Smart Agriculture Monitoring System Using Iot

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Abstract:-Climate changes and rainfall has been erratic over the past decade. Due to this in recent era, climate-smart methods called as smart agriculture is adopted by many Indian farmers. One of the important applications of IOT is Smart Agriculture. It reduces wastage of water, fertilizers and increases the crop yield. Smart agriculture is an automated and directed information technology implemented with the IOT (Internet of Things). IOT is developing rapidly and widely applied in all wireless environments. In this project, sensor technology and wireless networks integration of IOT technology has been studied and reviewed based on the actual situation of agricultural system. Temperature sensor, Moisture sensor and pH sensor which senses the temperature, moisture content and pH in the soil. A combined approach with internet and wireless communications, Remote Monitoring System (RMS) is proposed. Major objective is to collect real time data of agriculture production environment that provides easy access for cultivation and increases the crop yield. By monitoring the field using the IP address Nutrient deficiency in the soil are detected and rectified.

Keywords- pH sensor, Arduino,Web application,Mobile application.

I.INTRODUCTION

The word 'Agriculture' springs from the Latin word 'Ager' means Land or field and 'Culture' means cultivation. It means the science and Art of manufacturing crops and livestock for economic purpose. Agriculture is an art of raising vegetarian from the soil for the use of mankind. Agriculture is that the mile stone within the history of human civilization, thanks to agriculture man settled at particular place. Agriculture is one amongst the oldest and prime activities of the human being. It's remained a vital source of land.

In spite of growing industrialization and urbanization within the world, nearly one half working population still engaged in agriculture. In developing Countries agriculture sector has been a major source of employment and it's contributed to the economy. The fundamental aim of agriculture is to lift stronger and more fruitful crops and plants and to help them for their growth by improving the soil and supplying the water. Agriculture is a backbone of Indian economy. In India about sixty four percent of the total population is dependent on agriculture for their live food. The agriculture activities in the world are closely controlled by Physical Factors.

Indian agriculture is not an exception for this, today India is facing two main problem concerned with agriculture. The first is meeting the increasing demand of food and other is supplying agro products for ever increasing population and the second is uneven development of agriculture and changing pattern of agriculture land use.

India tried to be self-sufficient in agriculture through the five year plans. After independence by taking systematic efforts due to the unique importance, agriculture gets more and more attention in every five year plans and top priority is given for the development of agriculture in our Country.

The study of land and agriculture from the geographical point of view gained more importance after 1950. At the beginning of 1970 and later on the green Revolution brought of remarkable change in the field of agriculture, due to this India become not only self-sufficient in food grains but it could also expert a small quality of it. The process of agriculture development is not properly channelized because of uneven rainfall, unavailability of basic infrastructure facilities and unbalance allocation of resources. The green revolution is succeed only in the areas of irrigation. In spite of lot of efforts by Government, the small farmers could not get the benefit of it. This creates a large gap between small and big farmers and imbalanced is created. To reduce this gap. Systematic planning is required for this purpose it is necessary to have the detailed information of the region.

Many countries like India, majority of the population depends on farming, and its national income comes from farming. In spite of this and even the modern technology is found everywhere, the agriculture area is following the old conventional technology. Our farmers still resort to traditional methods like manual distribution of seeds, two crops per year pattern,unscientific systems of cultivation. The monsoons are irregular, and unevenness of availability of water throughout the year poses a major

problem. All this leads to inadequate yield and low productivity. The implementation of scientific methods in the field of agriculture can bring about radical changes in the productivity of crops, due to improved efficiency in the farming techniques. Of the various advantages that IOT brings to the table, its ability to innovate the current scenario of farming methods is absolutely ground-breaking. Mostly, we come across ideas that suggest a wireless sensor network that collects data from the various sensors present in the field and sends the data to the main central server. This method focuses on studying the environmental factors to improve crop yield. But it turns out, monitoring environmental factors alone are never adequate to increase productivity of crops since a lot of other factors have a role to play.

