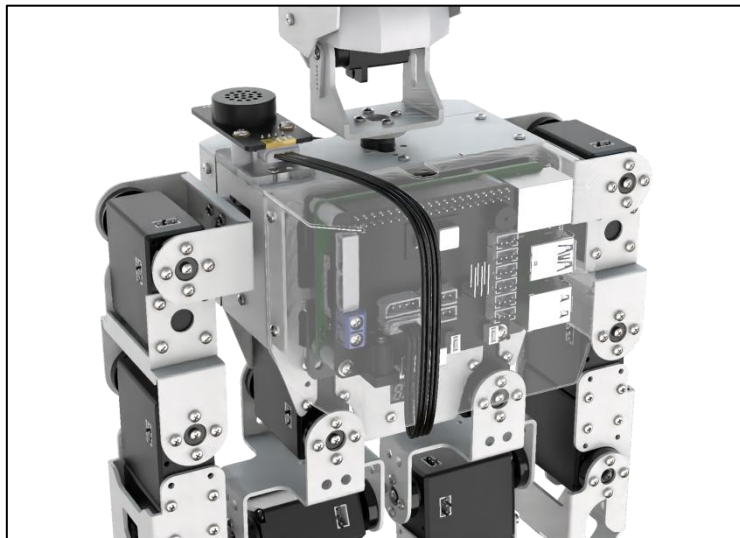


Lesson 6 Mask Recognition

1. Getting Ready

Prepare MP3 module and install it on the expansion hole of robot's shoulder. The specific installation method can refer to the file in "Sensor Installing and Wiring" under the same directory.



2. Working Principle

Let's look at the working principle:

Firstly, scale the screen to detect the human face. Then convert the recognized face coordinates into the coordinates before scaling, and then judge whether it is the biggest face, and frame the recognized face.

If the human face does not wear mask, MP3 module will play "no mask, please wear mask". If the human face is wearing a mask, MP3 module will play "Mask is on, please this way".

The source code of the program is located in:

`/home/pi/TonyPi/Extend/mask_detect.py`

```


23 #导入MP3模块库文件
24 import hiwonder.MP3 as MP3
25 addr = 0x7b          #传感器iic地址
26 mp3 = MP3.MP3(addr)
27 times = 0.0
28
29 # 初始位置
30 def initMove():
31     Board.setPWMServoPulse(1,1800,500)
32     Board.setPWMServoPulse(2,1530,500)
33     AGC.runActionGroup('stand_slow')
34
35
36
37 FILE = Path(__file__).resolve()
38 ROOT = FILE.parents[0]
39 if str(ROOT) not in sys.path:
40     sys.path.append(str(ROOT)) # add ROOT to PATH
41 ROOT = Path(os.path.relpath(ROOT, Path.cwd())) # relative

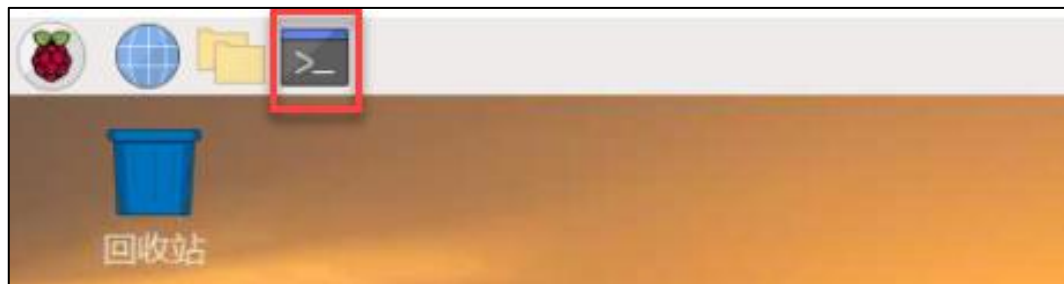
```

3. Operation Steps

i The entered command must pay attention to case sensitivity and space.

1) Turn on the robot and connect to Raspberry Pi desktop with VNC.

2) Click  or press “Ctrl+Alt+T” to open LX terminal.



3) Enter “cd TonyPi/Extend/” command and press “Enter” to come to the directory of the game programmings.

```
pi@raspberrypi:~ $ cd TonyPi/Extend/
```

4) Enter “python3 mask_detect.py” command, and then press “Enter” to start the game.

```
pi@raspberrypi:~ $ cd TonyPi/Extend/  
pi@raspberrypi:~/TonyPi/Extend $ python3 mask_detect.py
```

5) If want to exit the game, press “Ctrl+C” in the LX terminal. Please try multiple times if fail to exit.

4. Project Outcome

After the program is started, TonyPi Pro starts search for the face. If the face with no mask is recognized, MP3 module will play “No mask, please wear mask”. If the face with a mask is recognized, MP3 module will play “Wear mask, please pass”.

