arduino_k230 fall detection

k230 and arduino communication

1. Experimental Prerequisites

This tutorial uses Arduino, and the corresponding routine path is [14.export\arduino-K230\10.Arduino_k230_falldown_detect].

K230 needs to run the [14.export\CanmvIDE-K230\10.falldown_detect.py] program to start the experiment. It is recommended to download it as an offline program.

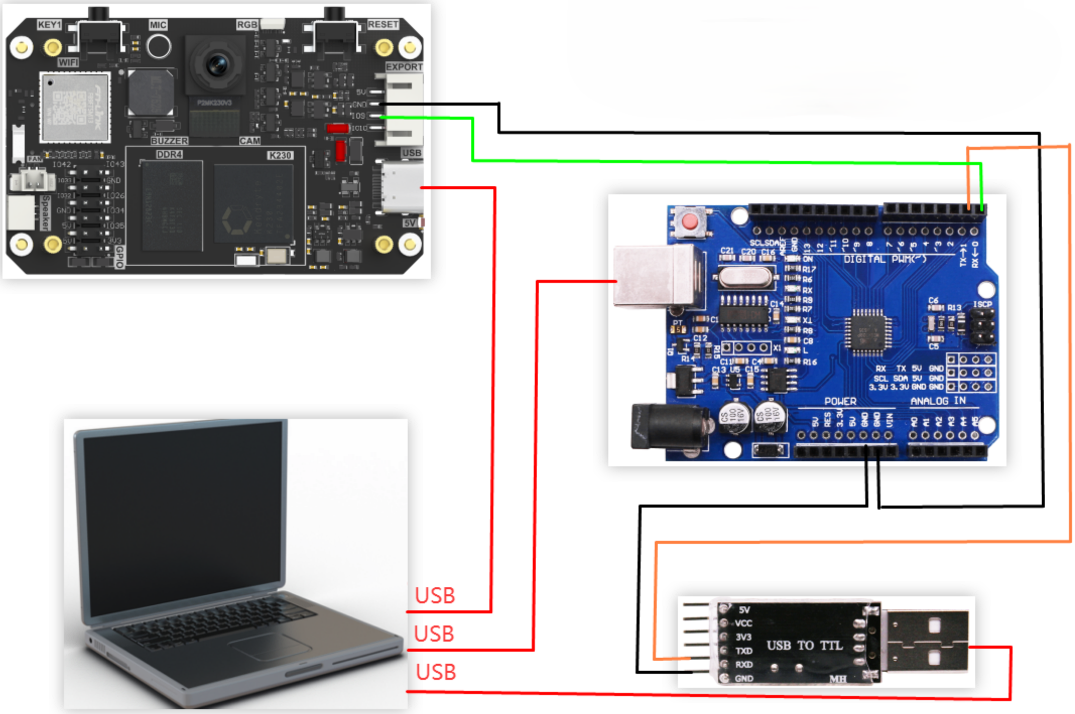
Items needed:

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 == 6)
        {
            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;
    }
    int x = values[2];
    int y = values[3];
    int w = values[4];
    int h = values[5];
    float score = values[7]/100.0;
    Serial.print("falldown:x:");
    Serial.print(x);
    Serial.print(", y:");
    Serial.print(y);
    Serial.print(", w:");
    Serial.print(w);
    Serial.print(", h:");
    Serial.print(h);
    Serial.print(" state:'");
    Serial.print(msg);
    Serial.print("', score:");
    Serial.println(score);


