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# IOT BASED SMART AGRICULTURE MONITORING AND AUTOMATIC IRRIGATION SYSTEM

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**ABSTRACT**: The need of a wireless monitoring technologies using IOT in modern farming has become a major necessity as it reduces many major barriers and problems on the issues concerning agriculture. The best method to overcome this problem is smart agriculture by modernizing the current traditional methods of agriculture. this project aims in improving the agriculture by smart technologies using internet of things (IOT) the system of various sensors such as PH sensor, moisture sensor, DHT11-humidity temperature sensor to measure moisture content present in the soil and also to measure humidity and temperature in the soil.ESP32 provides a standalone system to host MCU and is also interfaced with WIFI and BLE functionality with UART/I2C interfaces. The NPN transistor will control the water pump for automatic irrigation. whenever a low quantity of moisture is detected in the soil the motor turns on. Once the soil becomes wet, the motor turns off and hence irrigation is done automatically. All these data which are gained through the system can be monitored remotely via the thing speak(IOT based cloud platform)online from any part of the world. This system provides a greater result in monitoring and controlling field as well reduce farmer stress and provide many advantages on the field.

**KEYWORDS**: Internet of Things, ESP8266(cloud thingspeak) ,motor pump ,sensors.

## I. INTRODUCTION

The agriculture has many barriers and been a big stress for farmers the sensing of different factors of agriculture been a big cons as the farmers will not have an efficient knowledge on the factors like climate, humidity,and etc. Internet of things(iot) is the interconnection or network of physical devices that is interrelated computing devices, digital and mechanical machines, people or animals, object that can sense, accumulate and transfer data over web without any human involvement. everything is provided with unique identifier. It is a detecting, organizing, enormous information and man-made consciousness innovation to convey total framework for an administration. basically IOT is about extending the power of internet beyond smart phones and computers. Iot has changed today's world, smart cities, smart car, smart homes everything around can be turned into smart device with the help of IoT. the cloud computing has help in collection of data stored on reliable storage servers comes to action. with the help of iot technology provides the necessity data and control the usage of various resources .this allows in the improvement and control process in realtime.

### OBSERVATION OF THE STUDY:

The objective of the project is to update farmers with new technology and to avoid manual labour. providing ideal condition to reduce wastage of water and enhance productivity of crops. The environmental consequences and weather condition difficulties can be reduced by monitoring via thingspeak server online from any part of the world and thus reduce future problems.

## II. REVIEW OF LITERATURE

### 2.1 IOT BASED SMART SENSORS AGRICULTURE STICK FOR LIVE TEMPERATURE AND MOISTURE MONITORING USING ARDUINO

This paper presents an IoT based smart stick that enables live monitoring of the different agricultural parameters. This stick helps farmer acquire live data of temperature, soil moisture. The agricultural IoT stick gives the idea of plug and measures in which farmers can instantly enact smart monitoring system by positioning the stick in the field and obtaining live data feeds on different smart gadgets like smart tablets, phones etc. and the information which is produced through

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sensors could be simply analyzed and processed by agricultural experts even in remote areas via cloud computing technologies.

### 2.2 A LOW COST SMART IRRIGATION CONTROL SYSTEM

In this paper, the author proposes a model where the flow and direction of water is supervised and controlled. This is done with the help of DHT11 and soil moisture sensor. This method also proposes a way to select the direction of water and this information is also sent to the phone and Gmail account of farmer.This model also enables the farmer to switch on and off the motor with a single click. This paper proposes a prototype where number of sensors are deployed at different positions in the field. This paper also shows how the proposed model makes the traditional irrigation system more effective and sustainable. This paper also suggests an efficient energy and network model. This paper presents a model that is energy efficient, sustainable, automated and cost effective.

## III. PROBLEM STATEMENT AND PRELIMINERIES

The models proposed above are not cost ineffective moreover it is complex the methods are more of high technology and the understanding is bit more tough. the model proposed by us is way simpler yet it is more effective technology and also includes all the advantages of proposed models.

