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Iot Based Smart and Secure Agricuture Monitering System

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ABSTRACT: In agriculture, the internet of things plays a vital role. By allowing them to access information via mobile phones and the internet, technology such as the Internet of Things (IOT) allows them to automate the process of planting and monitoring crops. Considering these factors, this study emphasises the vital role of technology, particularly the IOT, in making farming smarter in order to reach future goals. As a result of population growth, food demand hasincreased in recent decades, making farmingpractises crucial in satisfying public need. It is vitalto focus on more intelligent and effective cultivationapproaches. This research aims to obtain acceptable real-time data from IoT sensors, demonstrating that they are capable of providing information on the state of the agriculture field based on user input.This paper's highlights the crop humidity and temperature monitoring, as well as providing security through the use of a GSM module to send messages.

KEYWORDS: Arduino Uno, Internet of Things (IOT), smart and secure agriculture, soil moisture sensors.

I. INTRODUCTION

In India, farming is done in the most basic of ways, and the majority of farmers are unaware of smart farming techniques. The vast majority of farming and agricultural activities is based on forecasts, which are occasionally inaccurate. Farmers are driven to suffer huge losses and, in some cases, commit suicide as a result of their circumstances. Given the importance of optimum soil moisture, water level, and irrigation in crop growth, such considerations must be taken into account.

A fundamental aspect of Smart & Secure is creating and maintaining the best conditions for crops.Plant development can be aided by cultivating in an environment that provides adequate water and a comfortable temperature, resulting in higher agricultural field productivity.More young people are becominginterested in agriculture and pursuing it as a careeras a result of the emergence of novel approaches forimproving agricultural output and management.To achieve a competitive advantage in meeting the needs of that rising population, agriculture will need to adopt new technology.In order to improve operational efficiency, reduce waste, and improve crop quality, IOT-enabled agriculture apps will assist smart agriculture and precision farming.

II. LITERATURE SURVEY

K. Laskmisudha et al. [1]"Smart Precision Based Agriculture Using Sensors"; the main core of this study on building tools and devices to manage, display and alert the user using the wireless sensor and network system.

M.K Gayatri & J.Jayasakthi et al. [2] "Providing Smart Agriculture Solutions To Farmers For Better Yielding Using Iot"; The paper states that use of cloud computing devices that can create a whole computing system from sensors to tools that observe data from human actors agricultural field images and from human actors on the ground and accurately feed the data repositories along with location of GPS co-ordinates

Chetan Dwarkani M et al. [3]"Design and Development of Precision Agriculture System Using Wireless Sensors Network"; this paper proposes a novel methodology for smart farming by connecting

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a smart sensing system and irrigation via wireless communication technology.

Dr V. Vidya Devi & G. Meena Kumari et al. [4]"Real-Time Automation and Monitoring System for Modernized Agriculture"; this study presents how an automated irrigation system was developed to optimize water use for agricultural crops. In addition, a gateway unit handles sensors information.

S. R. Nandurkar et al. [5]"Agricultural Protection System Based on IOT" It is designed for an IOT based monitoring system to analyse crop environments and the method to improve the efficiency of decision making by analysing harvest statistics.

III. COMPONENTS

ARDUINO UNO: Arduino Uno is a low-cost, adaptable, and simple-to-use open-source microcontroller board that may be used in a wide range of electronic applications. This board can operate relays, LEDs, servos, and motors as an output and can be interfaced with other Arduino boards, Arduino shields, and Raspberry Pi boards. [6].

Figure 1: Arduino Uno

DHT11 SENSOR: In the proposed work, the sensor called DH11 is utilized to measure temperature and humidity. The DhT11 digital temperature sensor is low-cost option. This sensor will assist the farmer in alerting him or her to the presence of humans and animals. If any of them are in their way to destroy the files. Rain detection and weather monitoring are also possible applications [7].

Figure 2: DHT11 Sensor

HC-SR SENSOR: Trigger, Echo and Ground are the pin names for the HC-SR04 Ultrasonic sensor, which is four-pin in module. The sensor is frequently used in a range of applications that require distance measurement or object detection. Two eye-like projects on the front of the module constitute the ultrasonic transmitter and receiver[8].

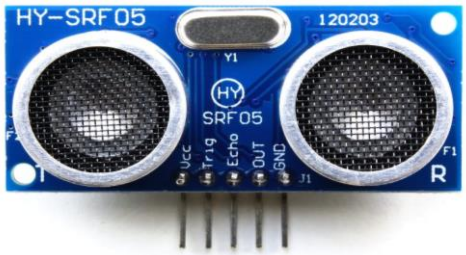

Figure 3: HC-SR sensor

MOISTURE SENSOR:A soil moisture sensor can determine the amount of moisture in the soil. The digital output from this sensor can be displayed on the LCD. The digital output can be changed, but not the analogue output. It shows whether the moisture level is high or low by displaying the results. The water motor will turn on automatically if the moisture level in the soil is greater than zero, otherwise it will not, and if the moisture level in the soil is greater than 80%, the water motor will turn off automatically. This is how the moisture sensor works in smart and secure agriculture. The output is considered to be at its peak. When the earth is wet, current travels from one terminal to the other, indicating that the circuit is short and the output is zero [9].

