 | 18 | 上課教材 | 錄影 3 | 課堂問卷 |
| 2017/12/20 2000 ~ 2200 | 線上真人-ZBrush 3D動畫造型設計 | 17 | 上課教材 | 錄影檔 | |
| 2017/12/18 2000 ~ 2200 | 線上真人-ZBrush 3D動畫造型設計 | 16 | 上課教材 | 錄影檔 | |



巨匠線上真人

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