# IOT BASED SMART IRRIGATION SYSTEM

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**Abstract -** A smart irrigation system can provide the precise amount of water needed for irrigation, which has increased water consumption. Given this need, the goal of this paper is to create a smart drip irrigation system that is Internet of Things (IoT) enabled by implementing Web and Android applications. This will prevent problems associated with constant human vigilance and water waste by offering a solution for continuous monitoring and control of the drip irrigation system. By automatically watering plants that require it, it also makes prevention easier. Additionally, it can persuade on lawns, parks, and agricultural fields, among other places. Technology advancements are constantly lowering hazards and simplifying operations. This type of issue can be resolved with the embedded system.

**Keywords:** DC motor, motor driver, WiFi module, Arduino UNO.

## I-Introduction

All of India's resources are dependent on its agricultural output because the country is primarily agricultural. Agriculture is the most important factor in determining the country's economic growth even during the modern industrialization period. Additionally, agriculture accounts for 8.56 percent of the nation's total exports.

In India, agriculture is the most important industry of all. Irrigation is the science of planning and designing an economical, low-cost, and effective irrigation system that adapts to the environment. By the development of appropriate conveyance framework and giving of satisfactory water supply will build the yield of harvests. In India, agriculture is without a doubt the most important source of income.

There is a need for more agricultural production as the population grows. To help more noteworthy creation in ranches, the prerequisite of how much new water utilized in water system additionally rises. Right now, farming records 83% of the all out water utilization in India. Water is wasted accidentally when water is used in an unplanned manner. This suggests that systems to prevent water waste without putting farmers under pressure need to be developed right away. Throughout recent years, ranchers began utilizing PCs and programming frameworks to sort out their monetary information and monitor their exchanges with outsiders and furthermore screen their yields all the more successfully. In the age of the Internet, where information plays a crucial role in people's lives, agriculture is rapidly becoming a data-intensive industry in which farmers must collect and analyze a significant amount of data from a variety of devices (e.g. machinery, sensors, etc.) in order to increase production and communication efficiency of relevant information. It is possible to create devices that can monitor the moisture content of the soil and, as a result, irrigate the landscape or fields as needed. These devices can be made with inexpensive moisture sensors and open-source Arduino boards.

## II-Hardware Components:

- □ Motor
- □ WiFi Module
- □ Moister Sensor
- □ Arduino
- □ Songel Relay

## III-Embedded Components

- * Arduino
- * WiFi Module
- * Songel Relay

## IV-Proposed System

## V- Construction

Connect the Arduino to the moisture sensor. Connect the Arduino to the Songle relay. Associate the WiFi module to the Arduino. Compose the code to peruse the dampness sensor and trigger the hand-off when the dirt is dry. Connect the Songle relay to the irrigation system. Test the framework and change the code depending on the situation. The Arduino will receive a signal from the moisture sensor when the soil is dry, which will cause the relay to be activated.

## VI-Working:

A smart irrigation system with a WiFi module, a moisture sensor, an Arduino, and a Songle relay makes it possible to control and monitor irrigation from a distance. The input device that measures the soil's moisture content is the moisture sensor. At the point when the dirt is dry, the sensor conveys a message to the Arduino. The Arduino is a microcontroller that goes about as the cerebrum of the framework. It starts the Songle relay by reading

the moisture sensor's signal.
The transfer is a result gadget that switches on the water system framework. The Songle hand-off is utilized to
control high voltage and high current gadgets like engines and siphons. When the soil is dry, the relay is used in this system to turn on the irrigation system. It sends a signal to the Arduino, which connects it to the relay. The hand-off then shuts a change to permit momentum to stream to the water system framework, which turns on the water stream.
The irrigation system is connected to the internet via the WiFi module, enabling remote control and monitoring. With the WiFi module, you can associate the framework to your telephone or
PC and get continuous information on the dampness levels in the dirt. The irrigation system can also be controlled remotely, allowing you to turn it on and off as needed. Overall, this smart irrigation system makes it possible to use less water by only watering plants when they need it, which saves water and lowers bills. Additionally, the system makes it simple to manage your farm or garden from anywhere in the world thanks to its remote monitoring and control capabilities.