}
```

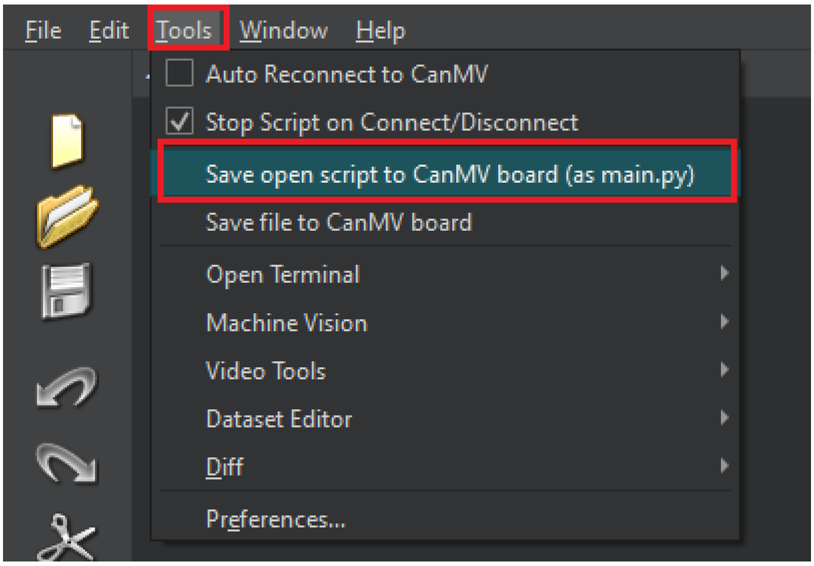
The above function is used to parse K230 data. Only when it complies with specific protocols can the corresponding data be parsed.

- x: is the horizontal coordinate of the upper left corner of the identified box
- y: is the vertical coordinate of the upper left corner of the identified box
- w: is the width of the identified box
- h: is the length of the identified box

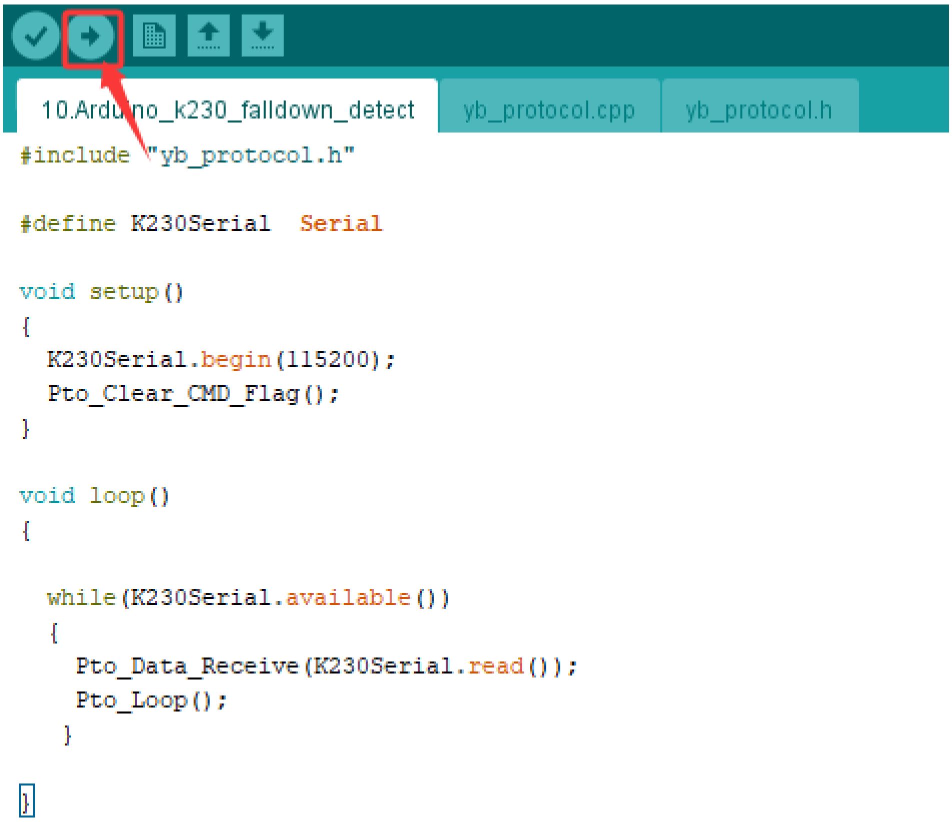
- state: is the state of identification, the detected fall state is "Fall", the detected non-fall state is "NoFall"
- score: is the score of the fall state

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.

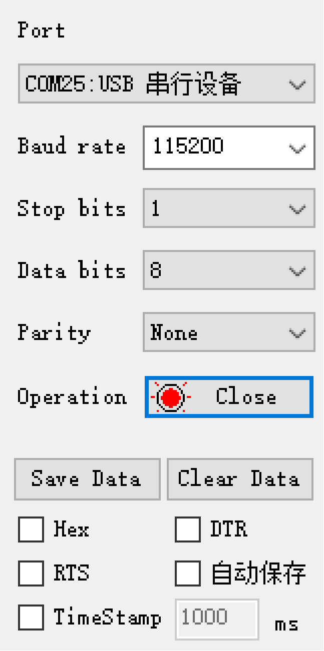


2. Arduino upload routine code (**Note that if the upload fails, disconnect the RXD connection on the Arduino connected to the k230 first, and then plug it back after the upload is successful**)



