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IOT Based Smart Agriculture Monitoring System

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ABSTRACT

India is an agricultural country. Water is the most important resource of agriculture. currently farming accounts for 83% of India's total water consumption. Using various smart farming tools, farmers are actively involved in livestock and crop cultivation. this page presents a concept based on the IoT smart farming system. Advanced technology is used on this home page Smart agriculture through IoT and automation. In this way, the water available for plants is monitored. With sensors, water is provided through irrigation if needed. This project is about how irrigation can be done. For efficient use with IoT. In this proposed method, we use different hardware such as ground sensors, temperature and humidity, direction, rainwater sensors sensitive to different soil conditions and measures the actual size of the sole. The main purpose of this project is to manage water supply. And installation monitoring via smartphone. This page is about irrigation systems. related to Our project help explains how irrigation can be implemented using IoT.

Keywords : Internet of Things (IOT), Irrigation, Soil Sensor, Temperature and Humidity Sensor, Rainwater Sensor.

I. INTRODUCTION

Irrigation has an important place in agriculture. Water efficiency doesn't just mean using less water will provide water according to demand. IoT systems have also gained momentum recently farm. IoT is an important part of connecting large systems such as software and metal, cost- effective, sustainable and smart agricultural technology. automatic watering System is necessary because it is a simple and easy way to control the system. It can also prevent human errors. The proposed system will help farmers continuously monitor and control the moisture level in the field. System using the Blynk application on the web. The sensor becomes sensitive when the humidity drops below a certain level There is information in the application. There are four sensors used: soil moisture sensor, DHT11 sensor for temperature and humidity, PIR sensor for motion, and Relay for on/off the water motor. The key part in this project is ESP8266 Nodemcu Microcontroller. And We can track waste with the help of the Internet of Things (IoT) and sensor technology.

The purpose of this wisdom Crop management system provides crop updates and alerts the farmer in advance of any damage. Places on the farm.

II. LITERATURE REVIEW

Researchers have used different theories depending on the situation. The system is automatically developed Irrigation or smart agriculture based on sensor network. System continues monitoring measurements of temperature, humidity and soil moisture. Agriculture is not just based on agriculture in addition to resource management, plant health also plays an important role in this. The system offers real- time monitoring helps the farmer monitor the crop in the field 24/7 using sensors is used in the system and takes immediate action depending on the environment. Similar to this page series different parameters such as water quality, soil moisture, temperature, humidity and the best way to do it to maintain the agricultural system. This work provides a good technique to develop the mind by connecting minds. Detection methods and irrigation through wireless communication technology or IOT technology. This is a low price also provides information about soil moisture, humidity and temperature etc. It also works well with receiving technology. From various parts of the fields and if necessary. The research also gives ideas on how to do this automatic irrigation systems were designed for efficient use of water in agriculture.

III.PROPOSED SYSTEM

A system is a combination of hardware and software. A piece of metal is included in System. The hardware and software tools and software are Blynk software which is also used to run it. The algorithm and programming in Atmega328p are important in our IoT project. In this project, sensors i.e soil moisture sensor, DHT11 sensor, PIR sensor, Relay connected with nodemcu8266. this system helps improve crop growth and hence demand for the future. this project A microcontroller IC Atmega328p is connected to all sensors shown in the book. Same as nodemcu8266 and LCD is also connected. Used as soil moisture, soil moisture sensor and detection method data on mobile using the application used on Nodemcu8266 using Blynk application. Motorized iron is also used for anything set up in a visible location, call, then find the nearest people and what's going on and send news or free mobile screen saver downloads. Temperature and humidity are measured by DHT11 temperature controller with 8 output micro controller that outputs temperature and humidity values as serial data. The sensor can measure temperatures from 0°C to 50°C and humidity from 20% to 90%. rain machine was also used in water-saving equipment that was connected to automatic irrigation systems when it rained in the area., then the sensor is blocked or stops.

