1.Voice control robotic arm movement

Command word table

Command words	Command words
Clamp the clip	Lift the arm up
Open the clip	Put the arm down
Action A	Arm left
Action B	Arm right
Action C	Action D
Action E	Reset
Go ahead	Back
Turn left	Turn right
Enter A mode	Enter B mode
Robot stop	Robot sleep
Red light up	Green light up
Blue light up	Yellow light up
light A	light B
light C	display power
Warning	

1.1、Function Description

By interacting with the Voice module on the X3 Plus, not only `14.3 Voice control car movement`the basic control of the car and the light strip can be realized, but also the movement of the Robotic arm can be controlled, including the state of up, down, left and right, and some preset actions. Groups, such as Robotic arm `Dancing`, `Clip the block`etc.

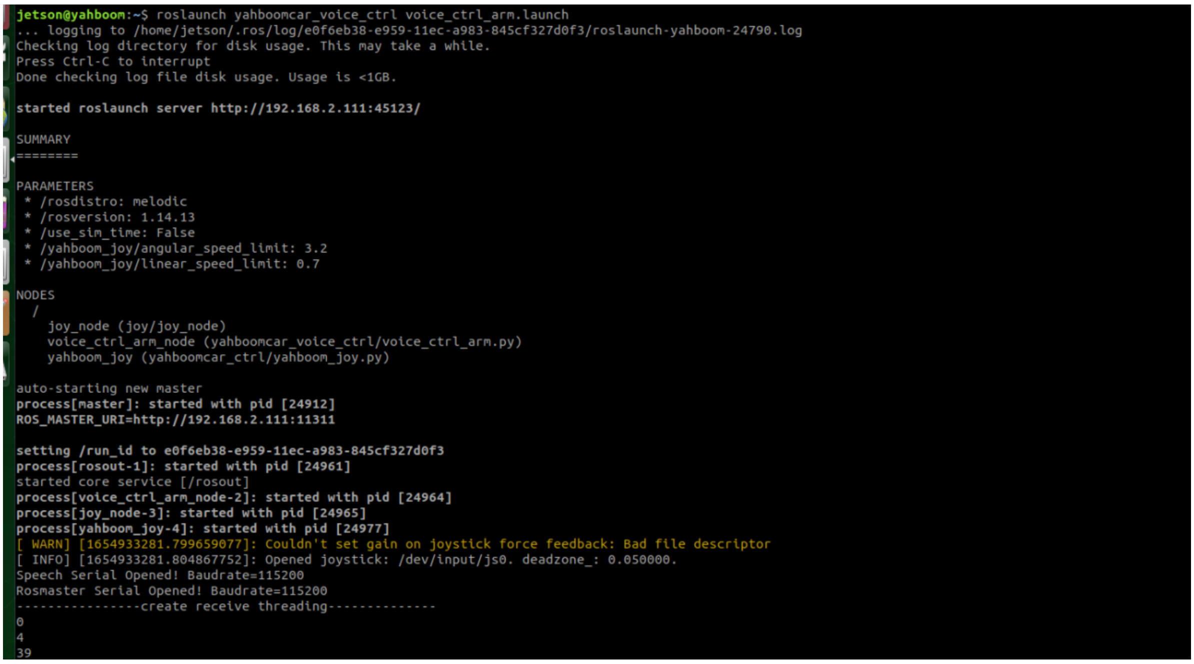
1.2 Start

1.2.1 Ros package path

```
~/yahboomcar_ws/src/yahboomcar_voice_ctrl/
```

1.2.2 Start

```
roslaunch yahboomcar_voice_ctrl voice_ctrl_arm.launch
```



```
jetson@yahboom:~$ roslaunch yahboomcar_voice_ctrl voice_ctrl_arm.launch
... logging to /home/jetson/.ros/log/e0f6eb38-e959-11ec-a983-845cf327d0f3/roslaunch-yahboom-24790.log
Checking log directory for disk usage. This may take a while.
Press Ctrl-C to interrupt
Done checking log file disk usage. Usage is <1GB.

started roslaunch server http://192.168.2.111:45123/

SUMMARY
========

PARAMETERS
 * /rosdistro: melodic
 * /rosversion: 1.14.13
 * /use_sim_time: False
 * /yahboom_joy/angular_speed_limit: 3.2
 * /yahboom_joy/linear_speed_limit: 0.7

NODES
  /
    joy_node (joy/joy_node)
    voice_ctrl_arm_node (yahboomcar_voice_ctrl/voice_ctrl_arm.py)
    yahboom_joy (yahboomcar_ctrl/yahboom_joy.py)

auto-starting new master
process[master]: started with pid [24912]
ROS_MASTER_URI=http://192.168.2.111:11311

setting /run_id to e0f6eb38-e959-11ec-a983-845cf327d0f3
process[rosout-1]: started with pid [24961]
started core service [/rosout]
process[voice_ctrl_arm_node-2]: started with pid [24964]
process[joy_node-3]: started with pid [24965]
process[yahboom_joy-4]: started with pid [24977]
[ WARN] [1654933281.799659077]: Couldn't set gain on joystick force feedback: Bad file descriptor
[ INFO] [1654933281.804867752]: Opened joystick: /dev/input/js0. deadzone_: 0.050000.
Speech Serial Opened! Baudrate=115200
Rosmaster Serial Opened! Baudrate=115200
----------------create receive threading--------------
0
4
39
```