```
#include "yb_protocol.h"

#define K230Serial  Serial

void setup()
{
  K230Serial.begin(115200);
  Pto_Clear_CMD_Flag();
}

void loop()
{

  while(K230Serial.available())
  {
    Pto_Data_Receive(K230Serial.read());
    Pto_Loop();
   }

}
```

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

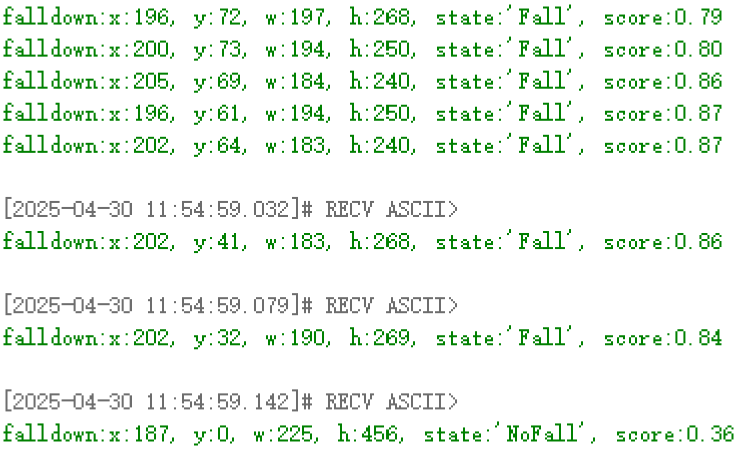
☐ RTS ☐ 自动保存

☐ TimeStamp 1000 ms

4. When the K230 camera recognizes a human body, the serial port assistant will print out the information transmitted from K230 to Arduino.

- x: is the horizontal coordinate of the upper left corner of the identified box
- y: is the vertical coordinate of the upper left corner of the identified box
- w: is the width of the identified box
- h: is the length of the identified box
- state: is the state of identification, the detected fall state is "Fall", the detected non-fall state is "NoFall"
- score: is the score of the fall state

As shown in the figure below



```
falldown:x:196, y:72, w:197, h:268, state:'Fall', score:0.79
falldown:x:200, y:73, w:194, h:250, state:'Fall', score:0.80
falldown:x:205, y:69, w:184, h:240, state:'Fall', score:0.86
falldown:x:196, y:61, w:194, h:250, state:'Fall', score:0.87
falldown:x:202, y:64, w:183, h:240, state:'Fall', score:0.87

[2025-04-30 11:54:59.032]# RECV ASCII>
falldown:x:202, y:41, w:183, h:268, state:'Fall', score:0.86

[2025-04-30 11:54:59.079]# RECV ASCII>
falldown:x:202, y:32, w:190, h:269, state:'Fall', score:0.84

[2025-04-30 11:54:59.142]# RECV ASCII>
falldown:x:187, y:0, w:225, h:456, state:'NoFall', score:0.36
```