II. LITERATURE SURVEY

1. A Sustainable Agriculture System Using IOT

Ramya Venkatesan and Anandhi Tamilvanan explains about a Sustainable Agriculture System Using IOT. This work developed a system a system which will automatically monitor the agriculture fields. As well as performing live video streaming for monitoring the agriculture field from the server itself, through raspberry pi camera. The agriculture fields are monitored for environmental temperature, humidity at soil moisture sensor. IOT and wireless sensor node helps to decrease the efforts, for observing the agricultural fields. IOT also avoids the loss of agriculture parameters database and save in the storage device or cloud for long life. It also provide continuous monitoring in all places including the critical areas. Agriculture product rely on environment factory like relative humidity, PH of soil, temperature etc. The proposed system model is developed in order to get more yields by identifying the causes.

2. A Model for Smart agriculture using IOT

Prof K.A.Patil,N.R.Kale proposes about a model for Smart Agriculture using IOT. Climate changes and rainfall has been erratic over decade. Due to this, climate-smart methods called smart agriculture is adopted by many farmers. In the existing system, village farmers may have planted the same crop for centuries, but over period, weather patterns and soil conditions and epidemics of pests and disease have been changed. By using the proposed system approach, which senses the local agricultural parameters, identify the location of sensor, transfer the data crop fields and crop monitoring. The Received updated information allows the farmers to cope with and even benefit from these changes. The Complete real-time and historical environmental information is expected to help to achieve efficient management/monitoring and utilization of resources.

3. Smart Agriculture System using IOT Technology

Muthunoori Naresh, P.Muna swamy explains about the Smart Agriculture System using IOT Technology. In the existing system agriculturists used to figure the ripeness of soil and presumptions to develop certain kind of products. They didn't think about the level of water, dampness and climatic conditions. The profitability relies totally upon the last phase of the harvest in which they depend. In this proposed system, they improved the efficiency of the product which appraises the nature of the harvest. To go up against the challenges in the field, IOT is used in providing accuracy and conservative cultivation. They also used wireless sensor networks in precision Agriculture by separating the solitary plants for checking in the tens or several square feet .Also used different kinds of sensors such as Temperature sensor, Humidity sensor, Soil moisture sensor, Water level sensor and ARM processor.

4. IOT Based Monitoring System in Smart Agriculture

S.R. Prathibha, ANupama Hongal, M.P.Jhothi explains about the IOT Based Monitoring System in Smart Agriculture. The farmers are still using traditional methods for Agriculture, which results in low yielding of crops and fruits, so the crop yield can be improved by using automatic machineries. But by using IOT, we can expect the increase in production with low cost by monitoring the efficiency of the soil, temperature and humidity monitoring .In existing System, they used only the traditional methods for the crop yield. But in the proposed system, the combination of traditional methods with IOT and wireless sensor networks can lead to agriculture modernization. The developed System is more efficient and beneficial for farmers. The application of such system in the field can definitely help to advance the harvest of the crops and global Production.

5. Smart Agriculture Monitoring System using IOT

P.Lashitha Vishnu Priya ,N.Sai Harshith ,Dr. N. V. K. Ramesh explains about the Smart Agriculture Monitoring System using IOT. The implemented framework comprises of different sensors and de-vices and they are interconnected by means of remote correspondence modules. The sensor data is been sent and received from client end utilizing Internet connectivity which was enabled in the Node MCU mo the same time. dule- an open source IOT platform. This system is used to maintain the optimal conditions of the irrigation system effectively. The data can be viewed on the Thing Speak app or any web page. The farmer can go through each and every information regarding the levels, at what time it's been functioning, any fluctuations appearing or not, whether the operations are been performed in time.The foremost function is to monitor the crop growth using

digital means.This will provide the accurate values of various parameters upon which growth depends.Besides,this model will help the farmer to monitor more than one land at the same time. Monitoring through this system requires less man power,people with physical disabilities can be employed for monitoring fields.

