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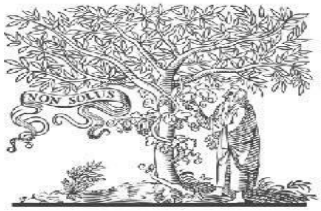

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IOT BASED SMART AGRICULTURE & SECURITY SYSTEM

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***Abstract*— This project is to promote smart Agriculture and to reduce the work load of farmers they can control their motor pump by sitting at their homes and also can get alert if any fire is harming the crops and in the security field to keep away animals from the crop fields and also it is useful to increasing Agricultural productivity and incomes .Today everyone is talking about Smart Agriculture because of its qualities like Time Efficiency ,Faster Access, Efficient Communication, Global Connectivity through any devices and minimum Human Effects. In water pump management and soil & moisture measurement and saving crop from animals.**

***Keywords*—agriculture,crop-security,fasteraccess,globalconnectivity.**

I. INTRODUCTION

The Internet of Things (IoT) is a network of shared physical items that, with an Internet connection, may communicate with one another. IoT is significant for agriculture. Industry that by 2050 will be able to feed 9.6 billion people worldwide. Smart agriculture increases crop productivity by reducing waste and making effective use of fertilizer. In this study, a system is created to manage irrigation and monitor crop fields utilizing sensors (soil moisture, temperature, humidity, and light). If the moisture level in the field drops below the critical level, the watering is automated. Along with watering, light intensity management can be automated in greenhouses. Periodically, notifications are transmitted to farmers' mobile devices. Farmers may check on the state of their fields from anywhere In places with limited water supplies, this technique will be more practical. This method is 92% more effective than the standard method.

II. EASE OF USE

To raise various crops, farmers typically work on enormous tracts of land. It's not always feasible for one person to continuously monitor the entire farmland. A specific area of land may occasionally receive more water, resulting in water logging, or much less water or none at all, resulting in dry soil. Crops may be harmed in either scenario, or farmers may incur losses.

Therefore, to address this issue, we suggest an "IOT Irrigation Monitoring and Control Project". This can be an extremely beneficial project that allows the user to operate and analyse the water supply from a distance. The IOT (Internet of Things) idea is utilised by this system. Therefore, for our project, we use a Wi-Fi module to link our system to the internet. To deliver the control signals and connect to the website we want, we utilise an Arduino Uno board.
Two items are shown on the website:

A. motor's condition

B. moisture content

BACKGROUND

The countries whose economies are built on agriculture and where the meteorological circumstances cause a lack of rain and water scarcity served as the inspiration for this project. To meet the growing demand, food production technologies must evolve swiftly. In many countries where agriculture contributes significantly to economic growth and when the climate is isotropic, we are unable to employ agricultural resources to their full potential. One of the main factors is the lack of rain and water in land reservoirs. The water table is being lowered by routine water extraction from the soil, which is causing the expanses of unirrigated land to progressively grow. Additionally, the unforeseen usage of water unintentionally results in waste of water supply to the land is delayed due to which the crops dry out. Lack of water impairs plant growth before withering is evident. Along with

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this reduced pace of growth, fruit with less water content tends to be lighter in weight. This issue can be resolved properly if we utilize an automated irrigation system, in which irrigation only occurs when there is a pressing need for water, as indicated by the moisture in the soil.

III. SCOPE

The potential for IoT-based smart security and agriculture systems is enormous. Increase crop output, lower costs, and increase operational efficiency with the use of IoT in agriculture. Farmers may monitor a variety of aspects of farming, including soil moisture, temperature, humidity, and other variables in the environment that could affect a crop growth, with the aid of sensors and smart devices. Farmers can remotely control their equipment with IoT devices. irrigation, fertilization, and other agricultural equipment increase the productivity and decrease the labor-intensiveness of farming activities.

A. Method

1. Sensor Deployment: Setting up sensors in the field is the first stage in developing an IoT-based smart agriculture system. These sensors can be used to keep an eye on environmental variables that have an impact on crop growth, such as soil moisture, temperature, and humidity. The condition and behaviour of livestock can also be tracked using sensors.

