Smart Plant System

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IoT Project
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Table of contents

Idea

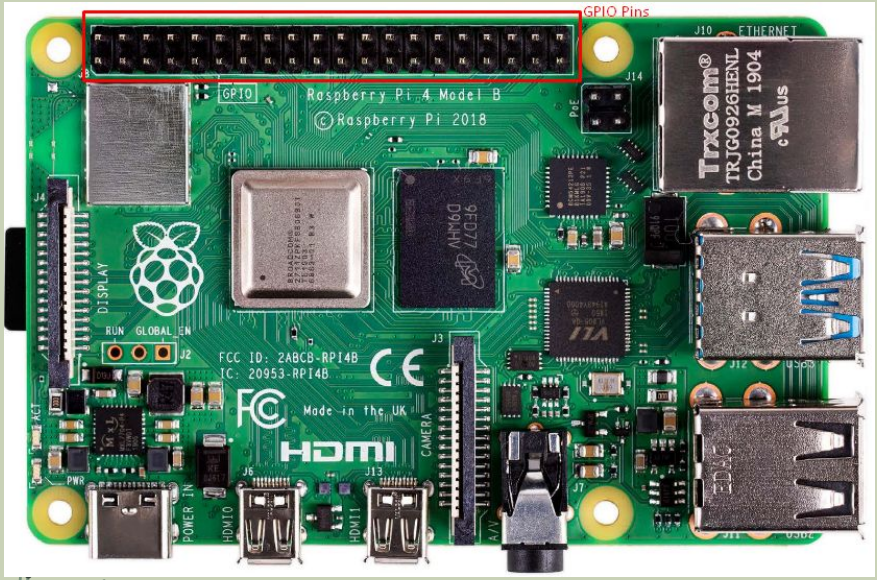
A device that automatically waters plants while also monitoring a plant's temperature, humidity, and light level.

Use Arduino controls the pump based on the soil moisture level read. Through the Adafruit program, Raspberry Pi displays the temperature, humidity, and light level content. Water is fed via the tube when the soil moisture falls below the threshold value .

Components

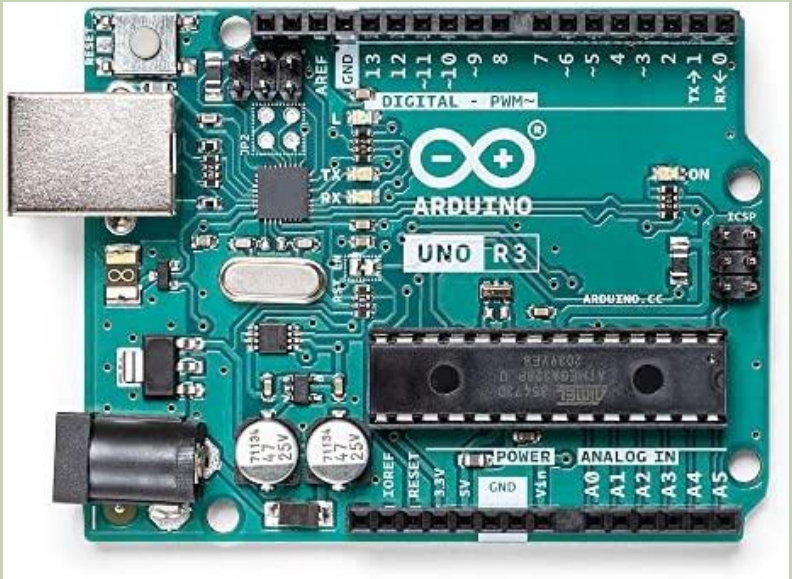
- Raspberry Pi
- Arduino Uno
- Temperature+Humidity sensor
- Light sensor
- Moisture sensor
- Jumper wires
- Pumper
- Relay module

Raspberry Pi 4



PIN	NAME		NAME	PIN
01	3.3V DC Power		5V DC Power	02
03	GPIO02 (SDA1,I²C)		5V DC Power	04
05	GPIO03 (SDL1,I²C)		Ground	06
07	GPIO04 (GPCLK0)		GPIO14 (TXD0, UART)	08
09	Ground		GPIO15 (RXD0, UART)	10
11	GPIO17		GPIO18(PWM0)	12
13	GPIO27		Ground	14
15	GPIO22		GPIO23	16
17	3.3V DC Power		GPIO24	18
19	GPIO10 (SP10_MOSI)		Ground	20
21	GPIO09 (SP10_MISO)		GPIO25	22
23	GPIO11 (SP10_CLK)		GPIO08 (SPI0_CE0_N)	24
25	Ground		GPIO07 (SPI0_CE1_N)	26
27	GPIO00 (SDA0, I²C)		GPIO07 (SCL0, I²C)	28
29	GPIO05		Ground	30
31	GPIO06		GPIO12 (PWM0)	32
33	GPIO13 (PWM1)		Ground	34
35	GPIO19		GPIO16	36
37	GPIO26		GPIO20	38
39	Ground		GPIO21	40

