

# Smart Automated Irrigation System

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**Abstract-** *Internet of Things (IoT) is known for its worldwide network of “smart devices” that can sense and interact with their environment by means of the internet which acts as the communication and interaction with users and other parts of the system. Farming plays a financial function within the growth of a country. Problems about farming were constantly lagging the growth and improvement of the country. The lone answer to this difficulty is modern system agriculture and technology for sustainable use of water by updating the present old-style methods of farming. Hereafter the deliberate technique targets IoT enabled remotely actual-time approaches of tracking and controlling the irrigation systems. All 80% to have water resources across the world is used as irrigation purposes. As for the upcoming years the demand increases due to the increasing population. To meet this call, we must undertake new strategies to preserve the need for water for the irrigation process. The proposed system is developed such that the data sent from the sensors and predict the amount of water needed and that much is transferred. The water waft controller, ph sensor, water level monitoring sensor and temperature and soil moisture sensors are used to get records in your telephone.*

**Keywords-** Mobile controlled irrigation, Smart Irrigation system, Raspberry Pi, Sensor controlled, IoT.

## I. INTRODUCTION

INDIA'S major source of income is from the agriculture sector and 70% of farmers and general people depend on agriculture. In India most of the irrigation systems are operated manually. Irrigation requirement depends on soil properties like moisture and temperature and the type of crop which is grown in the soil. Technologies have been developed for efficient use of water for irrigation purpose [1]. In India agricultural area receives power supply usually in non-peak hours; also, frequent power cuts and low voltage supply will create a big problem for farmers. The off-peak hours are usually night hours after 11 pm. If the farmer does not attend the irrigation, there is the chance of wastage of water and labor. Also, excess watering ends in the degradation of soil. On the way to control and display the irrigation procedure, smart and automatic irrigation gadget is Developed, carried out and tested. There may be a want for an automated irrigation system as it is straightforward and easy to install.

This system uses values on and off to govern water motor. Python programming language is been used for automation purpose.

There may be a need for automated irrigation machine as it is simple and smooth to put in. This machine uses values on and off to manipulate water motor. Python programming language is been used for automation reasons.

The relaxation of the paper is prepared as follows: Section II illustrates a literature survey. Section III represents with the proposed System. The requirements for setup is supplied in Section IV. Implementation is discussed in Section V. accompanied by Conclusion in Section VI.

## II. LITERATURE SURVEY

This The gadget developed on smart automated irrigation device on the wi-fi sensor network for the green use of farmers. In this machine we're continuously monitoring the abilities like temperature, humidity and soil moisture. In this algorithm used to maintain the threshold values of the soil moisture. As the system will stop the irrigation depending upon the moisture in the soil.

This system proposes low cost moisture sensor-based data acquisition system required for automated irrigation system. The authors have developed an impedance-based moisture sensor. Sensors works on the change of impedance between two electrodes kept in soil [2].

This paper represents irrigation management system using WSN and water pumps. Water level sensor is connected to main irrigation canals, and flow sensor is connected to water pump. These sensors are connected to wireless gateway which sends data periodically to web server. Database connected to web server monitors irrigation water level at all main. The web based IMS analyze the data stored in database and compares with specified values. Then it (IMS) sends SMS to farmers and engineers to make aware of water requirement [3].

The system supports water management decision, used for monitoring the whole system using GSM module. The system continuously monitors the water level in the tank

and provide accurate amount of water required for plant or crop. The system checks the temperature and humidity of soil to retain the nutrient composition of the soil managed for growth of plant [4].

This system is smart irrigation techniques using internet of things (IOT). In this system sensors are placed in the agriculture field, measures the soil moisture value, water level in the tank and well-water through mobile data communication network. The web servers use intelligent software to analyze the data and act according to the result obtained to perform desired action [5].

### III. PROPOSED SYSTEM

The proposed computerized irrigation and monitoring device consists of the raspberry pi, water pump, and moisture and temperature sensors. smart phones module is used for communicate. In the proposed work, crops or plants are considered along with their water requirement at different stages. The crops or plants are irrigated concerning the water requirements at different stages of their growth.

Fig 1 shows the architectural design of the model. The smartphone is hooked up to raspberry pi through Bluetooth. The motor is managed by using the smartphone through the values ON and OFF.

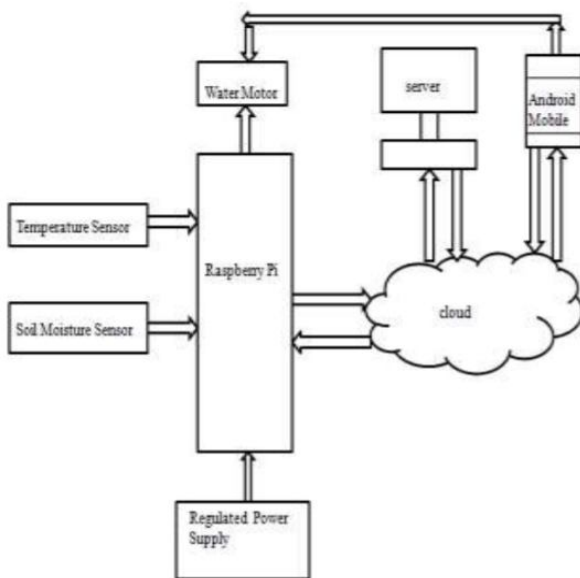


Fig. 1. Proposed System Design

### IV. REQUIREMENTS

#### 1. 16x2 Liquid Crystal Display –

Will be used to visualize the data locally it will help to operate the device standalone



Fig2. Liquid Crystal Display

#### 2. Raspberry-Pi

The sensor technology to automate irrigation improves water usage efficiency. The raspberry pi is a small single board computer which is been used to teach computer science. The raspberry pi is been used as a computer where external memory can be used and it has four ports where any input devices can be connected. This project uses raspberry pi for easy process and installation.



