AUTOMATIC DRIP IRRIGATION USING IOT AND CLOUD DATABASE

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ABSTRACT

Emergence of controlled environment agriculture (CEA) starting from computer controlled water irrigation system to lightning and ventilation has changed the conventional scenario of farming. This project proposes and demonstrate a cheap and straightforward way to use Arduino based controlled irrigation system. The designed system deals with various environmental factors like as moisture , temperature and amount of water required by that crops using sensor like water level sensor and soil moisture sensor. Data is controlled and received by controller which can be link to an interactive website which shows the important time values with the quality values of various factor required by a crop. This allow user to regulate irrigation pumps automatically and to satisfy the standard values which can help the farmer to yield maximum and quality crops. Studies conducted upon laboratory prototype suggested the designed system to be applicable which may be implemented.

Keyword : - *Emergence of controlled environment agriculture (CEA), cheap and straightforward way.*

1. INTRODUCTION

INDIA may be a country where the main occupation is agriculture.73% of population is depend directly or indirectly on agriculture. Cultivating a crop influences world science and climatic condition. Farmer depends on monsoon mostly for water resources, Which is inefficient . Hence Irrigation system is of major concern which involves watering the plants depending upon soil moisture, soil fertility and climate. As an India is an agro-based country, the wants are enhancing day by day. Out of them first and foremost need is source of power for agriculture.

The main aim of the project is to supply water to plants automatically using soil moisture sensor. They sense the soil moisture and thus the ambient temperature to understand if the soil actually needs watering or not. Assimilation is that the synthetic application of water to the land or soil is used to assist within the growing of agricultural crops, Maintenance of landscapes and revegetation of disturbed soil in dry areas and through periods of inadequate rainfall. Several sprinklers have pipe thread inlets on the rock bottom of them that allows a fitting and also the pipe to be connected to them. The sprinklers are usually utilized in the highest of top flush with the bottom surface. Because the method of dripping will reduce huge water losses it became a well-liked method by reducing the labor cost and increasing the yields.

1.1 LITERATURE REVIEW

The need for systems that make agriculture easier and more viable has improved within the past few years. The capacity to conserve two of the foremost important resources of a farmer, water and time has been latest challenges .A system that gives this ability through the utilization of systematic and reliable methods like wireless sensing element networking ,sprinkler irrigation, GSM ,SMS technologies are readily available on mobile phone which is to help the farmer get a battery yield and on a larger scale, help the agricultural and economic process of the

country. There is a growing range of application of knowledge mining techniques in agriculture and a growing quantity of knowledge that are presently available from several resources. This can be comparatively a unique analysis field and it is expected to grow within the future. There is a great deal of work to be done on this rising and attention grabbing analysis field. The microcontroller primarily based drip irrigation system that monitors and controls all the activities of drip irrigation system with efficiency. The current system model to modernize the agriculture industries at a mass scale with optimum expenditure .They can give irrigation to larger areas of plant with less water consumption and lower pressure. Making use of this system one can save manpower, water to enhance production and ultimately profit.

1.2 METHODOLOGY

An automatic plant watering system making use of Arduino microcontroller UNO R3 is programmed such it offers the interrupt to the motor via the motor driver module. Soil sensing element is connected to the A0 pin to the Arduino board that senses the wetness content in the soil. Whenever the soil wetness content worth goes down the sensing element senses the humidity changes giving signal to the microcontroller so that the pump is activated. This idea is used for automatic plant watering system. The circuit comprises of an Arduino UNO board , a soil moisture sensor, a 5V motor pump, motor driver L293D ,motor driver IC to run the pump. You will be able to power the Arduino 5V to 9V battery for the pump motor. These are two practical parts during this project. These are the wetness sensors module and the motor driver for motor pump. Therefore the Arduino board is programmed making use of the Arduino IDE software. The operation of the wetness sensing element is to sense the temperature content in the soil, and conjointly it measure wetness level in the soil. The motor driver interrupts the signal to pump supplies water to the plants. This project uses microcontroller Arduino uno board to regulate the motor and monitor soil wetness.

