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IOT Based Crop Field Monitoring System

Hemant G. Patil , Parvez J. Patel , Manisha S. Mahajan , Shreya G. Bhele

Undergraduate scholar, Department of Electronics and Telecommunication [3rd year], Government Engineering College Aurangabad, Maharashtra, India

ABSTRACT: Irrigation is one of the most important part in the life of plants. It is a great thing when we can automate this process. There are a lot of advantages of automating this process like, only that much amount of water will be supplied as per the requirement of the plant and in resulting the water will be saved. Here in this project we have used node - mcu as a controller which will monitor the moisture of soil with the help of moisture sensor, with the help of inbuilt wi-fi module we can upload the moisture data to the cloud.

In this we have used a relay module that will switch the Pump motor ON-OFF when moisture level crosses the set value (standard Value). So, we can control the moisture level of the soil automatically as well as we can get moisture related data that can be accessed world-wide.

KEY WORDS: IOT, Automation, Thing speak, Node MCU, Irrigation.

I.INTRODUCTION

As we know irrigation is one of the most important parts of agriculture and it takes a lot of time if it is done by human beings. But can we make it automatic? Then the answer is yes. We can But how? Then this is the place where we are going to discuss it. Our main motto is to make the irrigation process completely automatic as well as to monitor the temperature and humidity of the surrounding which plays a major role in the health of crops.so this project deals with the product that has been developed to perform all the tasks mentioned above. We have used sensors for monitoring the temperature , humidity of surrounding and soil moisture , a Node mcu to monitor and control these things and a water pump to supply water to crops. We are going to use the concept of IOT to connect our system with the ThingSpeak cloud which will allow us to give detailed information about our project in any corner of the world.

II. LITERATURE SURVEY

On the concepts of Smart Irrigation System there are various journals / papers available . For this Journal we refer to "Automatic Irrigation Systems", After referring to this paper we come to the result that there are some more things which can be added in this system. And we finalized factors ,Soil moisture sensor, moisture and humidity in the root zone of the plant.

1. Surrounding Humidity:

The amount of water vapours present in the surrounding environment .This factor will help the farmer to protect his crops from different pests and insects that come from moisture contained in the surrounding.

2. Surrounding Temperature :

This is the temperature of the crop field which affects the need of irrigation to the crop. By this temperature data farmers can decide the different works in the field like irrigation, spraying, fertilizing etc.

3. Soil Moisture

This is the major fact which decides whether the water is to be supplied or not. If the soil moisture data is given to the farmers at the right time, they can plan their different procedures effectively.

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III. PROPOSED METHODOLOGY

This prototype monitors the amount of soil moisture. Moisture Sensors are placed inside the soil, this sensor uses two probes which senses the moisture sensor in the soil. A predefined range of soil moisture is set, and can be varied with soil type or crop type. If the soil is dry the moisture sensor value will be high, Arduino now alerts the motor to supply the required amount of water to the soil. so the pump is turned on and switched off when the value reaches threshold. In case the moisture of the soil deviates from the specified range, the watering system is turned on/off. System switched on/off and information about soil moisture, temperature and humidity of the surrounding is continuously updated on thing speak cloud. Users can access the cloud information from any place in the world.

IV.BLOCK DIAGRAM DESCRIPTION

Herein fig 1.1 is broadly divided into 3 parts that is

1.Input Panel

2.Processing Unit

3.Output Panel

In the Input Panel, input components blocks are there namely soil moisture sensor and DHT11 sensor is there for detecting moisture of soil and temperature ,Humidity of surrounding area.

Processing Unit, Processing unit contains the main processing block of the circuitry that is node mcu which hason chip Wi-Fi for transmitting real time data to think speak cloud. It takes input from input panel n process on it .An another thing done by it is uploading data to think speak cloud.

Output Panel, output panel contains user block and water pump for irrigation system.

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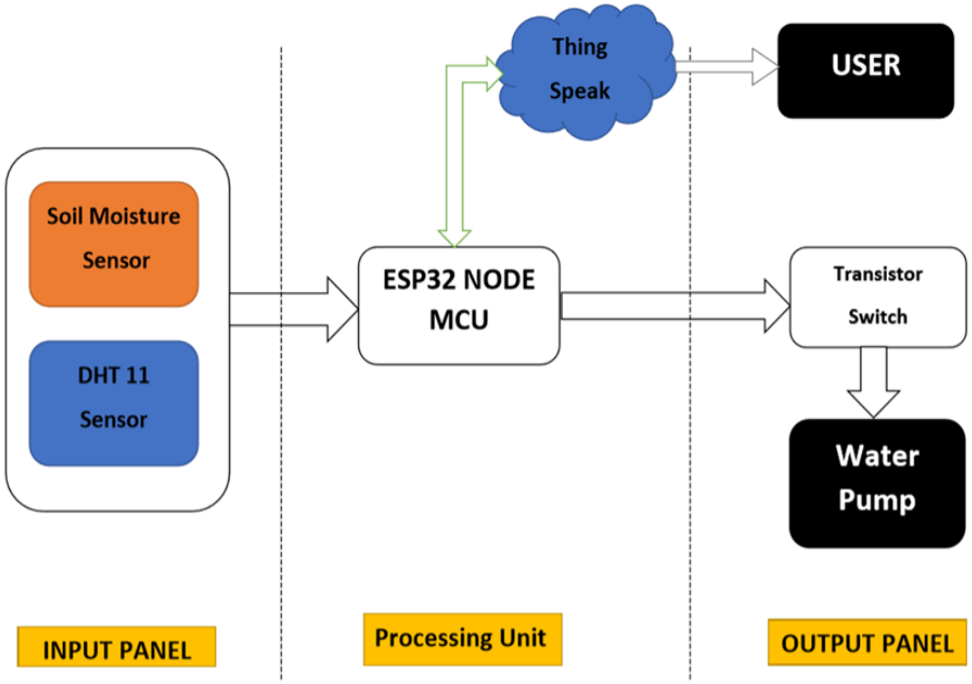
V. BLOCK DIAGRAM



