



e-ISSN: 2319-8753 | p-ISSN: 2347-6710

IJIRSET

International Journal of Innovative Research in
SCIENCE | ENGINEERING | TECHNOLOGY



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 10, Issue 8, August 2021

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 7.569

 9940 572 462

 6381 907 438

 ijirset@gmail.com

 www.ijirset.com



IOT Based Smart Agriculture Using Precision Farming

Pravesh Pandey¹, Sakshi Mishra²

UG Student, Department of Information Technology, B.K.Birla College, Kalyan(W), Maharashtra, India¹

UG Student, Department of Information Technology, B.K.Birla College, Kalyan(W), Maharashtra, India²

ABSTRACT: Agriculture plays the important role in the development of country in field of agriculture. Smart agriculture is a boon for farmers to easily work and grow crops. The outlook of this paper is to look after soil management, water management and diseases which effects crops. A brief study of the soil, will help farmers in better crop production. Internet of things (IOT), and sensors have made agriculture a much easy process and requires less hard work. There are many farmers in rural areas who are less aware about the smart agriculture and the new technologies, so providing them the knowledge and teaching how to use these facilities will help to increase production of crops.

KEYWORDS: Precision farming (Precision agriculture), Drones, Sensor, Smart Agriculture, Internet of things.

I. INTRODUCTION

In this growing population, agriculture is the most important part of our day to day life. Agriculture provides the basic necessity of all the humans that is food. 10 years back from today, farming was a big deal as the requirement of raw foods are needed in a much more amount then 20 or 25 years before. So to cultivate crops easily and in more quantity, farmers require more labour work, some farmers can afford tractors as they have finance to do so, but not all farmers can afford that. So farming good crops was a hard at that time. As the technology is developing many devices was developed by the engineers to help farmers in doing farming work and make farming easy and also which will require less labour work. But the most difficult task is to give training about these devices to farmers, it is hard sometimes to adapt things which we don't know. So the device should not be made much complicated, it should be easy and such devices are available in the market. With the help of smart agriculture the world has developed with a high speed. There are many factors which help small plants and crops to grow easily one of them is greenhouse, which helps small plants to grow and doesn't affect them. Farmers first should check the quality of soil and then he should cultivating crops, this will help farmers in a good way and they will be benefited with this and sometimes monsoon changes does not affect these crops as the soil will help the crops. There are many factors which affect crops such as wild animals, insects, as farmers can not stay on the field entire day so they can use drones which help them solve this problems if the drone sees any activities which the device thinks can be harmful, it will send and message to the device on other end and then the farmer can come fast and can get rid of them, and with the insects the drone can be built with insecticides spraying capacity so it would spray when the insects are in more quantity.

In this paper we have mainly focused on how to reduce the problems faced by the farmers due to soil quality and also how to maintain water management, and the most important factor is drones and how it can be fully utilized. There are many factors, it is further mentioned in the paper.

II. RELATED WORK

Smart agriculture means the agriculture work which has to be done should be done in smart way as such the farmers should use as much as recent technology and devices which will make their farming easy and can produce more amount of crops. Soil and water is the most important factor for cultivation so we have studied and also made a research on topic related to this .The example of such smart agriculture works in, [2] In this the smart irrigation is done with the help of cloud computing and Edge computing. The crop field is monitored with the help of some iot sensors. Cyberphysical system are used into collect data from crops and take the action accordingly to that. Another devices like GSM, WSN, PIR sensors are used for communication. ASCII text file system technology has been used for gathering the irrigation necessities of field. [3] Automation in smart agriculture was proposed to overcome the problems faced in manual agriculture. A smart Gps based remote controller robot is used to perform tasks like spraying theseeds , checking water , etc. In this field various sensor such as temperature sensor, soil moisture sensor, Proteus and simulator was used ,



