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AGRICULTURE ENVIRONMENT MONITORING SYSTEM USING ANDROID

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Abstract – *Agriculture is the basic source of living in India, But due to a lack of information and experience, farmers sometimes Face problems So, we decide to work on this diverse topic and come up with a project agriculture Environment Monitoring system using the Android' in which the temperature and moisture will be evaluated and analyzed. Climate changes had a significant impact on agriculture products .therefore a number of new technologies are being created to conduct smart agriculture in order to increase the quality and quantity of agricultural goods. The project includes a Soil moisture sensor, Humidity sensor is used to measure soil parameters. A water motor will be present which will be automatically turned on if less water content is found in the soil. This Project can start out to be revolutionary in the Indian agriculture field. The suggested method aids in the process of remote monitoring and water conservation. A GUI was elaborate for the android device to get all the parameters of the agriculture environment and we can see the parameter at present time.*

Key Words*: *Smart Agriculture, humidity sensor, ultrasonic sensor, temperature sensor, android device, Arduino,node-MSU, relay switch, soil moisture sensor.

1. INTRODUCTION

Today, growing crops can be a daunting task for farmers due to the unpredictable climate and high seed costs. Due to sudden climate change, the damage rate is high and the loss rate is high. There fore to avoid this scenario, we need to use effective design techniques. The solution to this problem is to follow precision agriculture practice. precision agriculture follows a defined set of rules. they collect data from agriculture and send it to our android device. Protection of cultivated plants is very important. Therefore, we need to monitor the data and this data must be real-time. Farming is made simple, cost-effective, and labor efficient through the use of smart farming, which also increases crop yields and boosts output. The use of numerous technologies and gadgets, including the internet and IoT device, is referred to as smart farming. In order to feed these many people, We need to increase our production. Precision is another name for smart farming. In this project, we are proposing a two-layer model (two soil moisture sensors will be used-first one in the upper part of the field and a second one in the bottom layer near the roots of the plantation. This two-layer system can save a lot of water in the areas where the water level of the soil is below the required level. We can save a huge amount of water. On the grass root level, we are basically monitoring the different parameters of the agricultural environment and also proposing automatic water supply to the fields when the soil moisture will become lower than the required quantity.

2. Literature survey

[1]. This study comprises an external solar panel and a smart farming concept(uninterrupted power supply). All sensor data is handled initially at a control unit center using an Arduino microcontroller.it uses the Thinkspeak cloud server. For manual soil parameter control and remote monitoring, a mobile application is being developed

[2] They proposed a method in this study that provides an intelligent monitoring system supported by the Android platform, giving the ability to immediately access monitored metrics on mobile devices from any location on Earth.. There are countless opportunities to expand the monitoring system because mobile phones and the application supportability provided by the Android operating system allow mobility over 2G and 3G networks.

[3] This study demonstrates how a low-cost smart agricultural model can be created utilizing basic sensors like soil moisture, humidity, temperature, and LDR sensors to detect light. The data is then collected into a database and made available to the user using an Android application

[4] Internet of Things-Based Smart Monitoring of Agriculture Field and Water Pump Control The evolution of sophisticated agricultural monitoring is shown in this work. An android device is used to monitor the entire system and all of its sensors while operating the pump motor.

[5] This paper discusses IoT implementation. There are a number of sensors used in it such as soil moisture sensor ph sensor, motion detector sensor, and water volume sensor. here two different sensors are used in this paper (ph sensor and motion detector sensor) here motion detector sensor is used to detect unusual movement that's happening around the field and send it to the server after that the device creates noise and the animal run away after hearing the noise.

3. SYSTEM DESIGN

A. Node MCU (ESP8266EX)

NodeMCU is an open source platform based on the ESP8266 that enables Wi-Fi connectivity and data transmission. Additionally, it can fulfil many of the project's requirements on its own by providing some of the most important microcontroller features, like GPIO, PWM, ADC, and others..

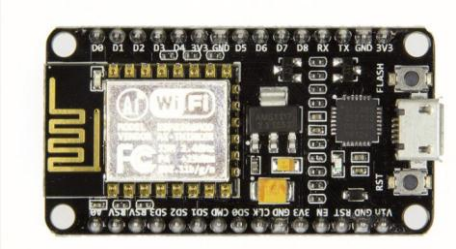


Fig-1:- Node MCU

B. ARDUINO UNO

A low-cost, versatile, and easy-to-use microcontroller that may be utilised in a variety of electronic applications is the open-source, programmable Arduino UNO board. This board can communicate with other Arduino boards, Arduino shields, and Raspberry Pi boards as well as control relays, LEDs, servos, and motors as output devices.

