MIT | Academy of Engineering
(An Autonomous Institute Affiliated to Savitribai Phule Pune University)

Smart Soil Nutrient Monitoring System Using MQTT

Course : EsIOT

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Agriculture requires real-time monitoring of soil health

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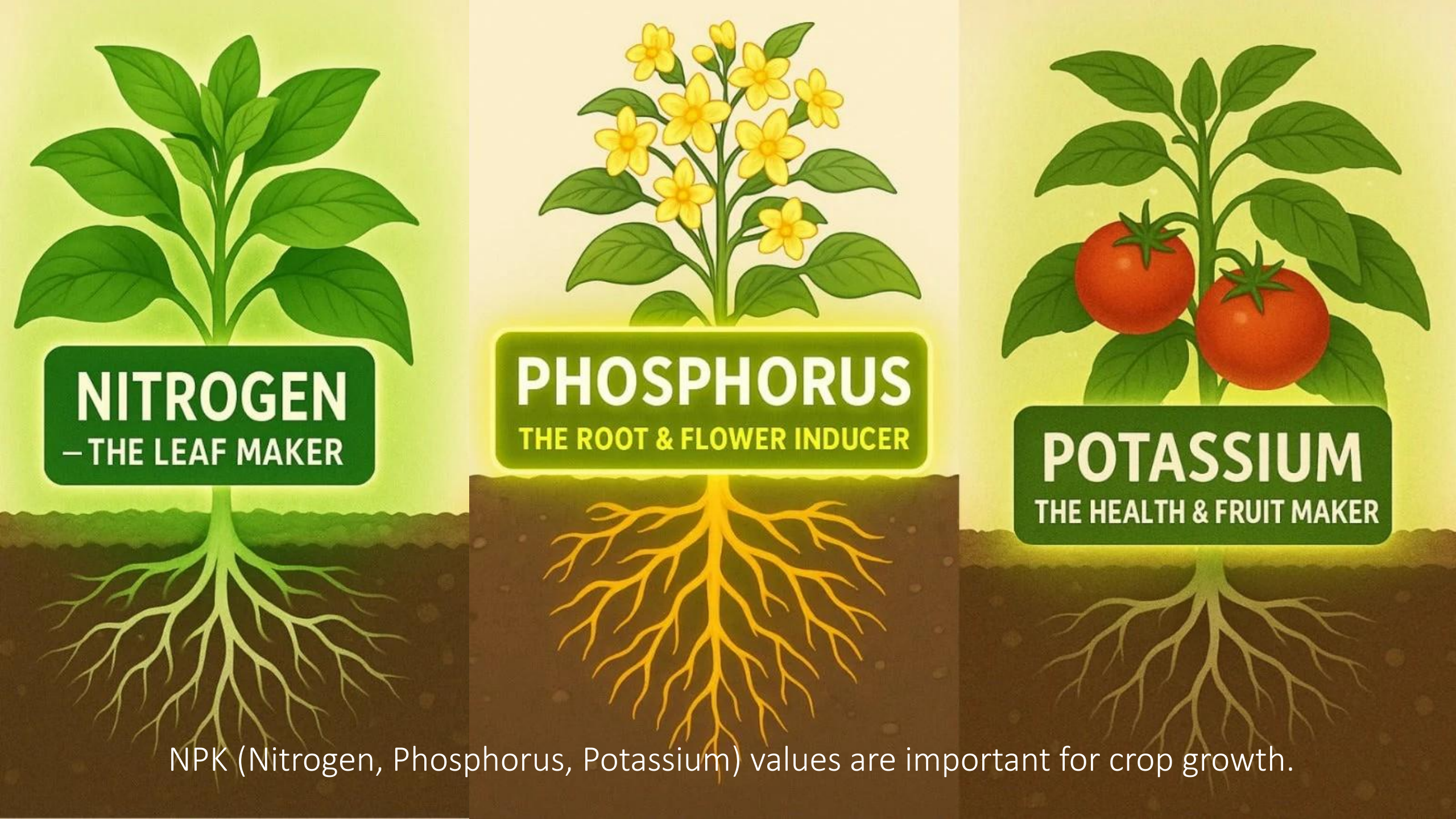

NPK (Nitrogen, Phosphorus, Potassium) values are important for crop growth.