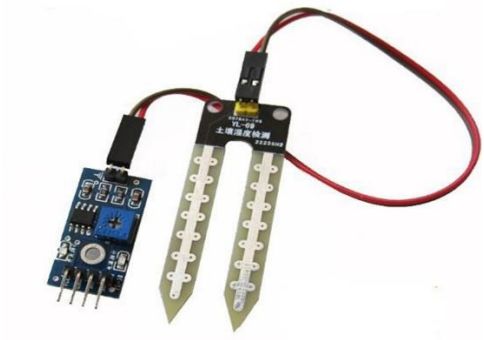

Figure 4: Soil Moisture sensor

BREADBOARD: The configuration of each breadboard is the same, with all rows numbered 1 through N and all columns numbered a through N. A breadboard's number of columns and rows is determined by the board in question. The breadboard is a pin-to-pin connection that does not require soldering and is commonly used in the fabrication of electrical prototypes. A breadboard is

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used to quickly build and test circuits before moving on to the next step in the design process. Circuit components like as ICs and resistors can be added to the breadboard through the numerous holes [10].

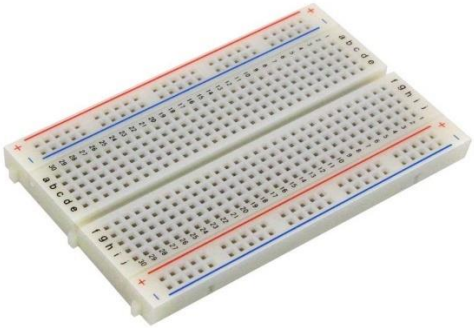

Figure 5: Breadboard

RAIN DETECTOR SENSOR: The rain sensor module is a simple rain detecting device. It can be utilised as follows: if rain droplets fall on the rain detector sensor via the rainy board, the sensors activate via the control board, alerting the farmer via the indicator. The analogue output is used to detect changes in rainfall amount. When the LED is connected to a 5V power supply, the induction board has no rain drop, and the do output is high, the LED will turn on[11].

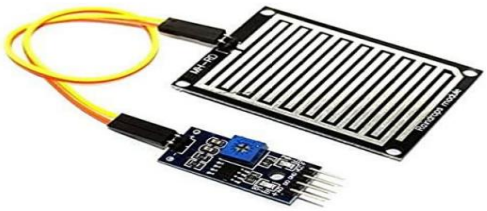

Figure 6: Rain Sensors

LCD DISPLAY:LCD stands for Liquid Crystal Display. The term "display" refers to a form of plat panel. The LCD is used in smart and secure agriculture to display the results of all sensors that perform according to their code. It's also utilised in notebooks and other electrical devices like mini-PCs to display graphics. The LCD will show whether the engine is on or off, as well as the moisture level in the soil, humidity, and the environment temperature in percentages. And whether someone has entered the field or not is indicated by an alert message[12].

Figure 7: Display

MOTOR DRIVER AND WATER PUMP:A 16-pin motor driver IC is widely used in the L293D. The motor is used in the agriculture system to start and stop the water motor based on the soil moisture demand or the water level of the soil. If the soil requires water, the motor will automatically deliver it via the motor driver. The water motor is easy to operate for everyone. This system can run motors in both clockwise and counterclockwise directions. As previously stated, this IC can drive two motors in any direction at the same time[13].

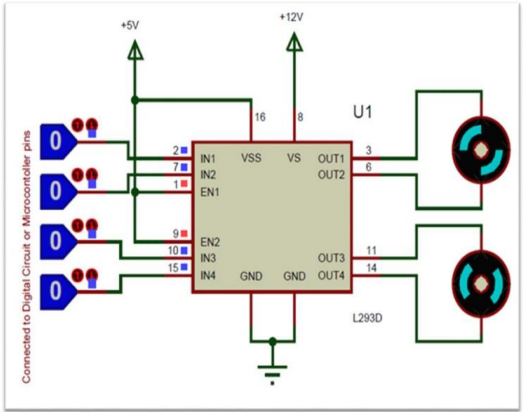

Figure 8: Motor Driver

Figure 9: Submersible pump

GSM MODULE:GSM modules come in a variety of shapes and sizes. The most common module based on the chip SIM900A and the Arduino Uno were utilised in this work. Connecting a GSM module to an Arduino is simple. Only three connections are necessary between the GSM module and the Arduino. A GSM module is a component that aids in the transmission of alert messages via SMS. And the owner will receive the messages right away[14].

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Figure 10: GSM module

BUZZER: Buzzers are made comprised of a DC power supply and electronic transducers that function simultaneously. They're commonly found in clocks, alarm clocks, electronic toys, computers, cell phones, and other goods that require sound generation. Active and passive buzzers are the two types of buzzers[15].

