OPEN ACCESS INTERNATIONAL JOURNAL OF SCIENCE & ENGINEERING

# IOT BASED AUTOMATIC IRRIGATION SYSTEM

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**Abstract: Basic income source for major population of our country is 'Agriculture'. In many time farmer incomeless due to rain and heavy wind flow damage to crop and destroy them completely. Using multi sensor and 'IOT' Based communication our system protect crop from rain and heavy wind flow and also provide smart irrigation system. In irrigation water requirement being large, that can save 80% of water with the help of smart irrigation. Saving time and avoiding problem like constant vigilance is aim of this prototype.**

**Depending on their water requirement, automatically providing water to the plants and gardens i.e. Water conservation. It is also efficient in Agricultural field, lawns and parks. Making work simpler and chance of reducing risk because this technology is advancing. Micro controller and embedded systems provide solutions for many problems. This project on "Automatic Irrigation System on Sensing Soil Moisture Content" is intended to create an automated irrigation mechanism which detecting the dampness content of the earth and turns the pumping motor ON and OFF. These all achieve by installing sensor in the field to monitor humidity, soil moisture, temperature which transmits the data to the microcontroller for estimation of water demand of plants.**

***Keywords:*** *cloud computing, Atmega Microcontroller, Moisture Sensor, Humidity Sensor, Temperature Sensor, Internet Of Thing (IOT),Solar Panel*

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## I INTRODUCTION

The continuous increasing demand of food required the rapid improvement in food production technology. In a country like India, where the economy is mainly based on agriculture and the climatic conditions are isotropic, still we were not able to make full use of agricultural resources. The main reason was the lack of rains & scarcity of land reservoir water. The continuous extraction of water from earth was reducing the water level due to which lot of land was coming slowly in the zones of un-irrigated land. Another very important reason of this was due to unplanned use of water due to which a significant amount of water was wasted. In modern drip irrigation systems, the most significant advantage was that water is supplied near the root zone of the plants drip by drip due to which a large

Quantity of water is saved. At the present era, the farmers have been using irrigation techniques in India through manual control in which farmers irrigate the land at the regular intervals.

This process sometimes has consumed more water or sometimes the water has reached Late due to which crops were dried. Water deficiency can be detrimental to plants before visible wilting occurs. Slowed growth rate, lighter weight fruit follows slight water deficiency. This problem could be perfectly rectified if we used automatic micro controller based drip irrigation system in which the irrigation would take place only when there would be acute requirement of water.

This project explained the design and implementation of an electronic system based on cloud computing and Internet of Things (IoT) for sensing theclimatic parameters in the greenhouse. Based on the characteristics of accurate perception, efficient transmission and intelligent synthesis of Internet of Things and cloud computing, the system have obtained real time environmental information for crop growth and then be transmitted.

||June 2021|| ISSN (Online) 2456-3293

The system can monitor a variety of environmental parameters in greenhouse effectively and meet the actual agricultural production requirements. Devices such as temperature sensor, light sensor, relative humidity sensor and soil moisture sensor are integrated to demonstrate the proposed system. This research focused on developing a system that can automatically measure and monitor changes of temperature, light, Humidity and moisture level in the greenhouse. The quantity and quality of production in

greenhouses can be increased. The procedure used in our system provides the owner with the details online irrespective of their presence onsite. The main system collects environmental parameters inside greenhouse tunnel every 30 seconds. The parameters that are collected by a network of sensors are being logged and stored online using cloud computing and Internet of Things (IoT) together called as Cloud IoT.

## II.PROPOSED BLOCK DIAGRAM AND EXPLANATION.

**EXPLANATION:**

1.This is a microcontroller-based circuit which monitors 1. and records the values of temperature, humidity, soil moisture and sunlight of the natural environment that are continuously updated as a log in order to optimize them to achieve maximum plant growth and yield.

