Digital Image Processing

Title: Template Matching

Objectives: The purpose of today's lab is to introduce you to the process of template matching and edge detection. You will find objects in an image using Template Matching.

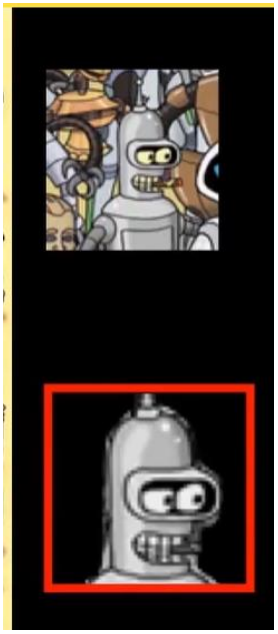
Tools Used: Python 3.10

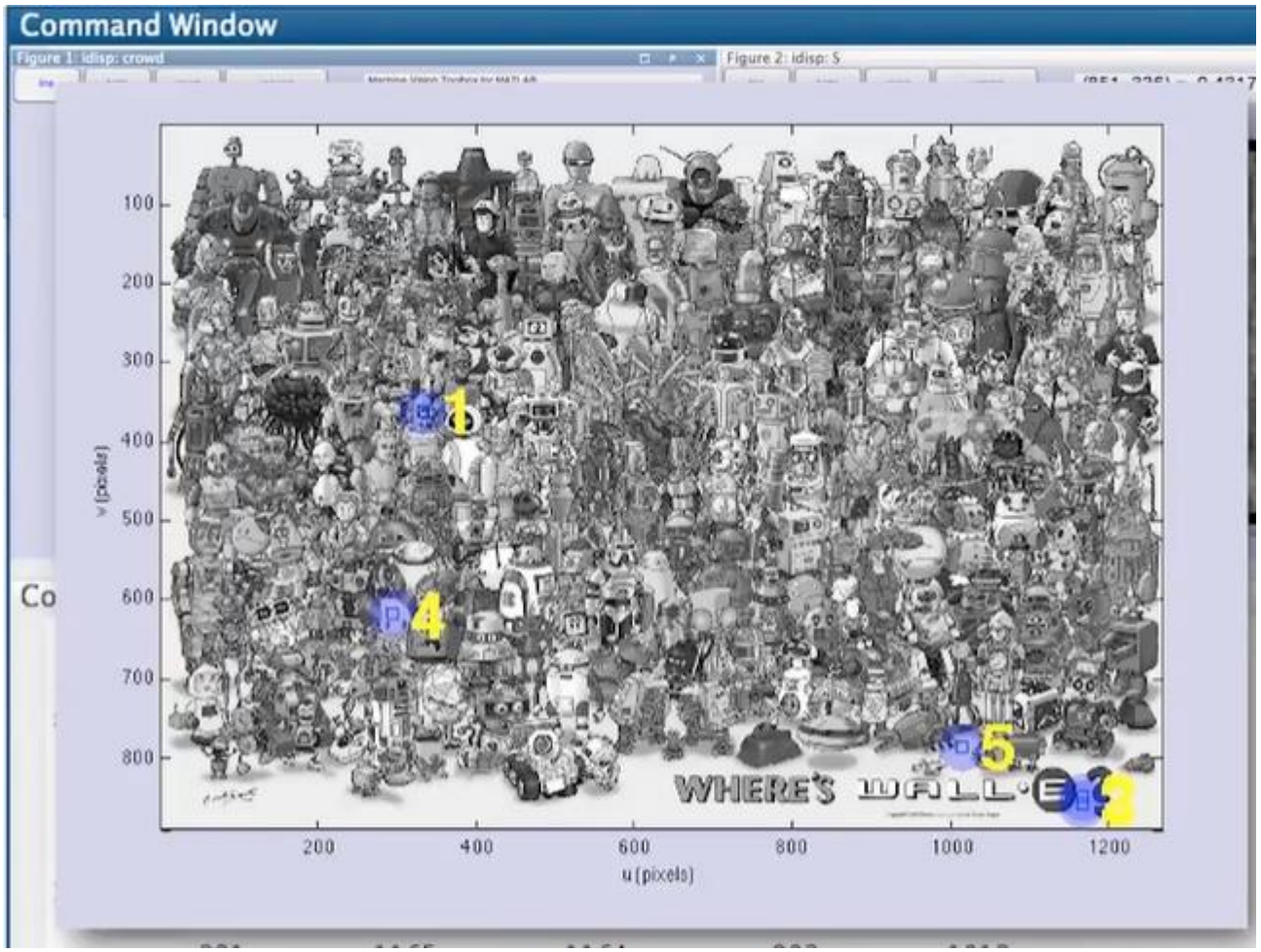
Procedure: Open IDLE and perform the following tasks