VII-Machine assemblage

To assemble the smart irrigation system with a WiFi module, moisture sensor, Arduino, and Songle relay, you will need the following equipment:

- Arduino board
- Moisture sensor
- Songle relay
- WiFi module
- Water pump
- 12V power supply
- Jumper wires
- Breadboard

Here are the steps to assemble the system:

Associate the dampness sensor to the Arduino board. Connect the sensor's VCC and GND pins to the Arduino board's 5V and GND pins, respectively. Connect the sensor's A0 pin to the Arduino board's A0 pin.

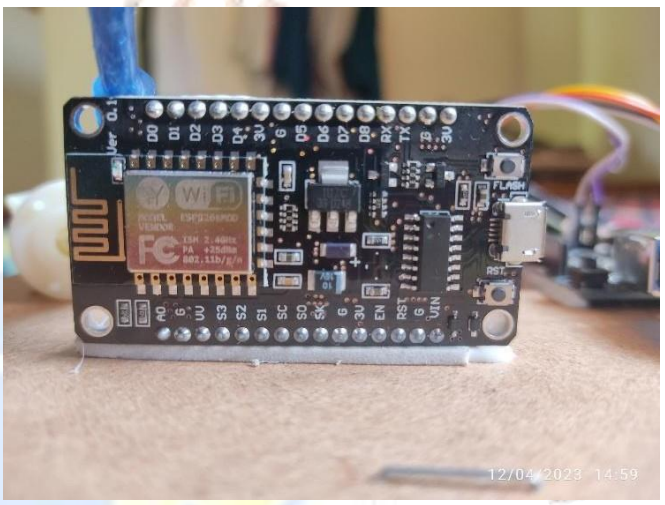
Connect the Arduino board to the Songle relay. Interface the VCC and GND pins of the transfer to the 5V and GND pins of the Arduino board, separately. Associate the IN pin of the hand-off to stick 12 of the Arduino board.

Interface the WiFi module to the Arduino board. Connect the module's VCC and GND pins to the Arduino board's 5V and GND pins, respectively. Connect the module's TX and RX pins, respectively, to the Arduino board's RX and TX pins.

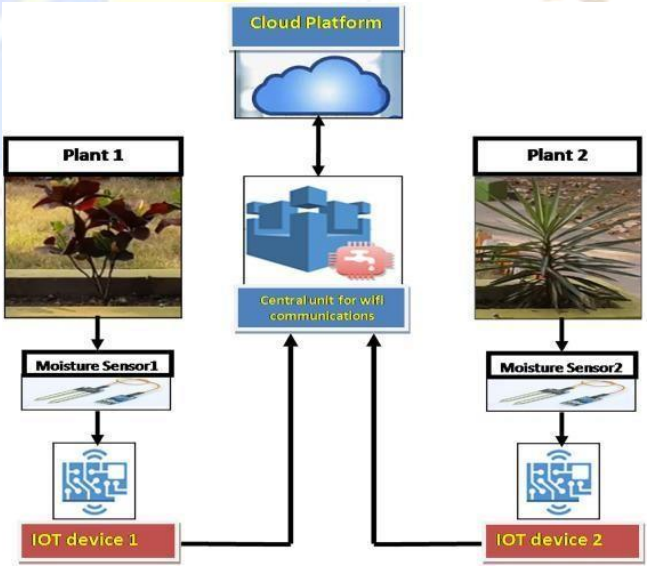
Connect the Songle relay to the water pump. The pump's positive and negative wires should be connected, respectively, to the relay's NO (Normally Open) and COM (Common) pins. Interface the power supply to the Songle hand-off. Connect the power supply's positive and negative wires to the relay's NO and COM pins, respectively. Attach the soil to the moisture sensor. The sensor should be buried in the soil close to the roots of the plants you want to water.

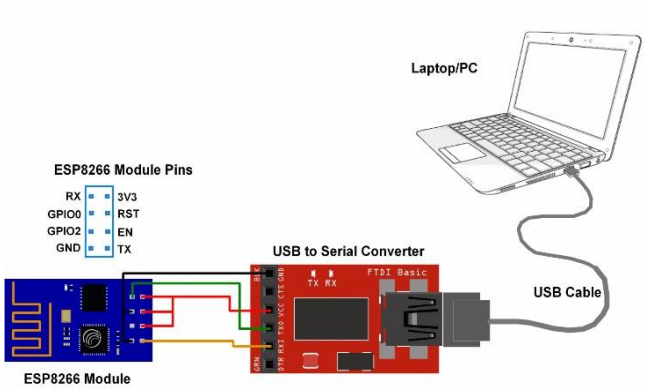
The code should be uploaded to the Arduino board. Create a program that, when the moisture level drops below a predetermined threshold, activates the relay by reading the values recorded by the moisture sensor. Additionally, you can add code to link the WiFi module to the internet and send data to a cloud-based server for remote control and monitoring. Examine the system. Monitor the system by turning on the power supply. The water pump should be turned on by the relay when the moisture level drops below the threshold, and water should begin to flow to the plants.

