Tag code recognition

1. Introduction

Apriltag tag code is a coded mark commonly used in machine vision. It has a high recognition rate and reliability and can be used for various tasks, including augmented reality, robotics, and camera calibration.

2. Startup

2.1. Preparation before program startup

This apriltag tag code uses the TAG36H11 format. The factory has been equipped with relevant tag codes and attached to the building blocks. You need to take out the building blocks and place them under the camera screen for recognition.

2.2. Source code

Code path:

```
dofbot_ws/src/dofbot_basic_visual/scripts/07.Apriltag_Recognition.ipynb
```

```
import cv2 as cv
import threading
import random
from time import sleep
import ipywidgets as widgets
from IPython.display import display
from apriltag_identify import ApriltagIdentify
from dofbot_utils.fps import FPS
from dofbot_utils.robot_controller import Robot_Controller
```

```
apriltag_Identify = ApriltagIdentify()
model = 'General'
```

```
robot = Robot_Controller()
robot.move_look_map()
fps = FPS()
```

```
button_layout      = widgets.Layout(width='320px', height='60px',
align_self='center')
output = widgets.Output()
# 退出 exit
exit_button = widgets.Button(description='Exit', button_style='danger',
layout=button_layout)
# 图像控件 Image widget
imgbox = widgets.Image(format='jpg', height=480, width=640,
layout=widgets.Layout(align_self='center'))
# 垂直布局 Vertical layout
display_box = widgets.VBox([imgbox, exit_button],
layout=widgets.Layout(align_self='center'))
```

```
def exit_button_Callback(value):
    global model
    model = 'Exit'

exit_button.on_click(exit_button_Callback)
```

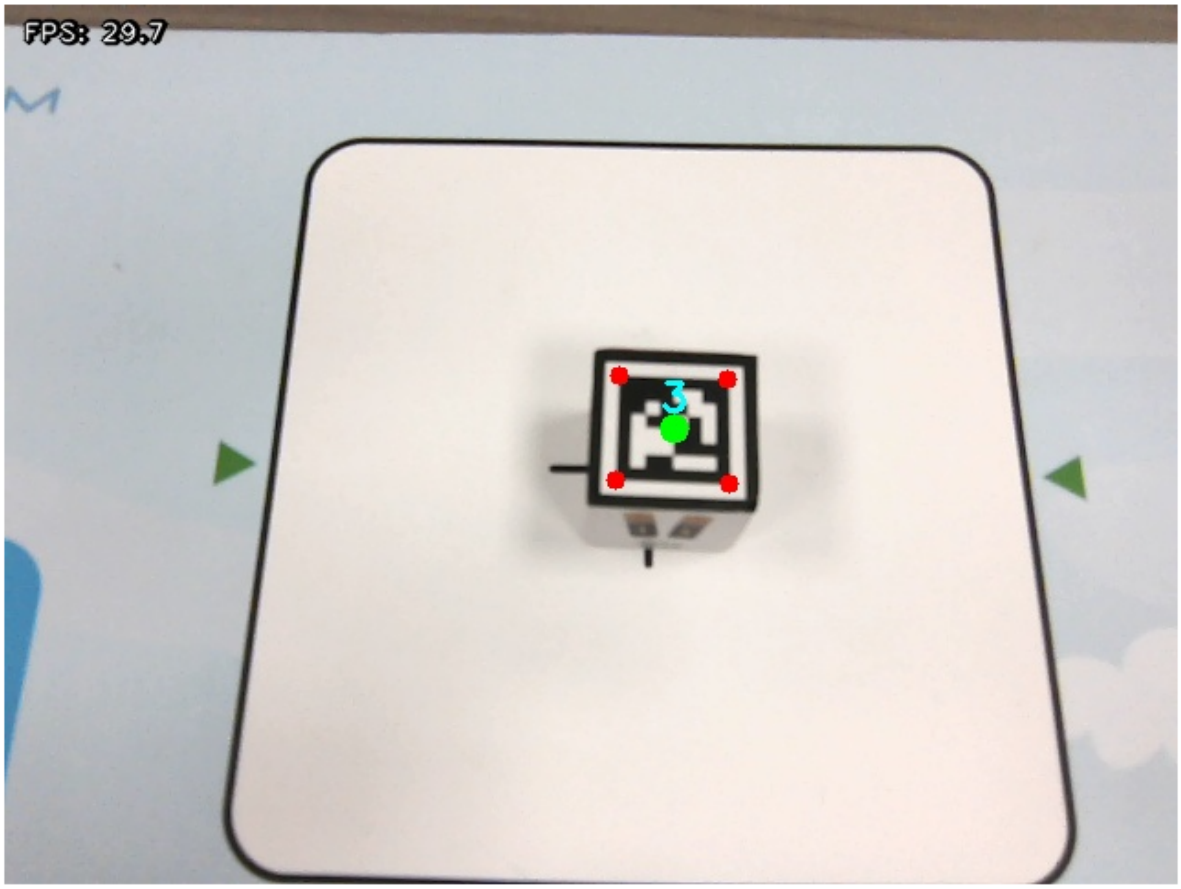
```
def camera():
    global HSV_learning,model
    # 打开摄像头 Open camera
    capture = cv.VideoCapture(0)
    capture.set(3, 640)
    capture.set(4, 480)
    capture.set(5, 30)
    # Be executed in loop when the camera is opened normally
    # 当摄像头正常打开的情况下循环执行
    while capture.isOpened():
        try:
            _, img = capture.read()
            fps.update_fps()
            img, msg = apriltag_Identify.getApriltagPosition(img)
            if model == 'Exit':
                capture.release()
                break
            fps.show_fps(img)
            imgbox.value = cv.imencode('.jpg', img)[1].tobytes()
        except Exception as e:
            print("program end")
            print(e)
            capture.release()
```

```
display(display_box,output)
threading.Thread(target=camera, ).start()
```

2.3, Program Description

Program Click the Run Entire Program button on the Jupyterlab toolbar, then scroll to the bottom to see the camera component display.

Put the label code into the camera screen, the system will recognize and frame the four vertices of the label code, and display the ID number of the label code.



Exit

If you need to exit the program, please click the [Exit] button.