6. Smart Farming using IOT

Amandeep, ArshiaBhattacharjee, PaboniDas, et.al., proposes about the Smart Farming by the aid of automation and IOT technology. We aim to implement a smart GPS based remote controlled vehicle that performs various tasks like monitoring fields to prevent thefts, scaring birds and animals, sensing soil moisture content, spraying fertilizers and pesticides, weeding, sensing soil moisture, etc. Smart irrigation, by usage of optimum amounts of water, depending on the requirement of each crop type and the soil will be executed. Finally, we plan on enforcing smart warehouse management, with temperature and humidity sensing for the benefit of the products being stored, and detection of presence of any invader who tries to steal from the warehouse. Controlling and monitoring of all these operations will be through a remote smart device with Internet connectivity and the operations will be performed by interfacing sensors, ZigBee modules, with micro-controller.

7. IOT Based Agriculture Monitoring and Smart Irrigation System Using Raspberry Pi

T.Vineela , J. NagaHarini , Ch.Kiranmai, G.Harshitha, B.AdiLakshmi explains about the IOT Based Agriculture Monitoring and Smart Irrigation System using Raspberry Pi. Many researches are done in the field of agriculture and most of them signify the use of wireless sensor network that collect data from different sensors deployed at various nodes and send it through the wireless protocol. The collected data provide the information about the various environmental factors. Monitoring the environmental factors is not the complete solution to increase the yield of crops. There are number of other factors that decrease the productivity. Hence, automation must be implemented in agriculture to overcome these problems.

In order to provide solution to such problems, it is necessary to develop an integrated system which wills improve productivity in every stage. But, complete automation in agriculture is not achieved due to various issues. Though it is implemented in the research level, it is not given to the farmers as a product to get benefitted from the resources. Hence, this paper deals about developing smart agriculture using IOT and given to the farmers. Implementation of such a system in the field can definitely help to improve the yield of the crops and aids

to manage the water resources effectively reducing the wastage.

8. NPK Measurement in Soil and Automatic Soil Fertilizer Dispensing Robot

Nishant singh, and Dr. A. D. Shaligram(2014), 'NPK Measurement in Soil and Automatic Soil Fertilizer Dispensing Robot', In 'NPK Measurement in Soil and Automatic Soil Fertilizer Dispensing Robot', Mr. Nishant singh and Dr. A. D. Shaligram has design a bot for dispensing the fertilizers for the soil based on the nutrient amount present by measuring the soil nutrient by using color sensor. In that the soil has mixed with proper chemical solution and the RBG lights has sent through the soil solution and the reflected light has absorbed. Based on amount of light reflected from the solution the nutrient content has measured. But these method needs a different chemical solution for each nutrient content.

III. EXISTING SYSTEM

IOT based smart agriculture system proves to be very helpful for farmers. Indeed, even in the wake of reaping, ranchers additionally face issues away of gathered yield. In order to give answer for every issue, it is important to create coordinated framework which deals with all components influencing the profitability in each stage. Threshold values for climatic conditions like humidity, temperature, moisture can be fixed based on the environmental conditions of that particular region. The system also senses the invasion of animals which is a primary reason for reduction in crops. This system generates irrigation schedule based on the sensed real time data from field and data from the weather repository. This system can recommend farmer whether or not, is there a need for irrigation. Continuous internet connectivity is required. This can be overcome by extending the system to send suggestion via SMS to the farmer directly on his mobile using GSM module instead of mobile app.

