stm32_k230 self-learning object recognition

k230 and stm32 communication

1. Experimental Prerequisites

This tutorial uses the STM32F103C8T6 development board, and the corresponding routine path is [14.export\STM32-K230\16_STM32_k230_self_learning].

K230 needs to run the [14.export\CanmvIDE-K230\16.self_learning.py] program to start the experiment. It is recommended to download it as an offline program.

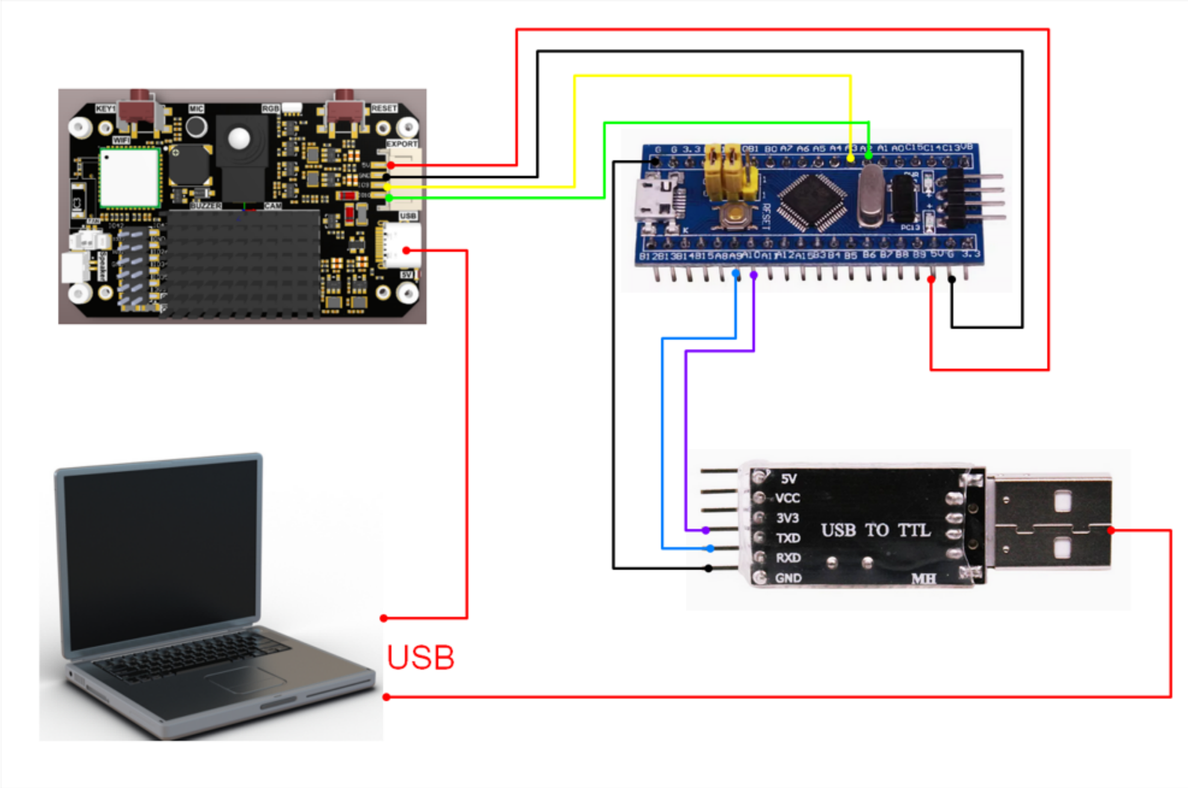
Things you need:

Windows computer , STM32F103C8T6 development board , USB to TTL module , K230 visual module (including TF card with burned image) , Type-C data cable , connection cable (Dupont cable)