Traditional soil testing is slow and manual.

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Collecting soil samples

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Collecting soil samples

Testing in Labs

Traditional soil testing is slow and manual.

Waiting for results

Objectives

To measure NPK values from soil in real time

To send data wirelessly using ESP8266 Wi-Fi module

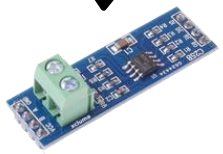
To publish NPK data to MQTT broker

To visualize readings live on an online dashboard

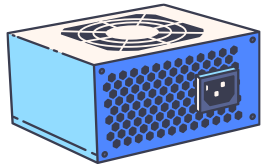
System Architecture

NPK SENSOR

SOIL



5V

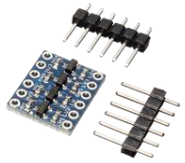


Rs485

POWER SUPPLY

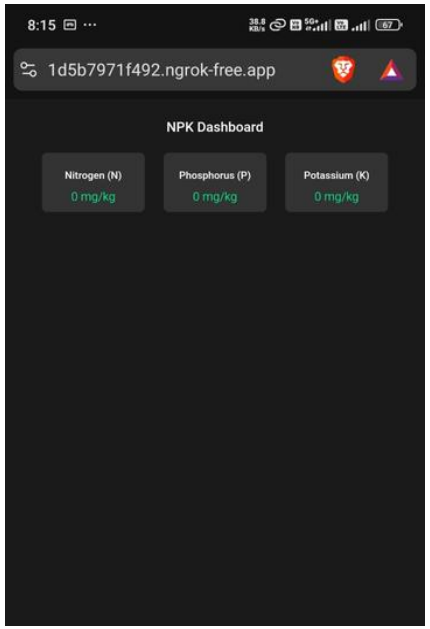
5V

3.3V



3.3V

ESP8266

