

Lab 04

Marker(測距離) & Tello EDU

安裝套件

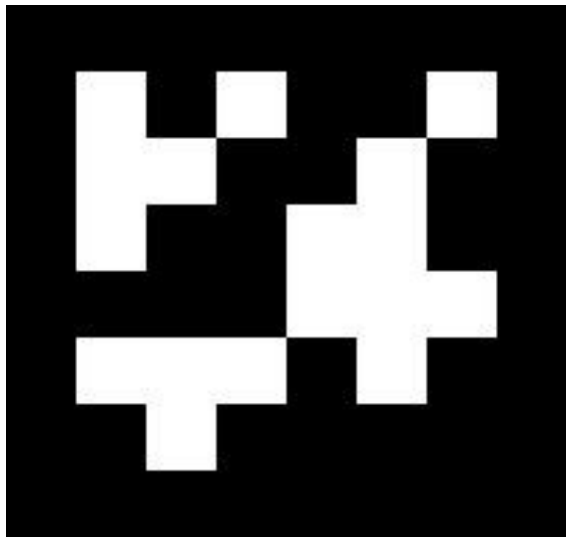
pip install opencv-contrib-python==4.4.0.46

pip install djitellopy

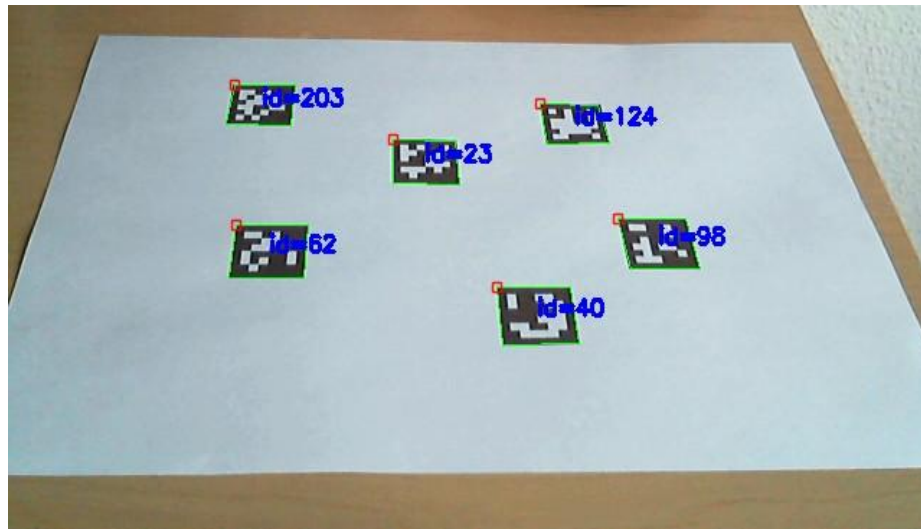
Marker Detection (50%)

- a. calibration
- b. marker detection**
- c. pose estimation**
- d. controlling

Marker Detection (50%)



aruco marker



marker detection

Marker Detection (50%)

Load the predefined dictionary

```
dictionary = cv2.aruco.Dictionary_get(cv.aruco.DICT_6X6_250)
```

Initialize the detector parameters using default values

```
parameters = cv2.aruco.DetectorParameters_create()
```

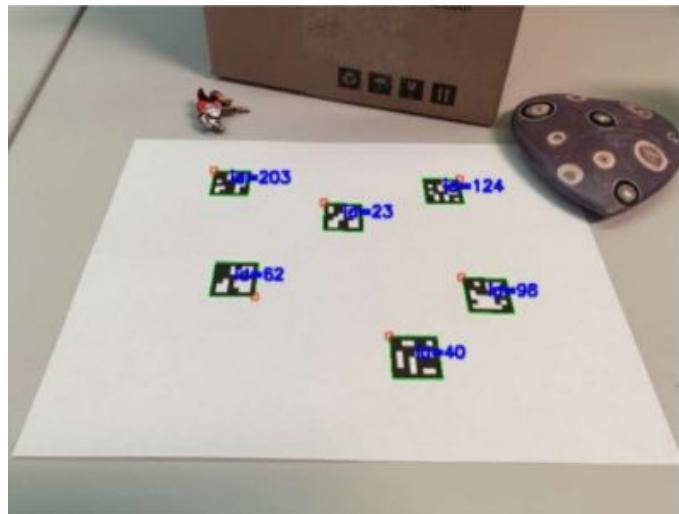
The list of parameters that can be adjusted including the adaptive threshold values can be found **here**

