# A review on Smart Agriculture using IOT

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**ABSTRACT**: Internet of Things has a strong backbone of various enabling technologies-Wireless Sensor Networks, Cloud Computing, Big Data, Embedded Systems, Security Protocols and Architectures, Protocols enabling communication, web services, Internet and Search Engines. Internet of Things (IoT) technology is one of the fastest growing fields in different domains including agriculture, because IOT sensors are capable of providing information about agriculture fields and then act upon based on the user input. This paper gives a literature review about the development of a system which can monitor temperature, intensity, moisture and even the rain in agricultural field through sensors.

**KEYWORDS:** IOT (Iternet Of Things),Smart Agriculture,Sensors.

## I.   INTRODUCTION

Internet of Things (IoT) technology is one of the fastest growing fields in different domains including agriculture, because IOT sensors are capable of providing information about agriculture fields and then act upon based on the user input. IoT improves the quality of our lives by bringing and fostering changes in many fields of activities to make them become handy, smart and endowed by sufficient artificial intelligence.The main goal of my project is to use IoT in the agriculture field in order to collect data instantly (soil Moister,temperature…), which will help one to monitor some environment conditions remotely, effectively and enhance tremendously the production.The feature of this paper includes development of a system which can monitor temperature, intensity, moisture and even the rain in agricultural field through sensors using Arduino board and in case of any discrepancy send a SMS.notification as well as a notification on the application developed for the same to the farmer's smartphone using Wi-Fi/3G/4G. because while we

were collecting them remotely any environmental changes were detected instantly and taking in consideration to make decisions.

There are no end solutions to the farmers about process of their cultivation in agriculture. Mostly they rely on their previous experience as well as very little knowledge of effective measures to take in case of any problems for productivity. The motivation of our irrigation system allows cultivation in places with water scarcity thereby improving sustainability. It proves that the use of water can be diminished. This will reduce the Man power and gives real time sensing and control that allows user to see accurate changes in it (field).As we are using Drip Irrigation, Moisture at field capacity and minimized soil erosion. And Have the ability to irrigate irregular shaped fields. This system could help the farmer to increase their yield of production.

## II.   SENSORS
### a.        RAIN SENSOR
Raindrop Sensor is a tool used for sensing rain. It consists of two modules, a rain board that detects the rain and a control module, which compares the analog value, and converts it to a digital value.
### b.        SOIL MOISTURE SENSOR
This soil moisture sensor module is used to detect the moisture of the soil. It measures the volumetric content of water inside the soil and gives us the moisture level as output. The module has both digital and analog outputs and a potentiometer to adjust the threshold level.
### c.        TEMPERATURE SENSOR
This is a waterproofed version of the Temperature sensor.  It is widely used to measure temperature in hard environments like in chemical solutions, mines or soil etc. ... It can measure a wide range of temperature from -55°C to +125° with a decent accuracy of ±5°C
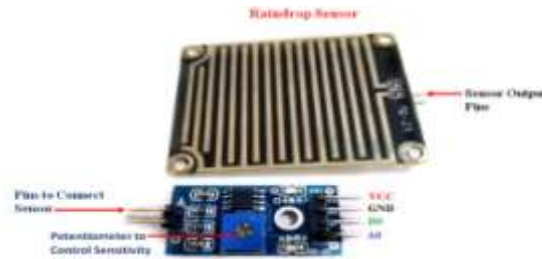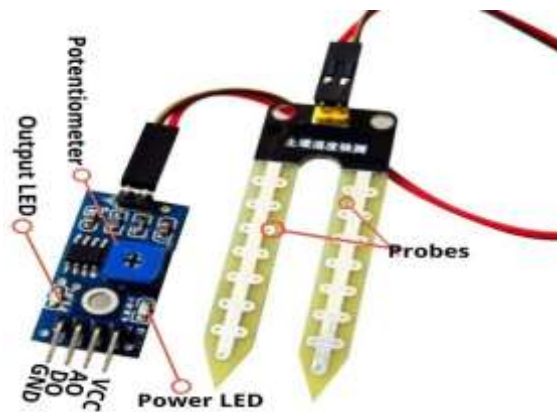
**Fig 1: Rain Sensor**


**Fig 2: Soil Moisture Sensor**


**Fig 3: Temperature Sensor**

## III. LITERATURE SURVEY

In [1], a smart GPS based remote controlled robot to perform tasks like weeding, spraying, moisture sensing, bird and animal scaring, keeping vigilance, etc. All the operations will be controlled by any remote smart device connected to Internet and the operations will be recognized by interfacing sensors, Wi-Fi or camera, ZigBee modules, and actuators with raspberry pi and.micro-controller

A smart agriculture system[2] using wireless sensor network. Different types of sensors are used to receive the information about crop conditions and environmental changes. These information are transmitted through network to the farmer and devices that starts corrective actions. Farmers are connected with network and aware of the agricultural field conditions at anytime from anywhere in the world.