2. COMPONENTS

1)**Moisture sensor:** The sensor used here is YL-69 which is formed from two electrodes which enable the sensor to read the moisture. This is often a basic volumetric sensor. A current is passed across the electrodes through soil and therefore the resistance to current in soil determines soil moisture in it. The sensor has both analog and digital outputs, which may be used accordingly. This outputs are available with PCB board fitted with LM393 comparator and a digital potentiometer.

2)**DHT11 temperature and humidity sensor**: This sensor provides ratio value in percentage (20 to 90% RH) and temperature values in degree Celsius(0-50 degrees C).DHT11 is a 4 pin sensor namely VCC, data, GND,NC. VCC power supply are often applied from 3.3 to 5.5 V DC. This is good for 20-80% humidity readings with 5% accuracy.

3)**DC motors**: DC motors help the onboard sensors to succeed in the soil while sensing measurements are being collected. A DC motor is a device that converts electricity to mechanical energy. These motors are driven by L293D IC. This is often a 16 pin IC which controls 2 motors simultaneously in any direction. These motor drivers act as current amplifiers as they take low-current control signal and supply a high-current control . It works on concept of H-Bridge which allows the voltage to be flown in either direction.

4) **Relay:** A relay is used to carry out the task of irrigation. It is an electrically operated switch which is used to control a circuit of low-power signal or where several circuits must be controlled by one signal. Relay allows you to turn on/off a circuit using voltage or current much higher than a microcontroller could handle.