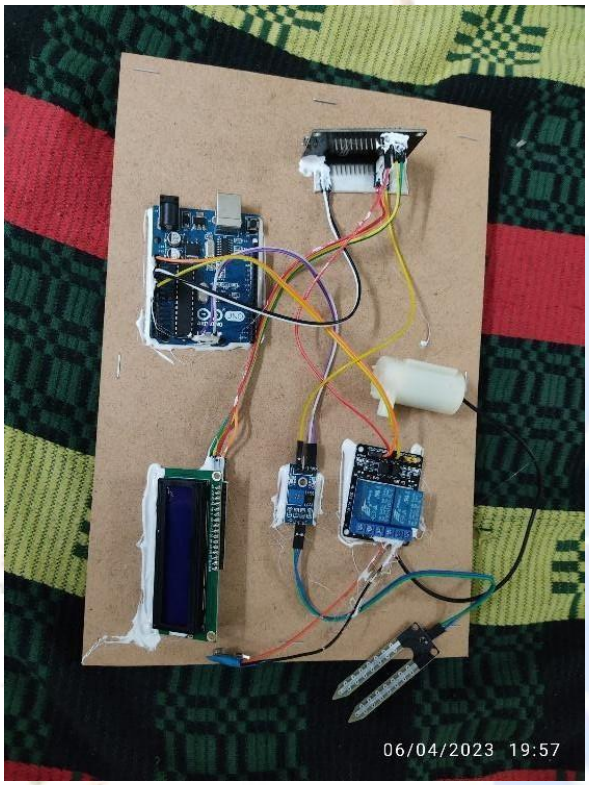
With these means, you can collect a shrewd water system framework that utilizes a dampness sensor, Arduino board, Songle transfer, and WiFi module to mechanize the course of water.



VIII-Experimental Setup






IX-Advantages

- Water conservation: The device keeps track of the soil's moisture content and only watered plants when they need it. This reduces waste and promotes water conservation.
- Improved plant development and health is made possible by the system by giving plants the appropriate amount of water at the appropriate time..
- Time-saving: The technology automates the watering process, saving the time and labour that would have been required to water plants by hand.
- Remote system monitoring and control are possible thanks to the WiFi module from any location with an internet connection. This means that even while you're away from home, you can monitor your plants and manage the watering system.
- Scalability: Depending on the size of the farm or garden, the system can be simply scaled up or down. To cover a bigger region, more moisture sensors and relays may be added.
- The Arduino board may be customized to meet certain plant watering requirements. This implies that the system may be modified to hydrate various plant species with various watering needs.

X Conclusion

In conclusion, a WiFi module, moisture sensor, Arduino, and Songle relay smart irrigation system is a very useful and effective method for automating the watering of plants. When plants need watering, the system employs a moisture sensor to determine the demand and activates a water pump by setting off a Songle relay. WiFi connection and Arduino programming enable the system to be customized and scaled up while also enabling remote monitoring and control. The intelligent irrigation system offers an efficient method for watering plants while also assisting in water conservation and plant health improvement. This concept offers a dependable and affordable method for irrigating plants in a way that is effective, sustainable, and adaptable.

XI- FUTURE SCOPE

Integration with other smart home systems: To develop a full home automation solution, the smart irrigation system may be combined with other smart home systems like smart lighting and temperature control systems.

Artificial intelligence: By anticipating when plants will require watering and modifying the irrigation schedule appropriately, artificial intelligence (AI) can assist to increase the system's accuracy and efficiency.

Integration with weather forecasts: The watering schedule can be modified by the system in response to anticipated variations in temperature or rainfall.

Use of solar power: The use of solar power can make the system more sustainable and reduce energy costs.

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