1 channel Plant Watering System with Raspberry Pi

Overview

The following guide will show you how to set up a watering system that can intelligently monitor and automatically water to the plant or flower.

Parts Required

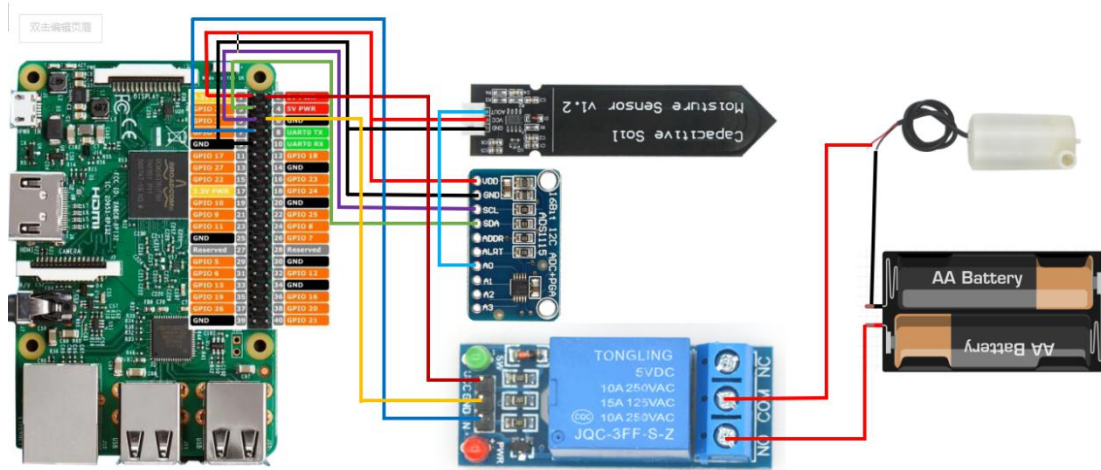1 x Raspberry Pi Board

1 x ADS1115 Analog Digital Converter

1 x Capacitive Soil Moisture Sensor

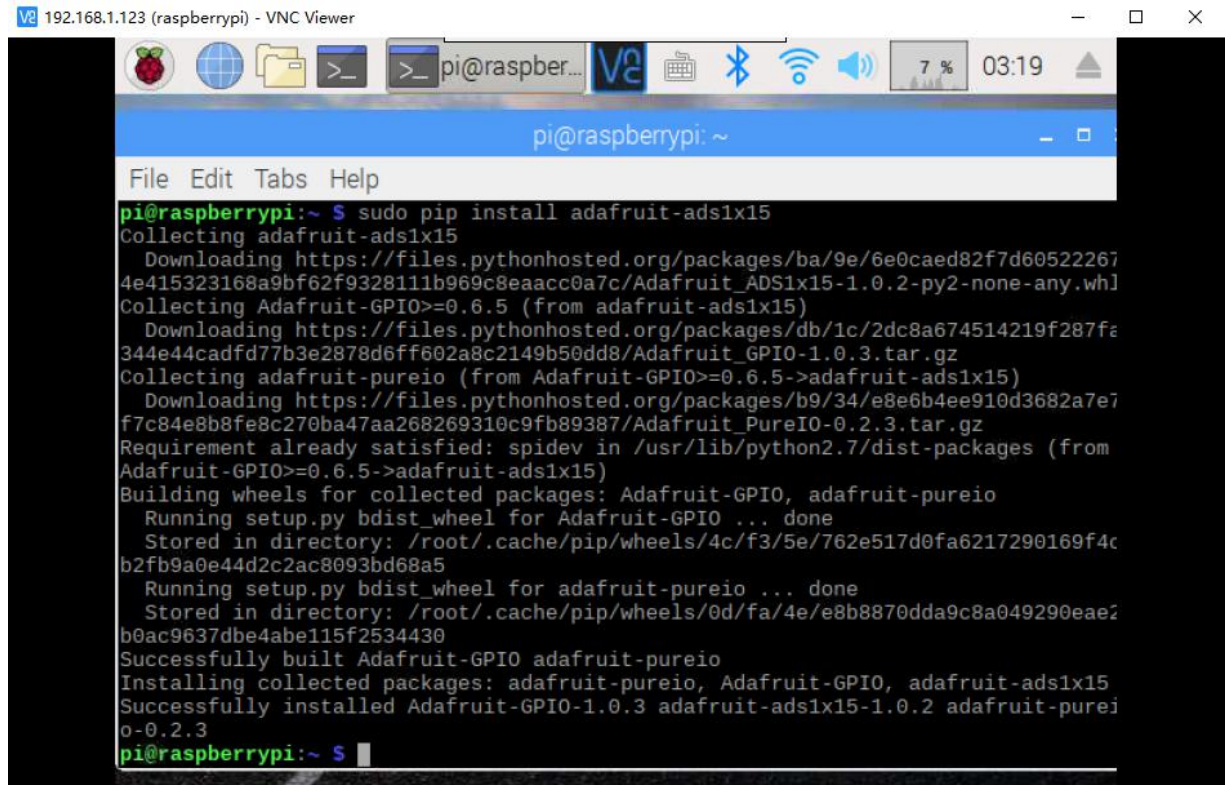1 x One-channel Relay

