Lab3

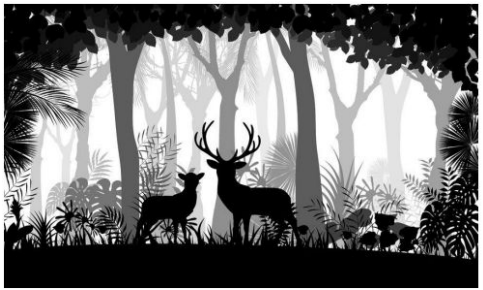
Connected Component (50%)
Foreground Detection (50%)

1. Connected Component (50%)

- Two-Pass Algorithm
  - Pass 1
    - Perform label assignment and label propagation
    - Construct the equivalence relations between labels when two different labels propagate to the same pixel
    - Apply resolve function to find the transitive closure of all equivalence relations
  - Pass 2:
    - Perform label translation

1. Connected Component (50%)

- 對做完 Otsu threshold（上次作業）的圖片找出 connected component
- 把不同區域塗上不同顏色
- 顏色不限制，不用跟範例一樣

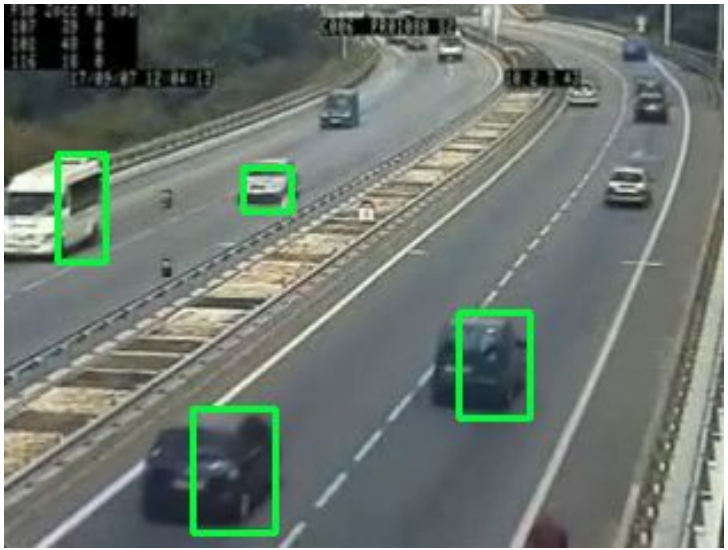


input

Otsu

Connected Component

2. Foreground Detection (50%)



2. Foreground Detection (50%)

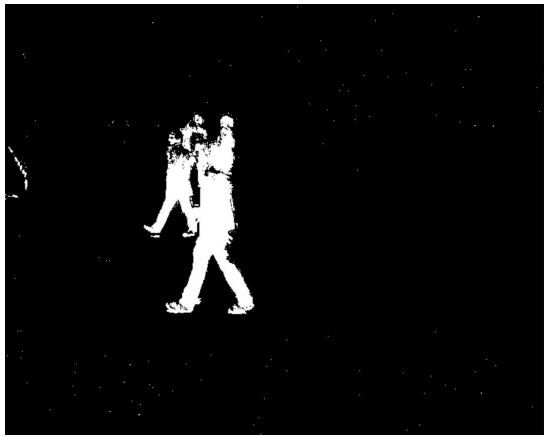
- Video
  - Videos are formed by continuous **frames**, new frames are shown when the video is being played. The time between each frame is called **frame rate**.
- How to read videos
  - **cap = cv2.VideoCapture(filename)**
  - **cap.isOpened()**: 檢查影片是否被成功讀取
  - **ret, frame = cap.read():** 不斷讀取來源影格，把資訊寫進rame
  - **cv2.imshow("frame", videoFrame)**: 顯示影片
  - **cv2.waitKey(33)**: 等待幾毫秒再讀取下一禎

2. Foreground Detection (50%)

- Background Subtraction
  - 創造一個 BackgroundSubtractor
    - **backSub = cv2.createBackgroundSubtractorMOG2()**
  - 用在 frame 上面
    - **fgmask = backSub.apply(frame)**

2. Foreground Detection (50%)

- Threshold
  - 找出 shadow 的值 (default=127, background=0, foreground=255)
    - **shadow_val = backSub.getShadowValue()**
  - **ret, nmask = cv2.threshold(fgmask, shadow_val, 255, cv2.THRESH_BINARY)**



2. Foreground Detection (50%)

- Connected component (修改第一題的 code)
  - 找connected component時，要同時**計算相連區域面積**
  - 若相連區域面積 > T，找出相連區域最外圍的四個邊
- Draw rectangles
  - **cv2.rectangle(image, (x1, y1), (x2, y2), color, line_width)**