

Integrated Automated Agricultural Operations Using Multiple Technologies

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Abstract— This is a kind of technology is applicable to all type of farm land cultivation. This technology observe actual status of the land and its environment. Based on the observed data it enrich or improve the farmland cultivation. In this system its a combinations of IOT, Big data analytics, wireless sensor network technologies. In Indian scenario all the fertile land are cultivated into an manual farm. So, the yield of the land should be improved because all data's are observed from sensor as well as traditional knowledge. The proposed system observe the data from environment, soil, water and fertilizer. After the collection of information it will be analyzed. Based on the analysis we take a decision for cultivating the crop. It also take the traditional knowledge for analyzing the cultivation. The proposed system is working in the form of integrated environment. It work like an automated system. In the proposed system consist of the various sensor which are fixed into the fertile land. So, this sensor give the nature of the farmland. The proposed system improve the agriculture cultivation. We can apply this system into an all type of farmland. Whether the land is arid or water rich environment, it can be possible to give the good result.

Keywords—IOT, Sensor, Cloud Computing, Wireless Sensor Network

I. INTRODUCTION

Now days IOT(Internet Of Things) is a emerging technology which can apply all field. This technology connect objects which are different in nature. IOT connect different kind of objects which may mechanical, electrical,chemical and any kind of object. The sensors are sense the environment and pass the information through the internet. Here we can access this communication from any where in the world. So, in this technology we can operate and control objects from remote places. So,the objects are get the command from remote place and act according to command passed from user. For Example In Home Management System full house is fixed by sensors. Suppose if the refrigerator is not working, then the sesnsor which detect refrigritator,and pass the signal to the remote place through the Cloud computing technology. So, we can give the command from anywhere else and clear the refrigerator problem. In a Home Based IOT contain TV in the Room. Suppose if the TV is not switch off after closing the door. Then the sensor immediately TV give the signal to the user. This signal pass through the cloud computing.Then the user give the command through the Cloud computing and Switch Off the TV. This the General operating in IOT .

According to the indian government 15th indian sensus[1] the decadal growth of the indian population is 17.70%. So, the indian population is continuously increasing. Based on the population, the indian poeple need food. So, we need to improve the food production in india. All over the world

climate change is the threatning problem for this planet. So, the climate will affect human being and living things in the planet. So,if we want produced the product in agriculture it will depend on the climate change. Because climate change will impact the crop production. Moreover indian government agricultural report[2] GVA(Gross Value Added) of the country is 17.4%. So Indian economy is depend on the agriculture. The proposed system is reduced the usage of water, fertiliser and other commodity of agriculture. So, we increase the farm land. It will give more opportunity to indian people. It will give the mass based production of the agriculture. So, the proposed system increase the food production of india. This proposed system reduced the loss of the farmer.

II. RELATED WORK

Already Ieee Article[3] Written in this Concept.But that previous system consist of Different Component. This components did not attached fully. Simply say it is not integrated environment. It is not an automated environment.. But this proposed system is full and fully integrated. The centralized compont is the Central Control Room. Already existing system did not use multiple technology. But this system is used multiple technology itself. So, I improve the proposed sytem based on the various technologies. This all technology is helpful to improve the future enhancement. So, the Proposed system is the multiple technology environment. But the previous sytem consist of two technology. So, this system is create automated Agriculture environment.

III. METHODOLOGY

The Proposed System build on various kind sensors which are operated into the farmland. It will continuously give the detail about the farmland. The following are the sensors which are used in farmland.

(i) Water Detection Alarm System (WMAMX)

This Sensor is classified into three types. These are

1. Water Leak Detection Cable(WD user.CS)
2. Water Leak Detection Point(WD PS)
3. Water Leak Detection (WD RS)

1. Water Leak Detection Cable(WD CS) : This sensor is used to detect the cable water leakage. So, if the water is passed from one place to another place using the Pipe. So this type sensor is used to detect the cable leakage.

2. Water Leak Detetction Point(WD PS) : This sensor is used to detect the exact point of the object. So we can detect the right place to detect the water leakage.

3. Water Leak Detection(WD RS) : This sensor is used to detect water level. If the water level is above the dangerous ot will indicate. So, this sensor is particularly used for Tank.

4. Dielectric Soil Moisture Sensors : This sensor sense the moisture content in the soil. The Electrical Character depends on the moisture content present in the soil.

5. AirFlow Sensor : This Sensor sense the air flow into the soil. It detect whether the enough air is exist in the soil. Suppose if the enough air is not available, it will indicate to the user.

6. ElectroMechanical Sensor: This type of sensor used to detect soil PH value, Nutrient Value, etc. So, It gives the exact detail about the mineral, nutrients and PH value in the Soil.