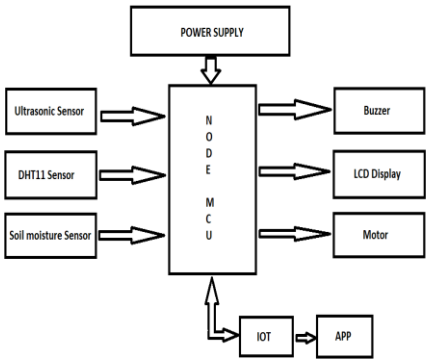
2. Data Collection and Analysis: A central database receives the sensor data for analysis. Farmers may make educated judgements about irrigation, fertilisation, pest management, and other farming practises thanks to the study of this data.

3. Remote Control: IoT technology enables farmers to remotely control a number of farming processes, including irrigation, fertilisation, and other agricultural equipment. Farming activities become less labour-intensive and more efficient as a result.

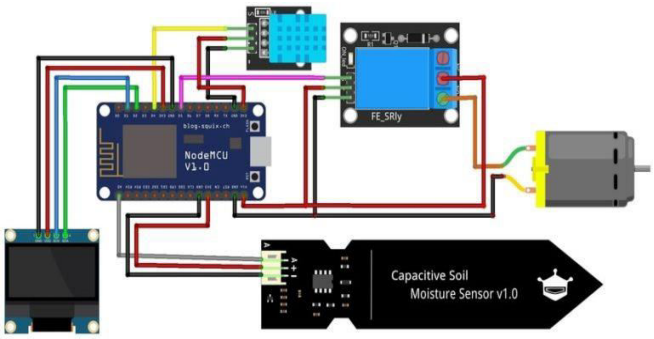
4. Alert and Notification: When specific conditions are fulfilled, IoT devices can be programmed to send alarms and notifications to farmers. For instance, a notification is issued to the farmer to take corrective action if the soil moisture level drops below a particular threshold.

5. Security Monitoring: IoT-based security solutions intelligent cameras, sensors, and alarms to find and notify farmers about any shady activities taking place on their farms. Farmers may remotely monitor their crops and respond quickly to security breaches with the use of IoT-based security devices.

B. .Block Diagram



C. Schematic Diagram



D. Operation

Information and communication technology is used in the notion of "smart agriculture" to handle all of the tasks and procedures associated with the agricultural industry. The IOT has the capability to affect many elements of the current scenario, including cutting-edge industries, smart cities, and cutting-edge technologies in linked automobiles [1]. IOT might, however, have a much greater effect on the agricultural sector. The designed solution presented in this paper is an example of an Internet of Things (IoT)-based smart agriculture system developed to monitor crop fields using a different kinds of sensing elements and to increase the potential of cropping system. The system's ability to increase productivity while minimizing expenses is one of its effects. Precision agriculture (PA) is any practice that improves the accuracy and control of farming operations

when it comes to producing livestock and cultivating crops. A collection of technology called "precision agriculture" combines sensors, information systems, and conscious management to optimize production. It is built on detecting, quantifying, and reacting to crop variability both within and between fields. The major objectives of precision agriculture are: • Sensing and monitoring, which refer to evaluations of the efficiency of farm operations. An observer can perform this manually, or it can be automated using sensors and satellites.
• Analysis and decision-making, which refers to comparing measurements from the perspectives of quantity, quality, and lead time.
Intervention, which involves improving agricultural output.
Devices from the Libelium platform carry out the acquisition level.Based on wireless sensor networks, Libelium is a platform (hardware and software) utilised in IoT solutions systems. Some of the most popular Smart World applications that Libelium can be used for include air pollution monitoring, forest fire detection, wine quality enhancement, sportsmen's care, healthcare, smartphone detection, perimeter access control, water quality monitoring, intelligent parking, vehicle auto-diagnosis, intelligent lighting, intelligent shopping, and smart agriculture. Libelium IoT platform on Agrotech was used to construct a new vineyard project, new weather station sensors for maximum accuracy, and monitoring "baby leaves" fourth-generation vegetable production for effective fertiliser use.

