



## 第四章

## Jump into filtering

1

Filter

影像處理

2

Edge detection

處理技巧

3

高斯  
Smoothing

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^^

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[課程檔案下載](#)

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## 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)



| 巨匠電腦真人課程

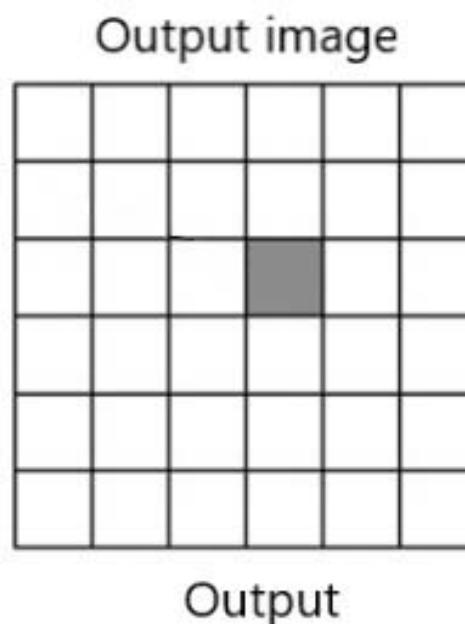
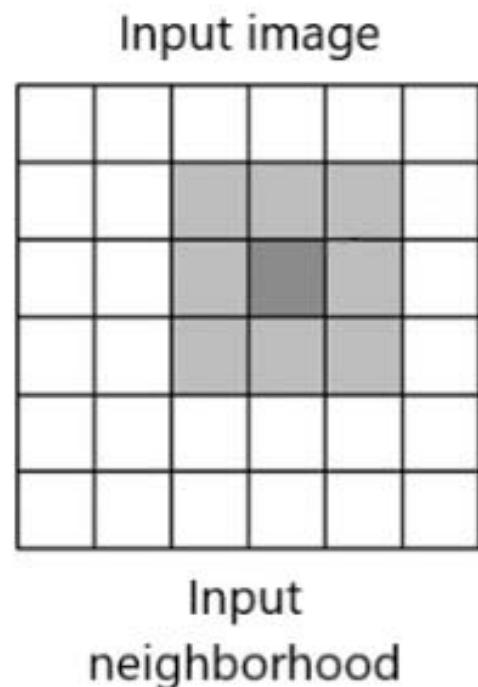
# ZOOM 學員操作說明



# Filters

- Enhancing an image
- Emphasize or remove features
- Smoothing
- Sharpening
- Edge detection