1.2.3 Core code `voice_ctrl_arm.py`

- code path

```
~/yahboomcar/src/yahboomcar_voice_ctrl/scripts
```

- Core code analysis:

  1） import the relevant library files

  ```
  from Speech_Lib import Speech
  from voice_arm_library import *
  from Rosmaster_Lib import Rosmaster
  ```

  Speech_Lib: Voice module library, reference path:

  ```
  ~/software/py_install_V0.0.1/py_install/Speech_Lib
  ```

  voice_arm_library：Robot arm action group library，reference path：

  ```
  ~/yahboomcar/src/yahboomcar_voice_ctrl/scripts
  ```

  Rosmaster_Lib: Rosmaster driver library，reference path：

  ```
  ~/software/py_install/Rosmaster_Lib
  ```

  2）Create voice recognition objects, drive control objects and robotic arm action objects

```
spe = Speech()
self.car = Rosmaster()
voice_arm = Voice_Arm()
```

3) the main function: recognize the voice, execute the relative program according to the recognized voice, take the robotic arm back to the initial position as an example

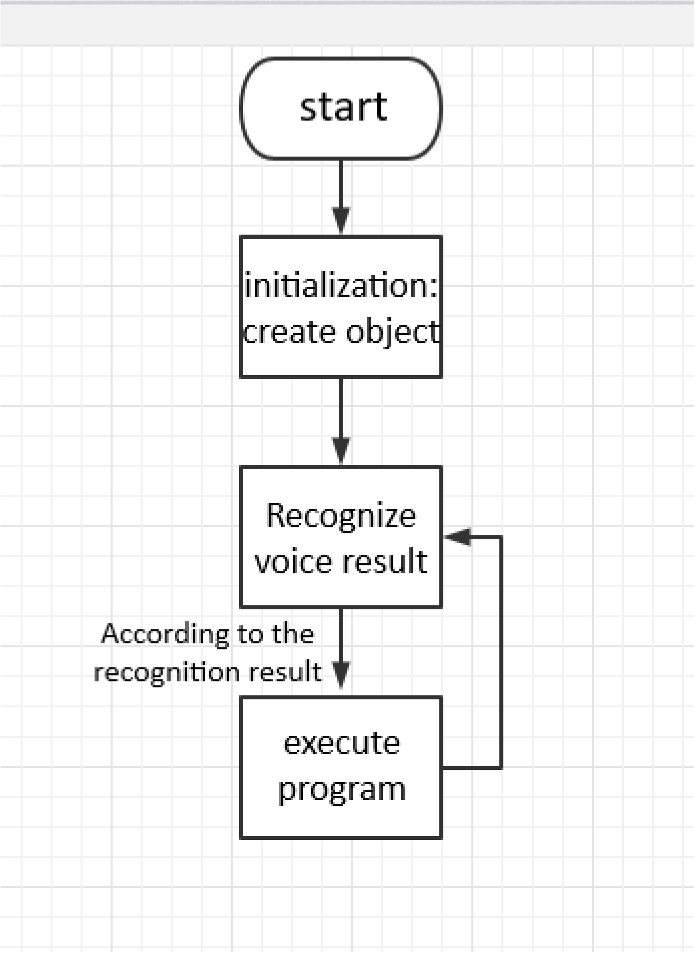
```
 speech_r = spe.speech_read()
            if speech_r!=999:
                print(speech_r)
            #print(speech_r)
            if speech_r == 49 :
             spe.void_write(45)
             voice_arm.init_pose()
```

Among them, `voice_arm.init_pose()` it is the program that needs to be executed. At this time, it will jump to the `voice_arm_library` library and execute the function init_pose() inside. In the init_pose() function, which programs are executed? It is explained below,

```
def init_pose(self):
    self.arm_joint.joints =[90.0, 145.0, 0.0, 0.0, 90.0, 31.0]
    self.pubPoint.publish(self.arm_joint)
```

Here, the angle `TargetAngle` that the data is published as a topic; then it returns to the main function and subscribes to the `TargetAngle` topic; after receiving the data, it enters the callback function, and then `self.car.set_uart_servo_angle` sends it to the bottom layer through the function to drive the steering gear.

1.3 program flow chart


start
initialization:
create object
Recognize
voice result
According to the
recognition result
execute
program