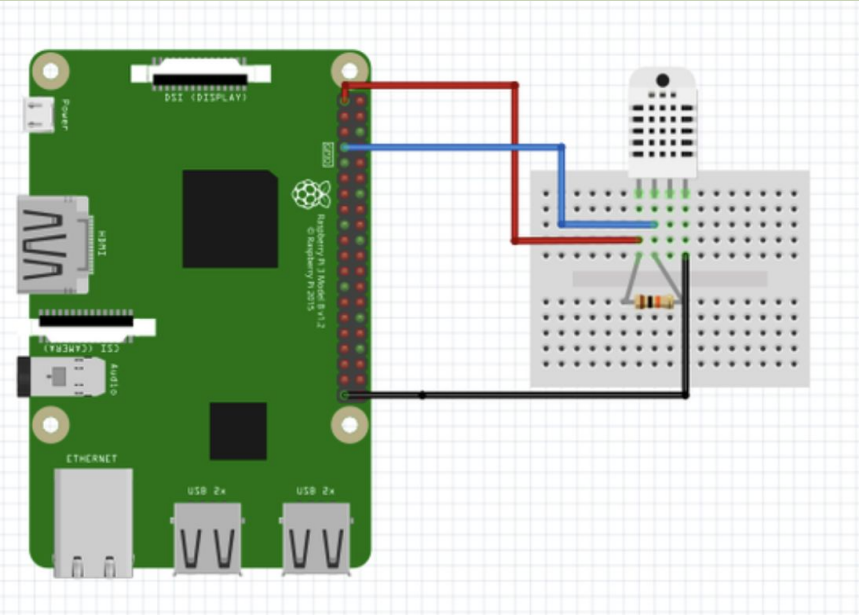
Arduino


DIGITAL - PWM~
ARDUINO
UNO R3
ON
ICSP
POWER
ANALOG IN
GND
ARDUINO.CC

Moisture Sensor

- Power supply: 3.3 - 5V
- Analog output
- Value from 0 - 550

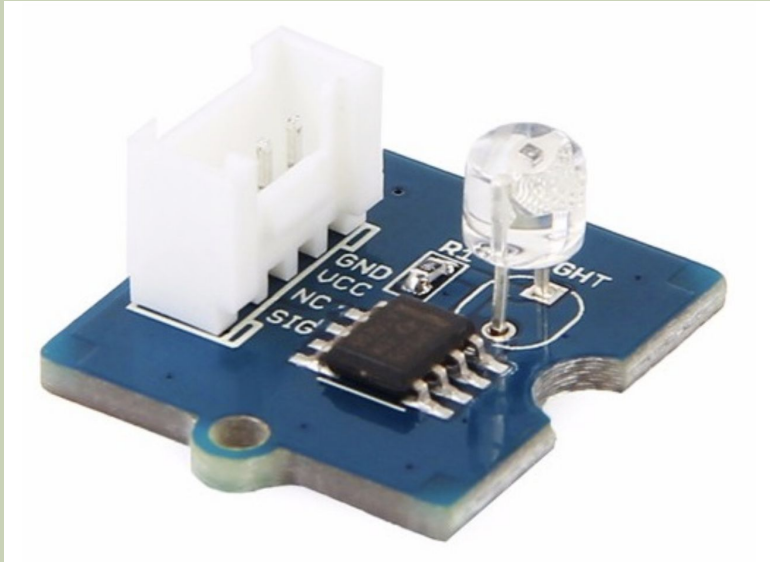
DHT22



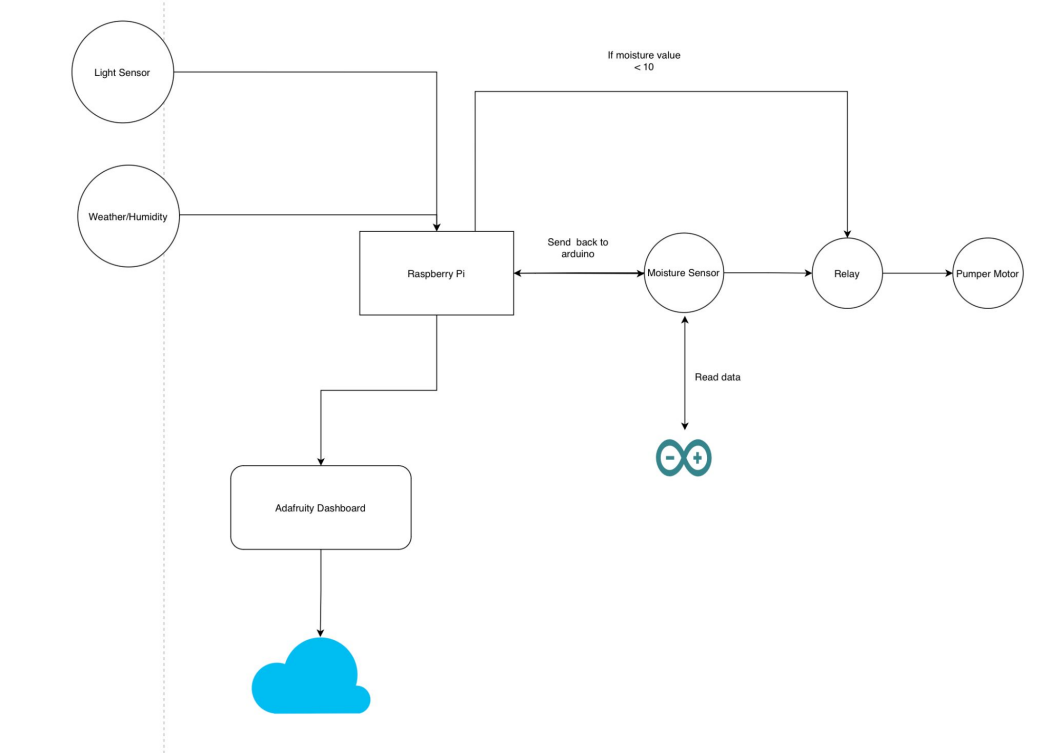
- Power supply: 3.3 - 5V
- Operating range:
  Humidity 0 - 100RH
  Temperature 40 - 80C
- Accuracy:
  +- 2% RH
  +- 0.1C

Lightsensor

- Power supply: 3.3 - 5V
- Analog output
- Peak Wavelength: 540 nm
- Ready to use library



Project Architecture



Code

```
#setup adafruit
ADAFRUIT_IO_USERNAME = 'cyrilmetropolia'
ADAFRUIT_IO_KEY = 'aio_FLVx78zG4clK1mH3fstd8ZOVEWO1' #Token key for Ada Dashboard
aio = Client(ADAFRUIT_IO_USERNAME, ADAFRUIT_IO_KEY)


try:
        tempC = aio.feeds('temperature-in-c')
        tempF = aio.feeds('temperature-in-f')
        humidity = aio.feeds('humidity')
        light = aio.feeds('light')
        moisture = aio.feeds('moisture')
except RequestError:
        tempC = aio.create_feed('temperature In C')
        tempF = aio.create_feed('temperature-in-f')
        humidity = aio.create_feed('humidity')
        light = aio.create_feed('light')
        moisture = aio.create_feed('moisture')
```

Code

```
#Function for Temp and Humid
def getTemp_Humid():
        values = []

        while True:
                try:
                        dhtDevice = adafruit_dht.DHT22(board.D17, use_pulseio=False) #Initial Lirary and PIN for Temp/Humid Sensor (Digital PIN 17)
                        temperature_c = dhtDevice.temperature #Read Temperature in C unit
                        temperature_f = temperature_c * (9 / 5) + 32 #Converting to F uni
                        humidity = dhtDevice.humidity #Read Humidity value
                        values.append(temperature_c) #Send value to array
                        values.append(temperature_f)
                        values.append(humidity)
                        print("Temp: {:.1f} F / {:.1f} C    Humidity: {}% ".format(temperature_f, temperature_c, humidity)) #Print values

                except RuntimeError:
                        break
        return values
```

