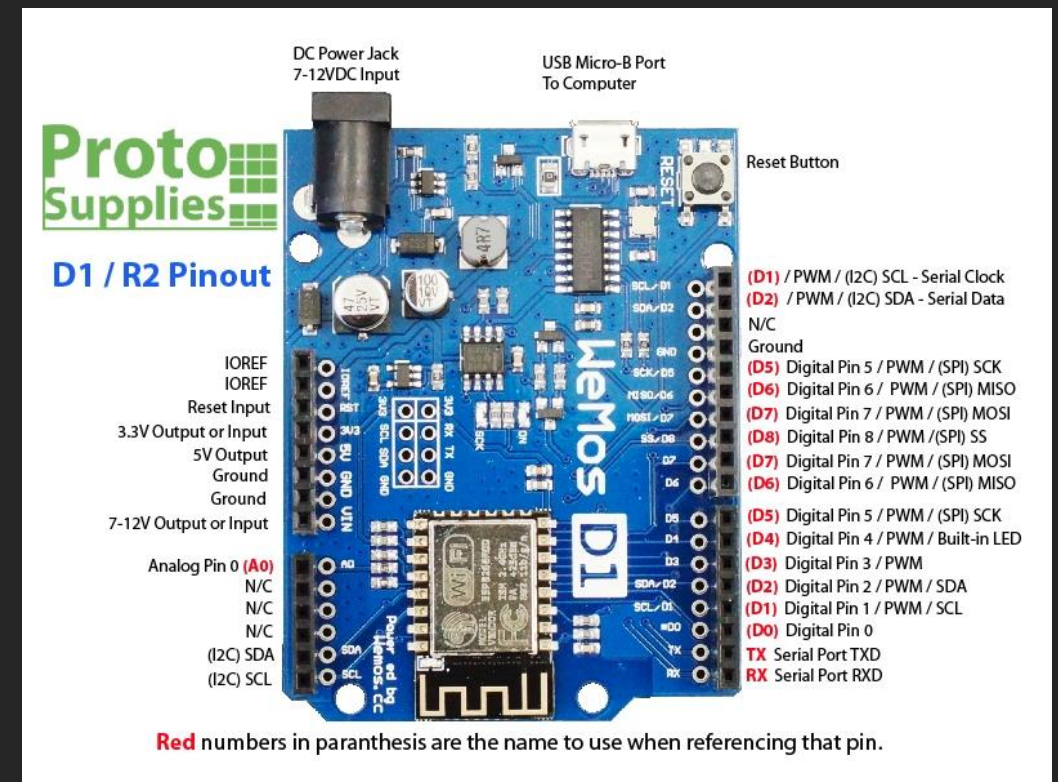
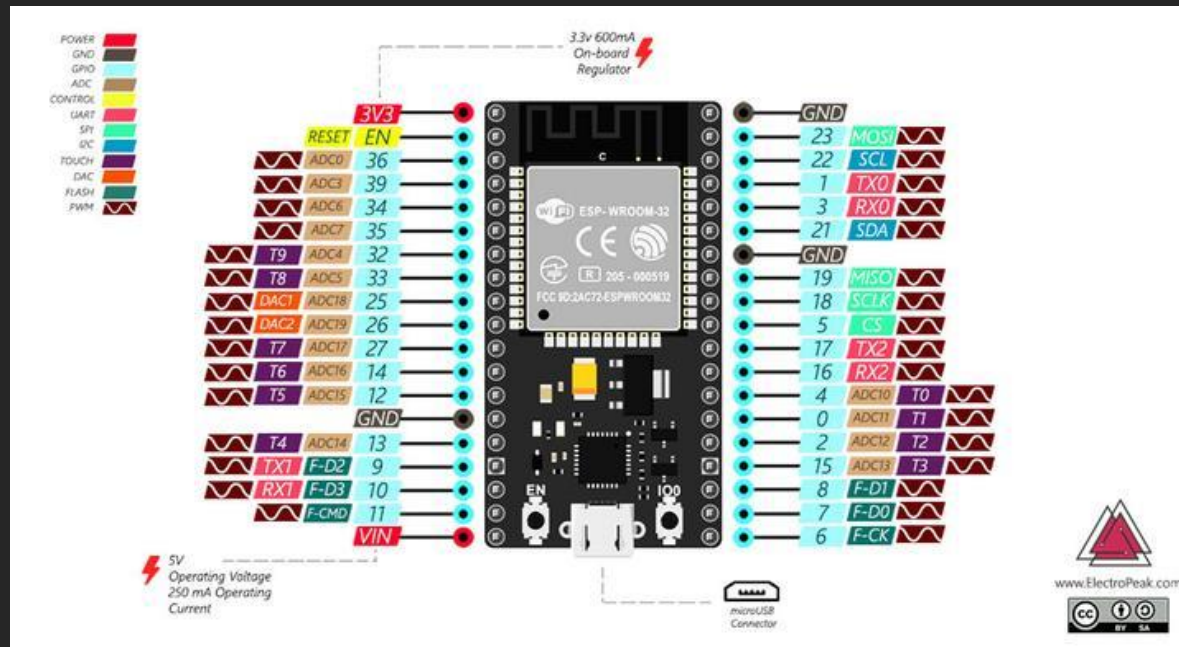


