Gesture recognition fixed action

To apply for a Baidu account, you can read the process of gesture recognition in Chapter 8. This tutorial is based on the successful recognition of gestures by gesture recognition.

1. Main code content

Code path:/root/Dofbot/6.AI_Visual/1.gesture_action.ipynb

```
#bgr8 转 jpeg 格式
import enum
import cv2
def bgr8_to_jpeg(value, quality=75):
 return bytes(cv2.imencode('.jpg', value)[1])
```

```
#导入相关的模块
import threading
import time
from Arm_Lib import Arm_Device
# 创建机械臂对象
Arm = Arm_Device()
time.sleep(.1)
```

```
import cv2
import time
import demjson
import pygame
from aip import AipBodyAnalysis
from aip import AipSpeech
from PIL import Image, ImageDraw, ImageFont
import numpy
import ipywidgets.widgets as widgets
# 具体手势请看官方提供 https://ai.baidu.com/ai-doc/BODY/4k3cpywrv
hand={'One':'数字 1','Two':'数字 2','Three':'数字 3','Four':'数字 4',
 'Five':'数字 5', 'Six':'数字 6','Seven':'数字 7',
 'Eight':'数字 8','Nine':'数字 9','Fist':'拳头','Ok':'OK',
 'Prayer':'祈祷','Congratulation':'作揖','Honour':'作别',
 'Heart_single':'比心心','Thumb_up':'点赞','Thumb_down':'Diss',
 'ILY':'我爱你','Palm_up':'掌心向上','Heart_1':'双手比心 1',
 'Heart_2':'双手比心 2','Heart_3':'双手比心 3','Rock':'Rock',
 'Insult':'竖中指','Face':'脸'}
# 下面的 key 要换成自己的
""" 人体分析 APPID AK SK """
APP_ID = '18550528'
API_KEY = 'K6PWqtiUTKYK1fYaz13O8E3i'
SECRET_KEY = 'IDBUII1j6srF1XVNDX32I2WpuwBWczzK'
client = AipBodyAnalysis(APP_ID, API_KEY, SECRET_KEY)
```

```
g_camera = cv2.VideoCapture(0)
g_camera.set(3, 640)
g_camera.set(4, 480)
g_camera.set(5, 30) #设置帧率
g_camera.set(cv2.CAP_PROP_FOURCC, cv2.VideoWriter.fourcc('M', 'J', 'P', 'G'))
g_camera.set(cv2.CAP_PROP_BRIGHTNESS, 40) #设置亮度 -64 - 64 0.0
g_camera.set(cv2.CAP_PROP_CONTRAST, 50) #设置对比度 -64 - 64 2.0
g_camera.set(cv2.CAP_PROP_EXPOSURE, 156) #设置曝光值 1.0 - 5000 156.0
ret, frame = g_camera.read()
```

```
# 定义摄像头显示组件
image_widget = widgets.Image(format='jpeg', width=600, height=500) #设置摄像头显
示组件
display(image_widget)
image_widget.value = bgr8_to_jpeg(frame)
```

```
# 定义转换显示中文函数
def cv2ImgAddText(img, text, left, top, textColor=(0, 255, 0), textSize=20):
 if (isinstance(img, numpy.ndarray)): # 判断是否 OpenCV 图片类型
 img = Image.fromarray(cv2.cvtColor(img, cv2.COLOR_BGR2RGB))
 # 创建一个可以在给定图像上绘图的对象
 draw = ImageDraw.Draw(img)
 # 字体的格式
 fontStyle = ImageFont.truetype(
 "simhei.ttf", textSize, encoding="utf-8")
 # 绘制文本
 draw.text((left, top), text, textColor, font=fontStyle)
 # 转换回 OpenCV 格式
 return cv2.cvtColor(numpy.asarray(img), cv2.COLOR_RGB2BGR)
```

```
#定义不同位置的舵机角度
look_at = [90, 164, 18, 0, 90, 90]
p_Prayer = [90, 90, 0, 180, 90, 180] #祈祷
p_Thumb_up = [90, 90, 90, 90, 90, 180] #点赞
p_Heart_single = [90, 0, 180, 0, 90, 30] #单手比心
p_Eight = [90, 180, 18, 0, 90, 90] #八
p_Congratulation = [90, 131, 52, 0, 90, 180] #作揖
p_Rock = [90, 0, 90, 180, 90, 0] #rock
p_fist = [90, 90, 0, 0, 90, 0] #拳头
p_horse_1 = [90, 7, 153, 19, 0, 126] #
p_horse_2 = [90, 5, 176, 0, 0, 180]
p_horse_3 = [90, 62, 158, 0, 0, 0]
global running
running = 0
```

```
# 定义移动机械臂函数,同时控制 1-6 号舵机运动，p=[S1,S2,S3,S4,S5,S6]
def arm_move_6(p, s_time = 500):
 for i in range(6):