Fig 3. Raspberry pi

#### 3. Soil Moisture Sensor

The sensor is used for converting the physical paraments into an electrical signal. In Fig 4. It shows the soil moisture sensor. It has copper electrodes which are used to sense the content of moisture in the soil. As the output of the signal is the analog signal; the signal is first converted to its digital signal then fed to the processor.

#### 4. Term Panel

The term panel is an android application used to write programs, codes and send these codes to the main controller using a local communication medium namely BLUETOOTH. A Bluetooth module is used to establish such a communication. Common commands like set passwords, set username etc. can be used to change configuration if the Bluetooth module used. The RFCOMM/SPP protocol emulates serial communication over Bluetooth.

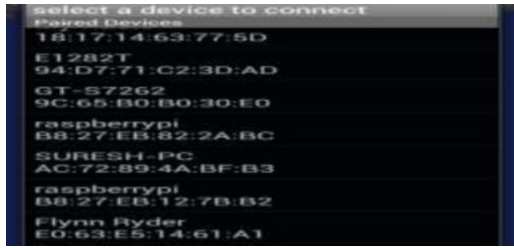


Fig 4. Android Application Screen

**V. IMPLEMENTATION**

The device consists of various sensors along with soil moisture sensor to a degree water content of soil, temperature sensor to hit upon the temperature. Dc motor-based automobile is designed for irrigation motive. The soil moisture electrode is inserted in the soil. It will check the value of that sensor and read the temp value sensor. The setpoint for soil moisture sensor & temperature sensor is 1000 & 35 respectively. If the soil moisture value is less than 1000, an alert message is sent "MOTOR ON" to the mobile then water will be supplied until the plants reach the moisture level. If the soil moisture value is less than 250, an alert message is sent "MOTOR OFF" to the mobile then the water supply will be stopped. The Raspberry Pi will send all the Information to the 2165 server using Wi-Fi. We are using an android app called "blue term" which will be connected to the raspberry pi through Bluetooth to control the water motor using voice or text.

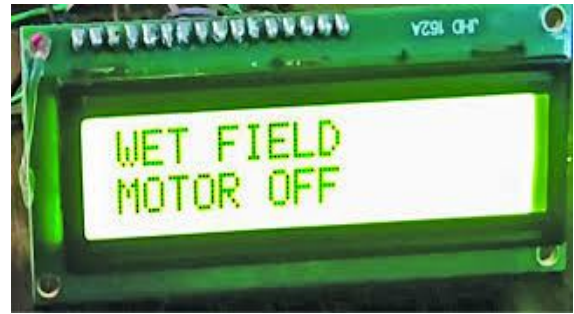


Fig 6. Indicator

The set up of the automated irrigation system is finished. It's miles found that the system works properly and the water is handed to the vegetation as and when required. If the soil is dry, an alert message is sent "MOTOR ON" to the mobile and through voice or text water pump starts which leads to water to flow. If the soil is wet, an alert message is sent "MOTOR ON" to the mobile and through voice or text water pump is turned off and the water flow stop.

We have used an android application i.e. Blue term. These applications work totally on Bluetooth. To interface the android application and the master robot we require a Bluetooth module. The software program term panel is used for coding and writing programming instructions and this programming records is despatched through bluetooth to the paired bluetooth module. This application acts like an emulator which then is given as the input to the microcontroller Raspberry pi. This set of codes is then given to the input of the motor driver which is responsible for the movement of the motor. As a result of which the Motor will start and water will be supplied to plants. The same codes are simultaneously sent to the output pin of the microcontroller.

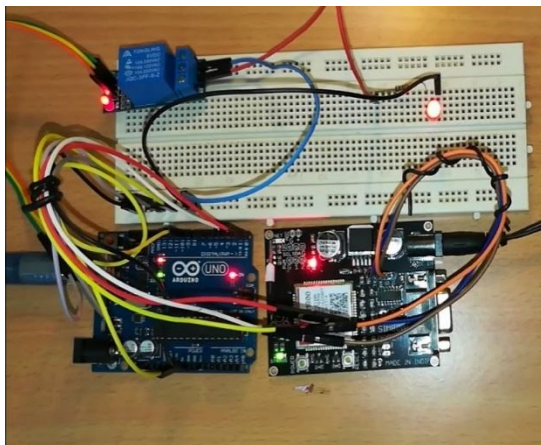


Fig5. Connections



Fig 7 Setup

## VI. CONCLUSION

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On the completion of the work, we successfully increase a device that could assist in a smart automatic irrigation machine by using studying the moisture stage of the ground. The clever irrigation system proves to be a Beneficial machine as it automates and regulates the watering Without any manual intervention. The number one application for This venture are for farmers and gardeners who do now not have enough time to water vegetation/flowers.

The farmers are going through Principal troubles in watering their agriculture fields. It's miles Because they have no right concept about while the contemporary Available which will pump water. The moisture sensors and temperature sensors measure the Moisture level (water content material) and temperature of the flowers. If The moisture degree is located to be under the favored degree, the Moisture sensor sends the signal to the raspberry pi and sends an alert message which indicators the water pump to show on and Deliver the water to the respective plant. Also, without journeying will Get the popularity of the motor and temperature on cellular. The gadget features a custom sensor layout for power Performance, cost-effectiveness, cheap components, as well as Scalability quit ease of use. In destiny some responsibilities Have to be achieved and could develop the system to a greater Mature country. The device may be also prolonged for outdoor Utilization.

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