python™

第11節 Finding contours

1. Contours 技術說明
2. 認識 Skimage 的 measure
3. 標記 Contours

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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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
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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

Finding contours

Original image

Contours

- Measure size
- Classify shapes
- Determine the number of objects

Total points in domino tokens: 35.

Binary images

Thresholded Image

Contours

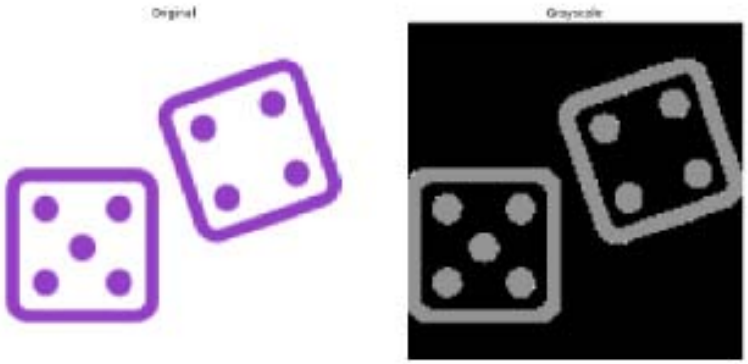
We can obtain a binary image applying **thresholding** or using **edge detection**

Find contours using scikit-image

PREPARING THE IMAGE

Transform the image to 2D grayscale.

```
# Make the image grayscale
image = color.rgb2gray(image)
```



Find contours using scikit-image

PREPARING THE IMAGE

Binarize the image

```
# Obtain the thresh value
thresh = threshold_otsu(image)

# Apply thresholding
thresholded_image = image > thresh
```

Thresholded

Find contours using scikit-image

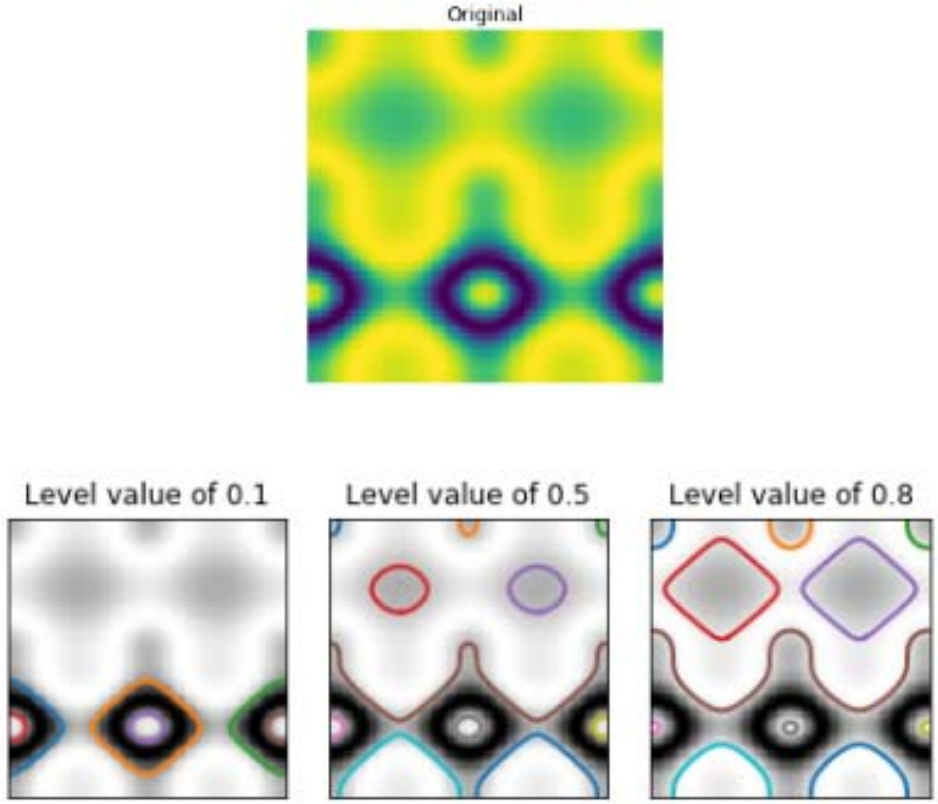
And then use `find_contours()` .

```
# Import the measure module
from skimage import measure

# Find contours at a constant value of 0.8
contours = measure.find_contours(thresholded_image, 0.8)
```

Contours

Constant level value



The steps to spotting contours

```
from skimage import measure
from skimage.filters import threshold_otsu

# Make the image grayscale
image = color.rgb2gray(image)
# Obtain the optimal thresh value of the image
thresh = threshold_otsu(image)

# Apply thresholding and obtain binary image
thresholded_image = image > thresh

# Find contours at a constant value of 0.8
contours = measure.find_contours(thresholded_image, 0.8)
```

The steps to spotting contours

Resulting in

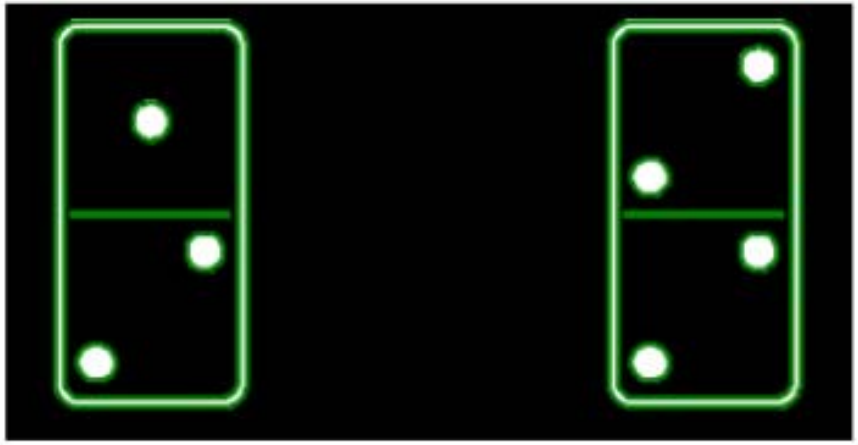
A contour's shape

Contours: list of (n,2) - ndarrays.

```
for contour in contours:
    print(contour.shape)
```

```
(433, 2)
(433, 2)
(401, 2)
(401, 2)
(123, 2)
(123, 2)
(59, 2)
(59, 2)
(59, 2)
(57, 2)
(57, 2)
```