 id = i + 1
 Arm.Arm_serial_servo_write(id, p[i], s_time)
 time.sleep(.01)
 time.sleep(s_time/1000)
```

```
# 定义小马运动
def horse_running():
 Arm.Arm_serial_servo_write(6, 150, 300)
 time.sleep(.3)
 Arm.Arm_serial_servo_write(6, 180, 300)
 time.sleep(.3)
```

```
global g_state_arm
g_state_arm = 0
def ctrl_arm_move(index):
 global running
 if index == "Prayer":
 arm_move_6(p_Prayer, 1000)
 time.sleep(1.5)
 arm_move_6(look_at, 1000)
 time.sleep(1)
 elif index == "Thumb_up":
 s_time = 500
 Arm.Arm_serial_servo_write(6, 180, s_time)
 time.sleep(s_time/1000)
 Arm.Arm_serial_servo_write(6, 90, s_time)
 time.sleep(s_time/1000)
 Arm.Arm_serial_servo_write(6, 180, s_time)
 time.sleep(s_time/1000)
 Arm.Arm_serial_servo_write(6, 90, s_time)
 time.sleep(s_time/1000)
 elif index == "Ok":
 s_time = 300
 Arm.Arm_serial_servo_write(4, 10, s_time)
 time.sleep(s_time/1000)
 Arm.Arm_serial_servo_write(4, 0, s_time)
 time.sleep(s_time/1000)
 Arm.Arm_serial_servo_write(4, 10, s_time)
 time.sleep(s_time/1000)
Arm.Arm_serial_servo_write(4, 0, s_time)
 time.sleep(s_time/1000)
 elif index == "Heart_single":
 arm_move_6([90, 90, 90, 90, 90, 90], 800)
 time.sleep(.1)
 arm_move_6(p_Heart_single, 1000)
 time.sleep(1)
 elif index == "Five":
 arm_move_6(look_at, 1000)
 time.sleep(.5)
 elif index == "Eight":
 s_time = 300
 arm_move_6(p_Eight, 0)
 time.sleep(1)
 Arm.Arm_serial_servo_write(2, 165, s_time)
 time.sleep(s_time/1000)
 elif index == "Rock": #rock
 Arm.Arm_serial_servo_write6_array(p_Rock, 1300)
 time.sleep(3)
 Arm.Arm_serial_servo_write6_array(look_at, 1000)
```

```
 time.sleep(1)
 elif index == "Thumb_down": #拇指向下
 Arm.Arm_serial_servo_write6_array(p_horse_1, 1300)
 time.sleep(1)
 elif index == "Congratulation": #作揖
 Arm.Arm_serial_servo_write6_array(p_horse_2, 1000)
 time.sleep(1)
 running = 1
 while running == 1:
 horse_running()
 elif index == "Seven": #数字 7
 Arm.Arm_Buzzer_On(8) #蜂鸣器自动响 0.5 秒
 Arm.Arm_serial_servo_write6_array(p_horse_3, 1000)
 time.sleep(2)
 Arm.Arm_serial_servo_write6_array(look_at, 1000)
 time.sleep(1)

 global g_state_arm
 g_state_arm = 0
```

```
#让机械臂运动到摄像头向前看的位置
arm_move_6(look_at, 1000)
time.sleep(1)
```

```
def start_move_arm(index):
 # 开启机械臂控制线程
 global g_state_arm
 global running
 if g_state_arm == 0:
 closeTid = threading.Thread(target = ctrl_arm_move, args = [index])
 closeTid.setDaemon(True)
 closeTid.start()
 g_state_arm = 1

 if running == 1 and index == "Seven":
 running = 0
```

```
# 主进程
try:
     Arm.Arm_Buzzer_On(1)
     s_time = 300
     Arm.Arm_serial_servo_write(4, 10, s_time)
     time.sleep(s_time/1000)
     Arm.Arm_serial_servo_write(4, 0, s_time)
     time.sleep(s_time/1000)
     Arm.Arm_serial_servo_write(4, 10, s_time)
     time.sleep(s_time/1000)
     Arm.Arm_serial_servo_write(4, 0, s_time)
     time.sleep(s_time/1000)

     while True:
         """1.拍照 """
         ret, frame = g_camera.read()
         #image = get_file_content('./image.jpg')
```

```
        """ 2.调用手势识别 """
        raw = str(client.gesture(image_widget.value))
        text = demjson.decode(raw)
        try:
