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IOT Based Safe and Smart Automation of Agriculture A Review

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Abstract**:** *Irrigation is a scientific process of artificially supplying water to the land or soil that is being cultivated. Traditionally in dry regions having no or little rainfall water had to be supplied to the fields either through canals or hand pumps, tube wells. Conventional irrigation methods had severe problems such as increase in workload of farm labour and often it lead to problem such as over-irrigation or under-irrigation, and leaching of soil. India is the country of agriculture. Mobile phones are become an integral part of us serving multiple needs of humans. In this project Commands to the device are given by authenticated person, who will activate or deactivate the irrigation motor and also provide current status of appliances which in turn gives uniform environmental conditions that are suitable for farming.*

Keywords—Internet of things, Smart framing, Soil moisture , Water level, Rain sensor.

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I. INTRODUCTION

In India, Agriculture is a major part of the GDP of the country. Most of people are doing farming in India. The agriculture field is involves in many industries in India. Lets say to make raw material for clothes we need cotton. So to get a cotton, people need to contact farmer or company that collect cotton from farmers. This is only one example there is many example like this. So basically agriculture is a backbone of the country. To growth of industries depends on the various fields. To make a vast amount of production in agriculture field farmer should know many things like moisture of soil, humidity, temperature, rain fall, etc. To make a cultivation smart we will make a fusion of traditional farming and modern technologies.

Using IoT, we can make communication between devices, machine and also services which based on internet. IoT is also help human to do work very easily. If we have look on policy of Internet of Things of Indian government, they have plan to invest 15 billion up to 2020 in Internet of Things. It is also state that it will help also other industries like agriculture, banking, retail business, auto mobile, and more by making system automated which are used in it. This will help to increase IoT devices to 2.7 billion. Currently there are 200 million devices which are connected to internet in India. It is assume that India will have share 5-7 % in Global market of internet of things.

In agriculture there are more labourer work is there so using automation we can save labourer work and also reduce the size of human resources in cultivation. It is also improve quality and accuracy, saves lots of energy, material. To make this happen researcher and scientist collaborate with large industries and trying to make automatic system which is very efficient and effective.

Using automation machine like fan, fridge, AC, lights can be run automatically i.e. depends on environment. It is makes a great use of available resources, like in home it saves electricity and in agriculture it saves water. This document is a template. An electronic copy can be downloaded from the conference website. For questions on paper guidelines, please contact the conference publications committee as indicated on the conference website. Information about final paper submission is available from the conference website.

II. LITERATURE SURVEY

Boselin Prabhu et.al proposed wireless sensor network system which is reduce the evaporation of water by drip irrigation. In this system, collect information from sensor and send it to the base station. Now when sensor send data to base station as packet so to reduce impact a packet author set a sensor in bulk mode. Now if plant need a water so base system start watering that plant using drip irrigation, these will save water as well reduce evaporation of water.

Minwoo Ryu et.al build a system to make a smart farming by connecting farms based on Internet of Things (IoT). In this they are using various sensors like temperature sensor, humidity sensors and CO2 sensors. Now they are using REST APIs to transfer data, Mobius which is IoT supporting platform and Cube which is a middleware between physical devices i.e. sensor and Mobius. Data which is collected from sensors sends to Mobius using cube and end user send a request for particular farm using REST APIs to Mobius. End user can see result of request can see on Mobile Application

In this Paper [3] made a system for Smart irrigation and whether monitoring system. For that they consider certain parameter like soil moisture, humidity, temperature, rain fall, wind speed, radiation, and wind direction. They are measured soil moisture to find out the dryness of soil and rain sensor sense evaporation rate of soil. So if soil moisture goes down from user defines value it start the watering and also sends a message using SIM300. A device called anemometer is used for mapping a wind speed. These data is upload on server and from that they are displaying data on LCD.

Sneha Angal build a system for plantation in office and home. In this system raspberry-pi, Arduino, ZigBee and soil moisture sensor is used. In proposed system raspberry pi is main control block and process the instruction send from Arduino. Here soil moisture sensor is connected to Arduino and ZigBee is an intermediate between raspberry pi and Arduino. This is a modular system so if any module is not working so user can change it. To enhancement of this system we can add GSM module to get status of soil and also watering plant by giving miscall on number of GSM module.

In this paper [5] author focused on a build low cost system because of that poor farmer can use it, make a step towards a smart farming. In this system they used raspberry-pi, soil moisture sensor and GSM Module. Now if soil moisture sense the dry soil then it will notify the farmers registered device and also sends mail on registered email address. In proposed system author used Local Shortest Path (LSP) to control the wireless sensor network i.e. to get data from sensor using LSP.

Lala Bhaskar et.al build a system to improve the quality of food and improve the productivity. This system measure various factors like temperature, humidity and also water level of soil and notify on LCD. To monitor the data they used monitor and send a message to the farmer to inform about current status about farm via SIM900 module on farmers register mobile number. They are using sensors like Soil Moisture sensor, Temperature Sensor. This system is useful to those farmers who has a power failure and non-uniform distribution of water due to power failure.