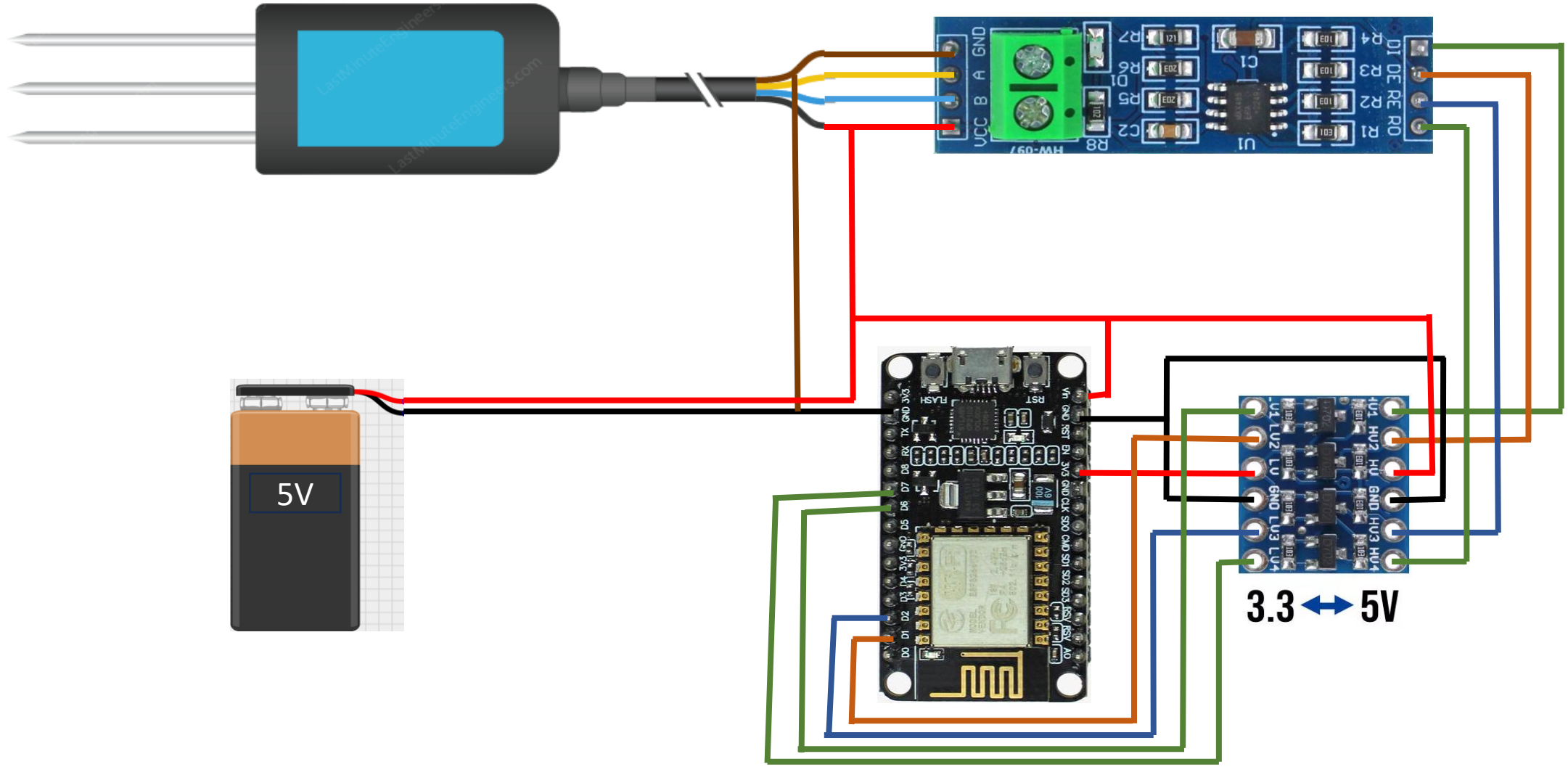


DASHBOARD

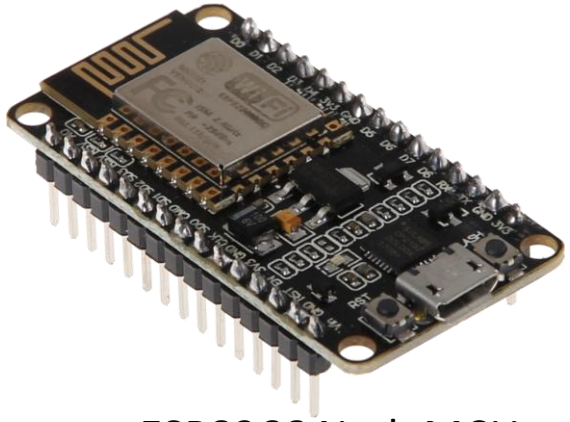
Message Queue Telemetry Transport

MQTT

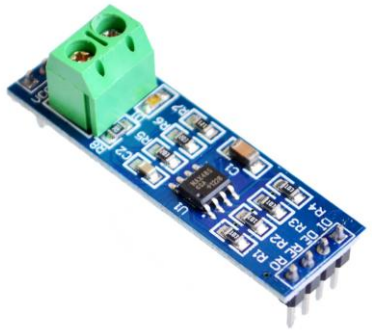
Circuit diagram



Hardware used



ESP8266 NodeMCU



RS485 to TTL converter

Logic level shifter

NPK soil sensor

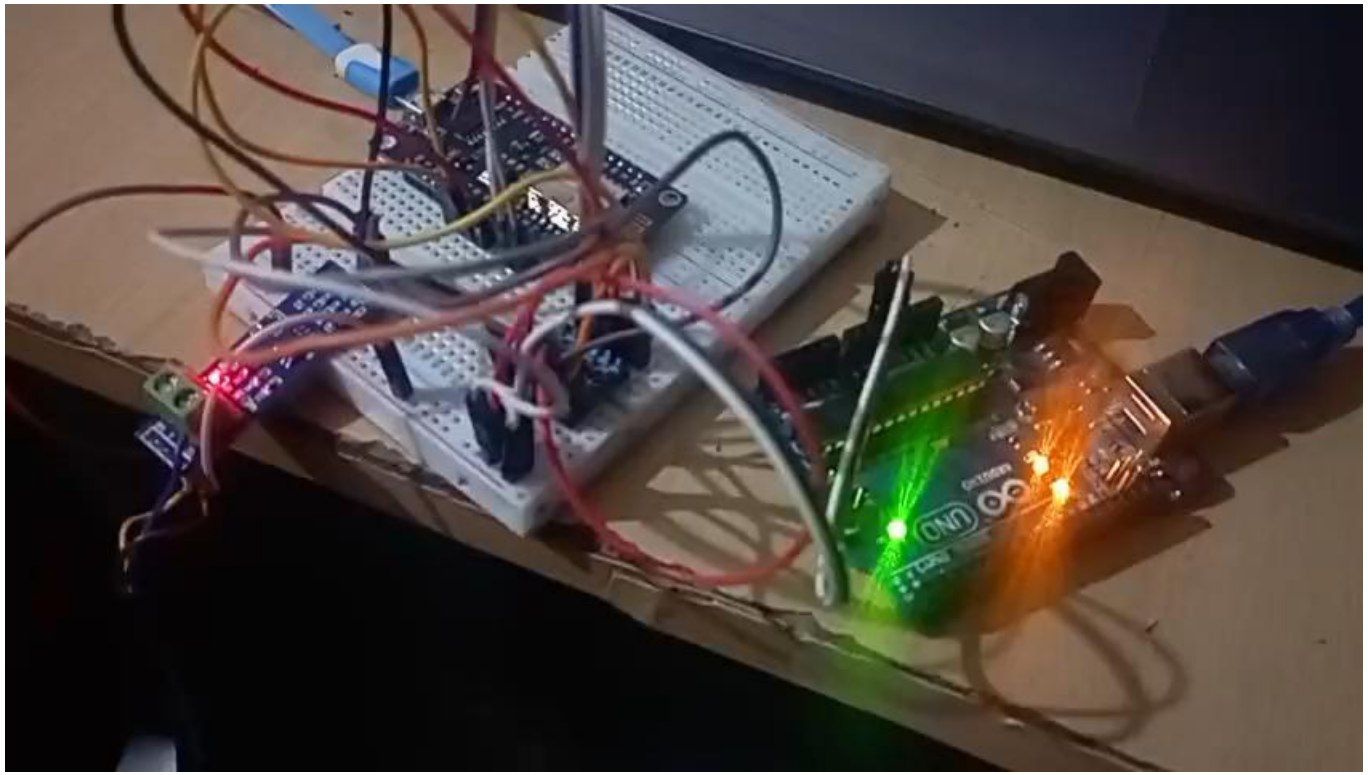
Software used

MQTT Box