Figure 11: Buzzer

JUMPER WIRES: Jumper wires are simply wires with connector pins on one end and connector pins on the other. A jumper wire is sometimes referred to as a jumper, a jumper cable, a DuPont, or a cable. Without soldering, jumper wires are used to connect electronic components or a test circuit. Jumper wires come in a variety of colours, and they all function in the same way [17].

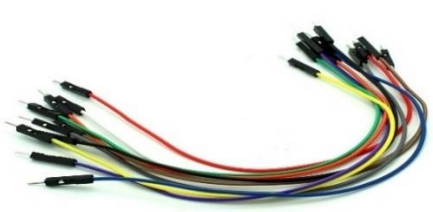

Figure 12: Jumper wires

BATTERY: The nine-volt battery was a popular size when transistor radios first came out. It is shaped like a rectangular prism with rounded corners and a polarised snap connector on top. Smoke detectors, clocks, walkie-talkies, electric guitars, and effects units are all examples of this type of device [18].

Figure 13: Battery

METHODOLOGY: Many studies have been undertaken recently in the area of internet of things project development, which will aid farmers in smart farming. The Arduino Uno and other electrical components are used to monitor the live humidity and wetness in this study. If anybody enters the agricultural field, the GSM module will notify them by sending messages to their mobile phones.

CIRCUIT DIAGRAM: The circuit diagram below shows the project's visual representation, with the components connected to their individual Arduino Uno[18].

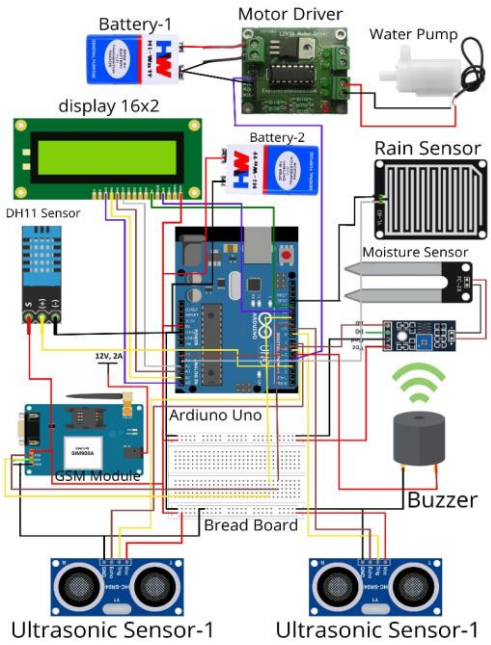

Figure 14: Circuit Diagram

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IV. RESULTS

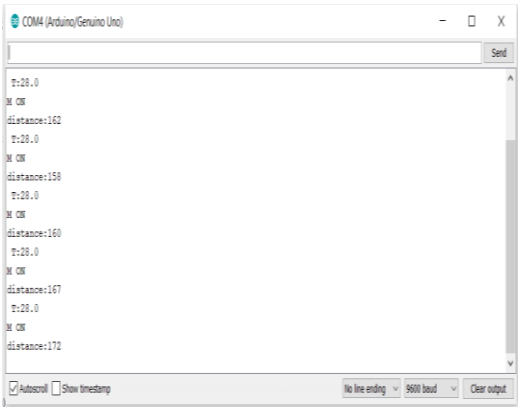

Figure 15: output of the serial screen

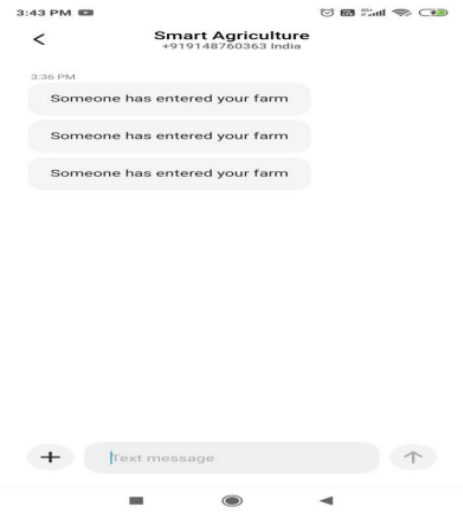

Figure 16: GSM alert message

Figure 17: Project model

ADAVANTAGES:

1. Increase in productivity
2. Reduced water consumption
3. Safe
4. No manpower required
5. Reduce soil erosion and nutrient leaching
6. Require smaller water sources

FUTURE ENHANCEMENT: Most projects nowadays use IoT components and sensors that can be accessed via a wireless or wired network from any internet application or mobile phone. So, here's the plan for the future. The newly built system can be upgraded to work with the existing one.

The project can be upgraded in the coming days as and when the demand arises because it is quite versatile in terms of expansion.

- Is capable of developing a mobile app.
- Notification of an abnormal heartbeat.
- The application can be used to help with the provision of additional home care services.

V. CONCLUSION:

Proposed work depicts the smart and secure agriculture system is feasible and cost-effective optimizing water resources for agricultural production. Irrigation system allows cultivation in places with scarcity thereby improving sustainability and use of water can be diminished. Proposed system provides the security for the agriculture via messages and also provides thecrop humidity and temperature monitoring information with a GSM module.

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