1 x Water Pump

15 x Jumper Wires

Connection Diagram

How to set up with Raspberry Pi?

Step 1: Add the ADS1115 module library to the Raspberry Pi system after connection completed, enter 'sudo pip install adafruit-ads1x15' in the Raspberry Pi terminal window, and then press Enter as shown below.
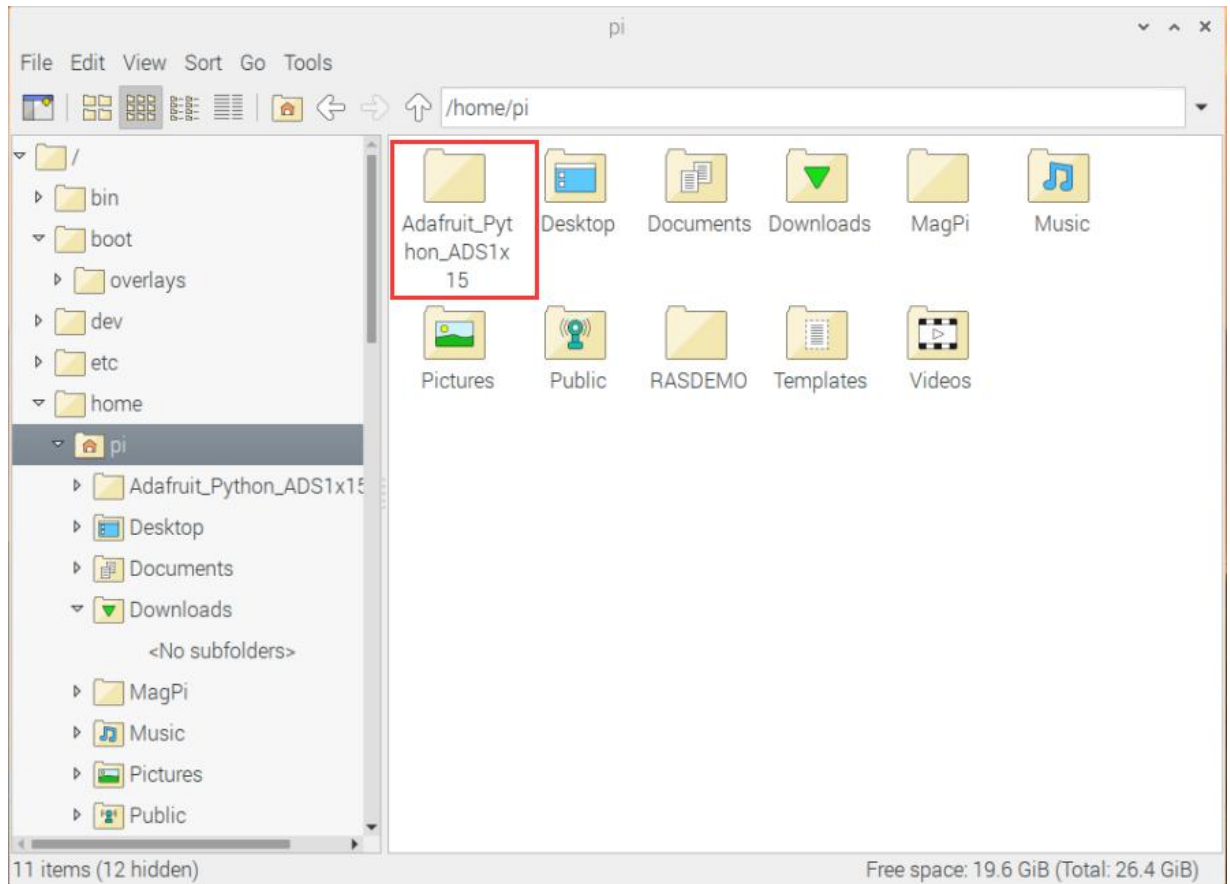
Step 2: After download completed, enter the command at the command line:

