

SMART AGRI WATER MANAGEMENT SYSTEM

A MINI PROJECT REPORT

Submitted by

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by

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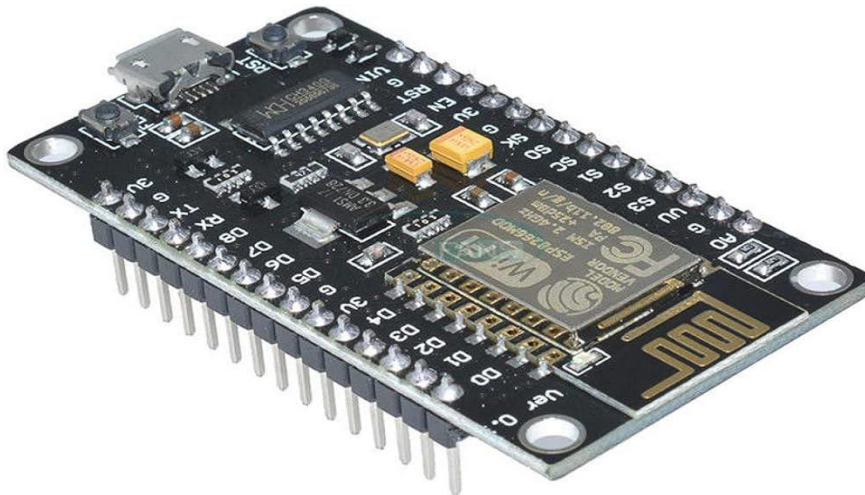
INTRODUCTION

Introducing our Smart Agriculture Water Management System: a cutting-edge solution revolutionizing farming practices. By leveraging IoT, temperature analytics, and Sensors, our system empowers farmers to optimize water usage with precision. Real-time monitoring of soil moisture, weather, and crop health enables data-driven decisions, maximizing yields while conserving resources. With remote control capabilities and tailored irrigation schedules, farmers can enhance productivity, reduce costs, and adapt to changing environmental conditions. Join us in ushering in a new era of sustainable agriculture.

COMPONENTS USED

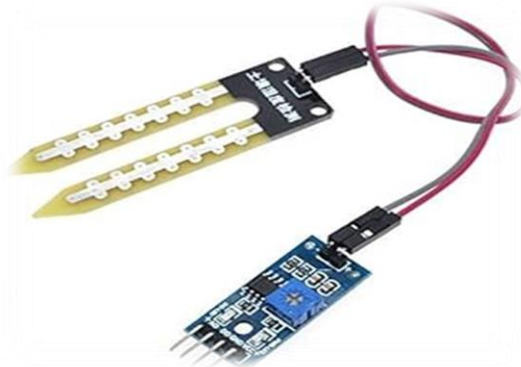
- 1.NODE MCU
- 2.SOIL MOISTURE SENSOR
- 3.RELAY
- 4.HUMIDITY AND TEMPERATURE SENSOR (DHT11 SENSOR)
- 5.JUMPER WIRES
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NODE MCU:



The Node MCU is a compact development board built around the ESP8266 microcontroller, designed for IoT applications. It offers Wi-Fi connectivity and features GPIO pins for easy interfacing with sensors and other devices. With its low cost, small size, and Lua-based programming environment, it's a popular choice for prototyping and building connected projects. Whether for home automation or industrial IoT, the Node MCU provides a versatile platform with robust capabilities and strong community support.

SOIL MOISTURE SENSOR:



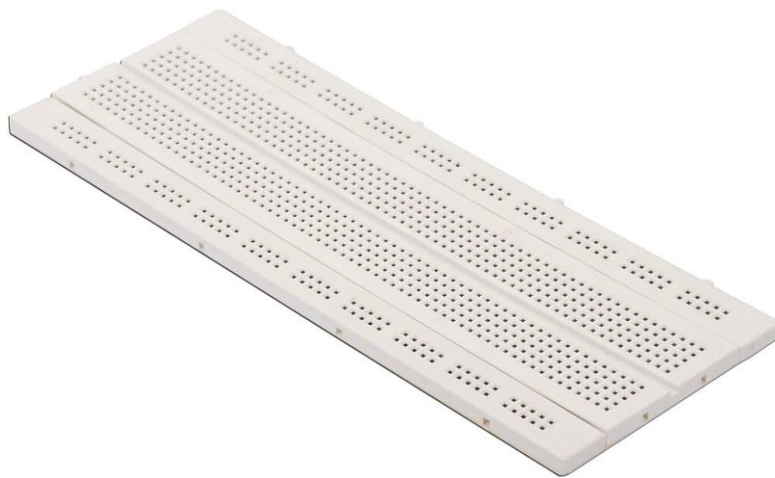
A soil moisture sensor is a vital tool used in agriculture and gardening to measure the moisture levels in soil. It typically consists of two electrodes that gauge the soil's conductivity, providing real-time data on moisture content. This information helps farmers and gardeners make informed decisions about watering schedules, preventing both overwatering and underwatering. By ensuring plants receive the optimal amount of water, moisture sensors promote healthy growth and sustainable resource management.

