

第13節

Right round the corner

1

Corner偵測

技術說明

2

偵測

Interest point

3

熟悉

Harris corner
detector

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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你還沒學過Python!

(線上老師 **LIVE** 直播教學 · 搶先看)

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ZOOM 學員操作說明

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

- 5 查看選項/共同註記/筆 (連連看)**: A dropdown menu is open from the '查看選項' (View Options) button in the top right. The '共同註記' (Annotate) option is highlighted, which opens the drawing toolbar below.
- 2 共享螢幕 (指導演練; 點評作品)**: The '共享螢幕' (Share Screen) button in the bottom toolbar is highlighted. A note specifies: '老師須先停止共享螢幕 才能請學生共享螢幕' (The teacher must first stop sharing the screen before asking the student to share the screen).
- 1 聊天**: The '聊天' (Chat) button in the bottom toolbar is highlighted.
- 3 與會者/舉手**: The '與會者' (Participants) button in the bottom toolbar is highlighted. A callout box shows the '與會者 (15)' list with a '舉手' (Raise Hand) button highlighted for a participant named '張齡月 (我)'.
- 4 解除靜音**: The '解除靜音' (Unmute) button in the bottom toolbar is highlighted.

Other visible interface elements include the top status bar with the URL 'www.pcschool.com.tw', the top toolbar with icons for '滑鼠' (Mouse), '文字' (Text), '筆' (Pen), '箭頭' (Arrow), '擦除' (Erase), '格式' (Format), '撤銷' (Undo), '重做' (Redo), and '清除' (Clear). The bottom toolbar also includes '邀請' (Invite), '錄影' (Record), and '靜音' (Mute) buttons.