Water level indicator definition In order to show whether the water level in a body of water is high or low, a water level display feeds data to a control panel. Some water level indicators use probe sensors and float switches to detect the level of the water.. "The Water Level Indicator employs a simple mechanism to detect and indicate the water level in an overhead tank or any other water container," the manufacturer claims.
Purpose of Water Level Indicator
If levels drop too low, the control panel may be set up to automatically activate a water pump to replenish the needed amount of water. To measure and control the water levels in a water tank, a water level indicator is used.
Water Level Indicator Sensor?*A water level indication sensor, also known as a probe sensor, transmits this data to the control panel. Using a combination of high and low sensors, the control panel is informed when the water levels are abnormally high or low. Afterward, the control panel will automatically switch the pump on or off depending on the required corrective action.*

E. How Do Water Level Indicators Work?
Principle of Water Level Indicator

1. A water level indicator's operation is relatively simple. The probes of the sensors are used by water level indicators which display the quantity of water in the water container. To set the alarm or water level indication, data is sent back to the control panel by using the probes. As previously noted, the control panel can be set up to turn on your pump automatically when the water must be filled again.

2. No bothering even though the level of water is full. An alarm is set off when the water level reaches the reference probe.

3. When the fill start is engaged, the water is immediately switched on to fill the tank.

4. Resetting the entire system and is in wait state for the water quantity to decrease once more.

A water level indicator may have three probes, depending on the manufacturer, or it may have up to seven.

There are three probes: a reference, fill-start, and fill-stop are used by 3 probe water level indicators to control water levels. Together, these probes control the water levels in a tank. The reference is where you want the water level to be before it starts to rise again.

More probes are used in 5 probe water level indicators The length of reference probe and fill start probe is almost same so than it can fill it again, so that alarms can be added. They include a low alert in addition to the same reference probe high-pitched alarm probe that will sound if water levels drop or rise too much.

The water level sensor detects the lack of water in the field. The output pin of the sensor for that particular field displays a strong signal („1) whenever water is needed in that area. All of the sensors' output pins are linked to the microcontroller port. The microcontroller at a specific pin entertains the high signals (logic 1) from the sensor. The motor (in this case, a water pump) connected at port 0 can be

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switched ON by knowing the location of the pin on which the signal appears. Water now begins to flow into the needed field. The sensor delivers a low signal (logic 0) to the microcontroller when watering is finished. When the microcontroller (UC) receives this signal, it turns off the water pump and begins monitoring the signal at the data pin. The uc continues the aforementioned procedure whenever any pin receives a signal. At each location where the water has to be monitored, the project suggests installing a water level sensor. The sensors are turned on when the engine is turned on, which causes the fields to automatically irrigate.

The system takes the necessary actions to limit or even stop the water flow once the water reaches a specific level, which could possibly take hours. After switching the power supply, the farmers' duty is finished quickly. The circuit also keeps track of the water level in the well or bore well, and if it drops too low, it shuts off the main engine to avoid a dry run and to protect the motor from damage. A high-speed microprocessor and water sensors at various locations and within the well are included in the project. These sensors are connected to the microcontroller, and the motor and water control circuits regulate them accordingly.

High Speed microcontrollers are utilized to ensure error-free functioning. It has many benefits over traditional, outdated microcontrollers, including CISC design, a larger memory word, quick operation, and a range of built-in capabilities like an ADC, communication protocols, etc.

The project also includes a Bluetooth modem, which enables users to be quickly informed of system errors, if all fields are adequately irrigated, or whether there is not enough water in the well. By just sending an SMS, the system may be turned on and off in the same way. In agriculture, power supplies are only available during specific hours of the day and not all the time, thus this scheduling is quite helpful.