硬體介紹

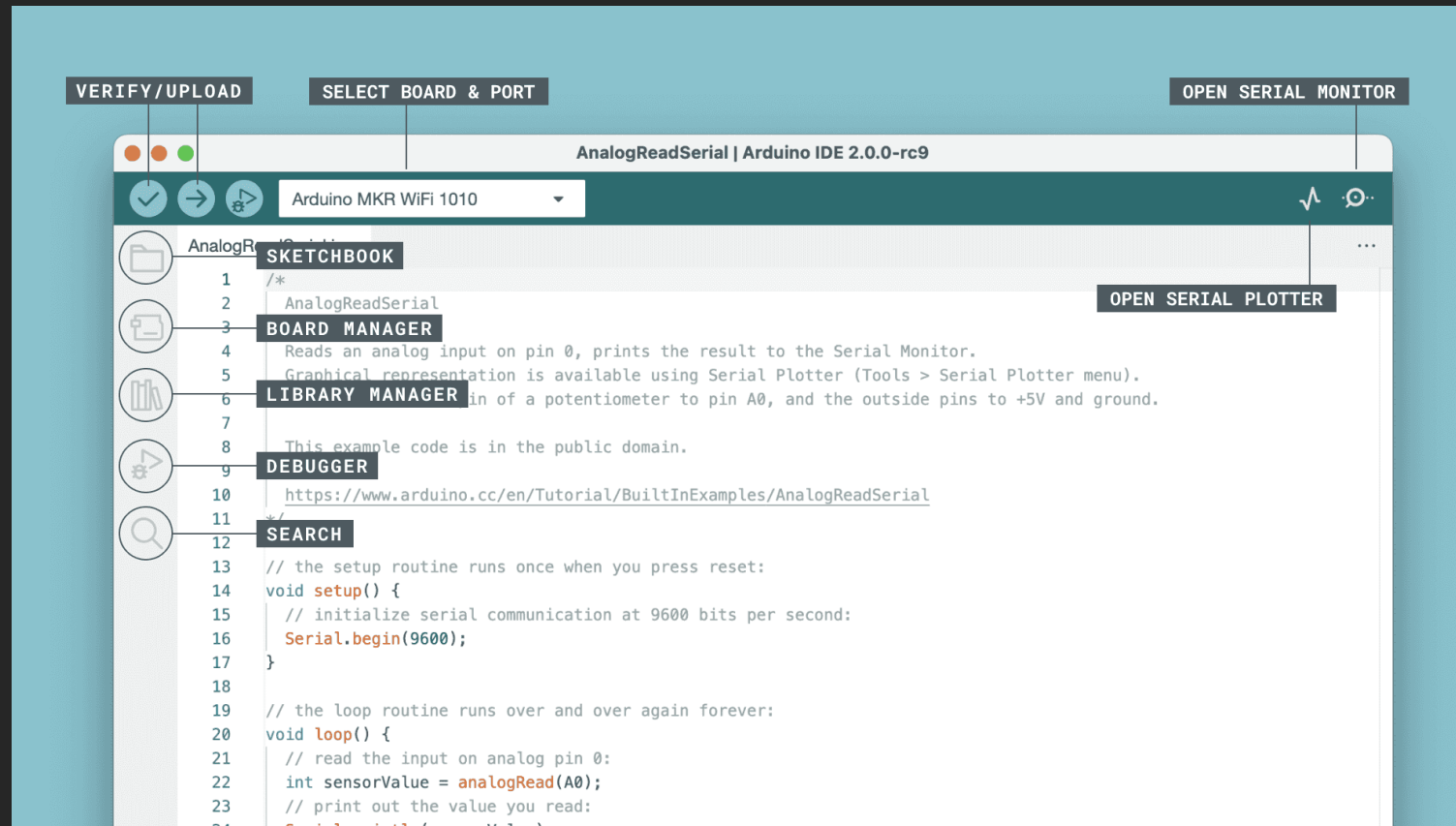
- GitHub 倉庫：
https://github.com/neko0xff/2023_school_Research_Server
- 維護者：
[neko0xff] <https://github.com/neko0xff>