Fig- 2:- Arduino UNO

C. SENSORS

i. SOIL MOISTURE SENSOR

A soil moisture sensor is a device that monitors the current moisture content of the soil. The irrigation system's sensor helps schedule water supply and distribution considerably more effectively. These gauges aid in reducing or increasing irrigation for optimal plant growth.

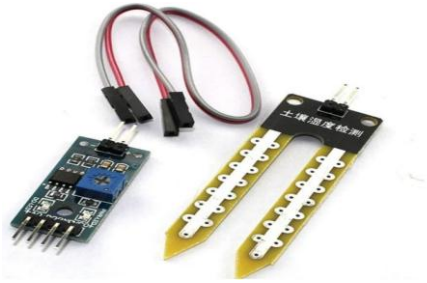


Fig 3:- Soil moisture sensor

ii. ULTRASONIC SENSOR

An ultrasonic sensor is a piece of technology that detects the distance between two objects using ultrasonic sound waves and then transforms the sound's reflection into an electrical signal. Ultrasonic waves move more quickly than audible sound does.

Fig 4:- Ultrasonic sensor

iii. FLAME SENSOR

A flame sensor is a specific kind of detector made for the purpose of spotting fires and responding to the appearance of flames. The installation of the flame detection system may affect how it responds. includes fire extinguisher system, propane gas, natural gas pipeline, and alarm system.

Fig 5:- Flame sensor

iv. TEMPERATURE AND HUMIDITY SENSOR

A fairly straightforward and inexpensive digital temperature and humidity sensor is the DHT11. It measures the surrounding air and outputs a digital signal to the data pins using a thermistor and a capacitive humidity sensor.

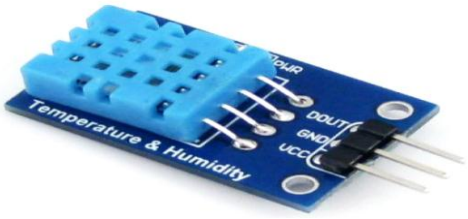


Fig 6:-DHT11 SENSOR

D. RELAY MODULE

Switches can be thought of as relays. It is customary to manually open and close circuits using switches. A switch that connects or disconnects two circuits is also known as a relay.

Fig:- 7 Relay module

E. MOTOR

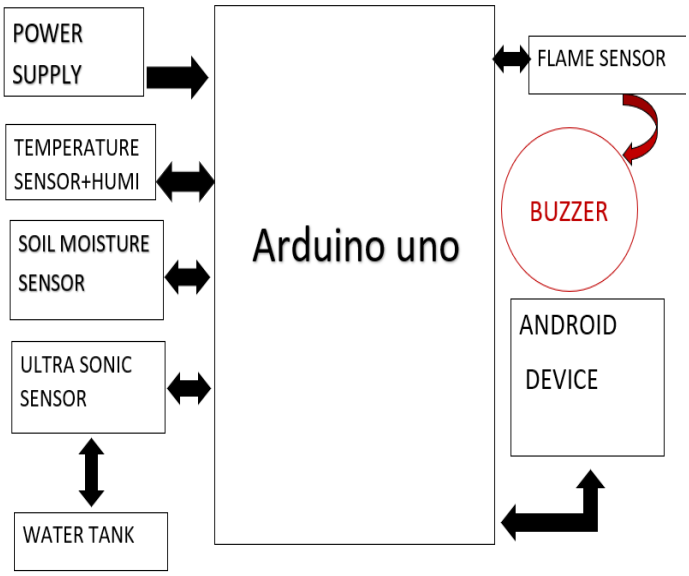
This is a DC water pump, which will be used for pumping the water from the container.

Fig:- 8 DC motor

F. ANDROID DEVICE

Android mobile is a device through which we can see all parameters or it will display the result.

4. BLOCK DIAGRAM



- The system first checks the moisture content of the soil.
- If the moisture level is less than the given value, then the motor is automatically on, and when it reaches its sufficient moisture content, it will be automatically off.
- We are using two moisture sensors 1st on the bottom layer of the field and the second one on the top layer of the field.
- Apart from soil moisture sensors, we are using a temperature sensor that will detect the temperature of the field and a humidity sensor that will give information about the humidity of the field.
- In this project a flame sensor is also used which will detect the flame in the field and a buzzer will turn on automatically till the fire is in the field.
- To get the level of water in the water tank, we are using an ultrasonic sensor that will detect the level of the water tank.