When a person needs to travel away from home for whatever reason or if, as is often the case, their home is distant from their farmland, this is quite beneficial. It also makes the person's job easier while saving valuable resources like water and electricity. The project can be used in vast agricultural fields, coconut plantations, and many other plantations, as well as in homes, workplaces, and colleges where there are enormous gardens to automatically monitor and irrigate them.

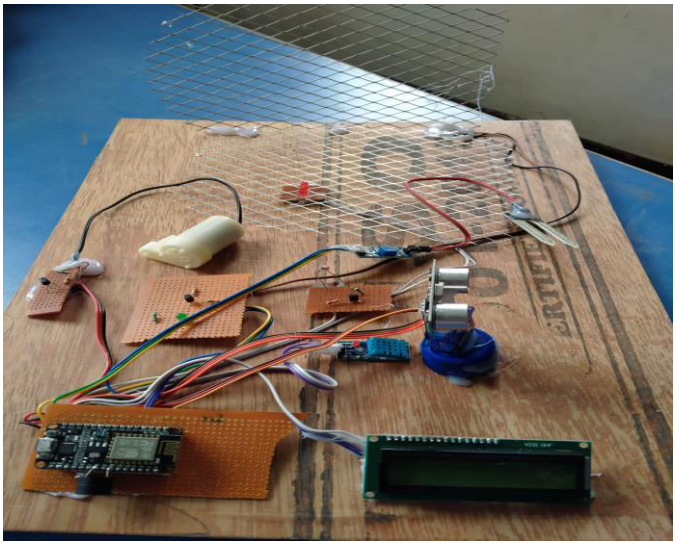
Applications:

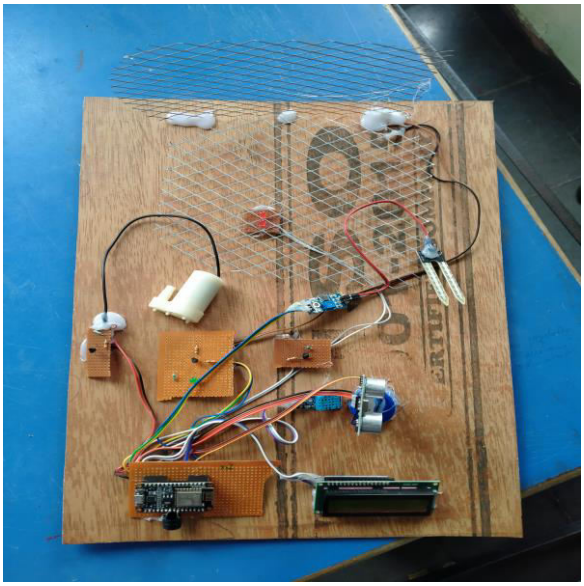
1 Irrigation
2. Garden and park irrigation
3. Incredibly effective in paddy(rice)farms
4. Pixi culture

Advantages:

1. The hardware cost and power use of this system will be quite reasonable.
2. The person's job is made easier and valuable resources like water and power are saved.
3. It can be used in sizable agricultural regions.

IV. RESULTS





TOP VIEW OF IOT BASED SMART AGRICULTURE & SECURITY SYSTEM

To begin our attempt, we created a power source. That is easy for me, but there are several challenges and problems with the main circuit that we encountered into, which includes component selection and I have to reference data books and other resources associated to it. I found it difficult to obtain the superior or more precise outcomes I desired. Moreover, there is a software issue. In addition to that , I faced some issues with soldering process that were fixed by doing hardware continuity tests.

V. CONCLUSION

Aggressive water management for agricultural land is supported by this method. This design is based on the features of current and upcoming microcontroller generations and the needs of the applications that use them. The microcontroller that is being utilised for the system makes the bold claim that by lowering power consumption, it may lengthen system life.

VI. FUTURE SCOPE

In the future, we can put this concept into practise to create an automatic system that develops, and we can also keep an eye on power issues so that we can always maintain field status.

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