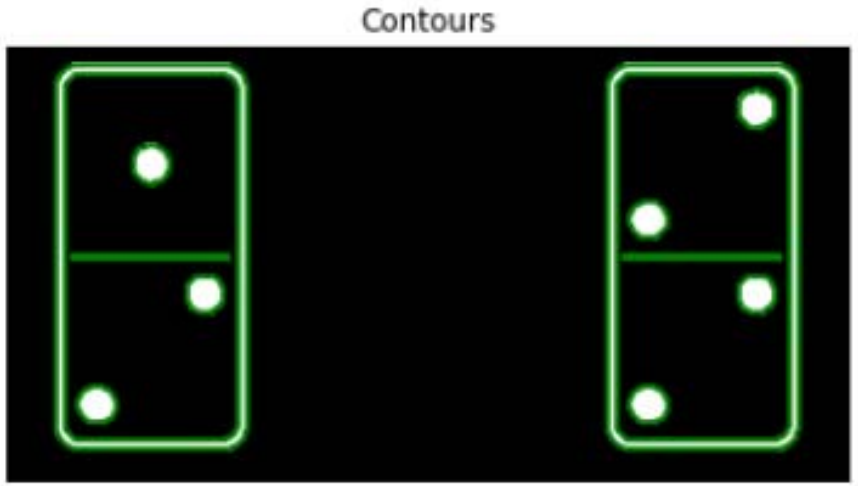
Contours



A contour's shape

```
for contour in contours:
    print(contour.shape)
```

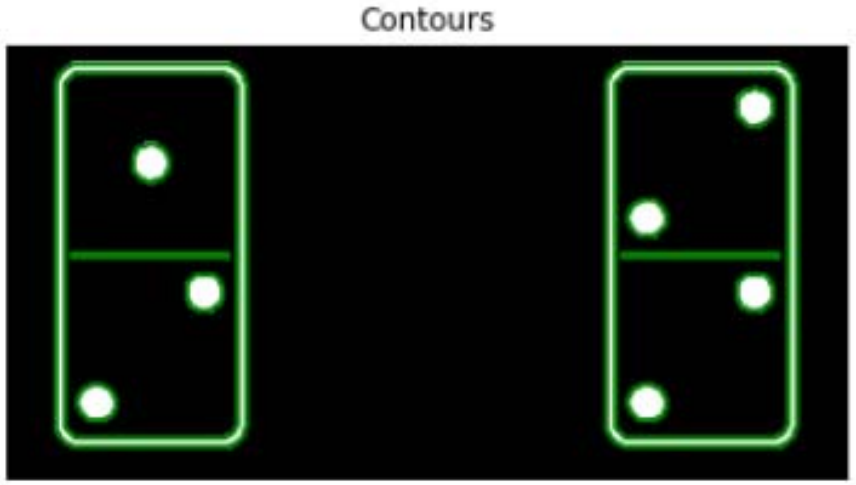
```
(433, 2)
(433, 2) --> Outer border
(401, 2)
(401, 2)
(123, 2)
(123, 2)
(59, 2)
(59, 2)
(59, 2)
(57, 2)
(57, 2)
(59, 2)
(59, 2)
```



A contour's shape

```
for contour in contours:
    print(contour.shape)
```

```
(433, 2)
(433, 2) --> Outer border
(401, 2)
(401, 2) --> Inner border
(123, 2)
(123, 2) --> Divisory line of tokens
(59, 2)
(59, 2)
(59, 2)
(57, 2)
(57, 2)
(59, 2)
(59, 2) --> Dots
```



練習時間

Jump into filtering.ipynb

jupyter 11.Finding contours Last Checkpoint: 9 hours ago (autosaved)

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Run Markdown

練習

Contouring shapes In this exercise we'll find the contour of a horse.

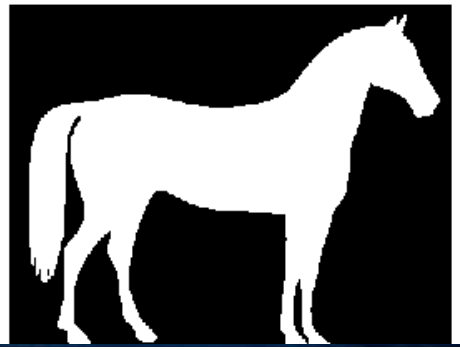
For that we will make use of a binarized image provided by scikit-image in its data module. Binarized images are easier to process when finding contours with this algorithm. Remember that contour finding only supports 2D image arrays.

Once the contour is detected, we will display it together with the original image. That way we can check if our analysis was correct!

show_image_contour(image, contours) is a preloaded function that displays the image with all contours found using Matplotlib.

Shape of a horse in black and white Remember you can use the find_contours() function from the measure module, by passing the thresholded image and a constant value.

Horse



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