2. Experimental wiring

k230 vision module	STM32
5V	VCC
GND	GND
TXD(IO9)	PA3
RXD(IO10)	PA2

USB to TTL module	STM32
RxD	PA9
TXD	PA10
GND	GND



3. Main code explanation

```
void Pto_Data_Parse(uint8_t *data_buf, uint8_t num)
{
    uint8_t pto_head = data_buf[0];
    uint8_t pto_tail = data_buf[num-1];
    if (!(pto_head == PTO_HEAD && pto_tail == PTO_TAIL))
    {
        printf("pto error:pto_head=0x%02x , pto_tail=0x%02x\n", pto_head, pto_tail);
        return;
    }
    uint8_t data_index = 1;
    uint8_t field_index[PTO_BUF_LEN_MAX] = {0};
    int i = 0;
    int values[PTO_BUF_LEN_MAX] = {0};
    char msg[PTO_BUF_LEN_MAX] = {0};
    for (i = 1; i < num-1; i++)
    {
        if (data_buf[i] == ',')
        {
            data_buf[i] = 0;
            field_index[data_index] = i;
            data_index++;
        }
    }

    for (i = 0; i < data_index; i++)
    {
        if (i == 2)
        {
            memcpy(msg, (char*)data_buf+field_index[i]+1, field_index[i+1]-field_index[i]);
        }
        else
        {
            values[i] = Pto_Char_To_Int((char*)data_buf+field_index[i]+1);
        }
    }

    uint8_t pto_len = values[0];

    if (pto_len != num)
    {
        printf("pto_len error:%d , data_len:%d\n", pto_len, num);
        return;
    }
    uint8_t pto_id = values[1];
    if (pto_id != PTO_FUNC_ID)
    {
        printf("pto_id error:%d, func_id:%d\n", pto_id, PTO_FUNC_ID);
        return;
    }
    float score = values[3]/100.0;
    printf("category:'%s', score:%.2f\n", msg, score);
}
```

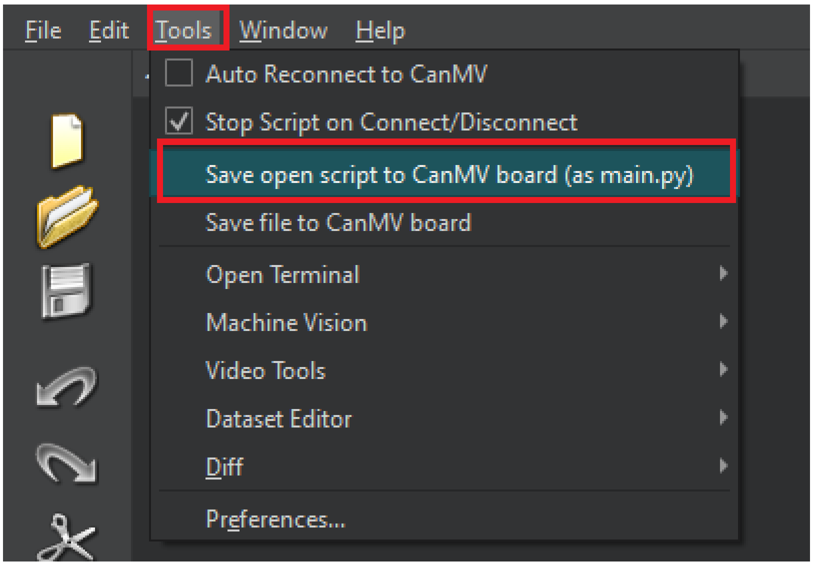
The above functions are for parsing K230 data. Only when they meet specific protocols can the corresponding data be parsed.

in

- category: is the recognized name
- score: is the score

4. Experimental Phenomenon

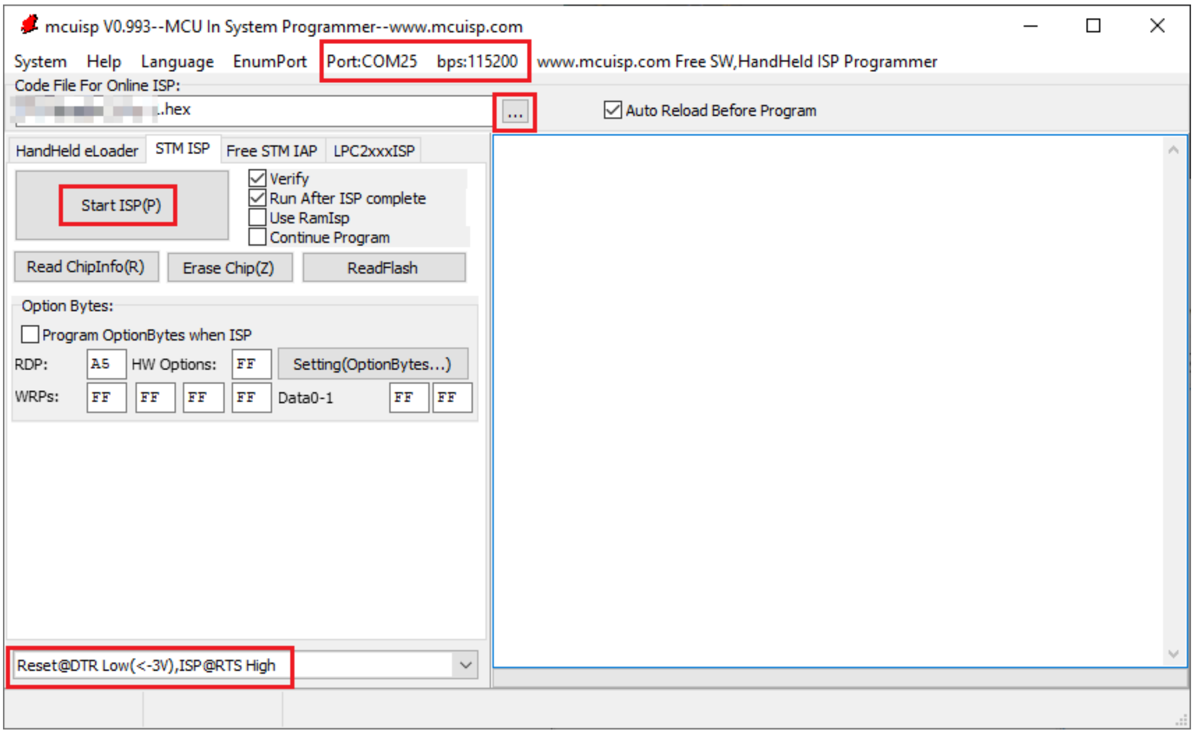
1. After connecting the cables, the k230 visual module runs offline. After K230 is connected to Canmv IDE, open the corresponding program, click [Save open script to CanMV board (as main.py)] on the toolbar, and then restart K230.