2.AT Mega 16 micro-controller as the main processing unit and it gets inputs from the temperature sensor (LM35), Humidity sensor (HSM20G) and moisture sensor. From the data obtained from the sensors, displays the values on a LCD. The whole system gets power from Either a DC battery or a solar charging circuit which has a solar panel?

3.ESP8266 Module which sends information from the system to the owner. The system operates according to the block diagram. The readings from the sensors are analog values. The analog input value is converted to a digital value using ADC and given to the micro- controller for further processing. In this system the temperature sensor detects the current temperature value and inputs it to pin of the microcontroller. The input is an analog input and it is converted to a digital input and calibrated .Then it is displayed. Similarly for humidity, moisture. The output value which is to be stored on to the cloud through Internet of Things (IoT) is first transmitted out of the microcontroller to esp8266 module. And finally information send from esp8266 module to user cell phone (Android Application) in the form of graph i.e. variation in temperature level, moisture level, humidity level. With the help of this graph also users decide whether soil is suitable for plants or not. In this diagram Different sensors and LCD Display are as follow respectively.

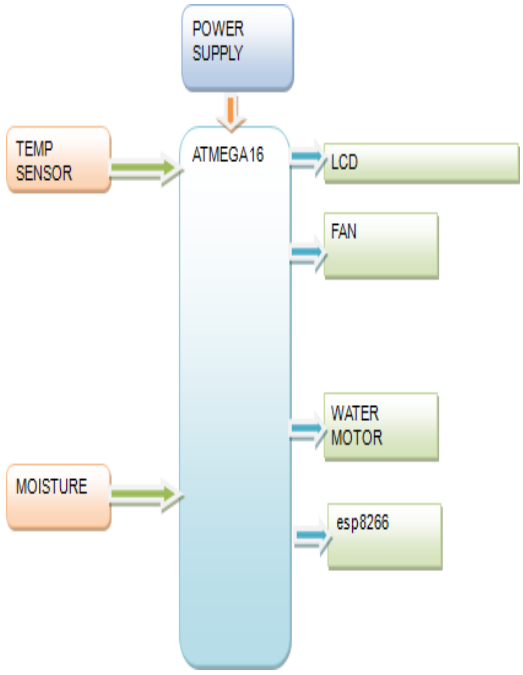


Fig.1 IOT BASED AUTOMATED IRRIGATION SYSTEM

•Temperature Sensor (LM35)

•Moisture Sensor

•Humidity Sensor

•LCD Display

•ESP8266 Module

**I Temperature Sensor**

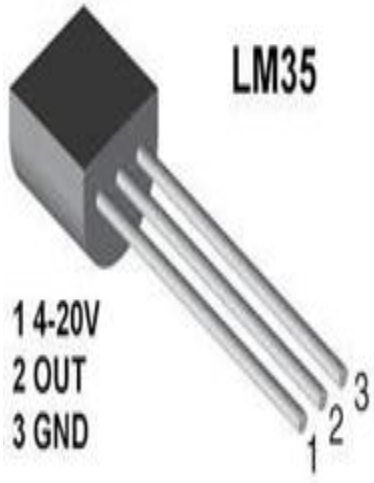


Fig2. Temp. Sensor

It is an integrated circuit sensor that can be used to measure the temperature in thegreenhouse. It measures and displays the phone (android application) in the form oftemperature values periodically and sends to microcontroller and processes it.

||June 2021|| ISSN (Online) 2456-3293

**II Moisture Sensor**

Fig3 .Soil moisture Sensor

The two copper leads act as the sensor probes. They are immersed into the specimen soil whose moisture content is under test. The conductivity of soil depends upon the amount of moisture present in it. It increases with increase in the water content of the soil that forms a conductive path between two sensor probes leading to a close path to allow current flowing through.

**III Humidity Sensor: -**

Humidity sensor is used for sensing the vapours in the air. The change in RH (RelativeHumidity) of the surroundings would result in display of values.