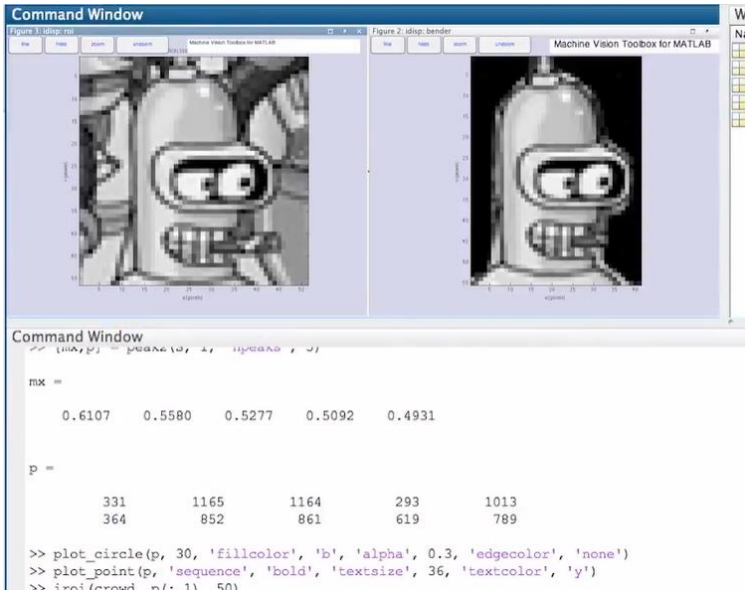
Task

- Write a template matching algorithm (function) in python.
- It should be generic. This means any image and/or template can be given to it.
- Find a crowd picture on the internet (should not be same as other class fellows). Make your template from it in photoshop or paint. Apply the template matching function on it. Draw a box around the window with closest 3 matches.
- A sample program with output is shown below.


WHERE'S WALL·E?




Command Window
Figure 1: idisp: crowd
Figure 2: idisp: S
100
200
300
400
500
600
700
800
v (pixels)
200
400
600
800
1000
1200
u (pixels)
WHERE'S WALL·E?



Code:

```
import cv2

import numpy as np


path = r'C:\Users\Naeem\Desktop\Jahanzeb\DIP\DIP Lab\Project 2\og.jpg'

img = cv2.imread(path, cv2.IMREAD_COLOR)

img = cv2.resize(img, (0, 0), None, .50, .50)


path2 = r'C:\Users\Naeem\Desktop\Jahanzeb\DIP\DIP Lab\Project 2\mask.jpg'

temp = cv2.imread(path2, cv2.IMREAD_COLOR)

temp = cv2.resize(temp, (0, 0), None, .50, .50)


gray = cv2.cvtColor(img, cv2.COLOR_RGB2GRAY)

template = cv2.cvtColor(temp, cv2.COLOR_RGB2GRAY)


height, width = template.shape
```

```
match = cv2.matchTemplate(gray, template, cv2.TM_CCOEFF_NORMED)


threshold = 0.39
loc = np.where(match >= threshold)


label = 1
for pt in zip(*loc[::-1]):
    cv2.rectangle(img, pt, (pt[0] + width, pt[1] + height), (0, 0, 255), 1)
    cv2.putText(img, str(label), (pt[0], pt[1] - 5), cv2.FONT_HERSHEY_SIMPLEX, 0.9, (0, 0, 255), 1)
    if label < 3:
        label = label + 1


cv2.imshow('Result', img)
cv2.waitKey(0)
cv2.destroyAllWindows()
```

Screenshot:


Result
3
3
3

Figure 1: Original Photo

Figure 2: Mask