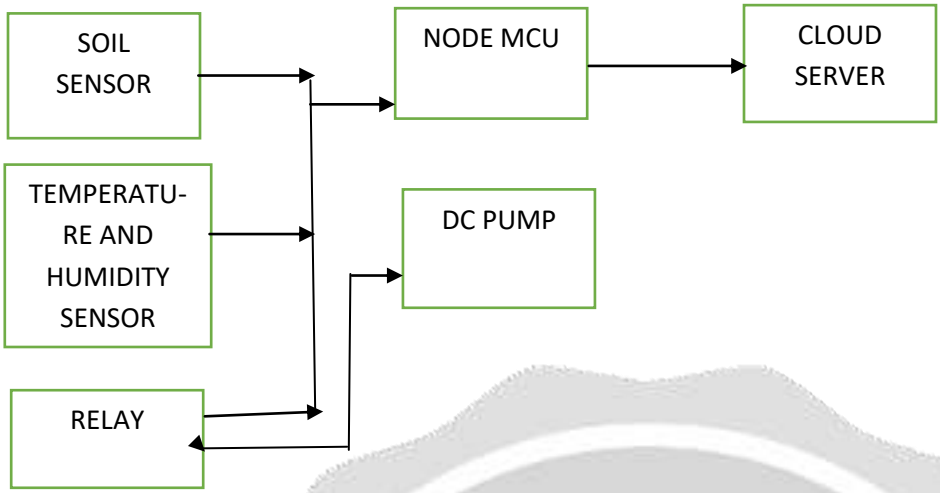


Fig -1: Block Diagram

2.1 CIRCUIT DIAGRAM

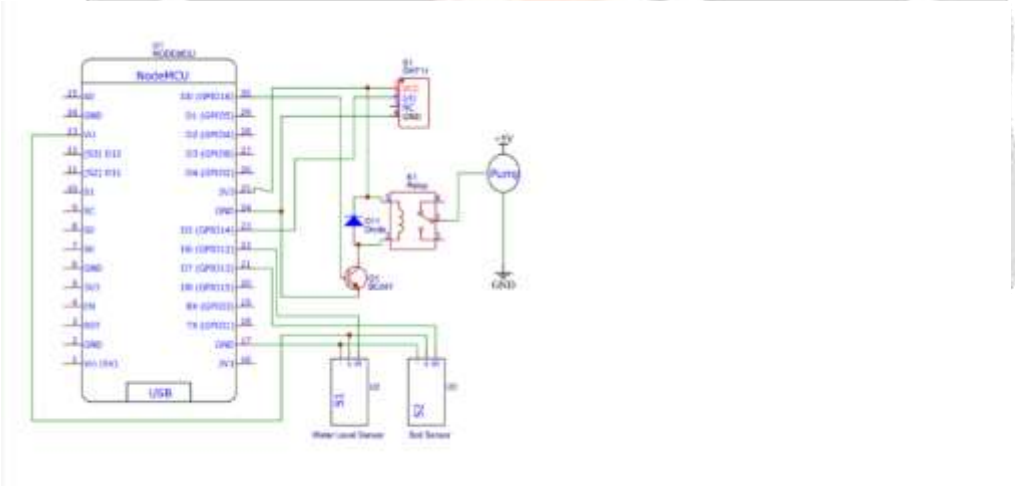


Fig 2. Circuit diagram

WORKING

Steps for implementing Hardware:

1)Connect Relay, DHT11 humidity and temperature sensor , DC pump to a NodeMCU open source interface on a PCB.

2) Also create a cloud server for data monitoring.

3)Connect a laptop to the whole circuit performing irrigation.

4)Firstly the DHT11 sensor senses the soil moisture content and sends the signals to the NodeMCU.

5)This sending signals require WIFI module called ESP8266 which is connected via hotspot of an android and this android displays the temperature, humidity and the status of the pump , if it is on or off after the data received. If the soil is dry it makes the pump on and vice versa.

6)If the soil is dry it makes the pump on and vice versa.
7)The cloud server shows the raw data graphs about the status of pump and the field .