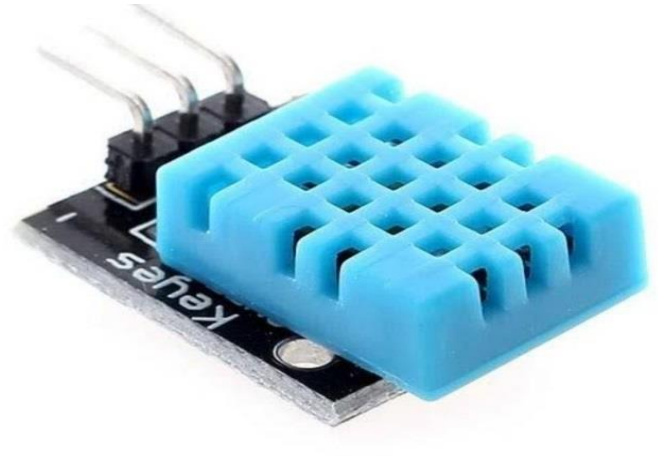

Fig.4 Humidity Sensor

**IV LCD Display**


Fig5. LCD Display

An integrated Liquid crystal display (LCD) is also used for real time display of data acquired from the various sensors and the status of the various devices. The system constantly monitors the digitized parameters of the various sensors.

Monitoring and controlling of a greenhouse environment involves sensing the changes occurring inside it which can influence the rate of growth in plants. The important parameters are the temperature inside the greenhouse which affects the photosynthetic and transpiration process, humidity, moisture content in the soil, the illumination etc. The above sensors used in this system.

**V ESP8266 Module**

Fig.6 ESP8266 Module

It is IOT device to use take data of soil and environment condition from controller and send to user in the Graphical form on user cell phone.

## III METHODOLOGY

In Sensor based Automated Irrigation System with IOT mentioned about using sensor based irrigation in which the irrigation will take place whenever there is a change in temperature and humidity of the surroundings. The flow of water is managed by solenoid valve. The opening and closing of valve is done when a signal is send through microcontroller. The water to the root of plant is done drop by drop using rain gun and when the moisture level again become normal and sensor sense it and send signal to microcontroller and valve is then closed.

## IV HARDWARES REQUIRED

•Microcontroller (ATMEGA 16)

•Temperature sensor (LM35)

•Moisture sensor

•16 *2 LCD display

•ESP8266 module

•Relay and Motor

||June 2021|| ISSN (Online) 2456-3293

## V.RESULT

The result i.e. the value of temperature, moisture Level, Humidity areshown on user cell graph .with the help of this information useralertwhether temp is low or high.so it is beneficial to farmer.

