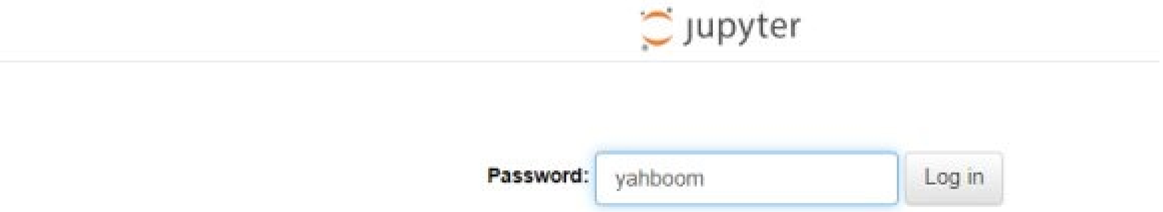
Human pose estimation

1. Experimental purpose

Drive the car to detect human posture

2. Experimental path source code

Enter the car system, end the car program, enter "ip (ip is the car's ip): 8888" in the browser, enter the password "yahboom"



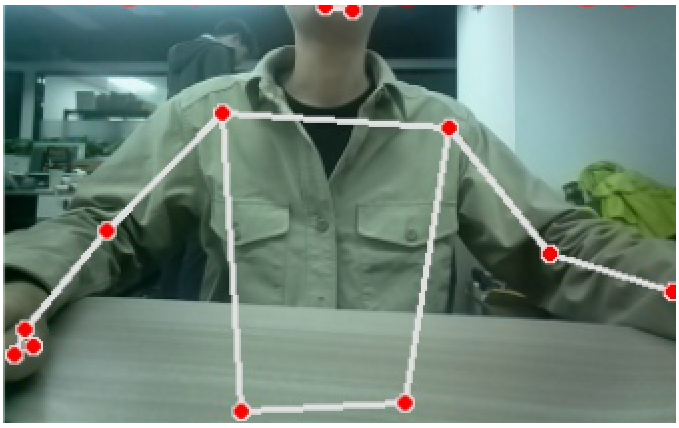
Password: yahboom

Then log in
Enter the path of **Rider-pi_class/5.AI Visual Recognition Course/8. Human pose estimation** and run **pose_dog.ipynb**.
You can also enter the command in the terminal to directly start the python script

```
python3 pose_dog.py
```

3. Experimental phenomenon

After running the source code, you can see that the car can imitate the human body.



4. Main program source code

```
def main():
    global h, w, start_time, status, height, quitmark
    flag = False
    if not cap.isOpened():
        print("Camera not open")
        exit()
    tmp = f"a{sport['count']}\n"
    tmp = f"b{sport['calories']}\n"


    while not flag:
        ret, frame = cap.read()
        if not ret:
            print("Read Error")
            break
        frame = cv2.flip(frame, 1)
        rgbframe = cv2.cvtColor(frame, cv2.COLOR_BGR2RGB)
        poseoutput = poses.process(rgbframe)
        h, w, _ = frame.shape
        preview = frame.copy()

        if poseoutput.pose_landmarks:
            mpdraw.draw_landmarks(
                preview, poseoutput.pose_landmarks, mppose.POSE_CONNECTIONS
            )
            knee_angles = get_knee_angle(poseoutput.pose_landmarks.landmark)
            body_ratio = get_body_ratio(poseoutput.pose_landmarks.landmark)
            avg_angle = (knee_angles[0] + knee_angles[1]) // 2

            # determine the status
            if status:
                if avg_angle > 160:
                    status = False
                    pass_time = time.time() - start_time
                    start_time = 0
                    if 3000 > pass_time > 3:
                        sport["count"] = sport["count"] + 1
                        sport["calories"] = sport["calories"] + int(0.66 *
pass_time)
                        logger(sport["count"], sport["calories"])
                        tmp = f"a{sport['count']}\n"
                        tmp = f"b{sport['calories']}\n"

            else:
                if avg_angle < 120 and body_ratio < 1.2:
                    start_time = time.time()
                    status = True
            height = int(115 - (180 - avg_angle) / 90 * 40)
            print(avg_angle, height)

            if status:
                cv2.putText(
                    preview,
                    f"{height} : {avg_angle:.1f} {body_ratio:.3f}",
                    (10, 40),
                    cv2.FONT_HERSHEY_SIMPLEX,
                    1,
                    (0, 255, 0),
                    1,
                    cv2.LINE_AA,
                )
            else:
                cv2.putText(
                    preview,
                    f"{height} : {avg_angle:.1f} {body_ratio:.3f}",
                    (10, 40),
                    cv2.FONT_HERSHEY_SIMPLEX,
                    1,
                    (0, 0, 255),
                    1,
                    cv2.LINE_AA,
                )
        else:
            start_time = 0
            # car.reset()
        b, g, r = cv2.split(preview)
        image = cv2.merge((r, g, b))
        # image = cv2.flip(image, 1)

        imgok = Image.fromarray(image)
        mydisplay.ShowImage(imgok)

        r, g, b = cv2.split(image)
        image1 = cv2.merge((b, g, r))
        image_widget.value = bgr8_to_jpeg(image1)
        #cv2.imshow("image1",image1)

        if cv2.waitKey(5) & 0xFF == 27:
            break
        if button.press_b():
            car.reset()
            break
```

The source code opens the camera and then detects the human body's posture accordingly. The results are displayed on the car screen and the computer screen.