When K230 is turned on, a purple box will appear on the screen. Please align the purple box with the objects to be learned. There are two objects in total. Follow the on-screen prompts to learn the two objects.

After both objects have been learned, if the corresponding object appears in the purple box, the object name and score will be displayed.

2. The hex file generated by the STM32 burning routine.



mcuisp V0.993--MCU In System Programmer--www.mcuisp.com

Port:COM25 bps:115200

Code File For Online ISP: [redacted].hex

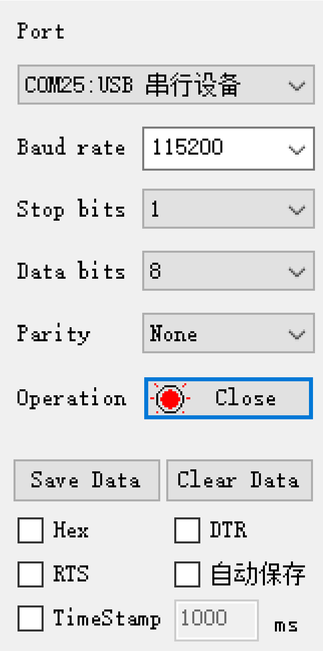
☑ Auto Reload Before Program

☑ Verify
☑ Run After ISP complete
☐ Use RamIsp
☐ Continue Program

Option Bytes:
☐ Program OptionBytes when ISP
RDP: A5 HW Options: FF
WRPs: FF FF FF FF Data0-1 FF FF

Reset@DTR Low(<-3V),ISP@RTS High

3. The serial port assistant is set to the interface shown in the figure



Port: COM25:USB 串行设备
Baud rate: 115200
Stop bits: 1
Data bits: 8
Parity: None
Operation: ● Close

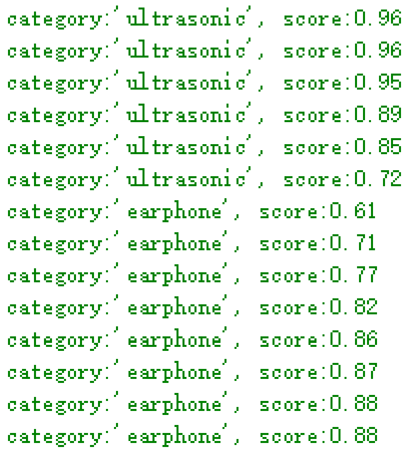
☐ Hex ☐ DTR
☐ RTS ☐ 自动保存
☐ TimeStamp 1000 ms

4. When the K230 camera recognizes an object, the serial port assistant will print out the information transmitted from k230 to stm32.

in

- category: is the recognized name
- score: is the score

  As shown in the figure below



```
category:’ultrasonic’, score:0.96
category:’ultrasonic’, score:0.96
category:’ultrasonic’, score:0.95
category:’ultrasonic’, score:0.89
category:’ultrasonic’, score:0.85
category:’ultrasonic’, score:0.72
category:’earphone’, score:0.61
category:’earphone’, score:0.71
category:’earphone’, score:0.77
category:’earphone’, score:0.82
category:’earphone’, score:0.86
category:’earphone’, score:0.87
category:’earphone’, score:0.88
category:’earphone’, score:0.88
```