電腦視覺原理及應用簡介

Lab4

Skin Color Detection

流程

- 讀取影片
  - cv2.VideoCapture(“videoName”)
- 使用高斯模糊
  - cv2.GaussianBlur(image, ksize, sigmaX)->dst
  - 高斯模糊是圖像與常態分佈做卷積
  - ksize是Gaussian kernel size, width、heigh要為奇數，例: (3, 3) or (5, 5) or (3, 5) or 自己調整
  - sigmaX是Gaussian kernel standard deviation, 可設成2
- 將color space從BGR轉換至YCrCb
  - cv2.cvtColor(image, cv2.COLOR_BGR2YCR_CB)
- 根據圖片的Cr、Cb產生出對應的mask
  - 參考範圍: 133 <= Cr <= 177, 98 <= Cb <= 122

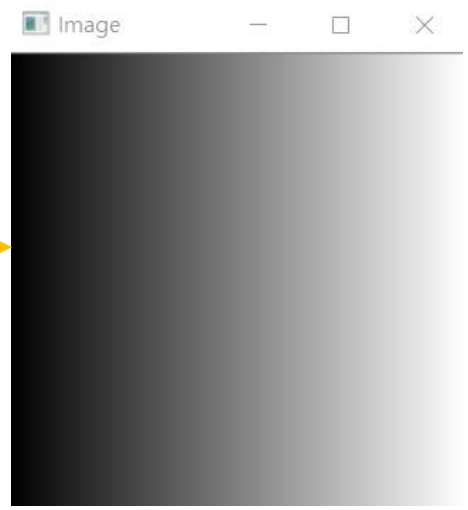
流程 (Cont.)

- 對mask使用erotion、dilation去除部分雜訊
  - cv2.erode(src, structuringElement)->dst
  - cv2.dilate(src, structuringElement)->dst
  - 注意mask的型態為bool, 而src的型態須為unsigned int, 需做型態轉換
    - mask.astype(np.uint8)
  - structuringElement可用(3, 3) or (5, 5) or (7, 7) or 自己調整
- 在mask中取得skin color pixels的輪廓
  - cv2.findContours(src, mode, method) ->contours, hierarchy
  - 注意src的型態為unsigned int, mask為bool, 需做型態轉換
  - mode可使用cv2.RETR_EXTERNAL
  - method可使用cv2.CHAIN_APPROX_SIMPLE
- 畫出輪廓
  - cv2.drawContours(image, contours, contourIndex, color, thickness)
  - contourIndex可設成-1, 代表畫出所有輪廓; color可設成(0, 255, 0); thickness可設成1
- 顯示結果

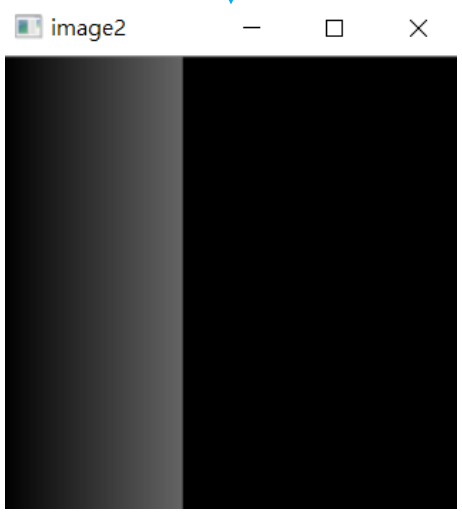
Mask範例

```python
import numpy as np
import cv2

image = cv2.imread("example.PNG", cv2.IMREAD_GRAYSCALE)
mask = image > 100
print(mask)
image2 = image.copy()
image2[mask] = 0
cv2.imshow("Image", image)
cv2.imshow("image2", image2)
cv2.waitKey(0)
cv2.destroyAllWindows()
```

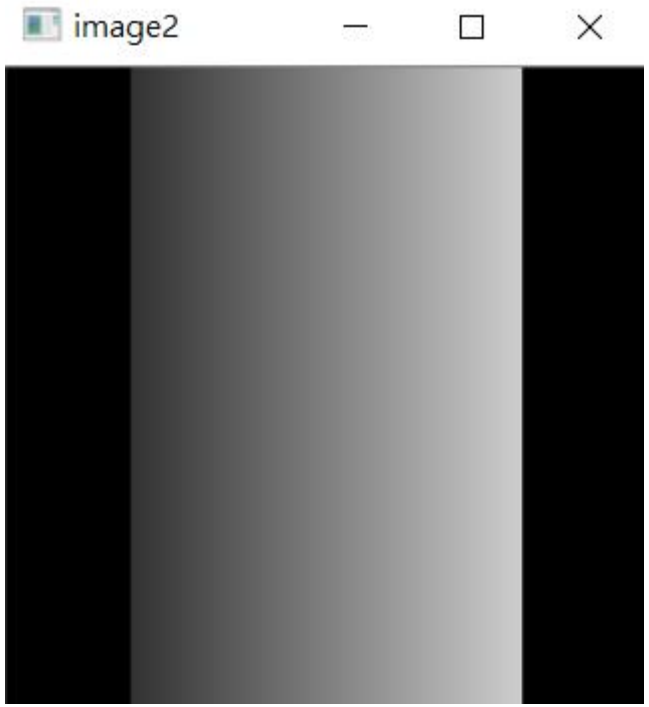



```
[[False False False ...  True  True  True]
 [False False False ...  True  True  True]
 [False False False ...  True  True  True]
 ...
 [False False False ...  True  True  True]
 [False False False ...  True  True  True]
 [False False False ...  True  True  True]]
```



Mask多個條件

- 多個條件要用bitwise and跟bitwise or
- 不能使用and跟or
- Ex:
  - mask = (image < 50) | (image > 205)
  - ~~mask = (image < 50) or (image > 205)~~



Demo


result
frame
The Guardian
AMERICAN CONSERVATIVE UNION
CPAC 2019


result
The Guardian
AMERICAN CONSERVATIVE UNION
CPAC 2019

參考資料

- GaussianBlur: https://docs.opencv.org/2.4/modules/imgproc/doc/filtering.html?highlight=cv2.gaussianblur#cv2.GaussianBlur
- erode: https://docs.opencv.org/2.4/modules/imgproc/doc/filtering.html?highlight=erode#cv2.erode
- findContours & drawContours: https://docs.opencv.org/2.4/modules/imgproc/doc/structural_analysis_and_shape_descriptors.html?highlight=cv2.findcontours#cv2.findContours