7. Mechanical Sensor: This sensors sense the hardness of the soil.

8. Water Flow Sensors: This sensor is used to monitor the flow of water from the drip irrigation pipe. If the soil water level is high it will automatically stop the flow of water.

9. Seed Tube Sensor: This type of sensor is fixed into soil. This sensor monitor seed, whether two or more seeds are bind in the soil. If two are more seeds are bind then it will indicate to the control room. If two ar more seeds are bind means it will not grow as plant. So, this sensor detect the seed status and it report to the control room.

10. SunLight Sensor: This type of sensor detect the light come from sun. It detect UV Light, Infrared and visible light. It also detect all type of rays which are exist in the sunlight.

11. Leaf Sensor: This type of sensor which fixed randomly fix into the many leaf of many plant . This Sensor is used to detect water loss or water deficiency in the plant.

12. Soil nutrient Sensor: This sensor detect nutrient of the soil. It gives the details of nutrients which exist in the soil. If any nutrient deficiency occur in the soil which will be indict to the control room.

13. PH Sensor : This sensor is used to detect the ph value of the soil. If the ph value is from 5.5 to 7.5 exist in the soil is nutral. If the ph value is greater than or less than that value is lack of nutrient problem exist in the soil.

14. Soil Moisture Sensor : This sensor detect the soil moisture content. If the moisture content is below the normal, it will indicate to the central control room.

(ii) Other Equipment :

1. LCD Television: This television is fixed into the central control room. We can watch the full form status in the visual form. It shows the video footage of the big form. This television is attached with CCTV camera which are fixed into form.

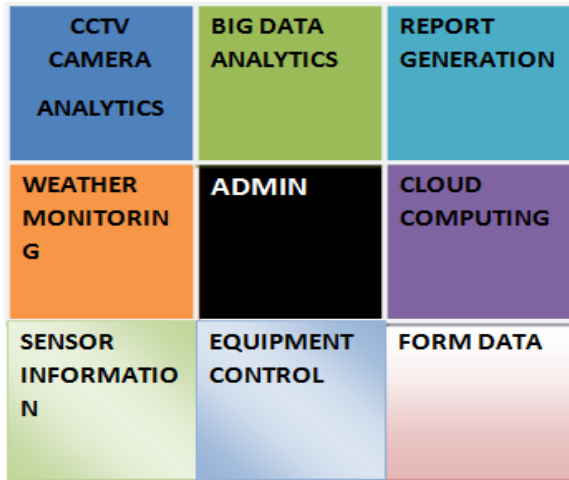
2. CCTV Camera : This camera is fixed every 100 meter space. So, it will give the clear picture about the form land. So, we can detect all activity which are occurred by animal or human being.

3. Smoke Detectors: This sensor is used to detect the smoke and fire which are occurred in the form land. If any fire or smoke occur it will give the signal to the central control room. Then we take the remedies for that accident.

4. GPS Sensor: This sensor is used to identify the earth postion. So we can easily solve the problem which exist in the Farmland.

5. Drip Irrigation tube: This equipment is attached with remote control sensor. So, we can atart or stop using the techniques of remote control which are available in central control room.

IV. RESULTS AND DISCUSSION



STRUCTURE OF CENTRAL CONTROL ROOM

Fig.1

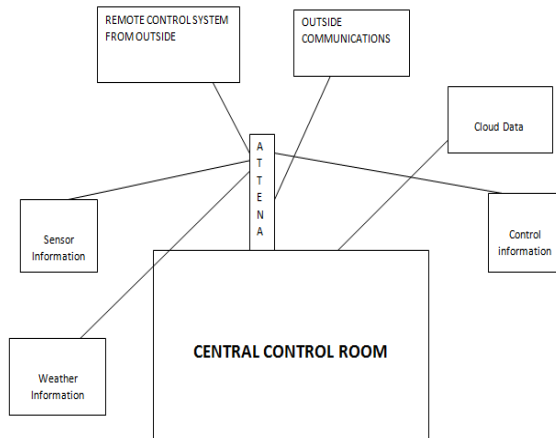


Fig.2

V. CONCLUSION AND FUTURE SCOPE

The Following are the components of the smart agriculture management concept in farm. These are

- 1. Central Control Room
- 2. Various Sensors
- 3. LCD TV
- 4. CCTV Camera

1. Central Control Room

This Room Centralize all component which are exist in the farmland. This central control room receives information from various sensor which fixed into the farm. This is a kind of input which are get from the environment. The Central control room gives command to equipment which are available in the farm. This equipment which are

attached with sensor. This sensor act as interface between equipment and Central control Room. This central control room consist of nine components itself. The followings are the details of the central control Room

