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# Smart Agriculture using IOT

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**ABSTRACT-** As New technologies has been introduced and utilized in modern world, there is a need to bring advancement in the field of agriculture also. Various Researches have been undergone to improve crop cultivation and have been widely used. In order to improve the crop productivity efficiently, it is necessary to monitor the environmental conditions in and around the field. The parameters that has to be properly monitored to enhance the yield are soil characteristics, weather conditions, moisture, temperature, etc. Internet of Things (IOT) is being used in several real time applications. The introduction of IOT along with the sensor network in agriculture refurbish the traditional way of farming. Online crop monitoring using IOT helps the farmers to stay connected to his field from anywhere and anytime. Various sensors are used to monitor and collect information about the field conditions. Collectively the about the farm condition is sent to the farmer through GSM technology.

## I. INTRODUCTION

One of the main aspects of human survival is the agriculture which is the main source of food. Unfortunately, most of the farmers in our country use traditional way of farming which is a hectic process to analyze data manually related to soil and crops. This can be overcome by modern farming methods. As the agriculture industry is one of the important aspects of a country's economic growth, it is necessary to bring automation in agriculture which relatively enhance the crop yield and helps in developing economy.

Deployment of automation in agriculture leads to effective crop monitoring without human intervention in the field. Internet of things is the network of physical objects embedded with sensors, software and electronic components like microcontrollers, as sensors and microcontrollers cannot be connected to the internet directly. The crop productivity is based on good irrigation system. In order to maintain the irrigation system effectively, sensor is deployed in the field which senses the water requirement of the soil and provides irrigation automatically. The farmer will be able to view the information of his field through GSM technology. Soil Monitoring with IOT uses technology to empower farmers and producers to maximise yield, reduce disease and optimise resources. IoT sensors can measure soil temperature, NPK, volumetric water content, photosynthetic radiation, soil water potential and soil oxygen levels. Data from the IoT sensors are then transmitted back to a central point (or the cloud) for analysis, visualisation and trend analysis. The resultant data can then be used to optimise farming operations, identify trends and make subtle adjustments to conditions to maximise crop yield and quality. The use of IoT in agriculture is known as Smart Agriculture (or Smart Farming), and IoT is a central component of Precision Farming.

### 1.1 CREATING SMARTER WATER SYSTEMS

Smart water systems based on internet of things (IoT) sensors, big data and analytics can reduce the amount of water that's wasted during agricultural and manufacturing processes, improve the efficiency of water distribution systems and alert companies if toxins or other impurities are detected. "Advances in IOT sensors, communications and cloud computing have dramatically lowered the cost of gathering, storing and analyzing data, whether this is from specific equipment, like pumps or valves, or entire processes like water treatment or irrigation, which creates smart technology solutions to meet water and energy needs. "They allow us to go beyond basic monitoring to efficiently access new types of data, at a level of granularity that wasn't cost effective in the past, especially for small and medium-sized organizations." In short, utilities, farmers and manufacturers of all sizes can use IoT technologies to improve their water management processes. Sensors can monitor tank filling levels, for instance, as well as control the quality of water used in manufacturing processes and detect leaks. Better management of the water system means "energy is also reduced when leaks are eradicated, as the energy to treat and pump leaked water is no longer required"



## 1.2 IOT BASED SMART FARMING

Internet of Things Smart technology enables new digital agriculture. Today technology has become a necessity to meet current challenges and several sectors are using the latest technologies to automate their tasks. Advanced agriculture, based on Internet of Things technologies, is envisioned to enable producers and farmers to reduce waste and improve productivity by optimizing the usage of fertilizers to boost the efficiency of plants. It gives better control to the farmers for their livestock, growing crops, cutting costs, and resources.

## II. EXECUTION PROCEDURE

### 2.1 SOIL MOISTURE SENSOR (YL-69)

Step 1: The soil moisture sensor (YL-69) consists of three pins namely A0, D0, VCC and SGND.

-The A0 pin of soil moisture sensor (YL-69) is connected to the analog input pin A0 of Arduino UNO.

-Connect VCC of YL-69 to 5V power supply pin of Arduino UNO.

-Connect the ground pins of YL-69 and Arduino UNO.

Step 2: Compile the code to check for errors.

Step 3: Upload the code to the Arduino board.

Step 4: Click Tools>Serial monitor to view the moisture content of the soil.

### 2.2 TEMPERATURE AND HUMIDITY SENSOR (DHT 11)

Step 1: The temperature and humidity sensor (DHT11) consists of positive, output and negative pins.

-The positive pin of DHT 11 is connected to the 5V power supply of Arduino UNO.

-The output pin of DHT 11 is connected to the digital output pin D7 of Arduino UNO.

-The negative pin of DHT 11 is connected to the GND pin of Arduino UNO.

Step 2: Compile the code to check for errors. Step 3: Upload the code to the Arduino board.

Step 4: Click Tools> Serial monitor to view the temperature and humidity.

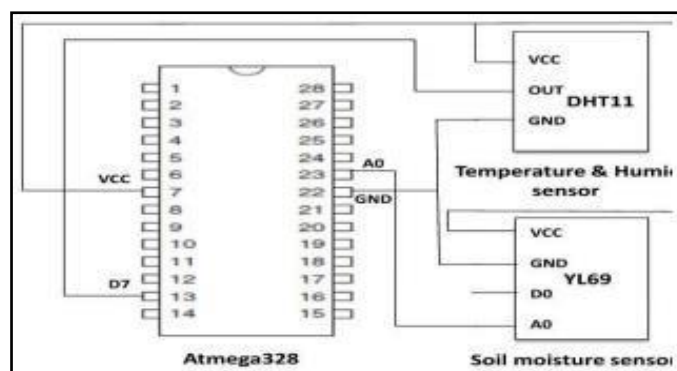


Fig. Connection of microcontroller and sensors

## III. CONCLUSION

With the incorporation of the LORA & IOT, we can upgrade the agriculture farm. These systems enable to check the quality of the soil and the growth of the crop in soil and with these system farmers are able to solve irrigation problems, temperature problems, humidity problems, etc. The availability of sensors for the agricultural parameters and microcontrollers can be easily interfaced with each other and with the help of Internet of Things, wireless sensor networks communication the challenges encountered by the farmers can also be reduced and a better communication path for the transfer of useful data can be achieved between various nodes. So, farmers are able to control various equipment's related to agricultural and monitor their crop on Smartphone or on computers.

These systems offer a high application area to the users to improve their skill and output of the crops in better way. Use these systems help to increase the Rice, wheat and maize and other agricultural production in India in the near future. IOT capable to control the condition of the yield and growth, it can also able to check soil, temperature, humidity, etc. with help of IoT

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