SMARTFARMER – IoT ENABLED SMART FARMING APPLICATION

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TABLE OF CONTENTS

1. Introduction
2. Literature Review
3. Methodology
4. Experimentation
5. Result and Discussion
6. Conclusion
7. Future Scope

INTRODUCTION

Smart Farming is a management concept focused on providing the agriculture industry with the infrastructure to leverage advanced technology including the cloud, internet of things IoT for monitoring, tracking and analysing the various operations. Main objective of smart farming is to increase the quality and quantity of products. Smart farming helps farmers to understand the important factors such as water, topography, vegetation and soil type.

Internet of Things Smart technology enables new digital agriculture. Today technology has become a necessity to meet current challenges and several sectors are using the latest technologies to automate their tasks. Advanced agriculture, based on Internet of Things technologies, is envisioned to enable producers and farmers to reduce waste and improve productivity by optimizing the usage of fertilizers to boost the efficiency of plants. It gives better control to the farmers for their livestock, growing crops, cutting costs, and resources.

LITERATURE REVIEW

The term "Internet of Things" refers to the connection of objects, equipment, vehicles, and other electronic devices to a network for the purpose of data exchange (IoT). The Internet of Things (IoT) is increasingly being utilised to connect objects and collect data. As a result, the Internet of Things' use in agriculture is crucial. The idea behind the project is to create a smart agriculture system that is connected to the internet of things. The temperature and humidity in the surrounding region, as well as the moisture level of the soil, are monitored using the soil moisture sensor. The data will be available on both a smartphone and a computer. As a result, Internet of Things (IoT) based Smart Agriculture

Systems have a significant impact on how farmers work. It will have a good impact on agricultural productivity as well.

METHODOLOGY

In entire farming process the methodology is divided into two sections i.e, the crop field where the production is done and the warehouse where the cultivated crops are stored. Both the sections consist of different and multiple sensors. The crop field consist of a GPS based vehicle which can be controlled manually as well as we can automate it. This GPS vehicle is attached with a microcontroller. The microcontroller is further connected with power supply, GPS module, moisture, temperature, humidity, and obstacle sensor. The GPS based vehicle can be moved automatically or manually all over the field. The values from the sensors are recorded each and every moment and these values are sent to micro controller i.e. Raspberry Pi. Raspberry Pi can take its own decisions if the system is working on automated mode or the user can give commands to Raspberry Pi manually. The advantage to this system is that the GPS vehicle also consist of cutter and sprayer. The system automates the process of spraying pesticides and fertilisers with the help of sprayer attached to it. The soil moisture sensor detects the data from the soil and send it to microcontroller and accordingly the motor pump is switched on or off. The obstacle sensor helps to detect any obstacle that comes infant of the vehicle so that vehicle do not collide with something and change its directions as soon as an obstacle is detected.

The warehouse consists of motion detector sensor, temperature sensor, humidity sensor, cooling fan, heater, water pump and alarm. The motion detector sensor is used to detects any theft in the warehouse. As soon as someone comes in contact with the motion detection sensor and alert is made to the owner so that the owner can take actions regarding this. The temperature and humidity sensors are used to detect humidity and if the humidity crosses the threshold then the cooling fan is switched on automatically until it reaches back to the threshold level. Heater is switched on in case the humidity reaches below the threshold level. All this sensors are again connected to a microcontroller and a power supply. In this section the power supply do not need to be wireless as the system stays in a particular area and do not need move prominently. The information gathered from both the sections are then sent to cloud which further send the data to a mobile app. The farmer can connect to the mobile app and get all information regarding the crop field and the warehouse. There are multiple options available in the app through which the farmer can have a control over the field as well as the warehouse. Whenever there is a theft in the warehouse a buzzer sound is automatically made by the app so that the farmer can take the necessary action

EXPERIMENTATION

In Internet of Things based smart agriculture, a system is formed to monitor the farmland with the help of sensors, which senses components like temperature, light, humidity, soil moisture, etc. Then, automate the irrigation system and allow farmers to monitor their field conditions from anywhere through IoT Analytics Platform. To make the agricultural process even smarter and accurate, precision agriculture is used. This makes agricultural practice more controlled and precise in terms of raising livestock and farming. Internet of Things based Advanced Farming plays a vital role when it comes to the use of IT and other elements like sensors, agricultural drones, autonomous vehicles, control systems, automated hardware, robotics, variable speed technology, and others.

RESULT AND DISCUSSION

Smart Farming has enabled farmers to reduce waste and enhance productivity with the help of sensors (light, humidity, temperature, soil moisture, etc.) and automation of irrigation systems. Further with the help of these sensors, farmers can monitor the field conditions from anywhere. Internet of Things based Advanced Farming is highly efficient when compared with the conventional approach. The applications of intelligent Agriculture solutions not only target conventional, large farming. With operations, but could also be new levers to uplift other growing or common trends in agricultural like organic farming, family farming (complex or small spaces, particular cattle and/or cultures, preservation of specific or high-quality varieties, etc.), and enhance highly transparent Farming.

CONCLUSION

In IoT-based smart farming, a system is built for monitoring the crop field with the help of sensors (light, humidity, temperature, soil moisture, etc.) and automating the irrigation system.

Smart farming reduces the ecological footprint of farming. Minimized or site-specific application of inputs, such as fertilizers and pesticides, in precision agriculture systems will mitigate leaching problems as well as the emission of greenhouse gases.

FUTURE SCOPE

Information and Communication Technology is a tool for smart farming in agriculture. Crop fields are monitored with the aid of IoT-based devices. Sensors are used in the technology to measure soil moisture, humidity, and temperature. It also allows effective use of water by using an automated irrigation system.

Food is one of the three essential human needs. We farm to meet the demand for food. However, as the world's population grows, the agricultural industry is confronted with numerous challenges. Changes in weather and the environment also have a significant effect on the agriculture industry. The industry has turned to technology to boost productivity to meet the growing food demand. Precision farming, agricultural drones, and smart farming apps are all part of it. All of this is installed on top of an Internet of Things framework.