git clone https://github.com/adafruit/Adafruit_Python_ADS1x15.git

To download another file of ADS1115. After download completed, the file shown below will appear in your pi file directory.

Step 3: After the download is complete, create a new water.py file in the pi directory, as shown below.
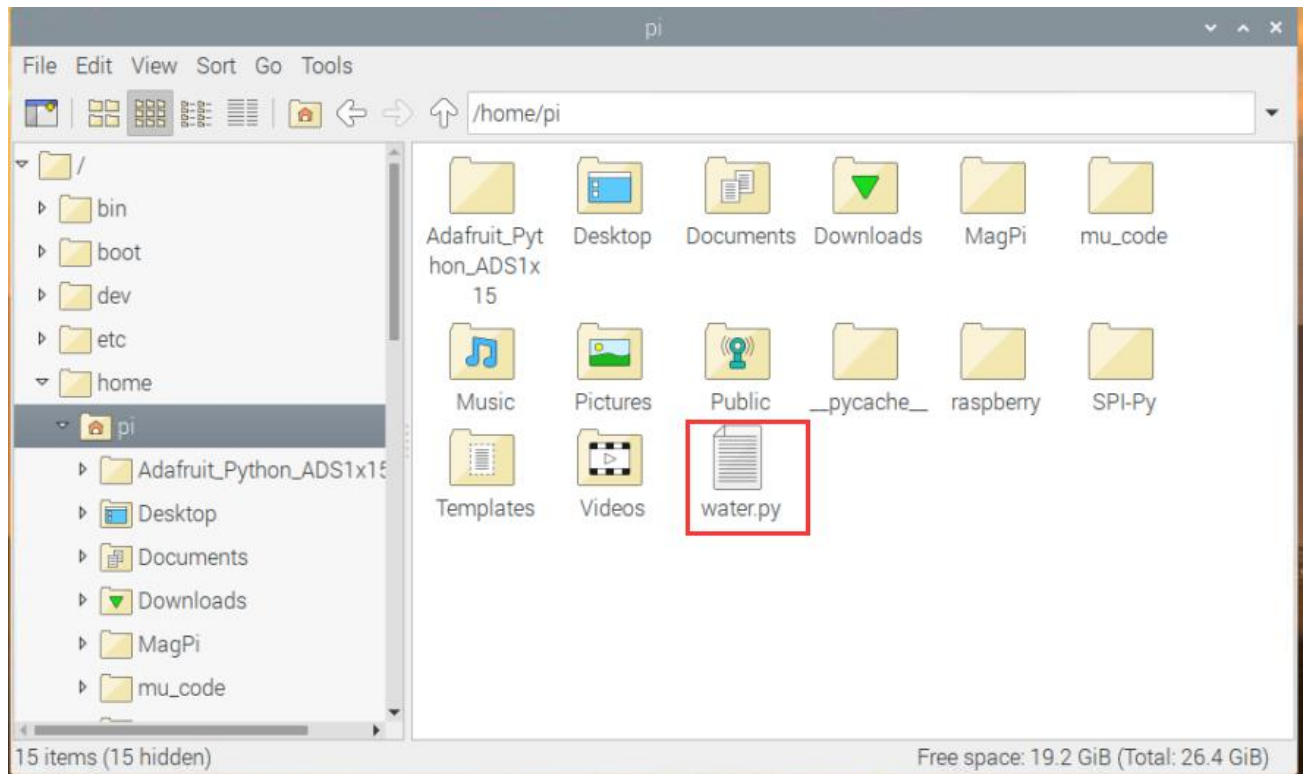
Step 4: Copy the following code into the **water.py file.**

```python
import RPi.GPIO as GPIO
import time
import Adafruit_ADS1x15
import math
adc =Adafruit_ADS1x15 .ADS1115()
GAIN = 1
PIN=7
def setup():
    GPIO.setmode(GPIO.BOARD)
    GPIO.setup(PIN, GPIO.OUT)
    GPIO.output(PIN, GPIO.HIGH)
    time.sleep(0.1)

values = [0]*100
def loop():
    while True:
        for i in range(100):
            values[i] = adc.read_adc(0, gain=GAIN)
        print(max(values))
```

```python
        if (max(values))>20000:
            GPIO.output(PIN, GPIO.LOW)
            print("ON")
            print(PIN)
            time.sleep(0.1)
        else:
            GPIO.output(PIN, GPIO.HIGH)
            print("OFF")
            print(PIN)
            time.sleep(0.1)

def destroy():
    GPIO.output(PIN, GPIO.HIGH)
    GPIO.cleanup()

if __name__ == '__main__':
    setup()
    try:
        loop()
    except KeyboardInterrupt:
        destroy()
```

