IoT Based Agriculture Irrigation, Monitoring and Controlling System through Data Analytics

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***Abstract*—**In now a days farming is to difficult to cultivate . Farmers in the agriculture sector are dealing with major irrigation issues. Crops can be harmed as a result of over- and under-irrigation.system with an Android-based mobile application and control system is developed and tested using local and cloud server architectures. The system collects real-time data from the irrigation site using four sensors (moisture content, temperature, humidity, and camera) and feeds it to the central controller.We are using that to enhance agriculture we included PH sensor to monitor the agriculture field.According to the soil moisture sensor the water supply will on and off the motor. We are using that web camera to determine the diseases of the crop .It takes the data from the picture with the help of web camera. It stores the data in the gmail when we press the switch to capture the image .

Keywords—component, formatting, style, styling, insert (*key words****)***

I. INTRODUCTION

In every county most commonly land is used for agriculture, growing forest, grazing animals , mining , construction of houses, roads , railways and industries,ect. In every country agriculture plays a major role. Agriculture is the major development in the in the human civilization. Agriculture is an important sector of indian economy. It contributes about 17% to the total GDP. Agriculture provides employment to over 60% of the population .

In india according to the land survey in 2018 to 2019 the agriculture land was 60.4%.The use of land depends up on the its fertility,water retention capacity, available minerals contents and climatic conditions.India is an equatorial and equi tropical country with mean temperature of above than 25’ celsius .This increases the speed of evaporation . Irrigation is vital for suste-nance of mankind but simultaneously it is very tedious and time consuming. There is already a shortage of water sources and hence it becomes essential for mankind to save it.This proposed system consumes the least amount of water required for crops, thus saving it .In case of increasing of water supply to the crop then the total crop will damage .Then farmers will face huge amount of loss.

In india there is a power cut problems in every place .The farmer didn’t know about at what time the power will come or not .In india in summer season the temperature is to high,At that time the water evaporate faster when compared to the other seasons. In summer season the humidity in air very low.Now a days the farmers are using huge amount of fertilizers for the crops. By using huge amount of fertilizers the PH of value of soil will change.

II RELATED WORK

The author says to eliminate the tedium of irrigation practise, a smart irrigation system with an automatic application and control system is developed and tested using local and cloud server architectures. The system collects real-time data from the irrigation site using four sensors (moisture content, temperature, humidity, and camera) and feeds it to the gmail mail. In thingspeak it display the four sensor measurements in real-time on a user-friendly graphic interface as they are received from the server. After reaching certain threshold values, the system automatically starts and stops irrigation pumps based on measurements from the soil moisture content sensor.[2]smart plant irrigation IoT system that adapts to a predefined irrigation habit on its own. In general, automated plant irrigation systems make decisions based on static models derived from the characteristics of the plant. In contrast, irrigation decisions in our proposed solution are dynamically adjusted based on changing environmental conditions. The model's learning mechanism reveals the mathematical connections between the environmental variables used in determining the irrigation habit and gradually improves its learning procedure as irrigation data accumulates in the model. We used Convolutional Neural Network (CNN) algorithm to determine the diseases of the plant. where as technology is rapidly advancing, the field of agriculture and farming necessitates the use of cutting-edge technology to make farmers' lives easier. The primary goal of automating the irrigation setup is to enable remote control and monitoring of the setup's status even when the farmer is not present. This paper proposes a new system that uses advanced sensors and a GSM module to provide SMS acknowledgement whenever a critical action is initiated during the process. This includes too much water being pumped to a crop, too much sunlight for an extended period of time, and a variety of other critical situations. The farmer will then have the opportunity to take appropriate action.
[4]makes use of the Internet of Things (IoT) via the Raspberry pi. The goals of this paper are to investigate the concept of smart irrigation systems using IoT, to develop a system using an Raspberry pi that processes data from the soil sensor to automatically water the plant, and to analyze the real-time soil condition of the plants via a smart phone connected to the internet. It was necessary to install sensors for each plant in order to determine the soil's condition. In order to supply water, each plant must also have a water pump. The hardware implementation that can detect the condition of the plant using the dht 11 sensor and moisture level sensor.Agriculture has been based on traditional methods for centuries, and when modern technology was introduced, it was only to modernize the traditional equipment. However, the potential for monitoring, automation, and data analysis based on real-time data acquisition from farms has yet to be fully explored. When we investigate this field, we will be able to see the potential for Internet of Things-based agriculture automation. The primary goal of this research paper will be to design and implement smart automation systems for farms, as well as to constantly analyze and report real-time data from the field.

