1、Autonomous driving case

1.1、Experiment description

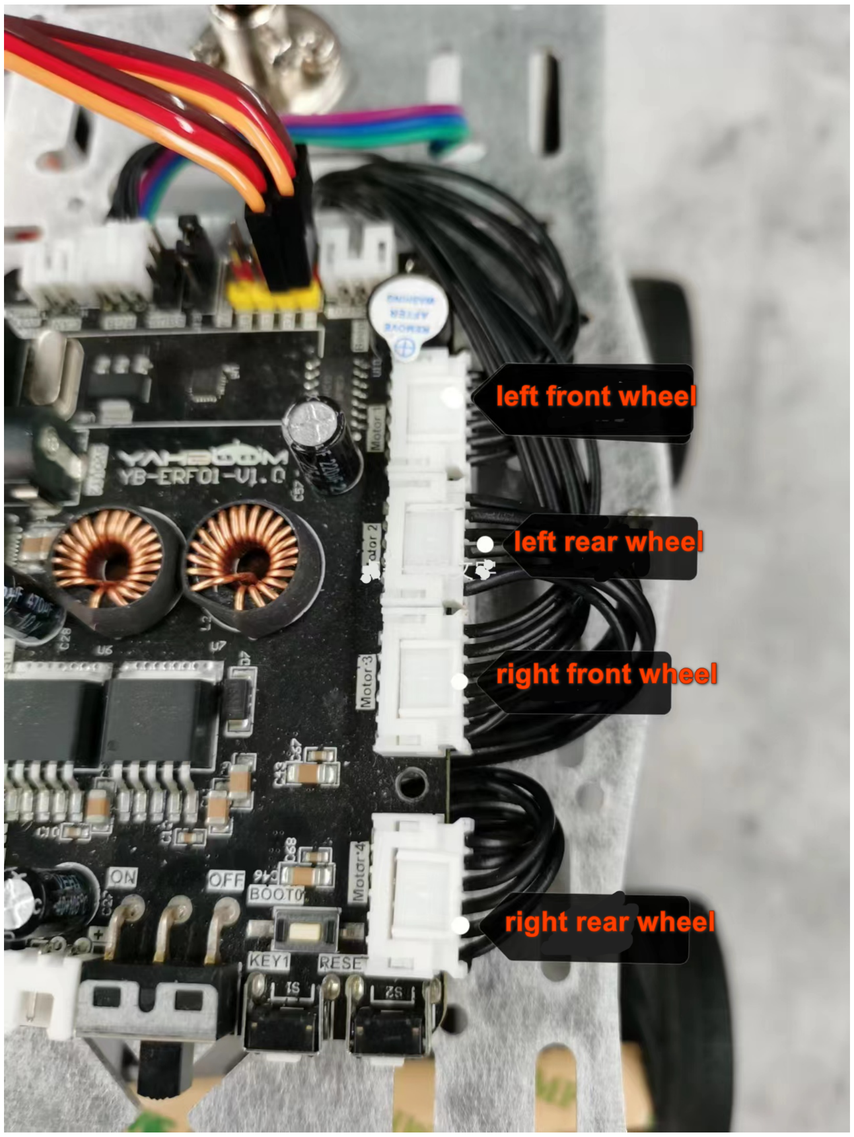
Note: This experiment is an expansion experiment and needs to be used with other external devices. The car chassis and ROS expansion board used here are not part of the K210 development board kit, so the effect of this experiment is for reference only. If there is no corresponding device, it cannot be used. Use this example code directly.

The ROS expansion board needs to flash the firmware in advance: ROS-CAR.hex

Since the voltage of the motor used this time is 8.4V, the battery of the ROS expansion board cannot be inserted into a 12.6V battery, and an 8.4V battery must be inserted.