所使用到的開發版

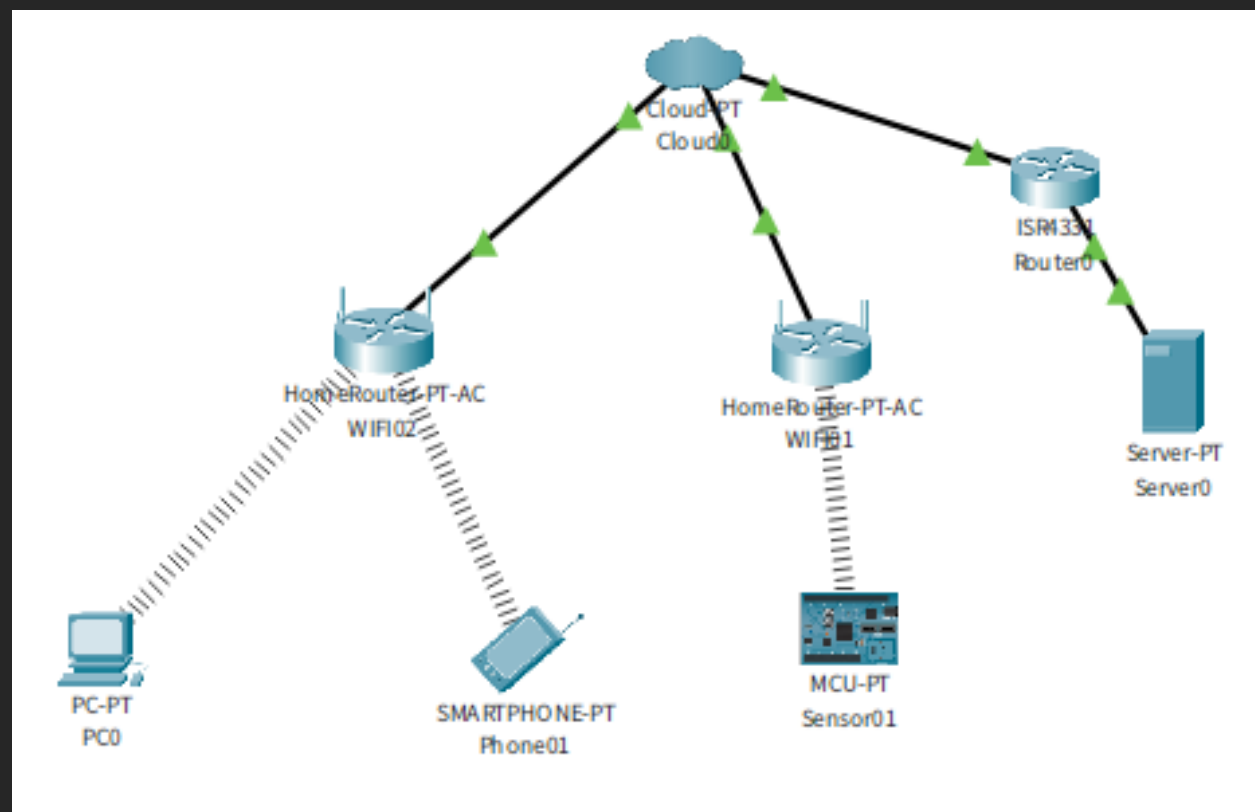
- ESP32/8266



開發環境: Arduino IDE 2.0



網路架構



傳到伺服器方式

- 方式
 - *HTTP Request: POST*
 - body
 - MIME type: application/x-www-form-urlencoded
 - URL `/upload/:deviceID/data?[Quary String]`
 -
-

傳到伺服器方式

輸入

- 格式: 字串