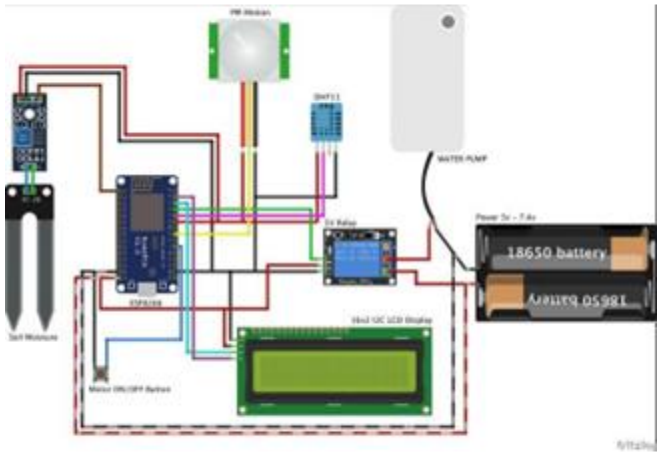

Fig. 1. Proposed System.

A. Nodemcu8266p: The ESP32 family of low-cost, low-power systems on chip microcontrollers may have dual-mode Bluetooth and integrated Wi-Fi. The ESP32 series incorporates built-in antenna switches, RF balun, power amplifier, low-noise receive amplifier, filters, and power management modules. It uses either an Extensa LX6 microprocessor—available in both dual-core and single-core variations—or an Extensa LX7 microprocessor. Chinese startup Express if Systems created and developed ESP32, which is produced by TSMC utilizing their 40 nm technology. It is the ESP8266 microcontroller's replacement.

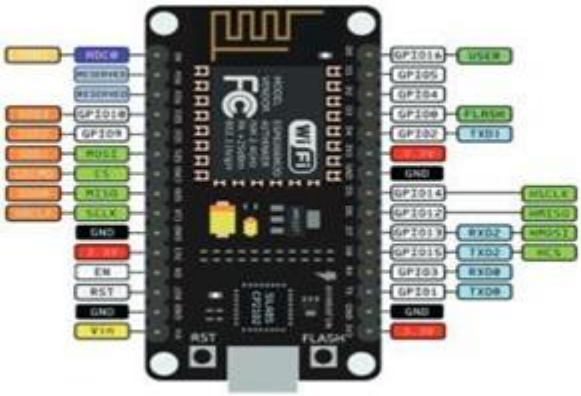

Fig. 2 Nodemcu8266

B. Temperature and Humidity Sensor DHT11: A simple, incredibly affordable digital temperature and humidity sensor is the DHT11. It measures the ambient air using a capacitive humidity sensor and a resistor, then outputs a digital signal on the data pin (no analogue input pins are required).

Fig. 3 Temperature and Humidity Sensor DHT11.

C. Soil Moisture Sensor: A resistive soil moisture sensor measures the soil's moisture content by utilizing the relationship between impedance and water content. Poorer electrical conductivity is a result of reduced soil water content. Better resistance readings are thus acquired, indicating low soil moisture.

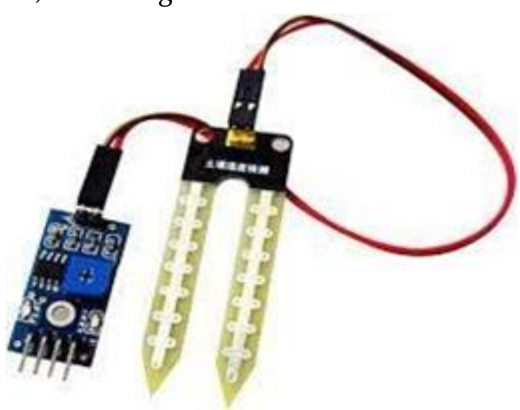

Fig. 4. Soil Moisture Sensor.

D. PIR Motion Sensor: Two slots, one for each type of special IR-sensitive material, are present in the passive infrared (PIR) sensor itself. The two slots can "see" out over a certain distance because the lens being used here isn't really accomplishing anything. This distance is essentially the sensor's sensitivity. Both slots detect the same quantity of infrared radiation (IR) from the walls, the room, and the outside environment when the sensor is in the idle state. A positive differential change occurs between the two halves of the PIR sensor when a warm body, such as a human or animal, first intercepts one side of the sensor. The opposite occurs when the heated body exits the sensing region, in which case the sensor produces a negative difference.