In the software section, the following tools we were used:

- Proteus software
- Arduino Uno
- Library:- Soil moisture sensor, Arduino

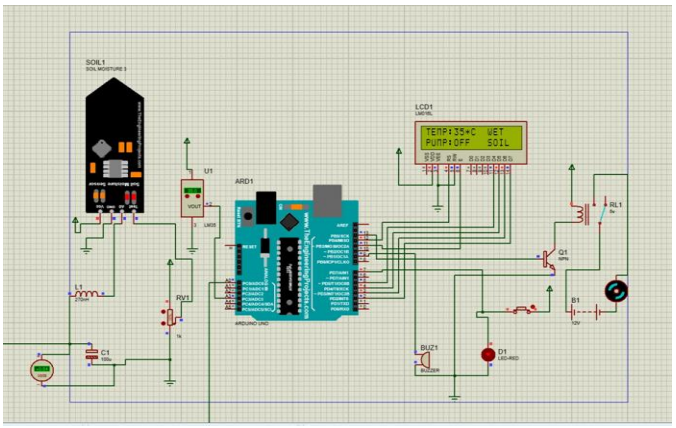


Fig:-9 simulation of hardware system

5. Result and Discussion

The agricultural environment monitoring server system proposed in this project was prototyped and tested. Early prototype versions were able to monitor and collect all outdoor environmental data such as soil information, temperature information, humidity information, humidity information, and water levels from sensors and other physical devices via the GUI. The prototype version includes a low-power system with built-in board modules and a compact web server with NetBeans IDE and Java programming language to automate watering and send external environment information to Android mobile apps. And the information from the mobile app.

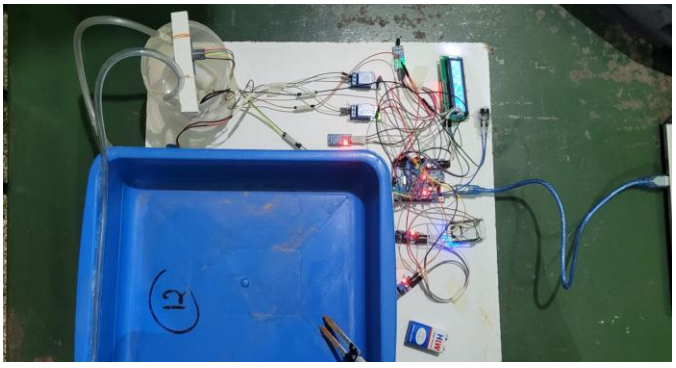


Fig 10:- A working model of agriculture environment monitoring system using android

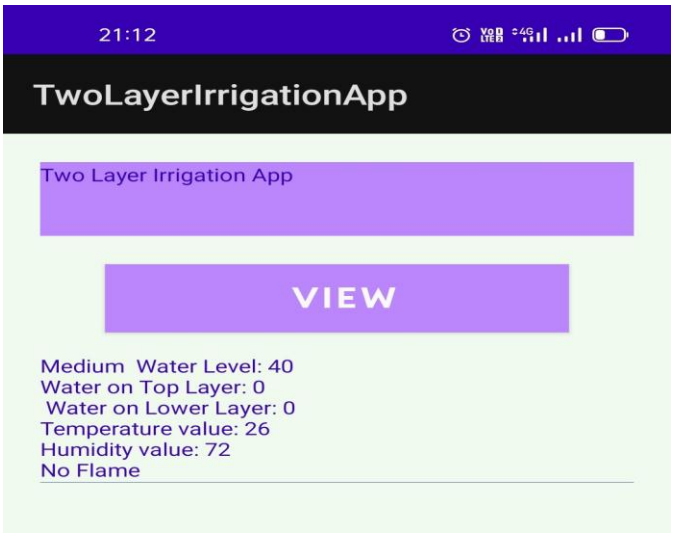


Fig:-11 Result display on Android mobile

6. CONCLUSION

The "Agricultural Environment Monitoring System using Android " project was used to optimize water use in the agricultural sector without the intervention of farmers by using the soil moisture content of the soil using Arduino UNO. The Arduino UNO will automatically turn the pump on and off as needed for the water. it is for irrigation and therefore helps while saving water This system is very affordable and feasible. This irrigation system is also useful in water-scarce areas and improves sustainability. It can also be adjusted according to the needs of the varieties of watering plants. If the agriculture environment monitoring server system proposed in this document is applied to the agriculture environment it is possible to monitor environmental information even in remote areas.,and it is expected to contribute to the increase in yield and quality in the agriculture field

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