Step 5: **Then run the program by typing the python water.py command in the terminal.**

Code Interpretation:

1.We need to import the four modules, they are: Raspberry Pi GPIO module, the delay function module, the ADS1115 module, and the math module.

```
import RPi.GPIO as GPIO

import time

import Adafruit_ADS1x15

import math
```

2.Instantiate an abc object using the ADS1115 module to read sensor data later; then define a position variable GAIN, and the physical pin 7 of the Raspberry Pi.

```
adc =Adafruit_ADS1x15 .ADS1115()

GAIN = 1

PIN=7
```

3. Set the 7-pin pin mode, pin input/output mode, initialization pin 7 in the setup() function, and then delay the 0.1 second debounce.

```
def setup():

    GPIO.setmode(GPIO.BOARD)

    GPIO.setup(PIN, GPIO.OUT)

    GPIO.output(PIN, GPIO.HIGH)

    time.sleep(0.1)
```

4.Finally, the specific function is implemented in the loop() function, and the value of the sensor is judged to be greater than 20000 by the if statement. If it is larger than 20000, the relay is operated by the pump. If it is less than, the relay is turned off and the pump stop working.

```python
def loop():
    while True:
        for i in range(100):
            values[i] = adc.read_adc(0, gain=GAIN)
        print(max(values))
        if (max(values))>20000:
            GPIO.output(PIN, GPIO.LOW)
            print("ON")
            print(PIN)
            time.sleep(0.1)
        else:
            GPIO.output(PIN, GPIO.HIGH)
            print("OFF")
            print(PIN)
            time.sleep(0.1)
```

Attention: The 20,000 set here needs to be set according to the moisture required by your own flowers, which is just explained with an example of 20000.

5.The last piece of code is where the function starts and ends. When the program is running, you can press 'Ctrl+c' to end the code run.

```python
if __name__ == '__main__':
    setup()
    try:
        loop()
    except KeyboardInterrupt:
        destroy()
```