Marker Detection (50%)

Detect the markers in the image

```
markerCorners, markerIds, rejectedCandidates =  
cv2.aruco.detectMarkers(frame, dictionary, parameters=parameters)
```

```
frame = cv2.aruco.drawDetectedMarkers(frame,  
markerCorners, markerIds)
```



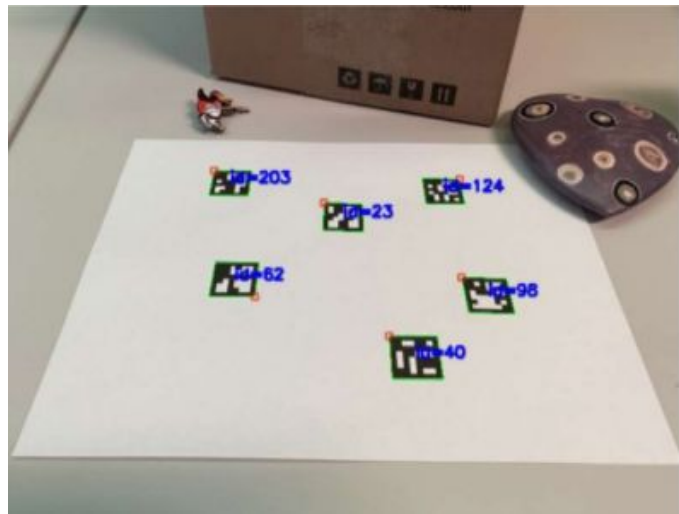
Marker Detection (50%)

#Pose estimation for single markers.

```
rvec, tvec, _objPoints =  
cv2.aruco.estimatePoseSingleMarkers(markerCorners,  
15, intrinsic, distortion)
```

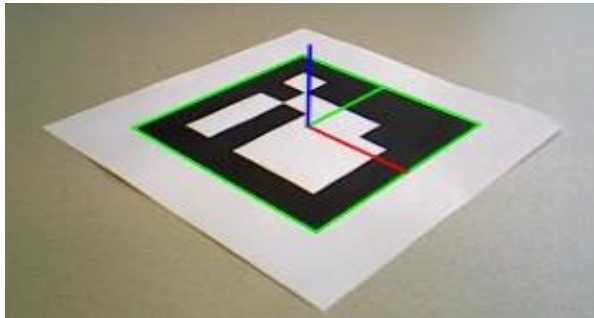
```
frame = cv2.aruco.drawAxis(frame, intrinsic,  
distortion, rvec, tvec, 0.1)
```

```
# Get the parameters of camera calibration  
fs = cv2.FileStorage("calibrateCamera.xml", cv2.FILE_STORAGE_READ)  
intrinsic = fs.getNode("intrinsic").mat()  
distortion = fs.getNode('distortion').mat()
```



Marker Detection (50%)

- a. calibrate the drone camera
- b. marker detection by drone camera
- c. pose estimation



x: 10.3478

y: 21.5618

z: 3.9908

Tello EDU (50%)

djitellogy

djitellopy

DJITelloPy API Reference

DJITelloPy

Swarm

Tello

DJITelloPy

This documentation is the API reference of the DJITelloPy Library.

For more information on the project please see the [readme on github](#).

API

Currently the library contains the following classes:

- [Tello][tello] for controlling a single tello drone.
- [Swarm][swarm] for controlling multiple Tello EDUs in parallel.



Table of contents

API

Example Code

Installation

[DJITelloPy API Reference](#)
installation:
pip install djitellopy

設備介紹

配件		數量
	飛行器	× 1
	螺旋槳（對）	× 4
	槳葉保護罩（套）	× 1
	電池	× 1
	Micro USB 傳輸線	× 1
	螺旋槳拆卸工具	× 1
	挑戰卡	× 4

電池管家



官方範例程式

- <https://github.com/dji-sdk/Tello-Python>

github.com/dji-sdk/Tello-Python

13 commits 1 branch 0 packages 0 releases 2 contributors View license

Branch: master New pull request Create new file Upload files Find file Clone or download

hanker-lu 1 · Add FAQ file(EN&CH) according recent questions asked by users;2 · Ren... 1 Latest commit 693776d on 15 Feb