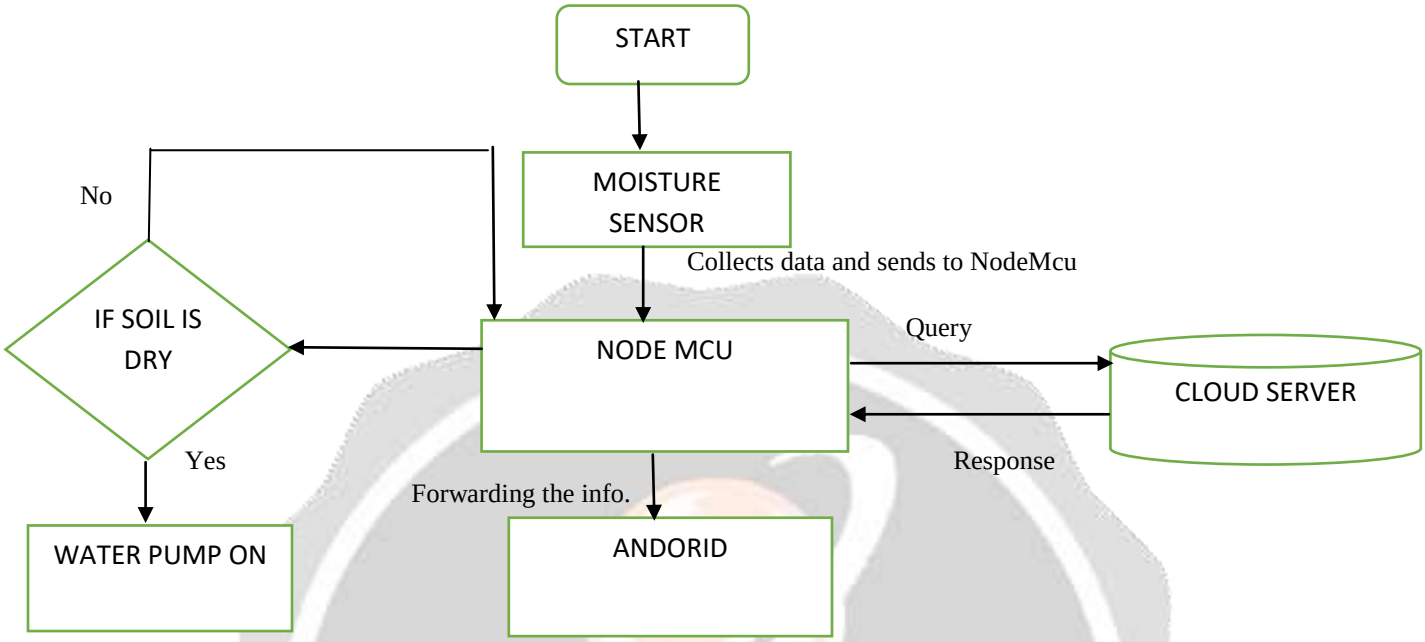


Chart -1: Flow Chart

The above flow chart describes about the process carried out.

The soil moisture sensors will firstly senses the moisture and DHT sensor sense the temperature and humidity.

The data is then sent to NodeMcu which is the IOT platform which works along with the wireless module ESP8266,and the data is displayed on the HTML page which is created on an android phone.

Thereafter, if the soil is dry ,the water pump switches on or the soil is wet the water pump switches off.

The detailed report and graphical analysis of the live stream of the field is updated every 2 minutes and it can be checked online from any part of the world .

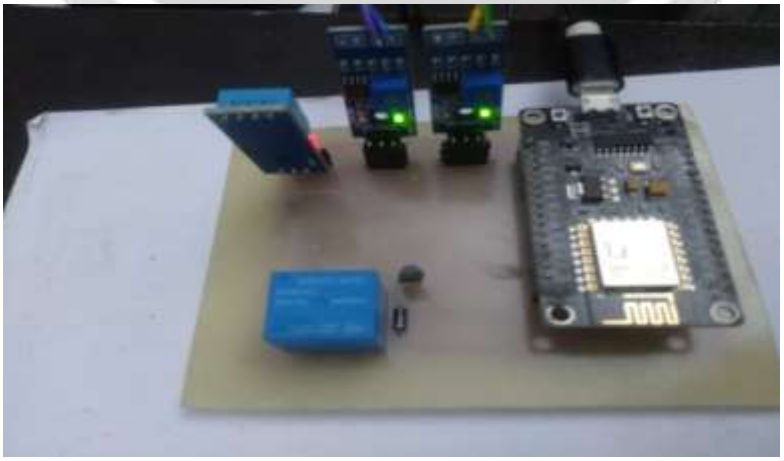


Fig-3:Circuit Model

3.FUTURE SCOPE

Water resources could be utilized efficiently and effectively hinged on various other parameters in order that agriculture sector become more productive. Automatic drip irrigation at different seasons is another future scope. Water is allowed to the field of crops depending upon the particular seasons. Some more parameters such as plant growth at different stages, whether condition are to be taken into account.
1)Communication through internet.

2)Communication through GSM mobile.

3)Solar power and wireless sensor application.

