STM32mini chassis car line patrol

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1. Experimental Preparation

1. Knowledge reserve

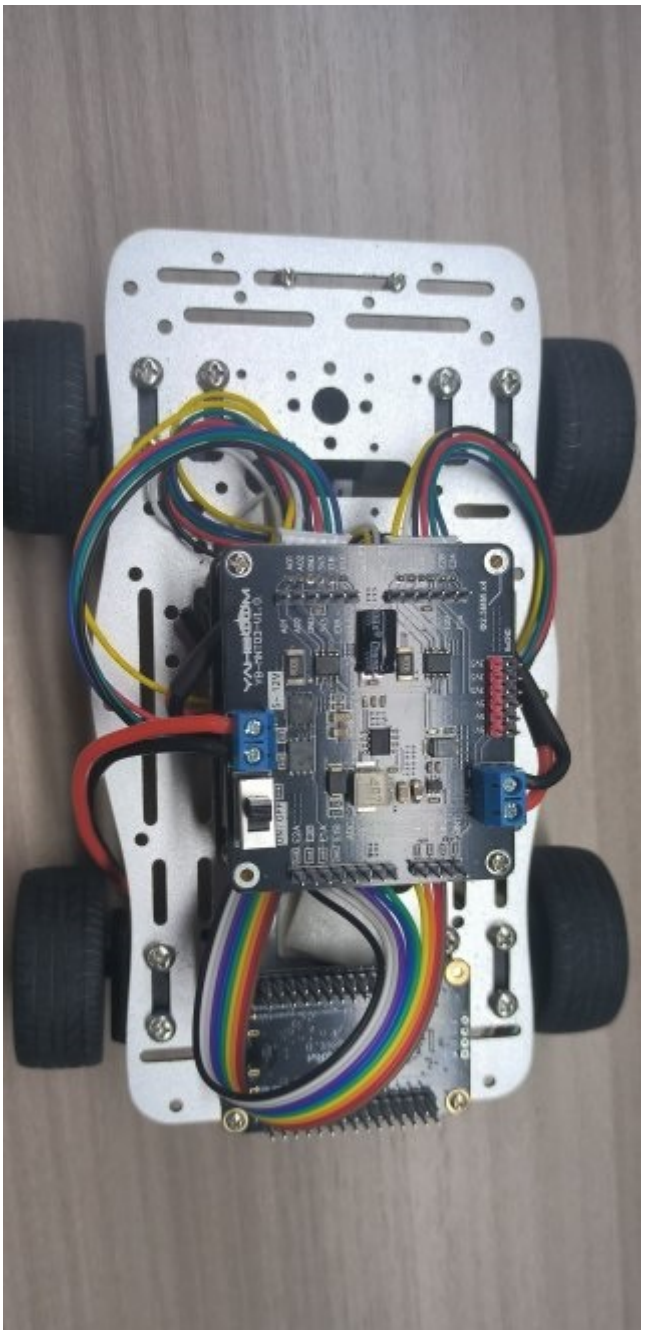
- Have good programming skills (mainly C language)
- Familiar with the architecture of stm32

2. Material preparation

- Smart car mini chassis *1
- stm32F103RCT6 *1 (requires the board of the Yabo board, other boards need to change the source code)
- Yabo version of the dual-channel motor driver board *2 (other motor driver boards may not be suitable for the source code provided in this tutorial, need to be transplanted by yourself)
- Eight-way tracking module *1
- 310 motor *4
- 7.4V battery *1
- Several Dupont wires
- Several M3 copper pillars and M3 screws

2. Trolley wiring

After assembling the car, it looks like the following figure:



2.1 STM32 and dual-channel driver board wiring part

1. Wiring of stm32F103RCT6 and dual-circuit motor board (topmost board)

STM32RCT6	The top dual-circuit motor board
PA11	AIN1
PA8	AIN2
PC6	BIN1
PC7	BIN2
3V3	3V3
GND	GND
PA0	E1A