# Neighborhoods

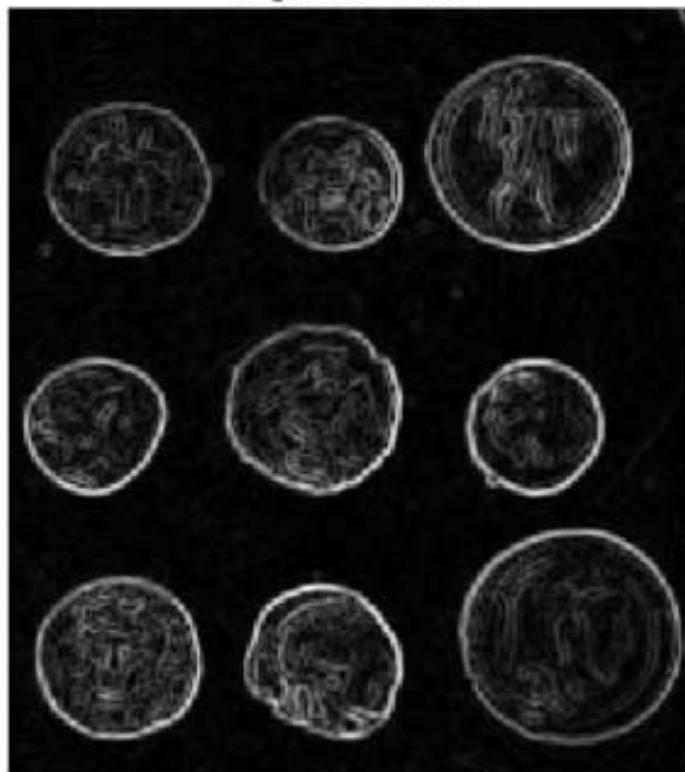


# Edge detection

Original



Edges with Sobel

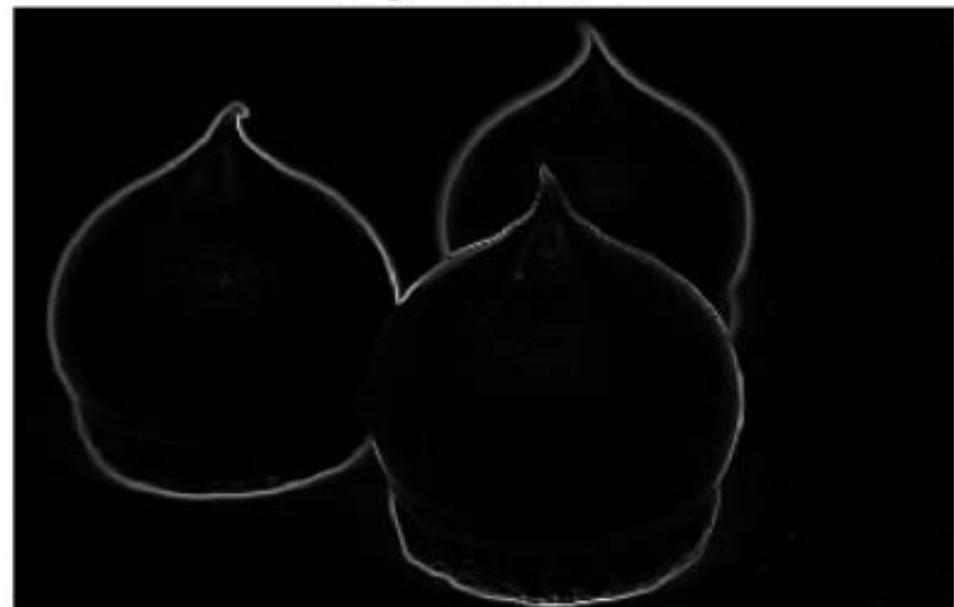


# Edge detection

Original chocolate kisses



Edges with Sobel



# Edge detection

## Sobel

```
# Import module and function
from skimage.filters import sobel

# Apply edge detection filter
edge_sobel = sobel(image_coins)

# Show original and resulting image to compare
plot_comparison(image_coins, edge_sobel, "Edge with Sobel")
```

# Comparing plots

```
def plot_comparison(original, filtered, title_filtered):

    fig, (ax1, ax2) = plt.subplots(ncols=2, figsize=(8, 6), sharex=True,
                                  sharey=True)
    ax1.imshow(original, cmap=plt.cm.gray)
    ax1.set_title('original')
    ax1.axis('off')
    ax2.imshow(filtered, cmap=plt.cm.gray)
    ax2.set_title(title_filtered)
    ax2.axis('off')
```

# Gaussian smoothing

Original



Blurred with Gaussian filter



# Gaussian smoothing



# Gaussian smoothing

```
# Import the module and function
from skimage.filters import gaussian

# Apply edge detection filter
gaussian_image = gaussian(amsterdam_pic, multichannel=True)

# Show original and resulting image to compare
plot_comparison(amsterdam_pic, gaussian_image, "Blurred with Gaussian filter")
```

# Gaussian smoothing

Original



Blurred with Gaussian filter



# 練習時間

## Jump into filtering.ipynb



jupyter Jump into filtering (autosaved)

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

Edge detection In this exercise, you'll detect edges in an image by applying the Sobel filter.

Soap pills of heart and rectangle shapes in blue background Image preloaded as soaps\_image. Theshow\_image() function has been already loaded for you.

Let's see if spots all the figures in the image.

A photograph showing several white soap bars of different shapes (rectangular and heart-shaped) and a small glass jar of lotion or cream. They are arranged on a bright blue surface that is scattered with small, pink, heart-shaped bath salts. A few green leaves are also visible among the soaps.

# 練習時間

## Jump into filtering.ipynb



jupyter Jump into filtering (unsaved changes) Logout

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練習

Blurring to reduce noise In this exercise you will reduce the sharpness of an image of a building taken during a London trip, through filtering.

Building in London Image loaded as building\_image.

A photograph showing the top of a building with a unique, angular, and patterned facade. The building is set against a bright blue sky filled with wispy white clouds. The image is used for a filtering exercise.

# 問卷

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

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取消割位  
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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



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