- 動作: 送出請求+欲想傳送的欄位
- Body String Value

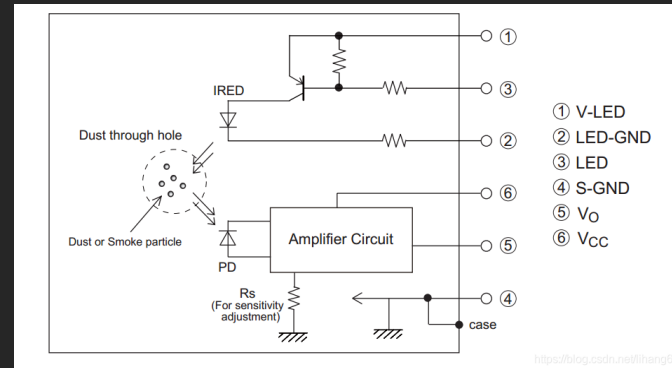
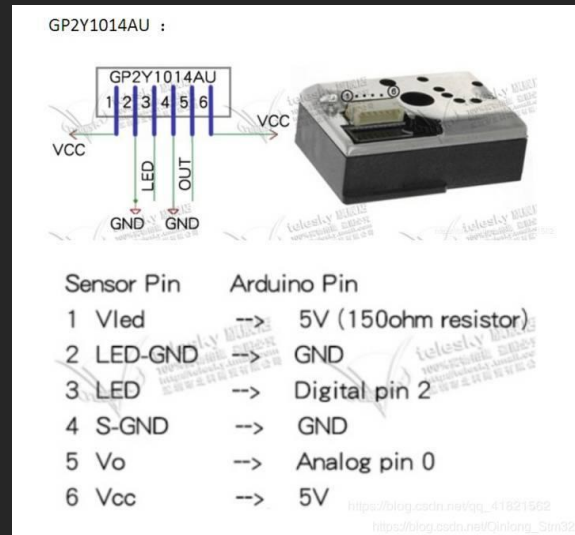
輸出

- 格式: JSON
- 動作: 成功回傳時,則回應上傳的中繼資料

Value	功能
hum	溫度
temp	溼度
tvoc	工業廢氣
co	一氧化碳
co2	二氧化碳
pm25	PM2.5
o3	臭氧



所使用到的Sensor型號



($T_a=25^{\circ}\text{C}$)

