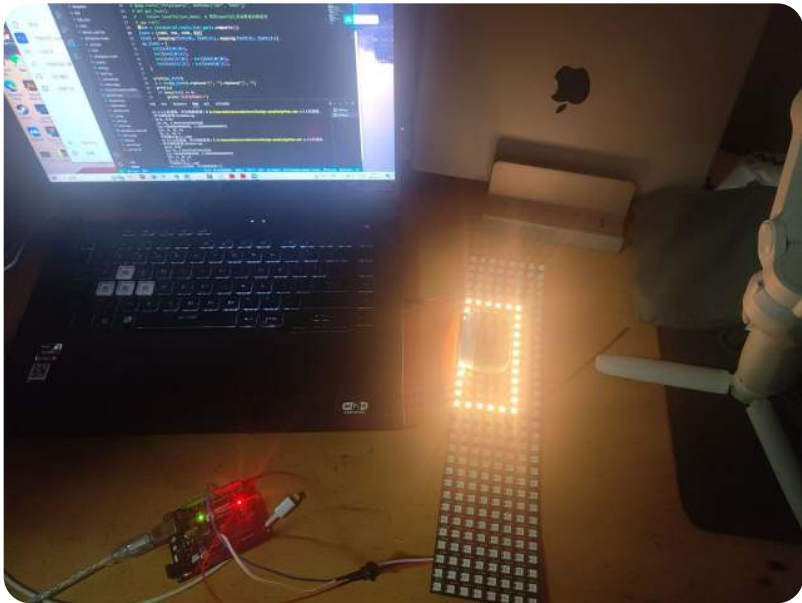
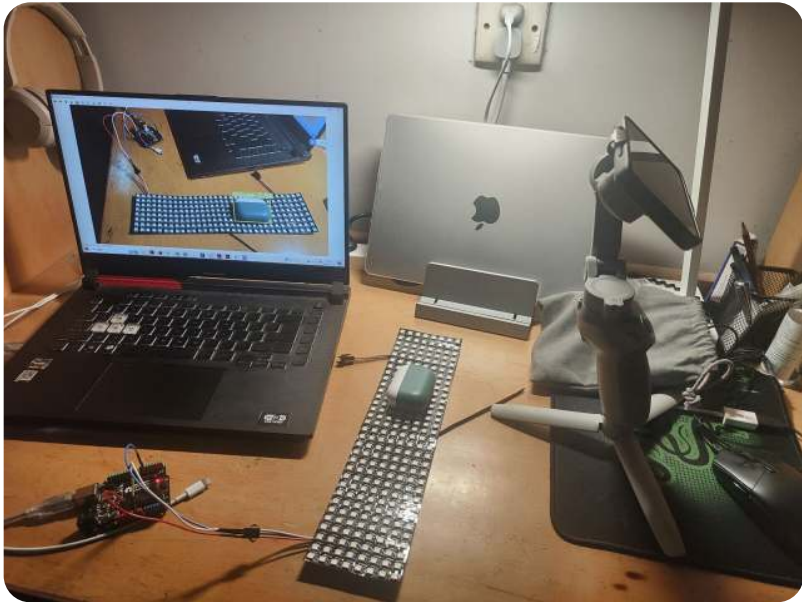




• 做你的家庭物品管理小能手

算法说明

算法实现思路



灯光的提醒

坐标

映射坐标+预测结果

接收预测弹窗提醒

用户行为

接收到用户的行为

用户行为

智能算法学习能力

通过接收到用户行为样本，再一次训练river模型提高预测精度

yolo8识别

app接收

物品名称
物品坐标

river模型预测

Key Program Segments

关键程序段

```
plist = list(serial.tools.list_ports.comports())
model = YOLO("yolov8n.pt")
j = 0

df = pd.read_csv("123.csv")
# Convert to Format
df.to_dict()

# Convert to Tuple
data = df.to_records(index=False)

pipe_nb = Pipeline(("vectorizer", BagOfWords(lowercase=True)), ("nb", MultinomialNB()))
pipe_nb.steps
for text, label in data:
    pipe_nb = pipe_nb.learn_one(text, label)
```

river预测用户模型进行模型更新

```
while cap.isOpened():
    # Read a frame from the video
    success, frame = cap.read()
    if success:
        # Run YOLOv8 inference on the frame
        results = model(frame, max_det=1)
        annotated_frame = results[0].plot()
        cv2.imshow("YOLOv8 inference", annotated_frame)
        path = results[0].boxes.xyxy
        if path.numel() != 0:
            path = results[0].boxes.xyxy[0]
            c = path.cpu().numpy()
            name = results[0].boxes.cls[0]
            inname = int(name.item())
            global zuobiao
            global finname
            zuobiao = list(map(int, c))
            finname = results[0].names[inname]
            print(zuobiao)
            print(finname)
            if cv2.waitKey(1) & 0xFF == ord("q"):
                break
        else:
            pred = pipe_nb.predict_one(finname)
            zuobiao.append(pred)
```

yolo8提取摄像头拍摄数据（物品坐标、名称）

```
if zuobiao != 0:
    post = str(zuobiao).replace("[", "").replace("]", "")

if len(plist) <= 0:
    print("没有发现端口!")
else:
    plist_0 = list(plist[0])
    serialName = plist_0[0]
    serialFd = serial.Serial(serialName, 9600, timeout=1)
    print("可用端口名>>>", serialFd.name)
i = 0
print(post)
```