Single_Tello_Test	modify the readme	last year
Tello_Video	1 · add the vcredist_x64.exe into tello_video_dll.zip;2 · remove the manu...	9 months ago
Tello_Video_With_Pose_Recognition	1 · add the vcredist_x64.exe into tello_video_dll.zip;2 · remove the manu...	9 months ago
doc	Tello-Python SampleCode v1.0.0	last year
.gitattributes	add the .gitattributes	last year
.gitignore	Tello-Python SampleCode v1.0.0	last year
LICENSE.md	Tello-Python SampleCode v1.0.0	last year
README.md	1 · Add FAQ file(EN&CH) according recent questions asked by users;2 · Ren...	9 months ago
TelloPython_FAQ(CH).txt	1 · Add FAQ file(EN&CH) according recent questions asked by users;2 · Ren...	9 months ago
TelloPython_FAQ.txt	1 · Add FAQ file(EN&CH) according recent questions asked by users;2 · Ren...	9 months ago
tello_state.py	Tello-Python SampleCode v1.0.0	last year
tello_video_dll(ForWin64).zip	1 · Add FAQ file(EN&CH) according recent questions asked by users;2 · Ren...	9 months ago

官方範例程式：Tello-Video

- 第一步。打開Tello無人機，並透過Wi-Fi將筆電連接到Tello



官方範例程式：執行 Tello-Video

- Tello_Video

 h264decoder	檔案資料夾
 pyimagesearch	檔案資料夾
 keyboard_djitello.py	Python 來源檔案
 lab04	Python 來源檔案
 LICENSE	Markdown 來源檔案
 README	Markdown 來源檔案
 tello	Python 來源檔案
 tello_control_ui	Python 來源檔案

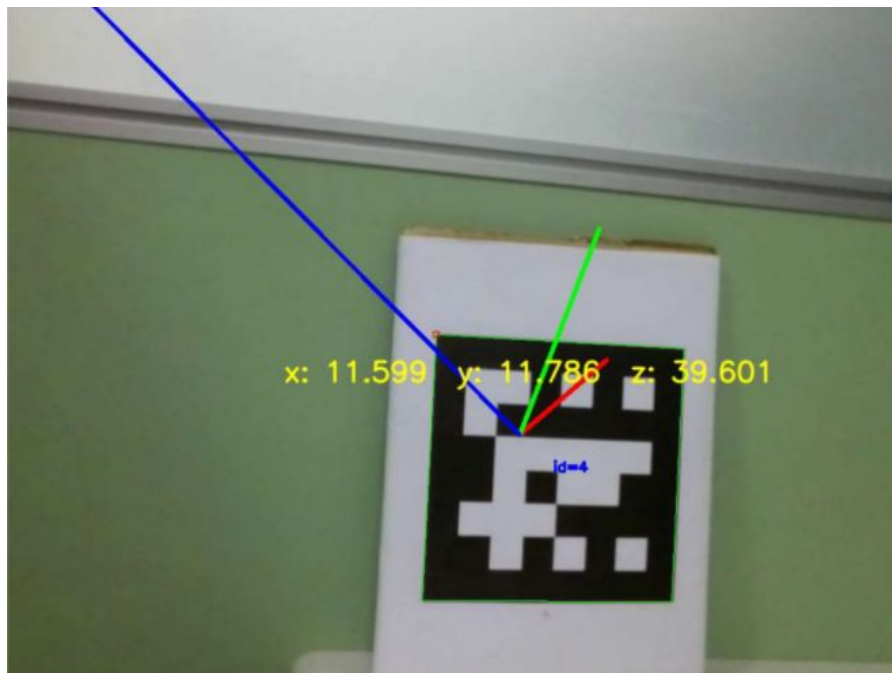
取像控制

lab04.py

```
1  import cv2
2  import numpy as np
3  import time
4  import math
5  from djitellopy import Tello
6  from pyimagesearch.pid import PID
7
8  def main():
9      # Tello
10     drone = Tello()
11     drone.connect()
12     #time.sleep(10)
13     drone.streamon()
14     frame_read = drone.get_frame_read()
15
16
17     while True:
18         frame = frame_read.frame
19
20         cv2.imshow("drone", frame)
21         key = cv2.waitKey(33)
22
23         #cv2.destroyAllWindows()
24
25
26
27 if __name__ == '__main__':
28     main()
```


測距離

利用cv2.putText()將位置放上去



測距離

若找不到aruco module

pip install opencv-contrib-python

```
(cvdrone1ab) C:\Users\raymo>pip list |findstr opencv
opencv-contrib-python 4.4.0.46
opencv-python         4.4.0.46
```

若無人機無法取像，嘗試關閉防火牆 飛完記得打開



注意

本週不要讓無人機起飛 !!!!

起飛的組別會當作本週作業未完成