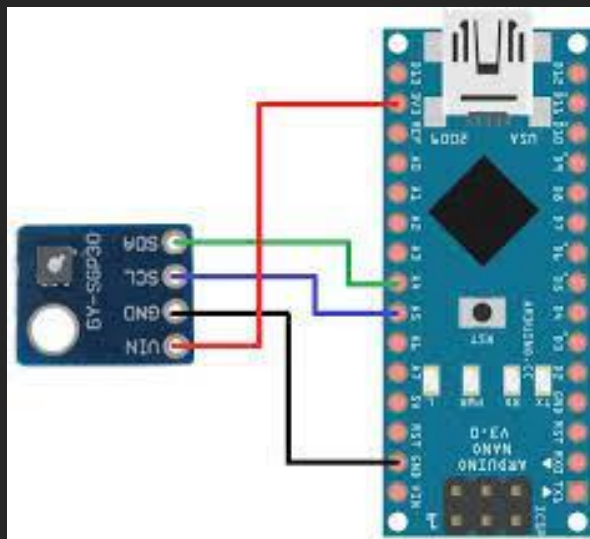
Parameter	Symbol	Rating	Unit
Supply voltage	V_{CC}	-0.3 to +7	V
*1 Input terminal voltage	V_{LED}	-0.3 to V_{CC}	V
Operating temperature	T_{opr}	-10 to +65	$^{\circ}\text{C}$
Soldering temperature	T_{sol}	-20 to +80	$^{\circ}\text{C}$

*1 Open drain drive input

https://blog.csdn.net/jing_41621562

GP2Y1014AU 顆 粒物濃度傳感器 (PM2.5)

- 原理：微塵會反射光線（基於光學原理），相對的微塵越多會導致接收到的光線越少



Technische Details:

- Betriebsspannung: 3.3 bis 5.0 V
- tVOC: 0 - 60.000 ppb (parts per billion)
- eCO2: 400 - 60.000 ppm (parts per million)
- H2 / Ethanol: 0 - 1000 ppm (parts per million)
- Messgenauigkeit: 10-15 % im Messbereich
- Betriebstemperaturbereich: -40 bis 85 °C
- Schnittstelle: I2C - Hex Adresse 0x58



GY-SGP40

二氧化碳 / TVOC 感測器

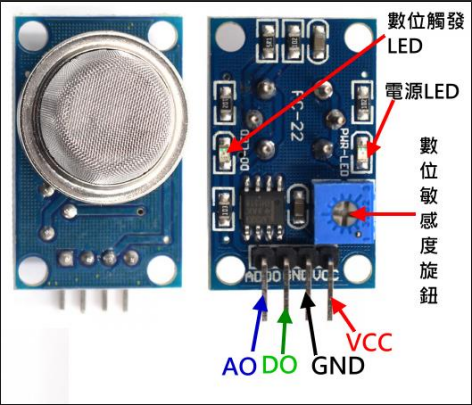
- 基於多像素技術來容許感應器透過可偵測天燃氣類型和濃度的各種接收器，以感知周圍環境

MQ-7

一氧化碳感測器

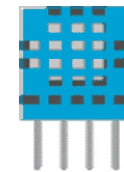
产品型号		MQ-7	
产品类型		半导体气敏元件	
标准封装		塑封	
检测气体		一氧化碳	
检测浓度		10-1000ppmCO	
标准 电路 条件	回路电压	V_e	$\leq 10V$ DC
	加热电压	V_h	$5.0V \pm 0.2V$ ACorDC (高) $1.5V \pm 0.1V$ ACorDC (低)
	加热时间	T_h	$60 \pm 1S$ (高) $90 \pm 1S$ (低)
	负载电阻	R_L	可调
标准 测试 条件	加热电阻	R_h	$31 \Omega \pm 3 \Omega$ (室温)
	加热功耗	P_h	$\leq 350mW$
下元 件特 性	敏感体表 面电阻	R_s	$2K \Omega - 20K \Omega$ (in100ppmCO)
	灵敏度	S	$R_s(\text{in air})/R_s(100ppmCO) \geq 5$
	浓度斜率	α	$\leq 0.6(R_{200ppm}/R_{100ppm}CO)$
标准 测试 条件	温度、湿度	$20^\circ C \pm 2^\circ C$; $65\% \pm 5\%RH$	
	标准测试电路	$V_e: 5.0V \pm 0.1V$; V_h (高): $5.0V \pm 0.1V$; V_h (低): $1.5V \pm 0.1V$	
	预热时间	不少于48小时	