VI. WORKING

In the agriculture field, sensors are used like soil moisture sensor and DHT11 sensor. The information received from the sensors is sent to the Thing speak cloud through the Node MCU device. In the control section, the system is activated and the pump motor is turned ON/OFF accordingly. Also, this system is automatically activated when the soil moisture is low, the pump is switched ON based on the moisture content of the soil. The application has a feature like taking some time from the user and watering the agriculture field when the time comes. And on the other hand when the moisture falls below the specific level motor gets off automatically through the transistor switch. Other parameters such as the moisture sensor demonstrate the threshold price and the level of water in the soil. Further, this project can be enhanced by designing this system for large acres of soil. Also, this system can be incorporated to make sure the value of the soil and the expansion of harvest in each soil.

Graphs of Soil Moisture, Surrounding temperature and humidity are continuously shown on the cloud. This can be accessed from any corner of the world.

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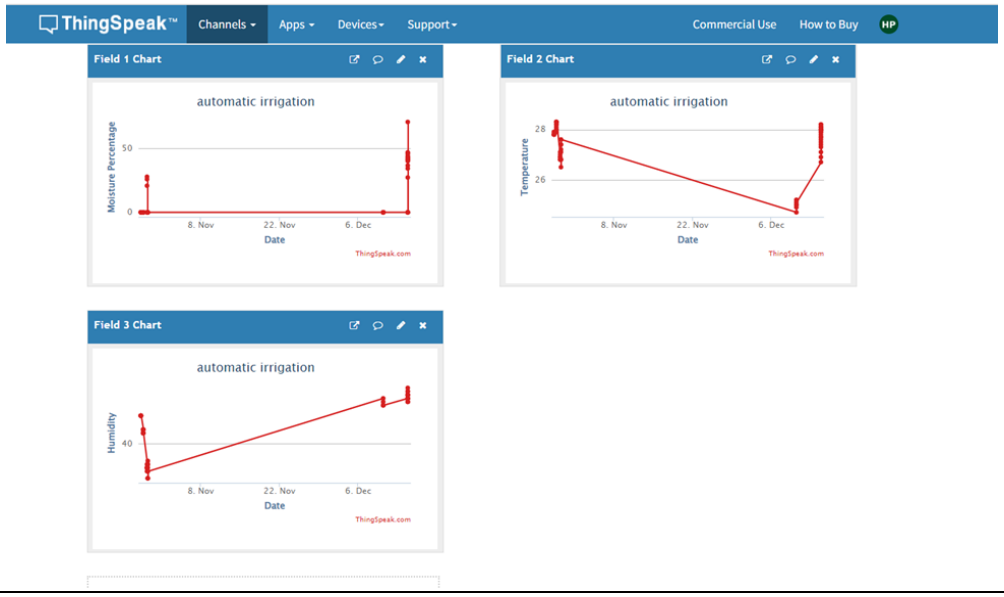
VII. THING SPEAK WINDOW



VIII. FUTURE SCOPE

We can add more different sensors to improve its working to make a fully technical crop field with the help of digital technology. As we have used here internet connectivity to the project we can monitor as well as control different measures of the field.

As we know the world is facing a shortage of natural resources, and as per the survey it will increase day by day. Water is one of the most important natural resources. It plays a very important role in agriculture for irrigation. So we have to use it very effectively without wasting it. This project will help us to supply the required amount of water to the crops without any wastage or shortage. So, we can save water as well as increase the efficiency of crop production.

As per above statements we can say that this project will allow the farmer to work smartly and automatically with effective use of technology.

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AUTHOR'S BIOGRAPHY

Hemant G. Patil, is an Undergraduate Student of Electronics and Telecommunication, of Government Engineering College Aurangabad, Maharashtra. He has completed his Diploma in Electronics and Telecommunication at Government Polytechnic Aurangabad, Maharashtra. He has published a journal paper in IRJET (International Research Journal of Engineering and Technology) entitled "Automatic gear transmission for the Geared Bikes". And another journal paper Published in IJARSET (International Journal of Advanced Research in Science, Engineering and Technology) entitled "Fault Tree Analysis Approach for Analog Circuit".

Parvez J Patel, is an Undergraduate Student of Electronics and Telecommunication, of Government Engineering College Aurangabad, Maharashtra. He has completed his Diploma in Electronics and Telecommunication at Institute of Engineering & Technology (Polytechnic), Kannad, Aurangabad, Maharashtra. He has published a journal paper in IJSRD (International Journal for Scientific Research and Development) entitled "Automatic Sprayer for Crops Using Arduino & Bluetooth".

Manisha S Mahajan, is an Undergraduate Student of Electronics and Telecommunication, of Government Engineering College Aurangabad, Maharashtra. She has completed her H.S.C. in Science from Swami Vivekanand Junior college Mantha, Maharashtra.

Shreya G Bhele, is an Undergraduate Student of Electronics and Telecommunication, of Government Engineering College Aurangabad, Maharashtra Aurangabad, Maharashtra. She has completed her H.S.C in Science Electrical maintenance (EM).