Corner detection

Original image



Corners detected



Points of interest

Points of interest

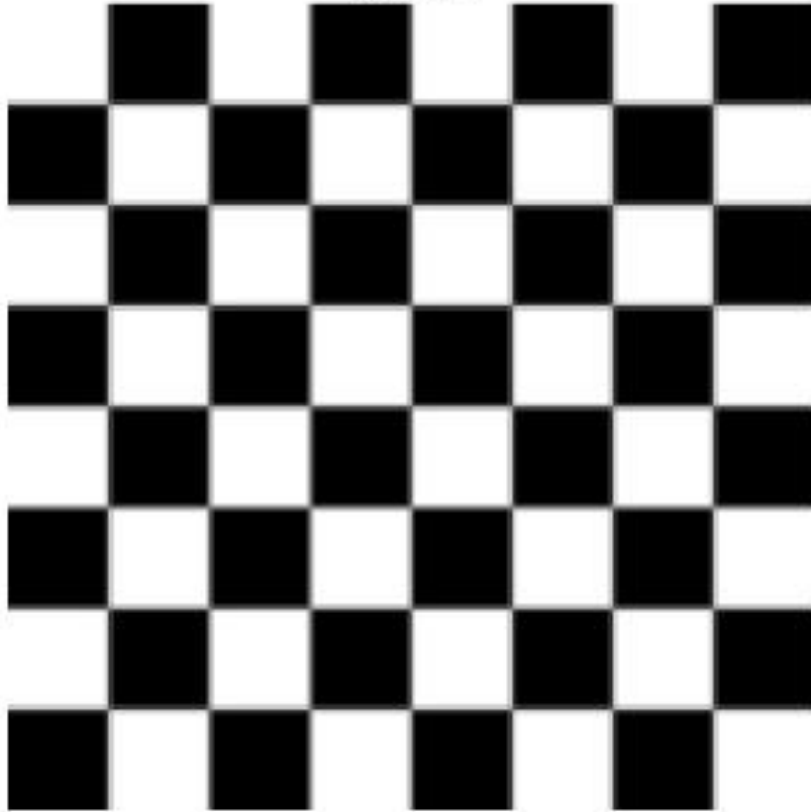


Edges with Sobel



Corners

Checkerboard

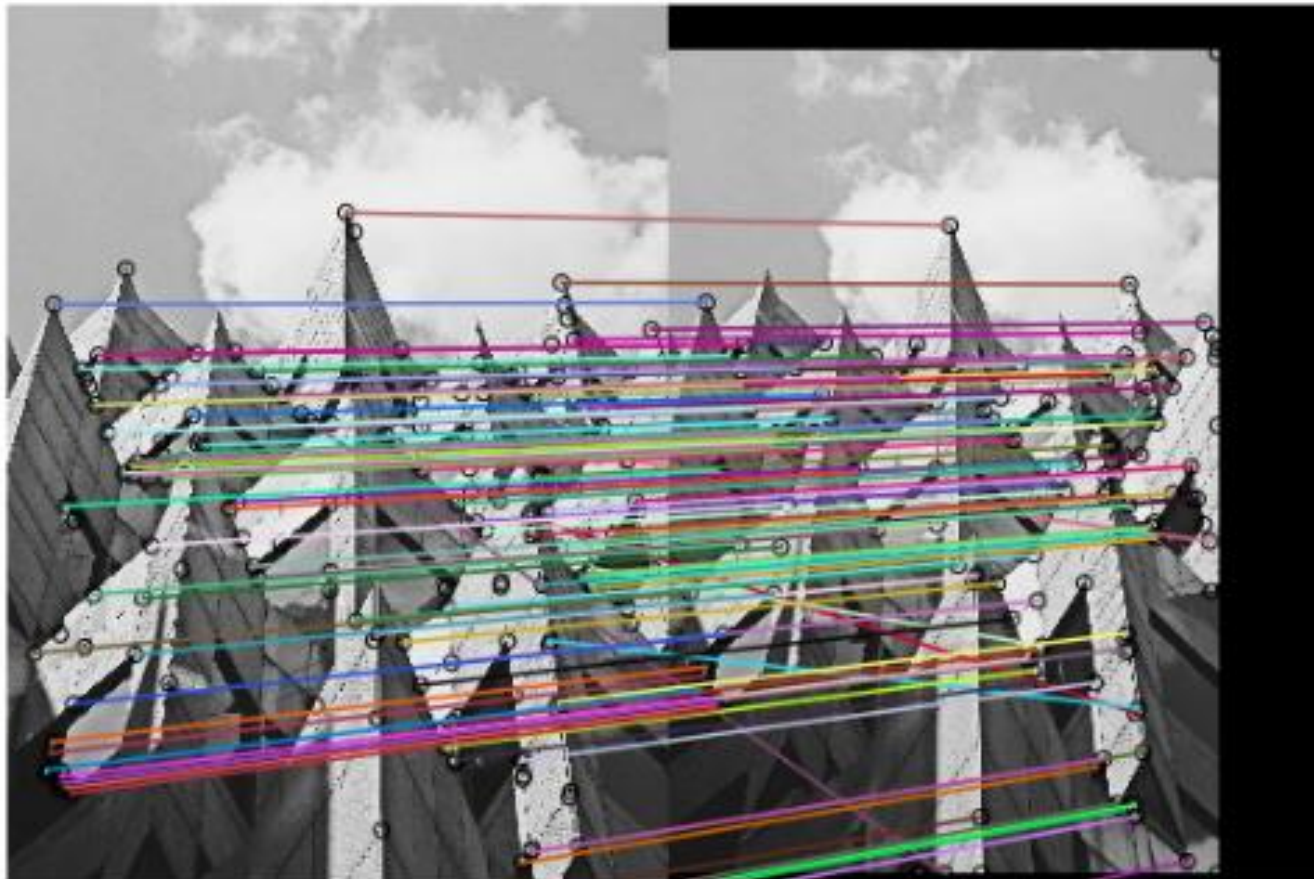


Building



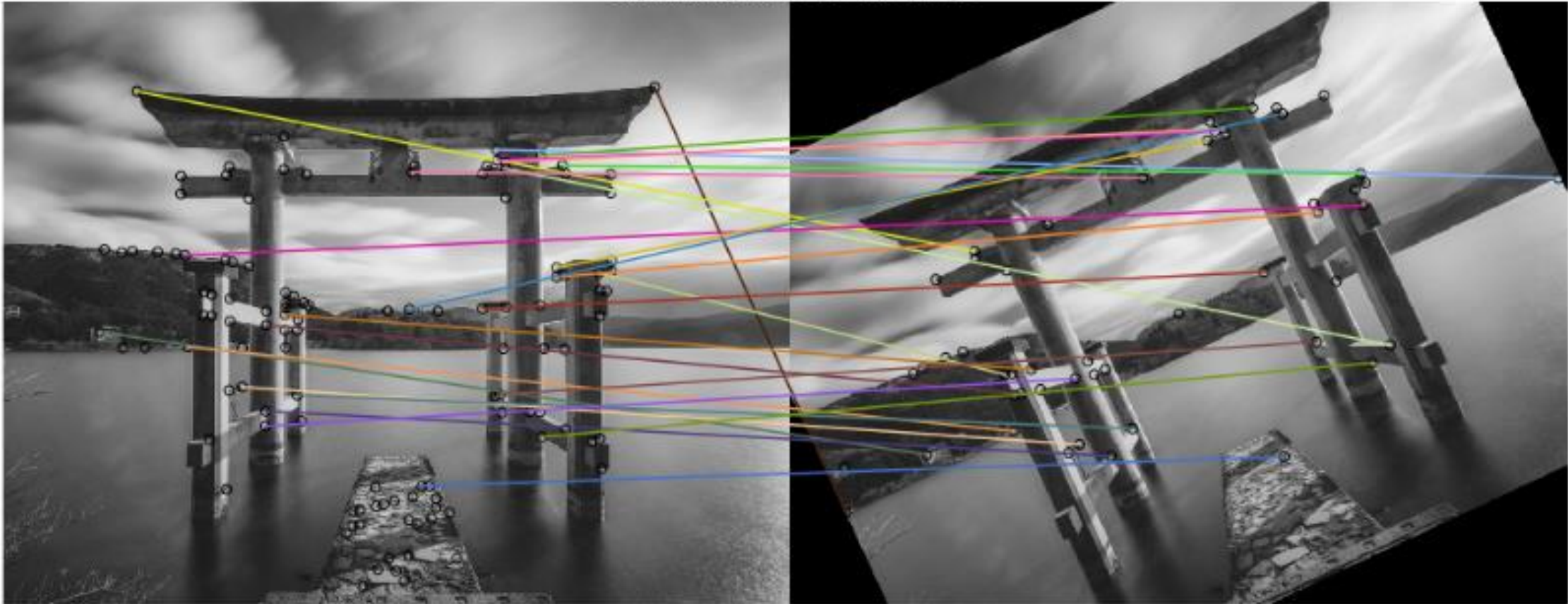
Matching corners

Original Image vs. Transformed Image



Matching corners

Original Image vs. Transformed Image



Harris corner detector

Original image



Corners detected



Harris corner detector



Harris corner detector

```
from skimage.feature import corner_harris

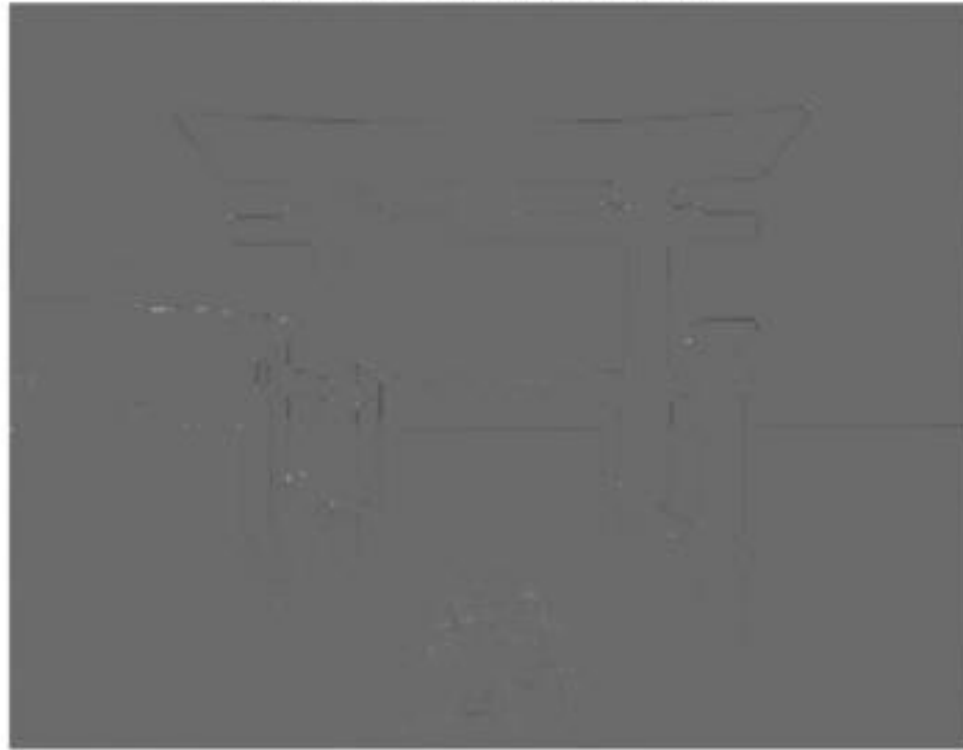
# Convert image to grayscale
image = rgb2gray(image)

# Apply the Harris corner detector on the image
measure_image = corner_harris(image)

# Show the Harris response image
show_image(measure_image)
```

Harris corner detector

Harris response image



Harris corner detector

```
# Finds the coordinates of the corners
coords = corner_peaks(corner_harris(image), min_distance=5)

print("A total of", len(coords), "corners were detected.")
```

A total of 122 corners were found from measure response image.

Corners detected

```
# Show image with marks in detected corners  
show_image_with_detected_corners(image, coords)
```

Corners detected





Show image with contours

```
def show_image_with_corners(image, coords, title="Corners detected"):  
    plt.imshow(image, interpolation='nearest', cmap='gray')  
    plt.title(title)  
    plt.plot(coords[:, 1], coords[:, 0], '+r', markersize=15)  
    plt.axis('off')  
    plt.show()
```












練習時間

13.Right round the cornor.ipynb



 jupyter 13.Right round the cornor Last Checkpoint: 16 hours ago (autosaved)  Logout

File Edit View Insert Cell Kernel Widgets Help Trusted Python 3


       Run    Markdown 

練習

Perspective

In this exercise, you will detect the corners of a building using the Harris corner detector.



Building from a bottom perspective Image preloaded as `building_image`. The functions `show_image()` and `show_image_with_corners()` have already been preloaded for you. As well as the `color` module for converting images to grayscale.















練習時間

13.Right round the corner.ipynb



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


        Run    Markdown 

練習

Less corners

In this exercise, you will test what happens when you set the minimum distance between corner peaks to be a higher number. Remember you do this with the `min_distance` attribute parameter of the `corner_peaks()` function.

Building from a bottom perspective Image preloaded as `building_image`. The functions `show_image()`, `show_image_with_corners()` and required packages have already been preloaded for you. As well as all the previous code for finding the corners. The Harris measure response image obtained with `corner_harris()` is preloaded as `measure_image`.



問卷

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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	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	



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