敏感体功耗 (P_s) 值可用计算下式: $P_s = V_e^2 \times R_s / (R_s + R_L)^2$

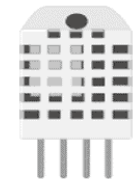


DHT11

溫/溼度感測器



DHT11



DHT22

	DHT11	DHT22
Operating Voltage	3 to 5V	3 to 5V
Max Operating Current	2.5mA max	2.5mA max
Temperature Range	0-50°C / $\pm 2^{\circ}\text{C}$	-40 to 80°C / $\pm 0.5^{\circ}\text{C}$
Humidity Range	20-80% / 5%	0-100% / 2-5%
Sampling Rate	1 Hz (reading every second)	0.5 Hz (reading every 2 seconds)
Advantage	low cost	More Accurate

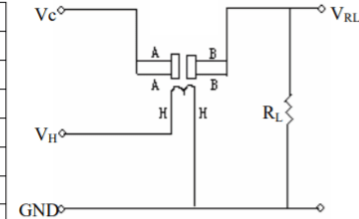
Technical Data

Model No.		MQ131	
Sensor Type		Semiconductor	
Standard Encapsulation		Bakelite (Black Bakelite)	
Detection Gas		Ozone	
Concentration		10-1000ppm Ozone	
Circuit	Loop Voltage	V_c	$\leq 24V$ DC
	Heater Voltage	V_H	$5.0V \pm 0.2V$ AC or DC
	Load Resistance	R_L	Adjustable
Character	Heater Resistance	R_H	$31\Omega \pm 3\Omega$ (Room Tem.)
	Heater consumption	P_H	$\leq 900mW$
	Sensing Resistance	R_s	$50K\Omega - 500K\Omega$ (in 50ppm O_3)
	Sensitivity	S	$R_s(\text{in air})/R_s(\text{in } 50ppm O_3) \geq 3$
	Slope	α	$(R_{100ppm}/R_{10ppm} O_3)$
Condition	Tem. Humidity	$20^\circ C \pm 2^\circ C$; $65\% \pm 5\% RH$	
	Standard test circuit	$V_c: 5.0V \pm 0.1V$; $V_H: 5.0V \pm 0.1V$	
	Preheat time	Over 48 hours	

Power of Sensitivity body(P_s): $P_s = V_c^2 \times R_s / (R_s + R_L)^2$

Resistance of sensor(R_s): $R_s = (V_c / V_{RL} - 1) \times R_L$

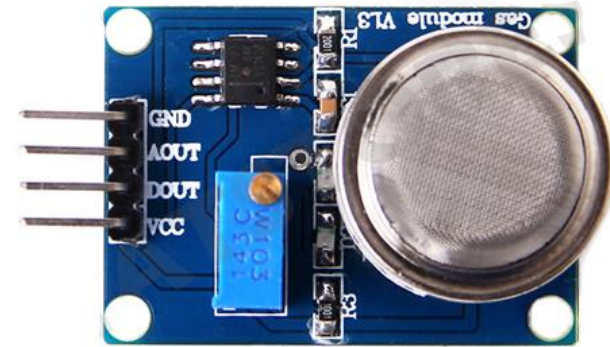
Basic test loop



The above is basic test circuit of the sensor. The sensor need to be put 2 voltage, heater voltage(V_H) and test voltage(V_C). V_H used to supply certified working temperature to the sensor, while V_C used to detect voltage (V_{RL}) on load resistance (R_L) whom is in series with sensor. The sensor has light polarity, V_c need DC power. V_C and V_H could use same power circuit with precondition to assure performance of sensor. In order to make the sensor with better performance, suitable R_L value is needed:

MQ131 Pinout

GND
Analog Out
Digital Out
VCC



MQ-131 臭氧(O_3)

The background features a vibrant, abstract design. It consists of a series of overlapping, semi-transparent geometric shapes, primarily triangles and circles, in a variety of colors including red, orange, yellow, green, cyan, blue, and purple. These shapes are arranged in a way that creates a sense of depth and movement. The top half of the image is dominated by these colorful shapes against a bright cyan background, while the bottom half transitions into a darker, more muted grey background where the text is located.

報告完畢