This paper describes the prototype design of a Raspberry pi intelligent irrigation system controller that will allow irrigation. The pH value of the soil.Monitoring parameter values are adjusted based on the optimal conditions required for a crop.

III. SYSTEM ANALYSIS AND DESIGN

A. Existing System

In Existing system, there is no ph sensor is implemented.Camera is also not implemented in the system. The both irrigation and monitoring system is not implemented in the single project.Stil now the both irrigation and monitoring system implemented in two different projects.

B. Proposed System

For large-area, more traditional farming, sensors placed within the ground may record real-time data on soil moisture, temperature and pH.We can save the over flow of water in the field.Smart irrigation controllers can be adjusted to water yards and plants the exact amount of water needed so they can thrive.A smart irrigation controller can help you get ahead of the water cost curve and help the planet by conserving your water resources.It delivers high quality crop production.

C. Methodology

This project does plant monitoring as well as smart irrigation.In plant monitoring, the farm can be monitored the farm with some of the sensors like Temperature, Humidity, Soil Moisture, dth11, Ph. This sensors will monitor the farm environment. Based on the land condition, the owner may do the smart irrigation. The water pump will switch on automatically with the help of sensors otherwise the owner can switch on the pump by watching the condition of the field.

Interface the GSM module to Raspberry pi to send the sms to the owner connect the dth11 sensor to Raspberry pi to retrieve the Temperature and Humidity value connect the soil moisture sensor to Raspberry pi to retrieve the moisture value of the soil

connect the ph sensor to Raspberry pi to retrieve the ph value of the soil connect the camera to Raspberry pi to retrieve the diseases of the plant.

By sending all the values of sensor to the cloud, there we can analyze and change the status of the motor which is connected to relay module Based on the retrieved values of the different sensors, we will change the status of the motor automatically. And also, an alert message will be sent to farmer or agriculture farm owner for communication between the farm and owner to easy. while we press a red color button on the kit the camera capture the image of the plant and send to the mail. In the mathlab, while we run the program it extract the image from the mail.Then it compare the newly captured image with image which we stored in the folder.Then it determine diseases of the plant.

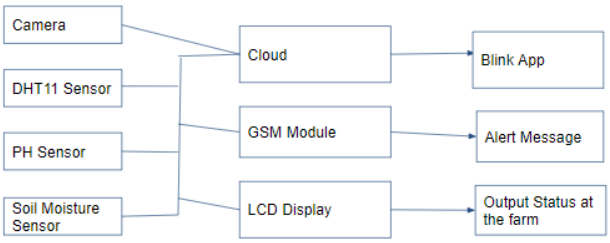

Figure 1 Flow Diagram of System

Here are some rules we framed for switching the motor to perform irrigation process to build our algorithm.

Temperature	Humidity	Soil Moisture	PH	Result Motor
> 40 deg	<50%	=>1<=	=>320 <=	ON

Figure 2 Conditions related to Sensors

IV MODULES

A. *Raspberry pi*

The Raspberry Pi is a small and inexpensive computer that can be used to learn programming through fun, hands-on projects. Join the Raspberry Pi community around the world. Raspberry Pi can be used to teach, learn, and create.

Figure 3 *Raspberry pi*

B. *Web Camera*

A webcam is a video camera that feeds or streams an image or video to or through a computer network, such as the Internet, in real time. Webcams are small cameras that typically sit on a desk, attach to a user's monitor, or are built into the hardware. During a video chat session with two or more people, webcams can be used.

Figure 4 : Web camera

C. Relay module

Relay module is used to operate alternating current devices by the input of digital signal from IOT Raspberry pi. We can use this module in real time projects.

Figure 5 : Relay module

D. GSM Module

A GSM modem is a device that can be either a mobile phone or a modem that allows a computer or other processor to communicate over a network. A SIM card is required to operate a GSM modem, which operates over a network range subscribed to by the network operator. It can be connected to a computer via serial, USB, or Bluetooth.