STM32RCT6	The top dual-circuit motor board
PA1	E1B
PA15	E2A
PB3	E2B
5V	5V

2. Wiring of stm32F103RCT6 and dual-circuit motor board (bottommost board)

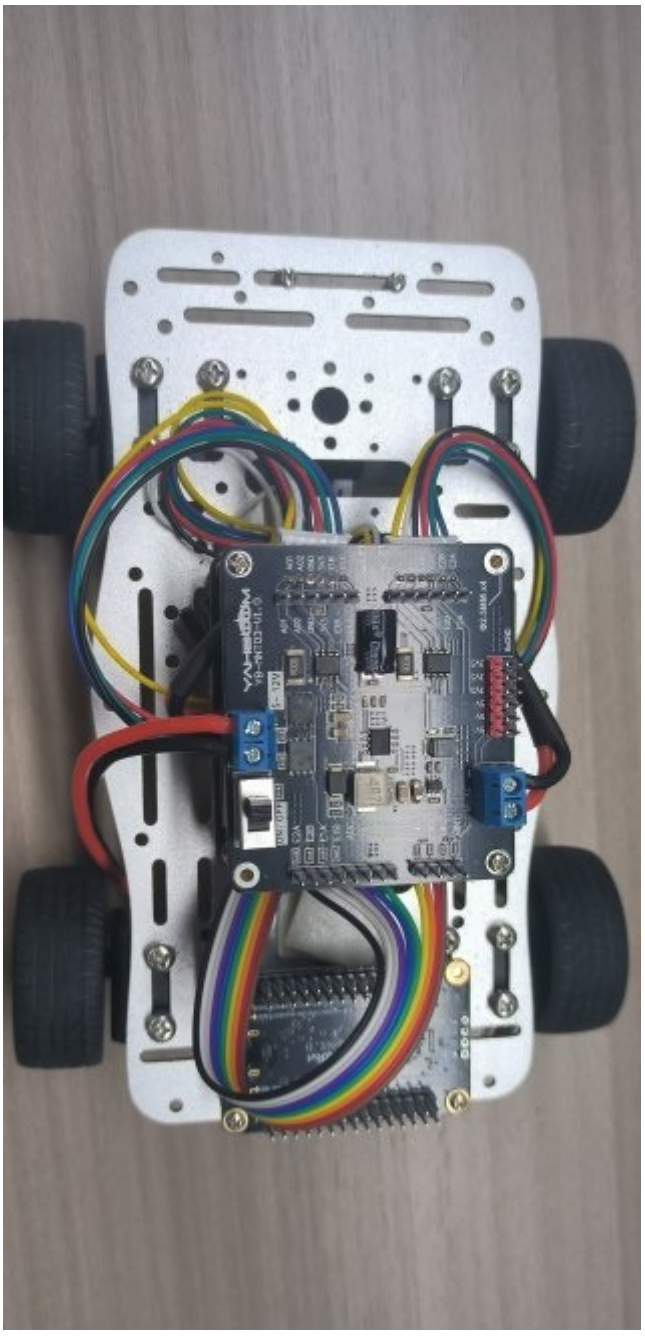
STM32RCT6	The bottom layer dual-circuit motor board
PB0	AIN1
PB1	AIN2
PC8	BIN1
PC9	BIN2
3V3	3V3
GND	GND
PA7	E1A
PA6	E1B
PB7	E2A
PB6	E2B

3. The top motor driver board is connected to the motors of the two wheels near the infrared sensor (the front motors),

   motorA--->left motor, motorB--->right motor

4. The bottom motor driver board is connected to the motors of the two wheels away from the infrared sensor (the rear motors),

   motorA--->left motor, motorB--->right motor



2.2 Wiring of STM32RCT6 and infrared sensor (this example uses serial communication)

STM32RCT6	Infrared sensor
PC10	RX
PC11	TX
No wiring	VCC is connected to the 5V interface of the top dual-circuit motor board
GND	GND

Main procedures

```
int main(void)
{
```

```
    //Hardware Initialization
    BSP_init();

    while(!Key1_State(1));//Waiting for a key press

    TIM6_Init();//Timer 6 initialization

    send_control_data(0,0,1); //Set to receive only numeric data

    while(1)
    {
        LineWalking(); //Faster response
    }
}
```

The main function is to perform PID processing for line patrol according to the value of the infrared probe, so that line patrol can be completed on the map with black lines and white background.

In app_irtrackin.c, there is a parameter for adjusting PID line patrol. If you want to increase or decrease the speed and optimize the effect, you can adjust the macro definition value inside.

```
#define IRTrack_Trun_KP (490) //P
#define IRTrack_Trun_KI (0.0001) //I
#define IRTrack_Trun_KD (5) //D

#define IRR_SPEED             400  //Line patrol speed
```

- IRTrack_Trun_KP: P value of pid line patrol
- IRTrack_Trun_KI: I value of pid line patrol
- IRTrack_Trun_KD: D value of pid line patrol
- IRR_SPEED: Speed of line patrol

When you want to check whether the motor wiring is correct, you can give a positive speed and then set the line patrol PID value to 0. If the wiring is correct, after pressing the key button on the RCT6 development board, the car will move forward and all four motors will move forward.

Experimental phenomenon:

On the premise of ensuring that the wiring and installation are correct, after the 8-way patrol module is calibrated, (if the same map as the tutorial is used), you need to put the car under the starting point diagram as shown below, and press the key1 button to start patrolling.

If the 8-way module probe cannot detect the black and white lines normally, you need to wait for the module to work normally before pressing the key1 button

If the floor is black, you need to put a piece of white paper under our map to cover the black. The main reason is that the material of the map is relatively transparent, which has a greater impact on the 8-way patrol sensor.