IV. PROPOSED SYSTEM

This project presents proposed model for Smart Agriculture to develop real time monitoring system for soil properties like Temperature, Humidity and moisture, crop yield identification using SMS based Alerts. It will also be possible to control various operations of the field remotely from anywhere, anytime by mobile as well as web application. The IOT based agricultural monitoring system has been used to maximize the yield of crop by monitoring the environmental parameters and thus providing the required information to farmer remotely. This system can be implemented in any type of agricultural field with varying soils. The use of IOT over the other technology one aides for deploying it in any type of environment for monitoring, making it flexible and

robust. The proposed system is developed for the goodwill of farmers. The system greatly reduces the human interaction, labour cost and wastage of water.
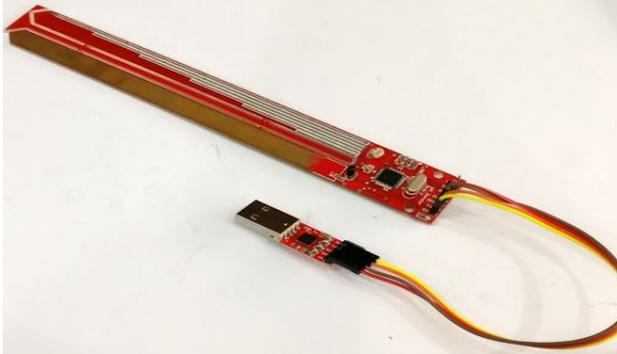

Figure 1. pH Sensing Atmega 8A Device

A pH meter is a scientific instrument that measures the hydrogenion activity in water-based solutions, indicating its acidity or alkalinity expressed as pH. The pH meter measures the difference in electrical potential between a pH electrode and a reference electrode, and so the pH meter is sometimes referred to as a "potentiometric pH meter".

The difference in electrical potential relates to the acidity or pH of the solution. Here it consists of 4 pins VCC, GND, Tx, Rx. It made up of ATMEGA 8A Microchip 8-bit AVR RISC-based microcontroller combines 8KB ISP flash memory with read-while-write capabilities, 512B EEPROM, 1KB SRAM, serial programmable USART, a byte oriented two-wire serial interface, 6- channel 10-bit A/D converter programmable watchdog timer with internal oscillator, SPI serial port, and five software selectable power saving modes. The device operates between 2.7-5.5 volts.

With this 3 in 1 soil meter you can check the garden, vegetable garden, lawn and potted plants whether the soil is suitable for a particular plant. Use the device to measure growing conditions for all kinds of plants indoors and outdoors. This 4 in 1 pH soil meter can be especially useful in lawn care in determining the soil conditions in different areas in garden and finding the correct lawn seed and fertilizer. Bad spots in the lawn can be caused by poor drainage (wet soil, test the 42 moisture), too much or too little acidity (test the pH), or the wrong light level (test light and use appropriate seed mix (sun/shade).

1. Features:

- No battery required, simple and convenient to use
- Simply insert probe of the meter into the soil, switch to the setting you want to measure and read the scale Probe length:21cm.
- Ideal tool for both indoor and garden plants care Please clean the electrode after each use

- Weight: 57g
- For outdoor & indoor plants, gardens & grass lawn.
- Take the guess work out of your daily garden watering light and moisture.
- Prevents over and under watering Scientifically accurate.
- Easy to use, just insert and read.

2. Applications:

- Chemical laboratory work
- Soil measurements in agriculture
- Water quality for water supply systems, swimming pools
- Brewing, industrially or domestically

V. CONCLUSION

The agricultural sector is of vital importance for the region. It is undergoing a process of transition to a market economy, with substantial changes in the social, legal, structural, productive and supply set-ups, as is the case with all other sectors of the economy. These changes have been accompanied by a decline in agricultural production for most countries, and have affected also the national seed supply sectors of the region. The region has had to face problems of food insecurity and some countries have needed food aid for IDPs and refugees.

Due to the relatively low demographic pressure projected for the future, the presence of some favorable types of climates and other positive factors, including a very wide formal seed supply sector, it should be possible to overcome problems of food insecurity in the region as a whole, and even to use this region to provide food to other food-deficient regions. Opportunities must therefore be created to reach these results.

Acknowledgment

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