RELAY:



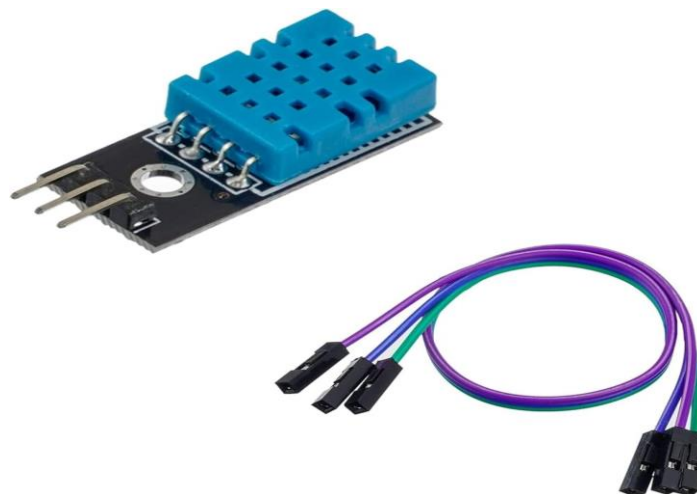
A power relay module is an electrical switch that is operated by an electromagnet. The electromagnet is activated by a separate low-power signal from a micro controller. When activated, the electromagnet pulls to either open or close an electrical circuit.

BREAD BOARD:



A **breadboard** is a widely used tool to design and test circuit. You do not need to solder wires and components to make a circuit while using a bread board. It is easier to mount components & reuse them. Since, components are not soldered you can change your circuit design at any point without any hassle. It consists of an array of conductive metal clips encased in a box made of white ABS plastic, where each clip is insulated with another clips.

HUMIDITY AND TEMPERATURE SENSOR (DHT11 SENSOR) :



Temperature and humidity sensor (or rh temp sensor) is devices that can convert temperature and humidity into electrical signals that can easily measure temperature and humidity. Temperature humidity transmitters on the market generally measure the amount of temperature and relative humidity in the air, and convert it into electrical signals or other signal forms according to certain rules and output the device to the instrument or software to meet the environmental monitoring needs of users control circuits, etc.

JUMPER WIRES:



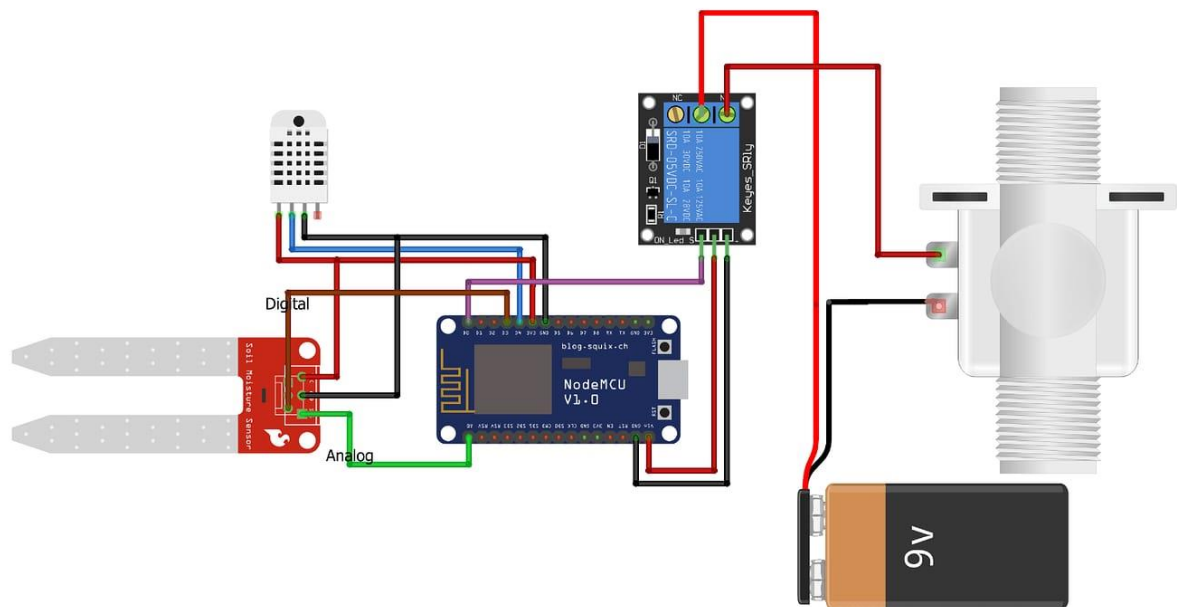
A **jump wire** (also known as **jumper**, **jumper wire**, **DuPont wire**) is an electrical wire, or group of them in a cable, with a connector or pin at each end (or sometimes without them – simply "tinned"), which is normally used to interconnect the components of a breadboard or other prototype or test circuit, internally or with other equipment or components, without soldering.