and the output will be shown in the mobile phone. [7] Author talked about the future use of IoT based technology and how these technology can help farmers to do cultivation with ease. They discussed about the application of area of small agriculture. They are crop water management, precision agriculture, food production and its safety. [8] This research paper gives idea about what changes had IoT brought in the field of smart agriculture such as monitoring crops, weather condition, soil, they can monitor the condition of field from anywhere and then the steps will be taken to make things right. Methods taken for monitoring crops are Monitoring of climate conditions, Crop management, etc. [9] In this paper the WSN (Wireless sensor network) technology is used. The advantage of this technology is as the many communication devices will be linked with each other this will help to gather them at one place and can be monitored easily. [10] This paper shares idea about implemented framework comprises of different sensors and devices and they are interconnected by means of remote correspondence module. [11] This research paper gives us the idea about how to manage water in crops the amount of water required by crops, the supply of water will be monitored by mobile application, A novel intruder deduction architecture model is used to find intruder in the fields by giving alert notifications. [13] In this paper author talks about the smart village and its main aim is to empower the village with advance connectivity through web services, measurement of environment factors like soil moisture, temperature, humidity and along with real time monitoring sensor. [15] With the help of WSN farmers measured soil related problems such as humidity and temperature and then collected data was sent to the base station through GPS and after accumulating the data according to that decision will be taken to irrigate field or not. [4] In this paper robots are the agents which is operated by Raspberry Pi with ROS platform for navigation. These robotic agent use Humidity, temperature, soil moisture, soil pH and a camera module.

III. METHODOLOGY

MATERIALS:

According to the hypothesis stated above, we have used Redmi note 7 pro smartphone, ESP8266 NodeMCU CH340 board which is highly integrated chip designed for needs of new connected world. This chip is connected with wifi networking solution. It has flash memory of 4mb, with processor speed of 80MHz to 16MHz. soil moisture sensor, it is a simple water sensor used to detect soil moisture. It does not require people to manage, it gives digital output of 5V when high moisture level and 0V when the moisture level in soil is low. 5V single channel Relay module. 12v DC Electronic solenoid water air Valve Switch, it controls the flow of fluid, it is used when the crops require water. Breadboard 400 points, cables. Three way soil moisture for moisture, Light intensity and pH testing meter. Drone which can be used to have a look on crops and can notify when detects any problems in crops. These are the main components which used now-a-days can decrease the problems arising in crops and also help farmers to increase cultivation, Drones will be used for various task which is further mentioned in the paper.

PRECISION AGRICULTURE (PA):

Precision Agriculture is satellite based farming or site specific crop management (SSCM). PA is farming management system based on observing, measuring and then responding to the inter and intra-field variability in crops. It is done with the help of GPS and GNSS. It was first emerged in the 1980s in the United States.

TECHNOLOGIES:

- (1) Sensors.
- (2) Drones
- (3) 3 way soil moisture meter.
- (4) NodeMCU CH340 board.

In smart agriculture sensors play the most important role in helping farmers for making their work easy each sensors have specific task which they perform at the when required or being activated by the farmers. The sensors which are used in every fields are soil moisture sensor, which tells farmer the moisture present in soil and if the moisture is low it sends a message to the device on other end which is operated by the farmer then he activates the water motor to give sufficient amount of water to the crops. Also temperature sensor is used to know the temperature of the surroundings of crops. There are many more sensors used by farmers. The most important aspects of farming in today's and coming years will be Drones, these drones can do multiple task as assigned to them. It can have a look on crops from a specific height which will protect crops from intruders. Drones can also spray insecticides and pesticides when require, it can also be used to spray seeds in the farm which will reduce a much amount of labour work for farmers.



CHALLENGES: The season changes which you used to occur on specific duration of time is not same as before which is the biggest challenges farmers are facing and due to this the soil sometimes does not support crops for cultivation and also doesn't provides the necessary factors for growing the crops. So to overcome this the farmers should check the fertility of the soil, which will help farmers to grow crops which can grow on that soil. Rainy seasons is also a trouble maker for crops as the water is provided by the well, devices can be made adaptive to the current changes and also considering the temperature and giving readings accordingly.

IV. FUTURE SCOPE

As farming is an non-ending works the devices and the experiments which will make the work easy has to be made and given to farmers, as the population is increasing on a high speed the cultivation of crops has to be done with the much more speed, so the researches will be done on this field to make livelihoods for every human being.

V. ACKNOWLEDGEMENT

I wish to extend my special thanks to Prof. Swapna Augustine Nikale, Department of Information Technology of B.K. Birla College of Arts, Science and Commerce (Autonomous) Kalyan, Thane, for their support and encouragement.