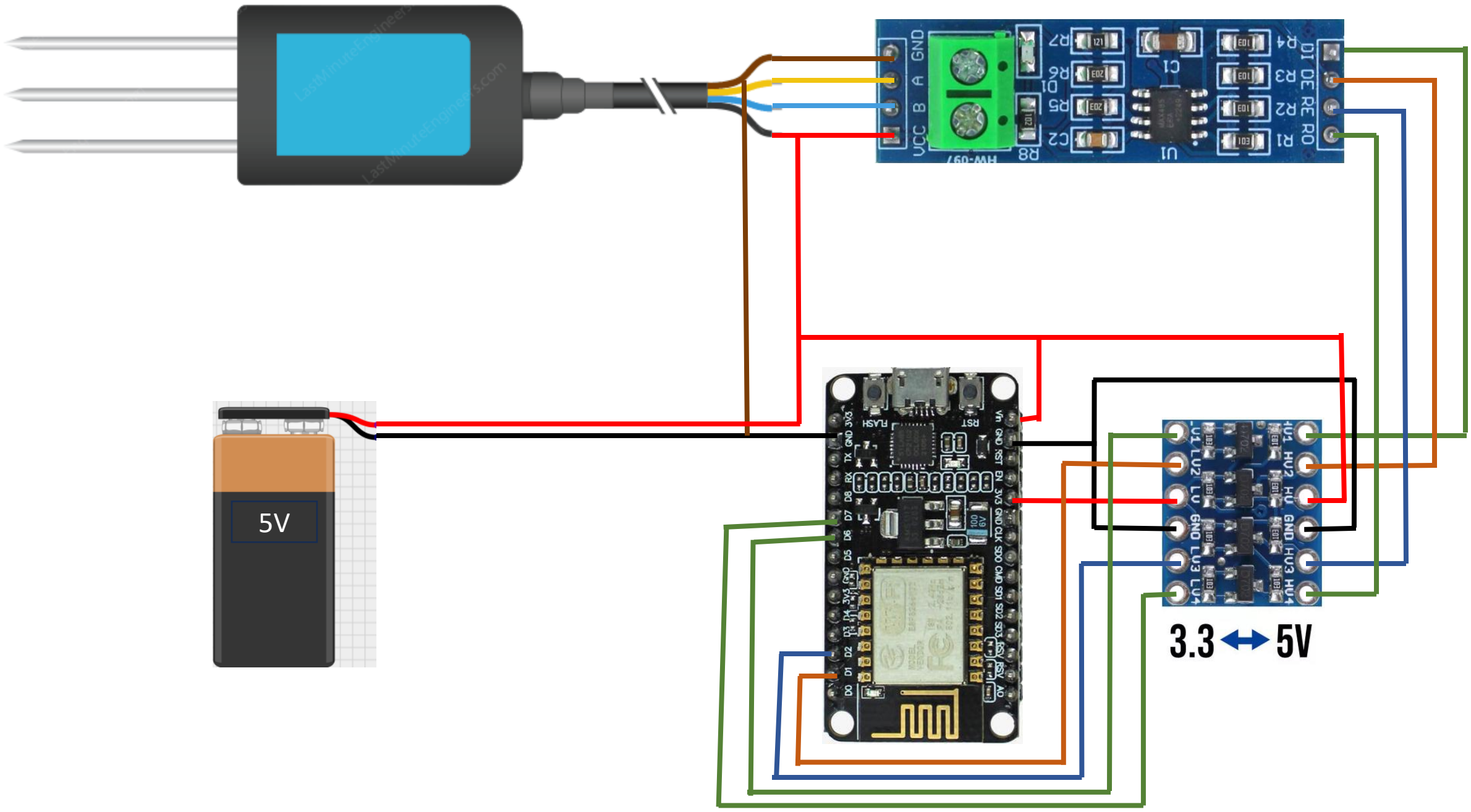
Arduino IDE

Python

Demonstration



Thank you

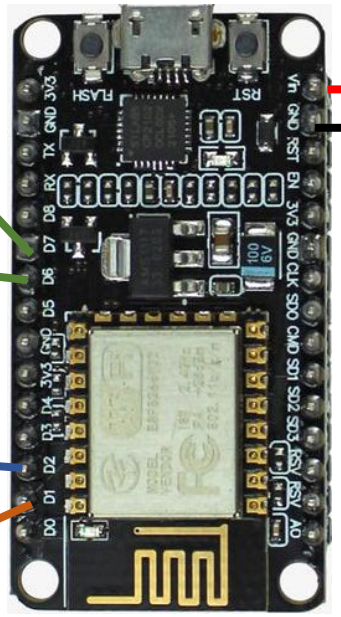

VCC B A GND
DI DE RE RO
5V
3.3 ↔ 5V

Connected to Ro of RS485 to TTL(input-receiver)

Connected to Di of RS485 to TTL(output-transmitter)

Connected to RE of RS485 to TTL(output)

Connected to DE of RS485 to TTL(output)



Power to esp

Common ground