### 3.1 Block Diagram of the Proposed System:

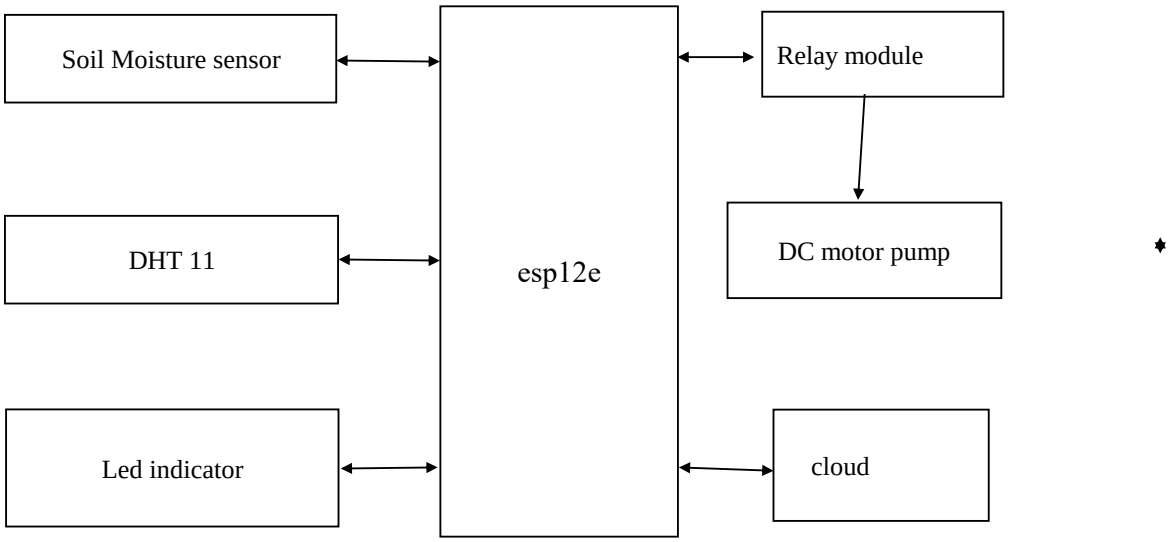


Fig 3.1 Block Diagram of Proposed system

### 3.2 Flow Diagram of the Proposed system:

The flow diagram represents the proposed system working, it begins with the connection to the sensors and after sensing the temperature values and humidity values which have been monitored are send to the cloud thing speak platform .the data are delayed to 10 seconds if there is any issue and gets back to the sensing values if not it displays the values.

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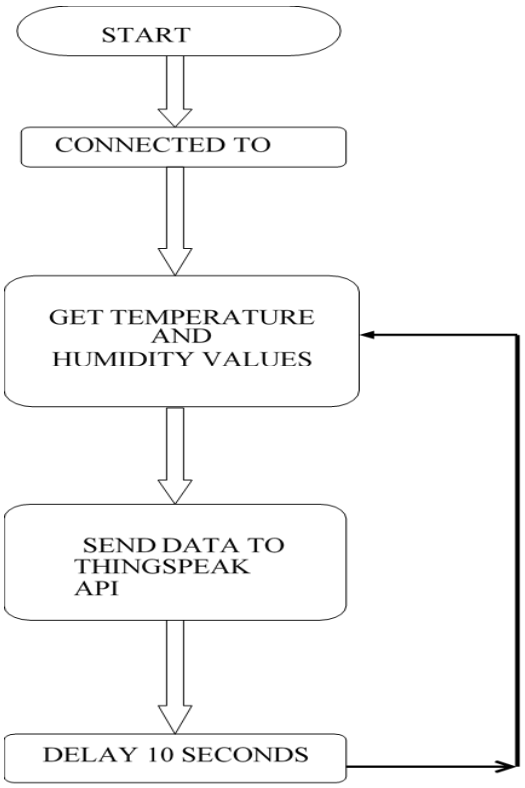


Fig 3.2 Flow Diagram of Proposed System

## IV. RESULT OF THE STUDY:

The result of the system ot the proposed system and the design is shown below.
We have measured the moisture of soil at different times of the day and figures below show the results of all the sensor readings at different platforms.

At the time of day

a)The figures shown below depict the sensor readings of temperature, humidity and soil moisture when the soil is DRY on serial monitor and Cloud server**.**

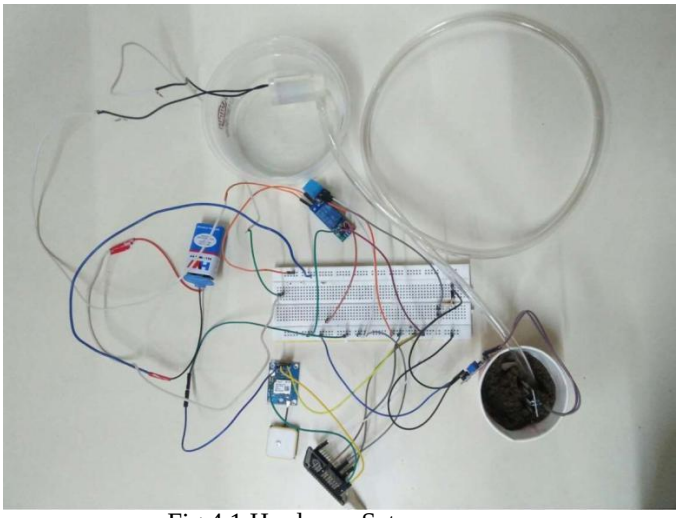

Fig 4.1 Hardware Setup

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**Graphs of sensor data on Thingspeak cloudserver**