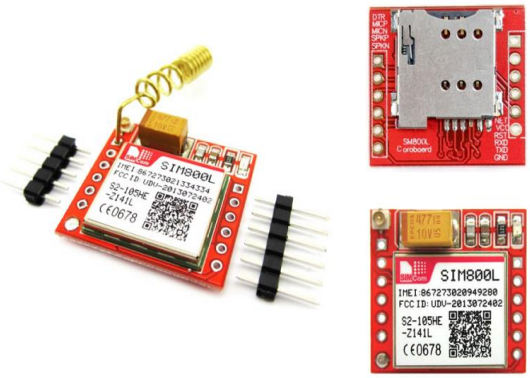

Figure 6 : GSM Module

Figure 7: Field chart

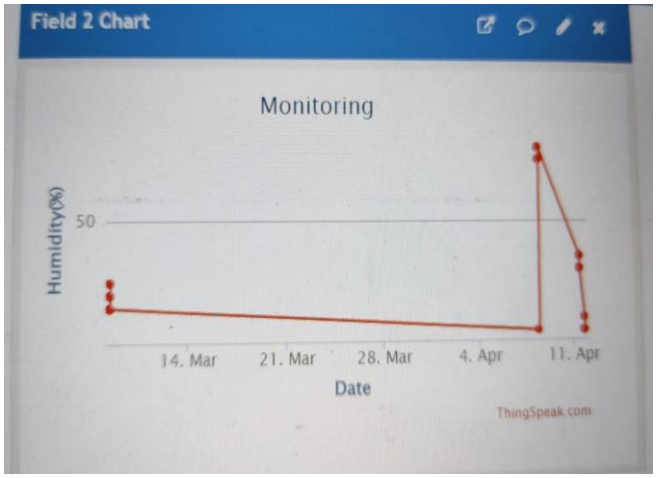

Figure 8: Field chart

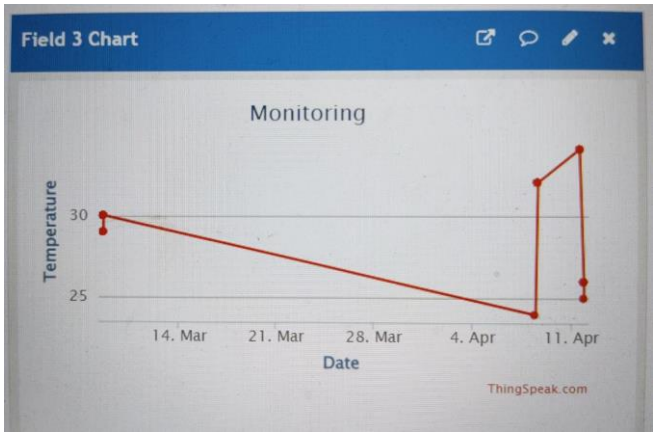

Figure 9: Field chart

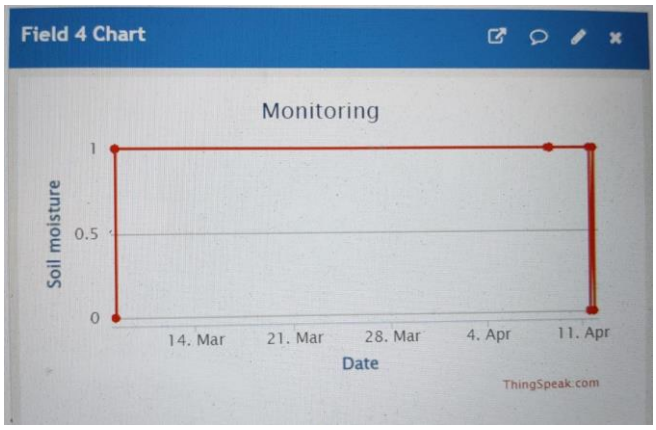

Figure 10: Field chart

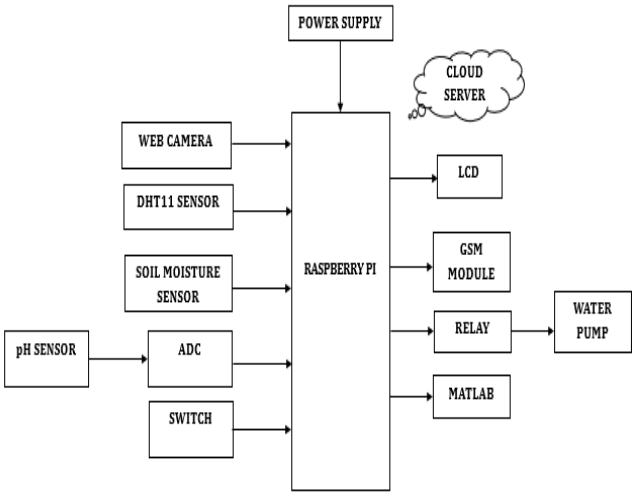

Figure 11 : Design

V. RESULTS AND DISCUSSION

By doing the above project we can make the agriculture processes in a easy way It is very easy to the farmer without human interaction to control the farm by changing the water pump on or off status.The farmer can easily monitor and understand the farm situation always by sitting at their home or any other place.The farmer can take further decisions and make the farm more yield and profitable.

VI. CONCLUSION

So, by using the IOT based system, we can control and monitor the farm and also irrigation process. The system that considers the farm environment and work according to our need.We can know about the diseases of the plant.

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