SOLENOID WATER VALVE



Water solenoid valves are control units which, when electrically energized or de-energized, either shut off or allow fluid flow. The actuator takes the form of an electromagnet. When energized, a magnetic field builds up which pulls a plunger or pivoted armature against the action of a spring.

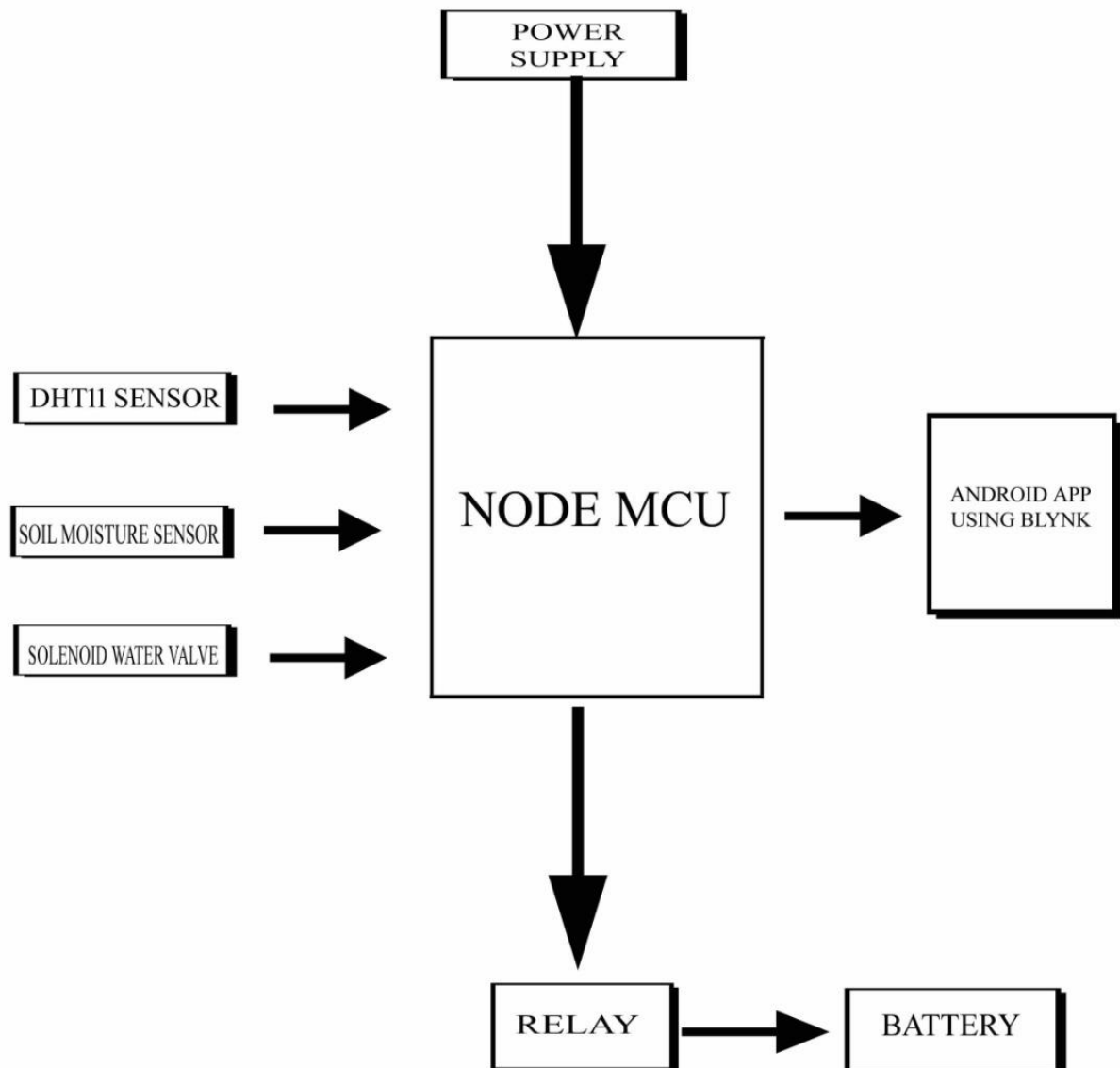
CIRCUIT IMAGE :