Fig. 5 PIR Motion Sensor

E. Relay Module: An electromagnet powers an electrical switch used in a power relay module. A separate low- power signal from a micro controller activates the magnets. The electromagnet pulls to open or close an electrical circuit when it is turned on.

Fig. 6 Relay Module

F. 16*2 LCD Display: A particular kind of liquid crystal display (LCD) called LCD 16x2 has a maximum character count of 16 per line and 2 lines. These screens are frequently utilized in many different applications, like electronic projects where text or data needs to be displayed. An integrated controller that can comprehend and carry out a number of orders powers the LCD. The display can be cleared, the cursor location may be adjusted, and the display's on/off state can be managed with these commands. A common component in electronic projects, such as those displaying text or data, is the LCD 16x2.

Fig. 7. 16*2 LCD Display

G. Solenoid Pump: Control devices known as solenoid valves can either shut off or permit fluid flow depending on whether they are electrically energized or de-energized. An electromagnet functions as the solenoid valve's actuator. An energized magnetic field develops and pulls an armature or plunger against the force of a spring.

Fig. 8. Solenoid Pump.

IV.DESIGN AND DEVELOPMENT

Figure (1) shows the circuit diagram of a smart farming system. In this diagram recording devices are connected port Wi-Fi module 8266p. In this project, sensors receive data and outputs that enable the Blynk mobile application. The system used is shown step by step in Figure (9). There are basic designs Figure of the IoT-based smart farming system shown in Figure (9).

Fig. 9. Development Kit.

V. RESULT AND DISCUSSION

Values obtained through sensors cause the system to turn off the water pump. A farmer can do this works via the Blynk app on a mobile screen or to control irrigation systems in the field. This was successful Hot and humid irons, rainwater, reflective irons to transmit data using IoT on the LCD output screen and mobile screen. The microcontroller is programmed and associated with the data obtained from the device used to control the current value. These are the job of sensor the operation is done using the Wi-Fi ESP8266 module. The system is used to monitor and control the water pump using software.

Fig. 10. Result on Desktop View

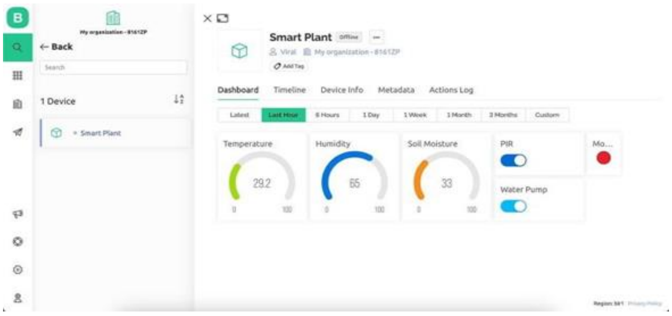

Fig. 11. Result on Mobile View.

VI.FUTURE SCOPE

Irrigation systems are one of the best ways to achieve high efficiency in a short time. Irrigation is the process of providing the desired water to agricultural lands. support system offers excellent performance and lower consumption. Like helping the farmer start a businesses automatic and smart. this system increases crop production, Machine Learning algorithms further improvements may be made in the future. Predictions or area estimates can be made by examining soil data, providing a detailed agricultural description of the crops that can be grown, and Air.

VII. ADVANTAGES AND APPLICATION

This method can provide clean water and prevent water loss. System automatic and requires minimal effort from the user. We can also use some sensors in this system. Stainless Steel Fittings and Autosalon. A system that automatically irrigates (pumps) the field. Users can: manual opening and closing. The main software of the smart farming system is used for monitoring purposes and water control applications. The system also ensures better crop yields every time improves the economy.

VIII. CONCLUSION

This smart irrigation system is guaranteed to bring positive development in the field of public irrigation of these are IoT and application systems. Therefore, this system is the solution to solve the problems encountered. irrigation systems. It is cheaper to develop irrigation systems or artificial farming water resources for agricultural production. The main purpose of this project is to reduce water pollution. Monitor installations using a phone or mobile device. The system has proven to be a useful system because it works without touching and regulates or changes the water. A new improvement way to improve crop quality and maintenance could save a farmer's life.

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