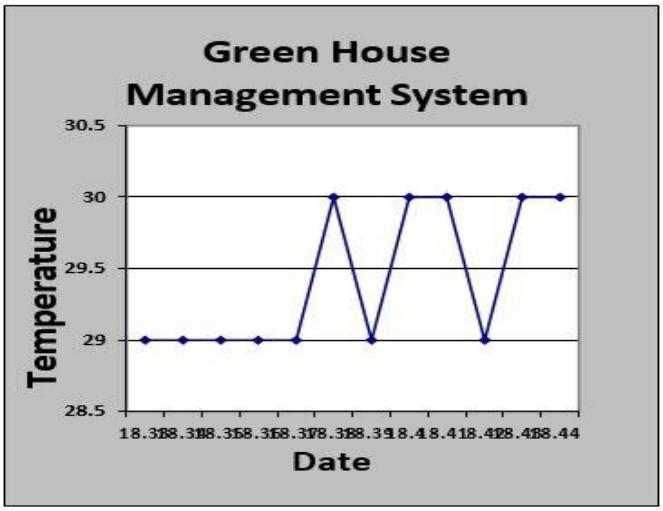


Fig.7 Displaying logged Temperature Values

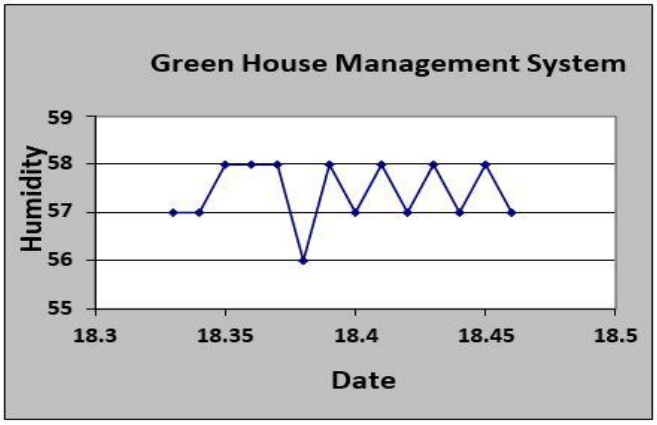


Fig.8 Displaying logged Humidity values

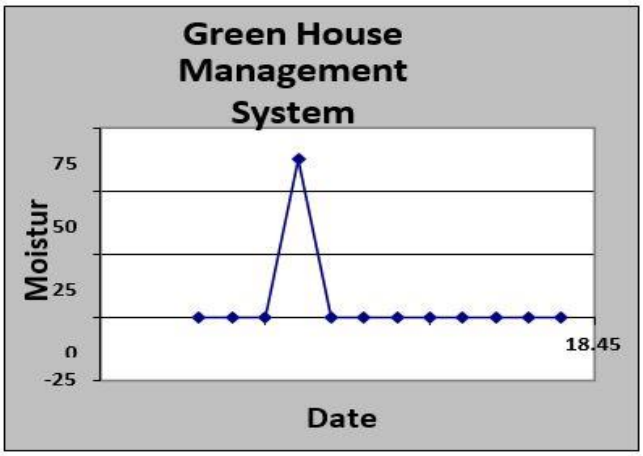


Fig9. Displaying the logged moisture values

## VI.ADVANTAGES OF SYSTEM

•Monitoring whole system from any place

•Remote control to the every sensor and hardware in a system

• Maximizing greenhouse security

• Quick action can be taken against emergency condition

## VII. DISADVANTAGES OF SYSTEM

• Agriculture being natural phenomenon relies mostly on nature and man predict or control nature let it be drought sun light availability pest control.so ever

• The smart irrigation need availability of internet continuously ruler part of developing didnot fulfill these requirements .moreover internet is slow

• Fault sensor or data processing engine can cause faulty I decision which may lead to over use of water fertilizers and other wastage of resources.

## VIII.CONCLUSION

•This paper describes the design of a greenhouse monitoring system based on Cloud IOT. Agriculture projects even in urban areas are on a rise in recent times, in unique forms. Technological progress makes the agricultural sector grow high, which here is made by the Cloud IOT.

The IOT will dramatically change the way we live our daily lives and what information is stored about us. This cloud computing is free to use anytime and anywhere as long as the computer is connected with the Internet. These monitoring system precepts different parameters inside the greenhouse using sensors, GSM, and cloud to provide the updates. The developed system can be proved profitable as it will optimize the resources in the greenhouse. The complete module is of low cost, low power operation hence, easily available to everyone.This paper is a basic idea of the research regarding greenhouse but still there is a lot more to be explored technologically.

## IX.ACKNOWLEDGMENT

We express our sense of gratitude towards our project guide Mr. P. R. Chaugule for his valuable guidance at every step of study of this project, also his contribution for the solution of every problem at each stage. We also extend our sincere thanks to all the staff members who extended the preparatory steps of this project. We are very much thankful to respected Principal Dr. M. S. Rohokale for his constant support. Finally we want to thank to all of friends for their support & suggestions. Last but not the least we want to express thanks to our family for giving us support and confidence at each and every stage of this project.

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[20th -21st May, 2021]

**In association with ISTE , IETE and CSI**

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