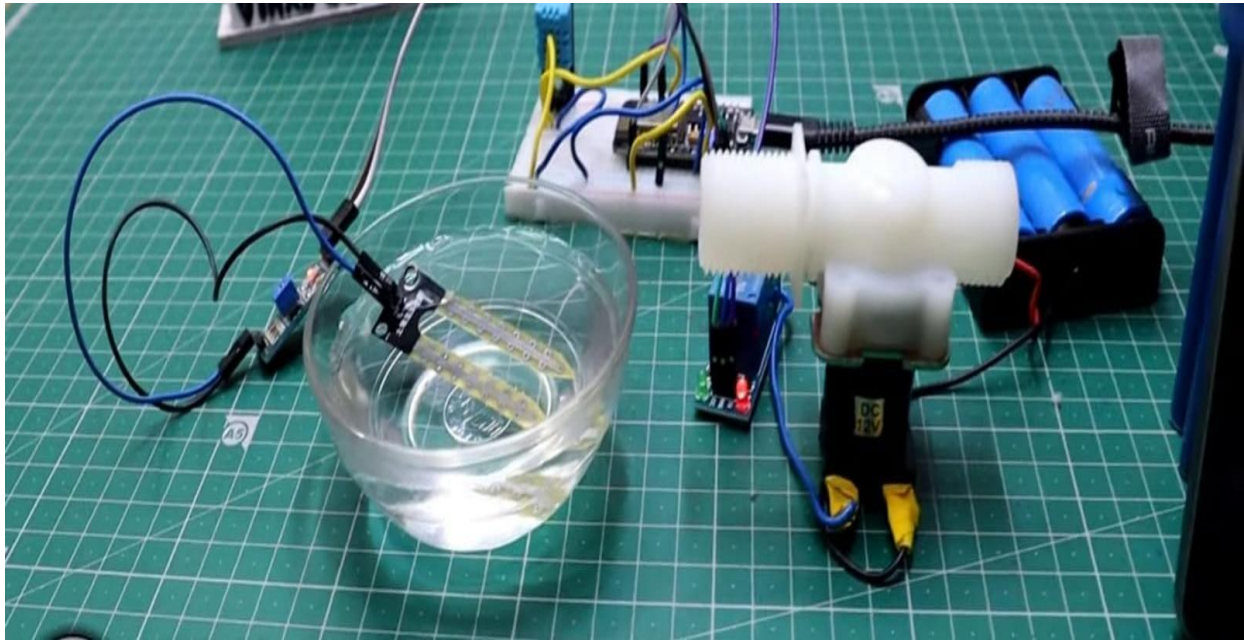
WORKING

The Smart Agriculture Water Management System, driven by a Node MCU central controller, orchestrates a network of components to monitor soil moisture, temperature, and humidity, enabling precise irrigation control. By intelligently activating the relay to regulate water flow, the system optimizes moisture levels for plant growth while conserving water resources. Its adaptable design, user-friendly interface, and scalability make it a versatile tool for farmers, fostering sustainable practices and maximizing crop yields in an era of increasing food demand and environmental challenges. This innovative system not only enhances agricultural productivity but also empowers farmers with real-time insights and decision-making capabilities. Through continuous data collection and analysis, it adapts to changing environmental conditions, ensuring efficient water usage tailored to the specific needs of crops and soil types.