The connecting wire of the trolley motor is shown in the figure below:

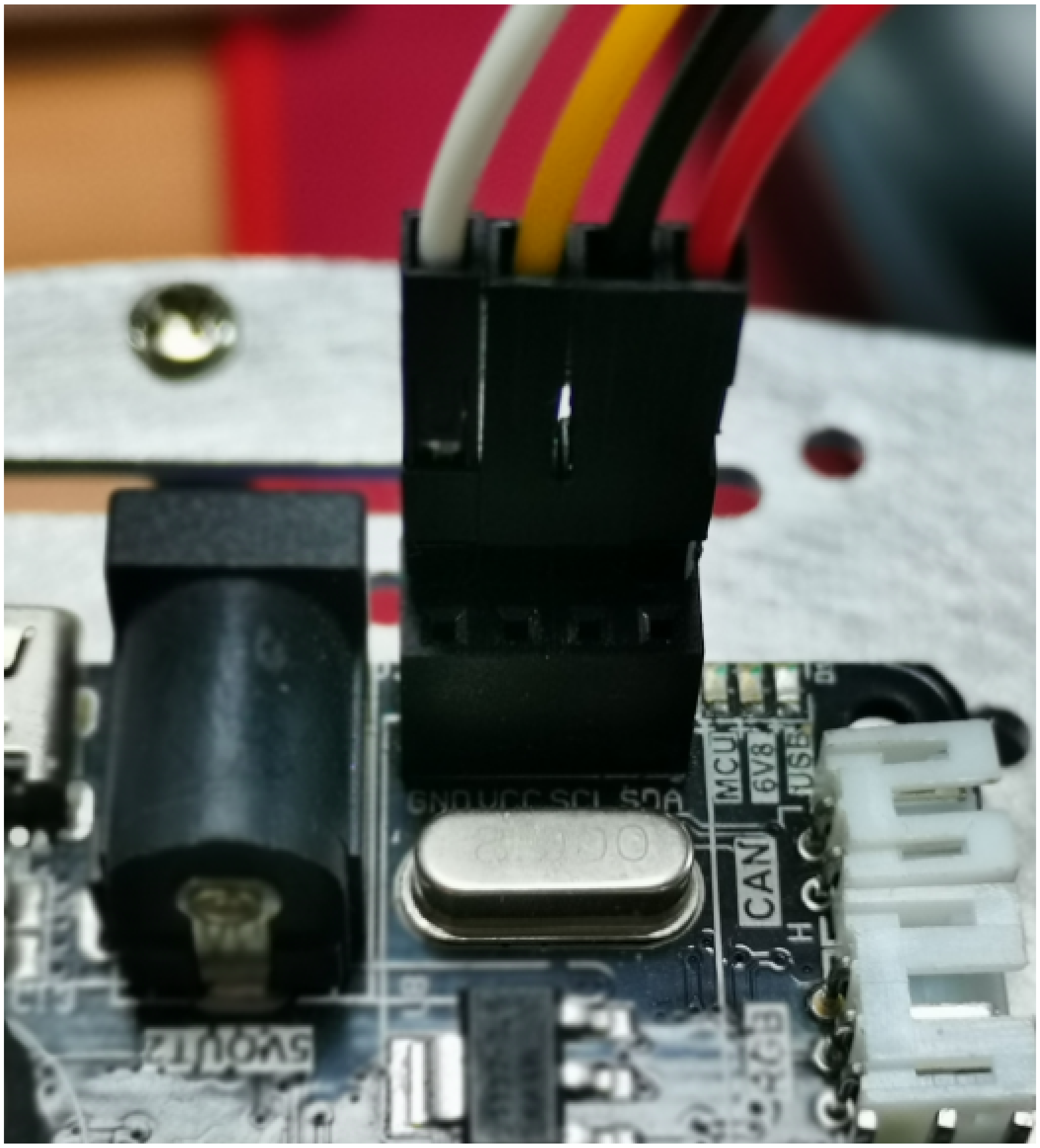
The motor Motor 1 is connected to the left front wheel, the motor Motor 2 is connected to the left rear wheel, the motor Motor 3 is connected to the right front wheel, and the motor Motor 4 is connected to the right rear wheel.