Code

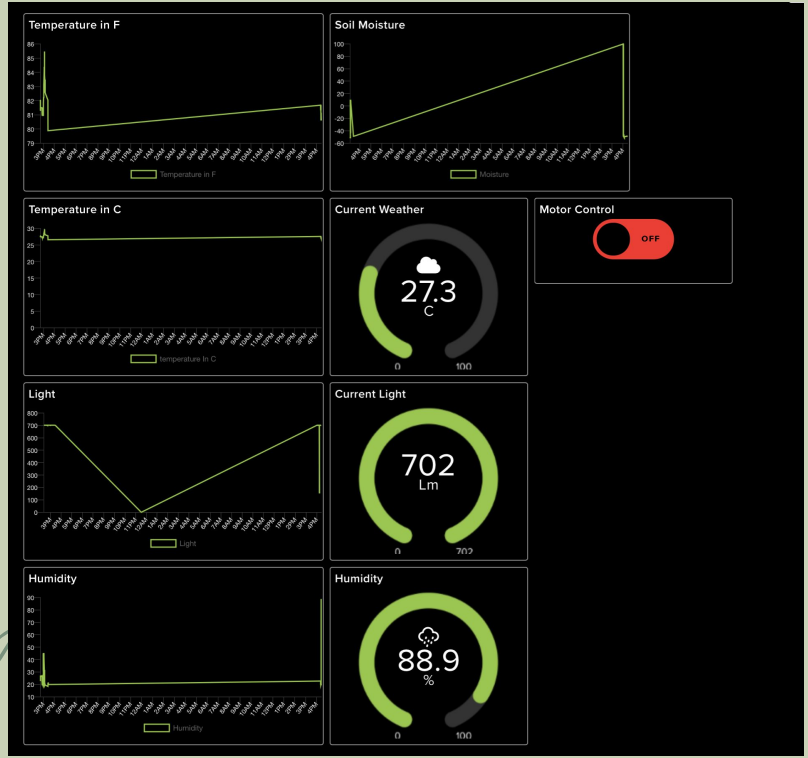
```
if __name__ == '__main__':
        while True:

                #send temp/humidity values to adafruit
                tempHumid = getTemp_Humid()
                if not tempHumid:
                        print("list is empty")
                else:
                        aio.send_data(tempC.key, tempHumid[0])
                        aio.send_data(tempF.key, tempHumid[1])
                        aio.send_data(humidity.key, tempHumid[2])
                        print("sent dht sensor data!")
                aio.send_data(light.key, getLightSensor())

                #send moisture data to adafruit
                moistureData = getMoistureSensor()
                if not moistureData or moistureData == 0:
                        print("list is empty")
                else:
                        aio.send_data(moisture.key, getMoistureSensor())
                        print("sent moisture data!")
                print(moistureData)


                time.sleep(4)
```

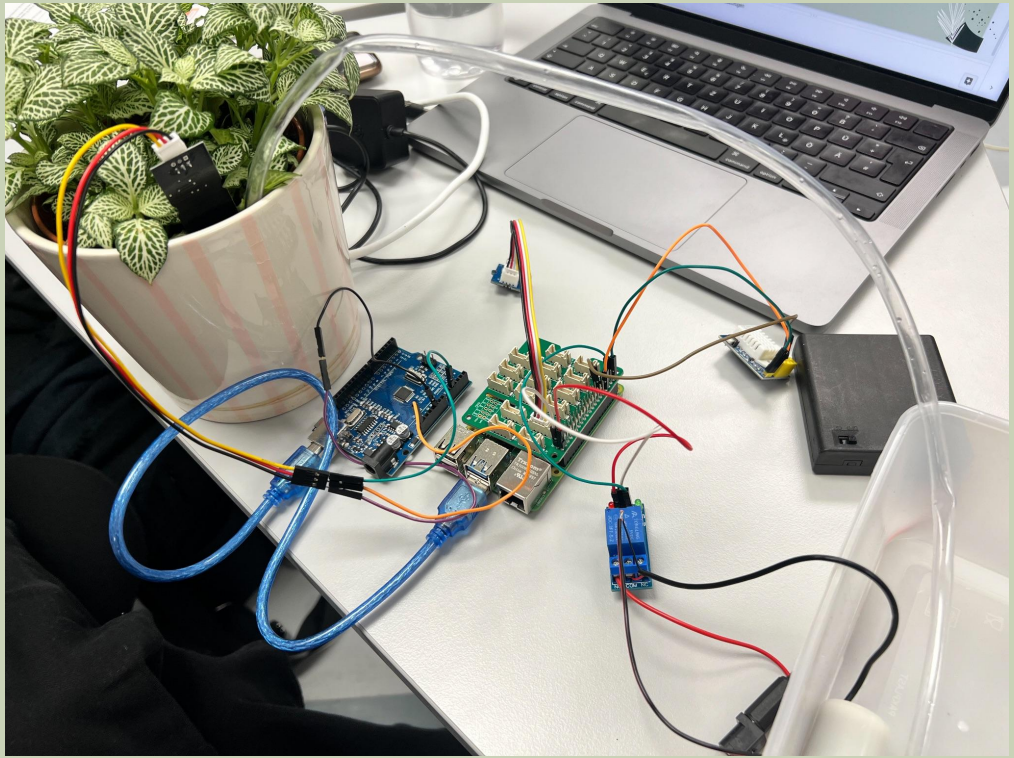
Dashboard



Raspberry Pi displays the soil moisture, temperature, light, humidity content through the Adafruit program.

Live Demo

Final assembly



Thanks!