BLOCK DIAGRAM:



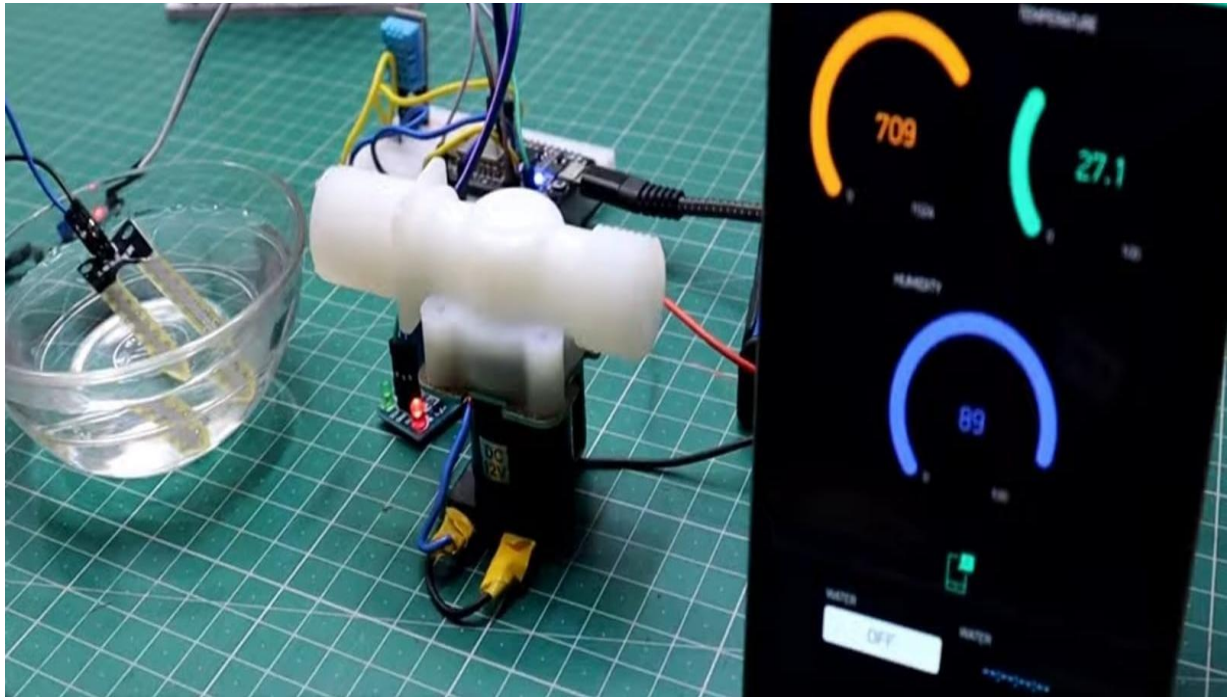
WORKING MODEL OF THE WATER MANAGEMENT SYSTEM:



CODE FOR CONTROLLING THE MODEL:

```
SmartPlantMonitoring
1 // Viral Science www.viralsciencecreativity.com www.youtube.com/c/viralscience
2 // IOT Smart Plant Monitoring System
3 #define BLYNK_PRINT Serial
4 #include <SPI.h>
5 #include <ESP8266WiFi.h>
6 #include <BlynkSimpleEsp8266.h>
7 #include <SimpleTimer.h>
8 #include <DHT.h>
9 #define BLYNK_PRINT Serial
10 #include <OneWire.h>
11 #include <DallasTemperature.h>
12 #define ONE_WIRE_BUS D2
13 OneWire oneWire(ONE_WIRE_BUS);
14 DallasTemperature sensors(&oneWire);
15
16 char auth[] = "vE0IgPwKvLb72yIP-Xwb6wHEd6k2_KKX"; //Authentication code sent by Blynk
17 char ssid[] = "Hacked"; //WiFi SSID
18 char pass[] = "0123456789"; //WiFi Password
19
20 #define sensorPin D3
21 int sensorState = 0;
22 int lastState = 0;
23 #define DHTPIN 2
```

OUTPUT:



CONCLUSION

This cutting-edge system represents a paradigm shift in agriculture, offering a holistic solution that not only maximizes productivity but also minimizes environmental impact. By leveraging advanced data analytics and automation, farmers can achieve optimal irrigation schedules tailored to the unique needs of their crops and local growing conditions. Moreover, the system's scalability and user-friendly interface make it accessible to farmers of all scales, from smallholders to large commercial operations, ensuring widespread adoption and impact. Through its emphasis on precision and efficiency, the Smart Agriculture Water Management System sets a new standard for sustainable farming practices, helping to secure food production in the face of climate change and resource scarcity while promoting long-term environmental stewardship. Furthermore, by reducing water wastage and minimizing the risk of over-irrigation, this system not only conserves a precious resource but also lowers operational costs for farmers. Its proactive approach to water management, coupled with its ability to adapt to dynamic environmental conditions, mitigates the impact of droughts and water scarcity, safeguarding agricultural livelihoods. Ultimately, the Smart Agriculture Water Management System exemplifies the transformative potential of technology in driving agricultural innovation, ushering in a new era of efficiency, sustainability, and resilience in food production.