In This Paper [7] author proposed a system with wireless sensor network using RFID. In this system, author put soil moisture on different location in the field i.e. farm or it can be a farm and each sensor has its unique ID. Now sensor sends a data to ZigBee at 2.45 GHz. Now sensor sends that data to base station and if soli is dry then pump station will start sprinkling water only on that portion of the field.

In this paper [8] they proposed system which is focused on improvement of farming method, measuring PH rate to find out soils dryness and also keep looking on temperature and water level. They used raspberry pi, LCD to display current status and GSM Module, soil moisture sensor and temperature sensor. Now when PH rate goes down from certain threshold value it will notify the user to improve farming method and also giving suggestion to farmer based on PH value. To measure temperature of soil they used LM35. In this system, they keep collect data to find water level but doing nothing. So to improve this system we can we can take action of watering land based on water level of land. For that we can put miserable motor in the system and watering plant.

Ch Sumaliya et.al proposed a system at low cost. In this system they used ATMEGA328 as controller and soil moisture sensor and temperature sensor. They used a raspberry pi and ZigBee as a receiver to show the data into LCD. Now if moisture in soil goes down from specific threshold value it will ring up buzzer and show status on LCD. When moisture goes up from threshold value they start submersible motor and buzzer will off. In this system they don't use wireless connection so to enhance this we can make a wireless system. We can also add temperature sensor to measure temperature and give instruction to miserable motor accordingly.

In this paper [10] they focused on a saving water using smart irrigation system. They are mainly focusing on gardens, plants and park for providing water automatically. They also supplying water based on requirement like which plan need more water and which plan require less water. They are using microcontroller to check the requirements and it is getting data from soil moisture sensor and temperature sensor. To improve this system we can used water level and supplying water accordingly i.e. if water level is law then plant who need watering only that plant can get water.

Ravi Kishore Kodali et.al made a smart irrigation system based MQTT protocol. They are using Esp8266 NodeMCU-12E, soil moisture sensor and water pump. In this system Message Queue Telemetry Transport Protocol (MQTT) is used for transfer the data between Esp8266 NodeMCU12E and the sensor. Soil moisture sends data to Esp8266 NodeMCU-12E, if soil is dry then Esp8266 NodeMCU-12E send instruction to water pump and water pump will start and after

Mare Srbinovska et.al made a wireless sensor network system for smart farming based on vegetable greenhouse. In this system they are measuring humidity, temperature and illumination. First stage of this system is measure the capabilities of data transfer and choose the algorithm for data exchange. Second stage of proposed system is make decision on system design and development based on experimental results. And last stage is testing of wireless sensor network, analysis and optimization of results.

In this paper [13] they are focusing on very important issues of agriculture product. They made one system to identify the disease of tomatoes. They made one robot to shoot plant continuously. Now after that they made one algorithm for processing a video. The first phase is highly focusing on identify the tomato plant and the second phase is focusing on identify of tomatoes border to find out about diseases. To identify diseases they are using k-mean clustering algorithm. Md Saifudaullah Bin Bahrudin et.al proposed system for fire detection. In this system they are used raspberry pi, Arduino Uno, Smoke detector sensor, camera module and GSM module. When smoke is detected system is click a photo and display it to the website. Now it takes a confirmation from user that fire is there or not. If fire is there then it send SMS to fire brigade about fire. Now using this system we can reduce to false positive because camera click the photo and it consume small amount of storage to store image

III.FUTURE SCOPE

This system is provides very huge future scope. It can be comprehend in many ways. One way is to add camera module to it. When flame sensor detect fire, camera module click picture and put it in website or send it in mail. And take input from user that there is fire or not if it is there send message to fire bridge.

Another way is attach different type of sensor like humidity sensor, measuring fertilizer and also attach temperature sensor to generate more data about soil. Another way is to join water pump to the system and when moisture goes down system will atomically start the motor.

This type of agriculture application of Internet of things in the real world environment is necessary to know the effect of the environment on such system. So is always better to know the risks beforehand

IV.ADVANTAGES

1. A farmer can control the irrigation system from any place in the world
2. There is no need to know the message typing
3. The Mobile may be in any mode
4. Because of the graphical interface it is easy to use the business
5. Simple to design and install
6. Reduce the erosion and nutrients leaching
7. Require the smaller water sources
8. Increase productivity and reduces water consumption

V.DISADVANTAGES

1. Only for large size farms
2. Equipment is expensive
3. Frequent maintaiance for efficient operation

VI.CONCLUSION

In this paper, we proposed a new algorithm to save a water usage and make irrigation system better. In this proposed system we used many sensors like soil moisture to measure moisture of soil, flame detection sensor to detect fire and also ultra-sonic sensor to find the water level in well. GSM module to notify the farmers about current state of the farms. If soil needs water we will send message as well as email to farmer about water and water level. To notify the farmer about dryness we set threshold value. If count goes up to that count system will notify the farmer. Now if fire is there in farm, system will also notify famer about it via message and email. System also send notify about water level of well

- user can monitor their large fields forests ,gardens from any where,this can be used in agricultural fields which is very helpful and useful for the farmers
- saves rainwater and promotes rainwater harvesting
-crop losses can be avoided easily
- it optimises the power usage through water resource management and also saving governments free subsidiary electricity and this proves an efficient and economy way of irrigation and this will automate the agricultural sector

These are the developments in our project compared to all that are already been present

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