- 1.CCTV Camera Analytics
- 2.Weather Monitoring
- 3.Cloud computing
- 4.Equipment Control
- 5. Farm Data
- 6. Sensor Information
- 7.Big Data Analytics
- 8.Report Generation
- 9. Admin

The first Component of this system is CCTV Camera Analytics Wing. In this system CCTV camera fixed every 100 meter gap. So, this CCTV camera send the image or visual data to the central control Room. This images or video is used for analysing many things which happen in the farm land. For example rat problem is the one of the biggest problem in Farm . The rat destroy the crop. It take food as crop yielding. In this system we can identify rat, we can kill the rat. Moreover this video is useful for many analyzing. So, this Component is very useful for improving production into the Farm. The socond Component is the weather monitoring System. In this system Weather is continuously monitor throughout the day and night. Because this weather data play an important role in the crop production. For example if the waether is snow in winter season , at time we are cultivating the crop based on the climate. If the climate is rainy situation at that time we cultivate crop which absorb high water. So, we can use traditional knowledge to cultivate the crop. Nowadays climate change[4] is the biggest threat for agriculture. So, if the temperature is increase[5] it will indimate us. So, we can sove the problem. So weather monitoring is the important task.

The third component of this system is Cloud computing component. In this component is used to access the data which are exist in the farms. Suppose admin is exist in outside. If any problem occur in the farms we can identify through the cloud computing Access. This farm data will be access using the authorization. For example if any technical problem occur, it will be identified, then the data or video footage will be sent to technical person. He could sit anywhere in the world. He guide the how to solve the problem using the video conference. So, in this cloud computing is used for access data as centralized. All the equipment can be control into direct or cloud method. For example the sensor which are fixed into the farm can be control through the wireless sensor method. Some time any person who is responsible for the farm can control through the cloud. For example, the drip irigation can be control through the wireless sensor method. All the equipment which are located in the farm can be control through the wireless sensor network.

The fifth component of this system is the farm data. In this system all operations are documented. Moreover the sensor data's are documented. The weather report of the form is continuously documented. Moreover Crop production, Water details, Soil report, Weather report

etc can be stored into cloud data. So, the admin can access anywhere else in the world. Based on the data we will do the operations. So, there is a huge data is storing into this Cloud data. This farm data will be stored into date wise, month wise and year wise. If any problem occur in future we will take the past data and analyzed. It also consist of the expense details of the farm. So , overall details stored into this farm. The sensor information play key role in this system. In the proposed system is most of the information, operation which are collected from sensors. So, if the sensor is fail it will be identified and replace another sensor immediately. So, the proposed system is full and fully operated using the Wireless sensor network. So, the sensor is essential for all equipment operation. Most of the command is implemented into remote places. It will goes through the cloud computing method and it will through the sensors and operate the equipment. So, the proposed system fully operated through the sensor. Actual status of the crop, Weather report all are collected through sensors. If all the informations are collected from various sources, it will be stored into the cloud data. After storing the data will take data and analyzed. The data is analyzed in various tools like R programming, Hadoop etc. Moreover this tools gives the result or some analytical report. Based on the report we are doing the analytics and we get statistics report as well as analytical report. The report is to improve production,reduce water and other resources. The big data analytics report is used for improve the proposed system. It is working in the form of feedback report come from customer. Here the data's which are collected from proposed system is the feedback of the automated agriculture report. After the completion of any kind of work we are doing the documentation. This documentation improve our system. In this proposed system we are also documenting the data which collected from various components in the proposed system. So, the report generation component is used for documenting the proposed system overall working report. This report will be analyzed using the big data analytics. Suppose if we want to improve the proposed system, this report is used for this system. It will be stored into the cloud computing area. The admin is the person who control all component exist in the proposed system. So, he is the centralized person. He know very well about all component of the system. He has the ability to manage the proposed system. He should have knowledge of technical as well as managing capability.

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REFERENCES

- [1]. Indian Government Population Census Report 2011.
- [2]. Annual Report 2017-2018 by Department of agriculture cooperation and Farmers welfare,India.
- [3]. S.R.Prathiba,Anupama Hongal,M.P.Jyothi "IOT Based Monitoring System in Smart Agriculture".
- [4]. In the Proceedings of the 2017 International Conference on Computer Science and Engineering, India. Published by IEEE,p-81-84.
- [5]. 4.Ministry of Environment,forest and Climate change Annual report.
- [6]. Annual Report 2017-2018 by Ministry of Environment, Forest and Climate Change.

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