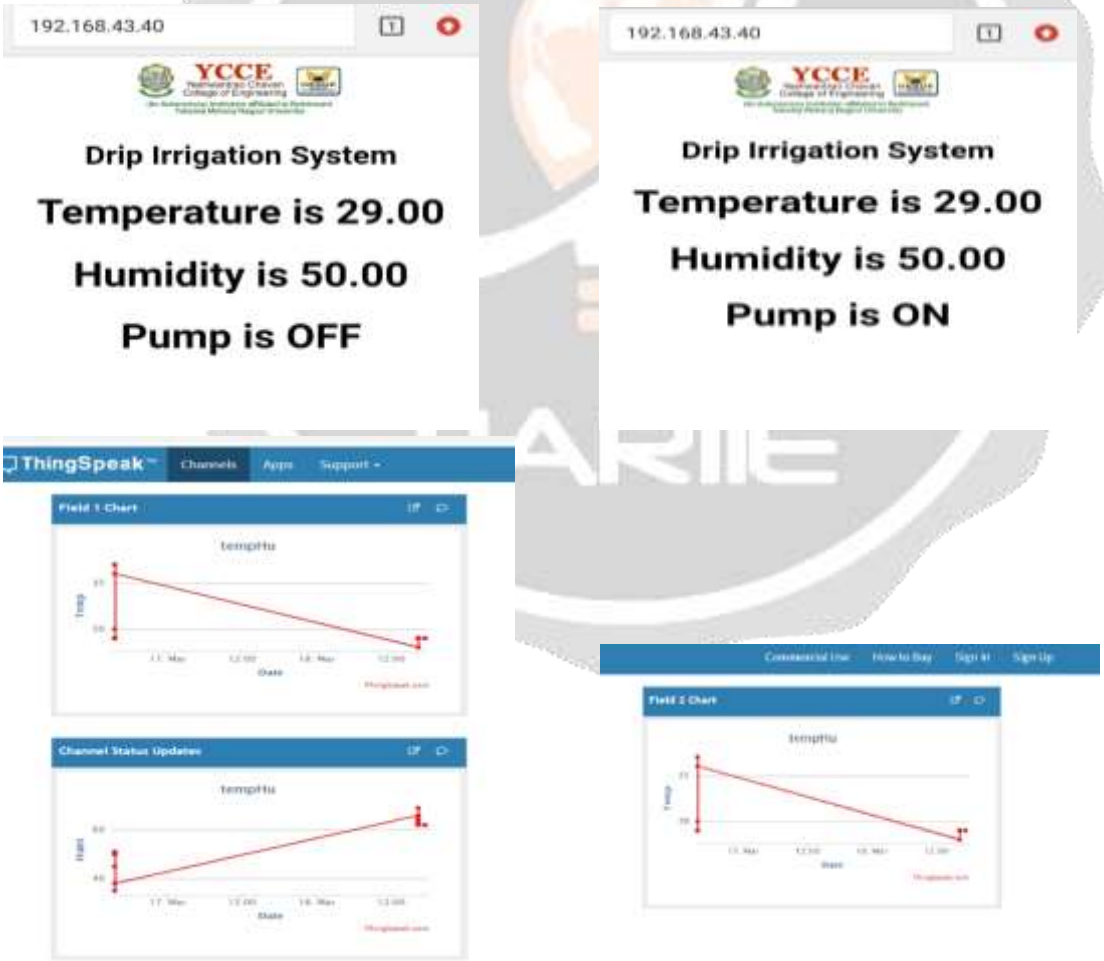
4)Handle security issue during session.

5)Centralizes database maintenance of crop according to the atmospheric condition throughout the year.

6)Can control more parameters more precisely.

3.1 RESULT

Thus we've successfully determined the temperature and humidity of the soil when the soil is dry and wet respectively .
The HTML page shows the on/off status of the pump consistent with the soil humidity.



Fif.4-2:Graphical analysis of live streams of a field

Above are the graphical data which is obtained using the ThingSpeak IOT platform that allows you to visualize and analyze live data streams in cloud database. This feature can help the farmers to take daily and current updates of the farms related to temperature and humidity of soil.

4. CONCLUSIONS

The primary application of this project is for farmers and gardeners who don't have time to water the crops or plants. The proposed system describe a novel approach for automated irrigation system at moderate cost. The humidity, moisture, temperature and water level are measured and received at the user end. The simple link Wi-Fi module is the best for IOT and cloud based project. Since there is no need of interfacing any external Wi-Fi module, the proposed hardware prototype is dense, lightweight, easily programmable and easily installable and is cost efficient.

5. ACKNOWLEDGEMENT

I would link to thank the management and the department for their constant supervision and encouragement. I would also like to express my sincere thanks for paying special attention as well as valuable guidance and support.

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