5. Function Extension

5.1 Modify the Volume

The voice can be broadcasted through MP3 module, you can following the operation steps below to modify the volume.

1) Enter “cd TonyPi/Extend/” command and press “Enter” to come to the directory of the game programmings.

```
pi@raspberrypi:~ $ cd TonyPi/Extend/
```

2) Enter “vim mask_detect.py” command, and then press “Enter” to enter the program editing interface.

```
pi@raspberrypi:~/TonyPi/Extend $ vim mask_detect.py
```

3) Find the code framed in the opening interface.

```

136         # Re-scale img_size to im0 size
137         det[:, :4] = scale_coords(img.shape[2:], det[:, :4], im0.shape)
        .round()
138         for *xyxy, conf, cls in reversed(det):
139             if view_img: # Add bbox to image
140                 c = int(cls) # integer class
141                 #get the inference result
142                 label = None if hide_labels else (names[c] if hide_conf
        else f'{names[c]} {conf:.2f}')
143                 #print result
144                 print(label)
145                 if str(label[:-5]) == 'without_mask': #without mask
146                     if time.time() - times >= 5: #set the time interval
        of 5 seconds between playback
147                         mp3.volume(30) #set volume 0-30 before playing
148                         mp3.playNum(6) # play No.6 MP3 file
149                         times = time.time()
150
151                 elif str(label[:-5]) == 'withmask': #with mask
152                     if time.time() - times >= 5: #set the time interval
        of 5 seconds between playback
153                         mp3.volume(30) #set volume 0-30 before playing
154                         mp3.playNum(5) #play No.5 MP3 file
        140,1          85%

```

4) Press “i” key to enter the editing mode. Then modify “30” in “mp3.volume(30)” to “20” (the rang is from 0 to 30), as the figure shown below.

```

146         if time.time() - times >= 5: #set the time interval
        of 5 seconds between playback
147             mp3.volume(20) #set volume 0-30 before playing
148             mp3.playNum(6) # play No.6 MP3 file
149             times = time.time()
150
151         elif str(label[:-5]) == 'withmask': #with mask
152             if time.time() - times >= 5: #set the time interval
        of 5 seconds between playback
153                 mp3.volume(20) #set volume 0-30 before playing
154                 mp3.playNum(5) #play No.5 MP3 file
155                 times = time.time()
156
157                 annotator.box_label(xyxy, label, color=colors(c, True))
158
159             # Print the inferred time of a frame
        -- INSERT --          152,50          88%

```

5) After modification, press “Esc” and then enter “:wq” (Please note that the colon is in front of wq). Then press “Enter” to save and exit the modified content.

```

152         if time.time() - times >= 5: #set the time interval
        of 5 seconds between playback
153             mp3.volume(20) #set volume 0-30 before playing
154             mp3.playNum(5) #play No.5 MP3 file
155             times = time.time()
156
157             annotator.box_label(xyxy, label, color=colors(c, True))
158
159             # Print the inferred time of a frame
        :wq

```

6) Enter command “python3 mask_detect.py” to restart the game, and observe the effect.

5.2 Modify the Voice

The game in this section is to broadcast the voice through MP3 module. When in use, you need to set the audio file to MP3 format. Take off the SD card of the MP3 module, and then add other MP3 files. The following image shows the MP3 module comes with voice files.

If want to modify the audio content, you can refer to the following operation steps to modify.

1) Refer to the steps (1)(2)(3)(4) to enter the editing mode, and then find the code shown in the figure below to modify No.6 and No.5 MP3 files to No.4 and No.3 MP3 files.

```

146         if time.time()- times >= 5: #set the time interval
of 5 seconds between playback
147             mp3.volume(30) #set volume 0-30 before playing
148             mp3.playNum(6) # play No.6 MP3 file
149             times = time.time()
150
151             elif str(label[:-5]) == 'withmask': #with mask
152                 if time.time()- times >= 5: #set the time interval
of 5 seconds between playback
153                     mp3.volume(30) #set volume 0-30 before playing
154                     mp3.playNum(5) #play No.5 MP3 file
155                     times = time.time()
156
157                 annotator.box_label(xyxy, label, color=colors(c, True))

```

```

146         if time.time()- times >= 5: #set the time interval
of 5 seconds between playback
147             mp3.volume(30) #set volume 0-30 before playing
148             mp3.playNum(4) # play No.4 MP3 file
149             times = time.time()
150
151             elif str(label[:-5]) == 'withmask': #with mask
152                 if time.time()- times >= 5: #set the time interval
of 5 seconds between playback
153                     mp3.volume(30) #set volume 0-30 before playing
154                     mp3.playNum(3) #play No.3 MP3 file
155                     times = time.time()
156
157                 annotator.box_label(xyxy, label, color=colors(c, True))
158

```

2) After modification, press “Esc” and then enter “:wq” (Please note that the colon is in front of wq). Then press “Enter” to save and exit the modified content.