arduino_k230 self-learning object recognition

k230 and arduino communication

1. Experimental Prerequisites

This tutorial uses Arduino, and the corresponding routine path is [14.export\arduino-K230\16.Arduino_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.

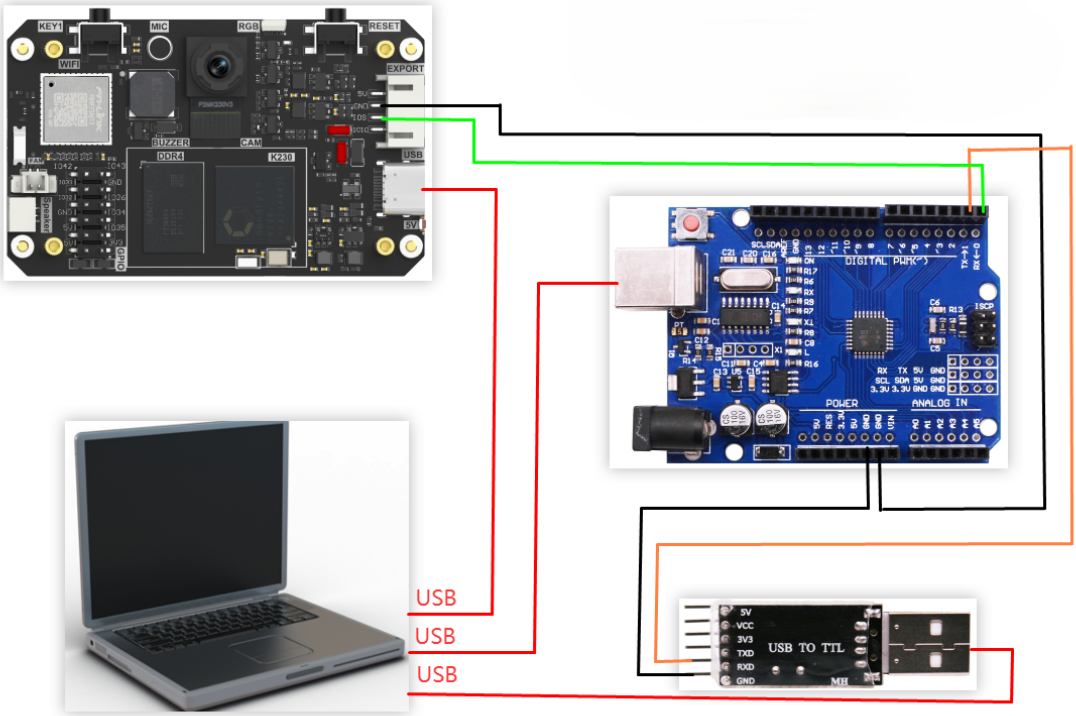
Items needed:

Windows computer, Arduino, USB to TTL module, K230 visual module (including TF card with image burned in), type-C data cable, connecting cable (Dupont cable)

2. Experimental wiring

K230 vision module	**Arduino**
GND	GND
TXD(IO9)	RXD（0）

USB to TTL module	**Arduino**
RXD	TXD（1）
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))
    {
        Serial.print("pto error:pto_head=0x");
    Serial.print(pto_head, HEX);
    Serial.print(" , pto_tail=0x");
    Serial.println(pto_tail, HEX);
        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)
        {
```

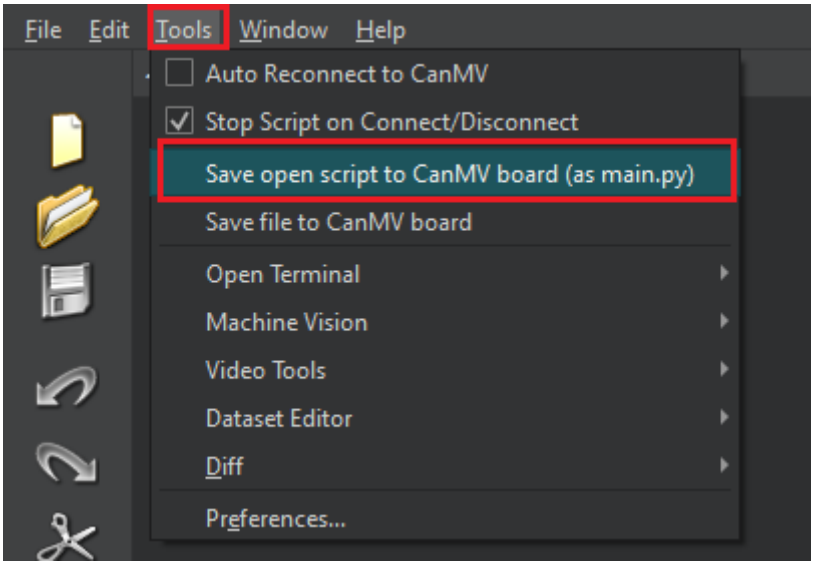
```
            memcpy(msg, (char*)data_buf+field_index[i]+1, field_index[i+1]-
field_index[i]);
        }
        else
        {
            values[i] = Pto_Char_To_Int((char*)data_buf+field_index[i]+1);
        }
    }

    uint8_t pto_len = values[0];

    if (pto_len != num)
    {
        Serial.print("pto_len error:");
    Serial.print(pto_len);
    Serial.print(" , data_len:");
    Serial.println(num);
        return;
    }
    uint8_t pto_id = values[1];
    if (pto_id != PTO_FUNC_ID)
    {
       Serial.print("pto_id error:");
    Serial.print(pto_id);
    Serial.print(" , func_id:");
    Serial.println(PTO_FUNC_ID);
        return;
    }
    float score = values[3]/100.0;

    Serial.print("category:'");
    Serial.print(msg);
    Serial.print("', score:");
    Serial.println(score);


}
```

The above function is used to parse K230 data. Only when it complies with specific protocols can the corresponding data be parsed.

- category: is the identified 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.

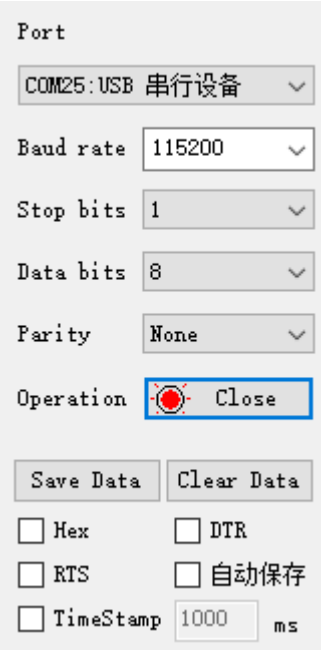


When K230 is turned on, a purple box will appear on the screen. Please align the purple box with the object to be learned. There are two objects in total. Follow the on-screen instructions to learn the two objects.

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

2. Arduino upload routine code (**Note that if the upload fails, disconnect the RXD connection on the Arduino connected to the k230 first, and then plug it back after the upload is successful**)

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



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

- category: is the identified 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
```