整合坐标信息和预测信息发送给arduino端口，让arduino带动灯光变化

```
while i < 2:
    time.sleep(1)
    serialFd.write(post.encode())
    # time.sleep(1)
    # print("1")
    i = i + 1
i = 0
if pred == 1:
    while True:
        resend = serialFd.readline().decode("utf-8").replace("\r\n", "")
        print(resend)
        if resend == "1":
            intresend = int(resend)
            break
        if resend == "0":
            intresend = int(resend)
            break
        df.loc[len(df.index)] = [finname, intresend]
```

接收protopie端的用户偏好，然后放入数据库之中，准备更新预测模型

```
#include <Adafruit_GFX.h>
#include <Adafruit_NeoMatrix.h>
#include <Adafruit_NeoPixel.h>
#ifdef FSTR
#define FSTR // Make Arduino Due happy
#endif

#define PIN 6
#include<SoftwareSerial.h>

SoftwareSerial softSerial1(2,3);
char arr [16]; // 定义一个字符数组
int num [4]; // 定义一个整数数组
Adafruit_NeoMatrix matrix = Adafruit_NeoMatrix(32,8, PIN,
    NEO_MATRIX_TOP + NEO_MATRIX_LEFT +
    NEO_MATRIX_COLUMNS + NEO_MATRIX_ZIGZAG,
    NEO_GRB + NEO_KHZ800);

const uint16_t colors[] = {
    matrix.Color(255, 0, 0), matrix.Color(0, 255, 0), matrix.Color(0, 0, 255) };
int i=5;
int j=1;
int x = matrix_width/1;
```

灯板相关的代码库的导入

```
#include<SoftwareSerial.h>

SoftwareSerial softSerial1(2,3);
void setup() {
    softSerial1.begin(9600);

    Serial.begin(9600);
}
```

创建串口通讯

```
void setup() {
    Serial.begin(9600);
    softSerial1.begin(9600);
    matrix.begin();
    matrix.setTextWrap(false);
    matrix.setTextColor(colors[0]);
}

void loop() {
    String inString="";
    if(Serial.available()>0){
        while(Serial.available()>0){
            inString += char(Serial.read()); // 读取一个字符
            delay(10);
        }
        atropy(arr, inString.c_str());
        int num [4];
        char *p = strtok(arr, ","); // 分割第一个子字符串
        int i = 0; // 定义一个索引变量
        while (p != NULL) { // 循环直到没有子字符串
```

接收python发送来的坐标和预测结果

```
matrix.fillScreen(0); // 清空矩阵
for(; j < 3; j++){
    for(; i < 50; i++){
        matrix.setBrightness(i);
        matrix.drawRect(11,1,8,7,matrix.Color(197, 127, 51));
        matrix.show();
        delay(10);
    }
    for(; i > 10; i--){
        matrix.setBrightness(i);
        matrix.drawRect(11,1,8,7,matrix.Color(197, 127, 51));
        matrix.show();
        delay(10);
    }
}
matrix.fillScreen(0);
matrix.show();
softSerial1.println("1");
```

灯光变化

```
if(softSerial1.available() > 0){
    while (softSerial1.available() > 0) {
        // From Protopie Connect 1.9.0, We can use '\0' as delimiter in Arduino Serial
        String receivedString = softSerial1.readStringUntil('\0');

        receivedData = getMessage(receivedString);

        if (receivedData.message.equals("yes")){
            softSerial1.println(receivedData.value.toInt());
            delay(100);
        }
        if (receivedData.message.equals("no")){
            softSerial1.println(receivedData.value.toInt());
            delay(100);
        }
        if(receivedData.message.equals("yes")){
            Serial.println("1");
            delay(100);
        }
        if(receivedData.message.equals("no")){
```

发送用户偏好给python

关键程序段

```
10  mouse,0
11  mouse,0
12  mouse,0
13  iphone,1
14  iphone,0
15  cnm,1
16  person,1
17  keyboard,1
18
```

river训练数据，每一次用户的选择都会作为一个样本更新模型

```
(900, 606) in the big rectangle is mapped to point (23, 8)
```

映射到灯板的坐标

```
[216, 158, 1597, 1069]
book
```

yolo获得的物品的坐标和识别的物品的名称

```
216, 158, 1597, 1069, 1
```

前面四位是坐标后面的一位是预测结果，1是需要提醒0是不需要提醒

RunPlugin

Message	Message	Value (optional)	Send	
Time	Message	Value	Pie	Source
10:06:03:432	0	-		COM6
10:06:03:420	yes		第一场景	Web

页面端弹出提醒



难点问题解决

- 软硬件端相互联通
- 确定识别区域映射坐标，得到放置物品位置并发送信息
- 优化学习算法，通过接收到用户行为样本，再一次训练river模型提高预测精度