VI. CONCLUSION

The above technologies can be used to benefit the farming and helps farmers to increase cultivation of crops. The sensors helps farmers to achieve the required level of production and also find different diseases and how to get rid of the diseases. There are many factors which we have to consider for farming and when we use smart agriculture we have to be fully sure about the reading because a small reading can make a big effect on crops and can cause huge loss. The inclusion of IOT in agriculture is the boon for upcoming years.

REFERENCES

1. Precision Agriculture –A Modern Approach To Smart Farming. 2018, Thakur Institute of Management Studies, Carrer Development and Research.
2. IOT based smart irrigation system for precision agriculture. 2019, KPR Institute of Engineering and technology
3. IOT based Smart Agriculture Monitoring System. Feb 2017, Department of ECE, SNS College of Engineering
4. REVIEW OF The APPLICABILITY OF ROBOTS IN EDUCATION. (2013), A Technology for Education and Learning, <https://doi.org/10.2316/journal.209.2013.1.209-0015t5>
5. Autonomous Cloud Robotic System for Smart Agriculture. 2019 Dept. of Computer Systems Engineering Sri Lanka Institute of Information Technology.
6. High Yield Groundnut Agronomy: An IoT Based Precision Farming Framework. IoT Based Precision Farming. 2017 (2019). International Journal of Information Dissemination and Technology, 9(4), 186. <https://doi.org/10.5958/2249-5576.2019.00036.0>
7. Smart Agriculture Using IOT: A Futuristic Approach. (2019). International Journal of Information Dissemination and Technology, 9(4), 186. <https://doi.org/10.5958/2249-5576.2019.00036.0>.
8. Internet-of-Things (IoT) based Smart Farming: Towards Making the Precision Farming in Agriculture. (2020). <https://doi.org/10.35940/ijrte.d4787.119420>
9. Smart Agriculture Using IoT Multi-Sensors: A Novel Watering Management System. Journal of Sensor and Actuator Networks. 2019
10. Smart agriculture monitoring system using IoT. International Journal of Engineering & Technology. 2018, <https://doi.org/10.14419/ijet.v7i2.7.10603>.
11. The Survey on Smart Agriculture Using IoT. Journal of Innovative Research in Engineering & Management, 2018
12. SMART AGRICULTURE USING IOT. Journal of MC Square Scientific Research, 2019.
13. MULTIPURPOSE SMART AGRICULTURE SYSTEM. JOURNAL OF ENGINEERING AND TECHNOLOGY, 2020
14. SMART AGRICULTURE MONITORING SYSTEM USING FUZZY LOGIC. Journal of Critical (2020). <https://doi.org/10.31838/jcr.07.13.210>.
15. Precision Agricultural System for Crops Water Management using IoT. Journal of Xidian University. (2020), <https://doi.org/10.37896/jxu14.8/037>.



16. Iot and Weather Based Smart Irrigation Monitoring and Controlling System for Agriculture. (2019), International Journal of Recent Technology and Engineering, 8(4), 11431–11436. <https://doi.org/10.35940/ijrte.d9065.118419>.
17. Surveillance and Steering of Agricultural Field using Zigbee. (2014), Recent and Innovation Trends in Computing and Communication.
18. Automated Microwave Irrigation for Moisture Level Control using Airblower, 2017.
19. https://www.google.com/search?q=images+of+smart+agriculture&source=lnms&tbm=isch&sa=X&ved=2ahUKEwi1x9z8nszyAhX5ILcAHTG4DFoQ_AUoAXoECAEQAw#imgrc=Vzumuzxhg5NPM.
20. https://www.google.com/search?q=images+of+smart+agriculture+using+drones&tbm=isch&ved=2ahUKEwjW873_nszyAhXGErcAHZaMDvkQ2-cCegQIABAA&oq=images+of+smart+agriculture+using+drones&gs_lcp=CgNpbWcQA1CW6wpY_5QLYKKYC2gAcAB4AIAB4gGIAe4PkgEGMC4xMS4xmAEAoAEBqgELZ3dzLXdpei1pbWfAAQE&sclient=img&ei=pUAmYZaNJ8al3LUPlpm6yA8#imgrc=SwIzgEV2MakNXM.



**Impact Factor:
7.569**



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

 9940 572 462  6381 907 438  ijirset@gmail.com



www.ijirset.com

Scan to save the contact details