

SMART AGRICULTURE MONITORING SYSTEM

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Abstract

Agriculture is the backbone for the development of any country. Yet still in this technology driven era, the majority of the farmers are using traditional farming approaches, which were completely dependent on manpower. Implementing automation in agriculture would minimize the need for manpower and also the need for continuous monitoring. This study proposes an agricultural monitoring platform based on the Internet of Things (IoT) that uses a sensor-based embedded device based on Raspberry Pi that tracks and automates simple tasks such as watering, lighting in greenhouse farming, and keeping farmers updated on any critical issues. It also continuously sends data related to the amount of water, temperature, humidity, light, etc., to a centralized server as well as to farmers. For further research in the field of agriculture, mining such data from multiple fields would be of interest.

Keywords: *Agriculture, Farmer, IoT, Farming technique, Sensor*

I. INTRODUCTION

Agriculture is an integral part of Indian economy. About 60% of the agriculture-based Indian population and one-third of the nation's income come from agricultural practices. Therefore, it plays a vital role in the country's growth. The growth of the country is constantly hindered by numerous farming problems. Opting for modernized agriculture, which involves modern trends, is a potential solution to these problems. Using IoT and other innovations, agriculture can therefore be made smart. Smart farming raises the yield of crops, eliminates the loss of water and the imbalanced use of fertilizers. The highlight of this project is that it tests the various agricultural parameters that affect the yield and also uses a GPS module to obtain position information. Second, where it can be further processed, it transfers all the data to the cloud. Thirdly, this project also includes an Android mobile app that provides farmers with easy access to information. In addition, this project introduces a smart device for irrigation that optimizes water use.

Internet of Things (IoT) is the interconnection or network of physical devices that are interrelated computing devices, digital and mechanical machines, people or animals, objects that can sense, accumulate and transfer data over the web without any human involvement. With a unique id, all is given. It is an advanced analysis and mechanized process that utilizes the identification, organization, enormous knowledge and creativity of man-made consciousness to convey a complete framework for an administration. IoT is simply about expanding the Internet's influence beyond mobile phones and computers. IoT has changed today's world. Smart cities, smart cars, smart homes everything around us can be turned into a smart device with the help of IoT. It also has applications in agriculture, business sectors, healthcare, transport and logistics[1], [2].

There are four main components of IoT-

- i. Low power embedded system- High performance and less battery consumption are the inverse factors that play an important role in the design of electronic systems.
- ii. Cloud computing- Data collected from devices is stored on reliable storage servers so here cloud computing comes into action.
- iii. Availability of Big Data- as IoT is highly dependent on sensors that are real time. So the usage of electronic devices is spread throughout every field that is going to trigger a massive flux of data.
- iv. Network connection- For communication, internet connectivity is necessary where each physical object is assigned by an IP address. A network connection is built between the devices with the help of these addresses[3].

Technology today has not reached its 100% capability. So the advantages and disadvantages of this technology are given below-

Advantages of IoT

1. Utilization of Resources Efficiently
2. Minimization of Human Efforts
3. Time-saving
4. Increase Data Collection

Disadvantages of IoT

1. Security
2. Privacy

3. Complexity[4].

The Internet of Things has the capacity to transform the lives of people in the world in an efficient manner. The ever growing population would touch more than 3 billion in a few years. So to feed such an immense population, the agriculture industry needs to embrace IoT. The demand for more food has to address challenges that include excessive climate conditions, weather change and different environmental effects that result from farming practices. Knowledge and excessive stopping technologies that can increase production and also regain the interest of farmers in this industry must work on the destiny of Indian agriculture. These smart farming techniques will therefore assist farmers in reducing scrap and improving capacity. It is essentially a high-tech and capital-intensive method for processing crops for the masses in a sustainable way. With the assistance of sensors, this technology can assist farmers to track field conditions from anywhere and can also irrigate fields with an automated system. It is the application of Information and Communication Technology into the field of agriculture

Benefits of IoT in Agriculture

- i. IoT empowers simple gathering and the executives of huge amounts of information which is gathered from sensors used and with the help of joining of distributed evaluating administrations such as cloud storage, farming field maps and more information can be retrieved from any place and everywhere which enables live monitoring and connectivity which is end to end.
- ii. IoT is viewed as an important segment for smart farming because with precise use of sensors and also smart gadgets, farmers could expand the output by 72% upto year 2050 as delineated by specialists.
- iii. By the use of IoT creations expenses could be diminished to an astounding dimension that would thus expand productivity and survivability.
- iv. By the use of IoT efficiency level would be further expanded as far as utilization of water, soil, fertilizers, pesticides etc.

For the suggested scheme, we were inspired by different kinds of problems faced by farmers: Indian farming is on the hitch because of the limited technical knowledge of the best and successful agricultural practices and, moreover, they are still dependent on traditional agricultural methods that lead to lower crop productivity. Thus, the production of crops can be maximized at reduced expense by utilizing future technology. This also decreases the pressure on farmers to take up heavy loans they have incurred to support their lives or to get decent crop yields of their own[5]. Apart from these issues scarcity of resources also adds up in their problem causing hindrance or stopping farmers from cultivating and hence Indian economy is also additionally getting influenced to large extent as most of the fruitful lands of the nation are being destroyed that forms the vital part of GDP. Through this framework, we are proposing a solution to this problem by implementing automated and systematic farming strategies that

enable farmers to cultivate with limited resources and higher yields that are guaranteed and successful in a productive way.

In agriculture, IOT technology gathers the environmental parameters of crop growth in a fixed position to help farmers find problems in time. In order to increase farmers' incomes and assist them in the prevention and control of crop diseases and pests, agricultural experts provide guidance with detailed information. It has been introduced with agricultural technology promotion and expert online FAQs through the personalized creation of mobile phone applications. In order to achieve scalability, high reliability, stability, compatibility with technical requirements, system architecture consists of three parts: the server, Android client and PC client. The monitoring of a crop field is clarified by an IOT Based Crop Field Monitoring and Irrigation Automation System. A system is built through the use of sensors and the irrigation system is automated according to the decision of a server based on sensed data. Sensed information transmitted to the web server database by using wireless communication. If the irrigation is automatic, then if the fields of humidity and temperature drop below the potential range, that implies. The user can remotely track and manage the device with the aid of an application that provides the user with a web interface.

II. CONCLUSION & DISCUSSION

The paper proposes a thought of consolidating the most recent innovation into the agrarian field to turn the customary techniques for water systems to current strategies in this way making simple profitable and temperate trimming. Some degree of mechanization is presented empowering the idea of observing the field and the product conditions inside some long-separate extents utilizing cloud administrations. The points of interest like water sparing and work sparing are started utilizing sensors that work consequently as they are modified. This idea of modernization of farming is straightforward, reasonable and operable. As relying upon these parameter esteems rancher can without much of a stretch choose which fungicides and pesticides are utilized for enhancing crop creation.

III. REFERENCES

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