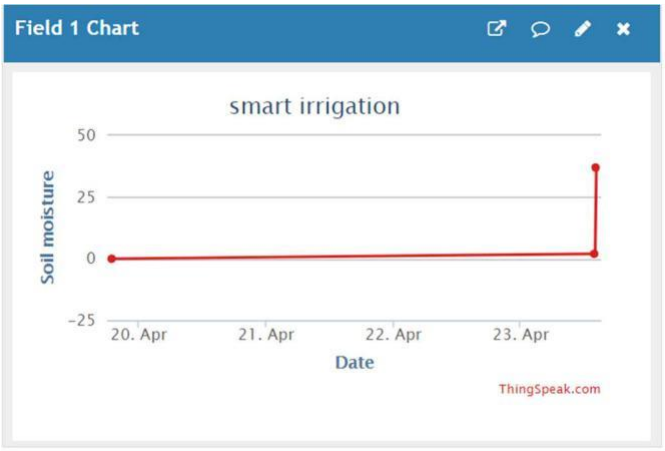


Fig 4.2 Graph of soil moisture

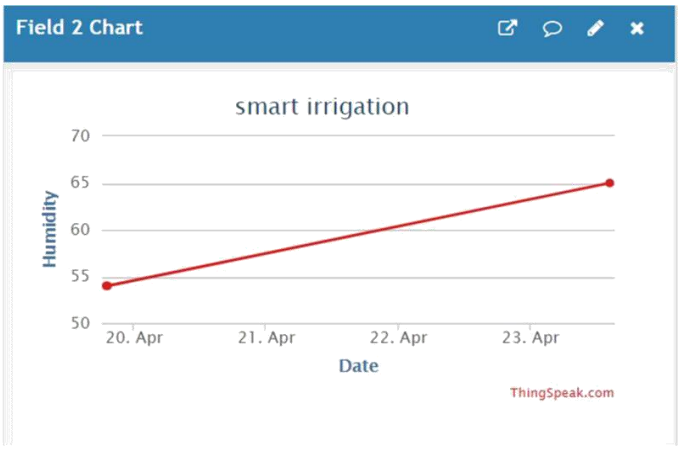


Fig 4.3 Graph of Humidity

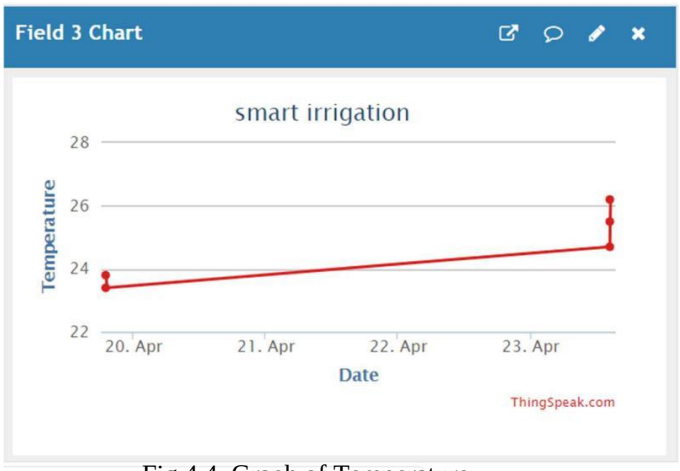


Fig 4.4 Graph of Temperature

The above figure shows the variation of soil moisture, humidity and temperature respectively with time. These graphs depict the real time data acquired on thingspeak.

b)The figures shown below depicts the sensor readings of temperature, humidity and soil moisture when the soil is WET on serial monitor and Cloud server.

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## V. ADVANTAGES:

The main advantage of this system is reducing the farmer stress by monitoring with the sensors and displaying it in a cloud platform. The system is cost efficient yet a better technological method. The agricultural difficulties can be reduced with IOT methodology, the moisture in the soil can be efficiently measured and the water for irrigation can be used effectively.

## VI.CONCLUSION

The proposed model explores the use of IoT (Internet of things) in the agriculture sector. This model aims at increasing the crop yield by helping in predicting better crop sequence for a particular soil. Thingspeak helps in real time sampling of the soil and hence the data acquired can be further used for analysing the crop. We have also taken many readings of the soil moisture, temperature and humidity of the environment for various days at different times of the day. Data on the cloud also helps the agriculturists in improving the yield, evaluating the manures, illness in the fields. This system is cost effective and feasible. It also focuses on optimizing the use of water resources which combats issues like water scarcity and ensures sustainability. This model focuses on the utilization of IoT in agriculture and the solutions proposed in this paper will improve farming methods, increase productivity and lead to effective use of limited resources.

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