The line sequence of the connection between the K210 development board and the ROS expansion board is shown in the figure below:

The white wire is connected to GND, the yellow wire is connected to VCC, the black wire is connected to SCL, and the red wire is connected to SDA.

It should be noted here that the logo in the diagram is the I2C line sequence logo, but the K210 uses serial port communication. Since the burned ROS-CAR.hex file has changed this interface to a serial port signal, the actual ROS expansion board The corresponding relationship of the interface is: SCL is actually TX, and SDA is actually RX.



1.2、Experimental goal

This lesson mainly learns the function of K210 development board and car chassis for visual line inspection.

The reference code path for this experiment is： 06-export\follow_line.py

1.3、Experimental operation

1. ROS expansion board flash firmware: ROS-CAR.hex
2. Connect the baseboard motor to the ROS expansion board, connect the left front motor according to M1, connect the left rear motor with M2, connect the right front motor with M3, and connect the right rear motor with M4.
3. Please download the trolley driver library and PID control library in the 06-export\library directory to the root directory of the memory card in advance.

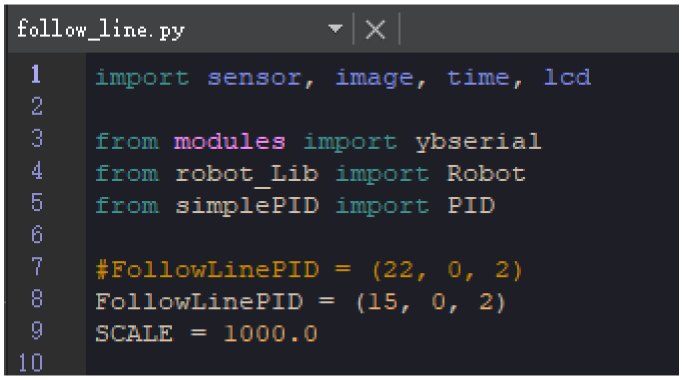
4. Open CanMV IDE and download the follow_line.py code into the K210 development board.
5. Connect the K210 development board to the ROS expansion board through the 4PIN cable.
6. Put the car into the visual line inspection map, move the K210 development board bracket to a suitable angle, and turn on the switch of the car.
7. After the system initialization is completed, the LCD displays the camera image, and there is a white box in the middle of the screen.Please move the car, fill the white box with the color to be recognized, wait for the white box to turn green, then start collecting the color, after the collection is completed, the green box disappears, and start running the program.

1.4、Experimental effect

After the system initialization is completed, the LCD will display the camera screen, and there is a white box in the middle of the screen. Please put the color to be recognized in the white box, and wait for the white box to turn green to start collecting colors. After the collection is completed, the green box disappears. Start running the program.

The car will move forward along the color identified in the green box just now.

If you find that the car often fails to follow the line, please check whether the car can recognize the corresponding color at each position, and then if the car responds too slowly or too fast, you can adjust the value of FollowLinePID appropriately.


follow_line.py
```
import sensor, image, time, lcd

from modules import ybserial
from robot_Lib import Robot
from simplePID import PID

#FollowLinePID = (22, 0, 2)
FollowLinePID = (15, 0, 2)
SCALE = 1000.0

```

1.5、Experiment summary

The function of color recognition is mainly to analyze the LAB value of the color. First put the color to be recognized in the box, and then the system will use the LAB value of the color read in the box, and then use the LAB value of the color collected by the camera as the Analyze and compare, if it meets the requirements, draw a box to indicate that the color is recognized, and transmit the position information of the recognized color to the PID controller for calculation, and judge the offset between the recognized color and the car, according to The offset is used to modify the direction of the car, so as to achieve the function of the car's visual line inspection