        res = text['result'][0]['classname']
        except:
            # print('识别结果：什么也没识别到哦~' )
            # img = cv2ImgAddText(frame, "未识别", 250, 30, (0, 0 , 255), 30)
            img = frame
        else:
            # print('识别结果：' + hand[res])
            # img = cv2ImgAddText(frame, hand[res], 250, 30, (0, 255 , 0), 30)
           www.yahboom.com
        if res == 'Prayer': # 1 祈祷
            print('识别结果：' + hand[res])
            img = cv2ImgAddText(frame, hand[res], 250, 30, (0, 255 , 0), 30)
            start_move_arm(res)
        elif res == 'Thumb_up':# 2 点赞
            print('识别结果：' + hand[res])
            img = cv2ImgAddText(frame, hand[res], 250, 30, (0, 255 , 0), 30)
            start_move_arm(res)
        elif res == 'Ok': # 3 OK
            print('识别结果：' + hand[res])
            img = cv2ImgAddText(frame, hand[res], 250, 30, (0, 255 , 0), 30)
            start_move_arm(res)
        elif res == 'Heart_single': # 4 单手比心
            print('识别结果：' + hand[res])
            img = cv2ImgAddText(frame, hand[res], 250, 30, (0, 255 , 0), 30)
            start_move_arm(res)
        elif res == 'Five': # 5 数字 5
            print('识别结果：' + hand[res])
            img = cv2ImgAddText(frame, hand[res], 250, 30, (0, 255 , 0), 30)
            start_move_arm(res)
        elif res == "Eight": # 数字 8
            print('识别结果：' + hand[res])
            img = cv2ImgAddText(frame, hand[res], 250, 30, (0, 255 , 0), 30)
            start_move_arm(res)

        elif res == "Rock": # rock
            print('识别结果：' + hand[res])
            img = cv2ImgAddText(frame, hand[res], 250, 30, (0, 255 , 0), 30)
            start_move_arm(res)
        elif res == "Congratulation": # 作揖
            print('识别结果：' + hand[res])
            img = cv2ImgAddText(frame, hand[res], 250, 30, (0, 255 , 0), 30)
            start_move_arm(res)
        elif res == "Seven": # 数字 7
            print('识别结果：' + hand[res])
            img = cv2ImgAddText(frame, hand[res], 250, 30, (0, 255 , 0), 30)
            start_move_arm(res)
        elif res == "Thumb_down": # 拇指向下
            print('识别结果：' + hand[res])
            img = cv2ImgAddText(frame, hand[res], 250, 30, (0, 255 , 0), 30)
            start_move_arm(res)

        else:
```

```
            img = frame
 image_widget.value = bgr8_to_jpeg(img)
except KeyboardInterrupt:
     print(" Program closed! ")
     pass
```

If the set gesture action is recognized, the robotic arm will perform the corresponding action. The current gestures and actions correspond to the following:

Like	**The motion of the robotic arm's claws is similar to clapping**
OK	The robotic arm nodded
Prayer	Robotic Arm Prayer
Comparing one's heart with one hand	The robotic arm kneels down to welcome
Number 5	The robot arm returns to the initial position
Number 8	The robotic arm saw the gun and acted like it was frightened
Rock	The robotic arm falls down
Thumbs down	The robotic arm makes a horse gesture and waits for the owner to get in the car
Bowing	The owner mounts the horse and starts running
Number 7	Pull back from the brink, stop running