A Smart agriculture System[3] that uses advantages of cutting edge technologies such as Arduino, IOT and Wireless Sensor Network.Monitor temperature, humidity, moisture and even the movement of animals which may destroy the crops in agricultural field through sensors using Arduino board.

In [4] proposed IOT based system to collect information about conditions like moisture,, weather, temperature and fertility of soil, Crop online monitoring enables detection of weed, , pest detection, level of water, crop growth, animal intrusion in to the agriculture field. .Wireless sensor networks are used for monitoring the farm conditions and micro controllers are used to control

and automate the farm processes. wireless cameras have been used to view remotely the conditions in the form of video and image,

A system [5] using Pysense board, Fipy board, Pycom expansion board and Raspberry Pi.the Fipy board is connected to a Pysense board as well as a Raspberry Pi and the whole device is deployed into field. IOT sensors devices are much capable of providing information about their own agricultural field. LoRa technology node is communicated with gateway and sends sensor data to gateway as well as sensors data is also stored in a Raspberry Pi. The complete proposed system needs an existing Wi-Fi or a mobile hotspot to get the sensor data.

In [6] developed a smart agriculture system using sensors in the agriculture industry to do smart agriculture. The agriculture field is monitored  by using wireless sensor technology. IoT sensors are of  high efficient and accurate to get the direct data of ground water level and warmth in agriculture field.

In this automated irrigation system[7] , the pumping motor turns ON and OFF based upon the moisture content of the soil. The pump will be operated by an operation-amplifier which takes the input from a soil moisture sensor. The soil moisture sensor is a sensor that detects the exact amount of moisture in the soil. Now here comes the role of IOT to give the information to the farmers about the status of the water moisture.

In [8], a smart technology to generate messages on different platforms is proposed to notify farmers. Farmers can  get live data such as temperature, soil moisture, UV index, humidity, IR from the farmland to take necessary steps to enable them to do smart farming by also increasing their crop yields and saving resources. The product proposed system   uses ESP32s Node MCU, breadboard, DHT11 Temperature and Humidity Sensor, Soil Moisture Sensor, SI1145 Digital UV Index / IR / Visible Light Sensor, Jumper wires, LEDs and live data feed can be monitored on serial monitor and Blynk mobile.



**Fig 4 : IOT in Agriculture**

In [9], Temperature sensor, Moisture sensor and pH sensor which senses the temperature, moisture content and pH in the soil. A combined approach with internet and wireless communications, Remote Monitoring System (RMS) is proposed. By monitoring the field using the IP address Nutrient deficiency in the soil are detected and rectified.

Smart Agriculture system[10] can forecast weather data, switching ON the pump motor acknowledging the dampness of soil terms of moisture levels with help of sensors which are interfaced to process module Arduino-UNO.

The architecture[11] with three layers are connected with cloud to which all the data are uploaded, processed and accessed with API libraries and the devices are connected. With the

use of cloud computing. The layers used in this architecture is intended to store, manage and monitor the crop growth details and also provide the efficient decision making for the process of fertilizers utilization. Water supply and plantation of crop basing on the data collected from the sensors connected to the ground of the field.

A system to monitor monitor temperature, moisture and level of water is designed [12] even the movement if any happens in the field which may destroy the crops in agricultural field through sensors using Arduino UNO board. An automated Smart Agriculture system is developed which reduces the resources and time that is required while performing it manually. This system uses the technology of Internet of Things. The system also measure level of water and moisture of soil in fields.

## IV. CONCLUSION

The IOT based smart Agriculture using will assist farmers in increasing the agriculture yield and take efficient care of food production, as the system will always provide helping hand to farmers for getting accurate live feed of environmental temperature, intensity and soil moisture with more than 99% accurate results. This paper deals with sensors used in the smart agriculture based on IOTand gives a literature view of smart agriculture system using IOT. The system is cost effective for optimizing water resources for agricultural production. The sensor is sensing and proves that the moisture of soil can be sent to the smart phone via messages. Thus, the IOT based farming is very helpful for the farmers for getting the updated information.

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