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Smart Agriculture A Review Using Iot

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Abstract: The agricultural industry has become more and more dynamic due to the increased demand for food in quality and quantity. Agriculture can be reinvented by the Internet of Things (IoT), a technology with great promise for business transformation. Agricultural products will be in great demand in the year coming future due to the increase of the world's population, so it is necessary to design new methods for agriculture, and smart agriculture is one of them. However, smart agriculture needs to be explored further to fully realize its potential. Using IoT technology, farmers can better manage their resources, such as fertilizer consumption and the number of vehicle trips, while reducing waste and increasing productivity. In this paper we have reviewed the few papers for further enhancement of work.

Index Terms – IoT, Sensors, Soil, irrigation, Smart Agriculture.

I. INTRODUCTION

In today's digital world the farmers can manage the agriculture data using farm IoT devices through which it can send and receive the ground level real-time information of agriculture. In recent years the landscape has changed, due to focused advancement of research in the field of artificial intelligence and machine learning has focused on agriculture, irrigation, animals, and farming contexts. Monitoring, control and decision-making solutions in the field of irrigation have sought to improve water conservation and production [1],[2],[3],[4],[5].

II. LITERATURE REVIEW

[Zuraida Muhammad, Muhammad Azri Asyraf Mohd Hafez, Nor Adni MatLeh, Zakiah Mohd Yusoff , Shabinar Abd Hamid] [6]:

The term "Internet of Things" refers to the linking or connecting of objects, appliances, vehicles, and other electronic devices into a network for the purpose of data exchange (IoT). The Internet of Things (IoT) is increasingly being used to connect objects and collect data. As a result, the use of Internet of Things in agriculture is important. The idea behind the project is to create a smart agricultural system that is connected to the Internet of Things. Technology has been paired with an irrigation system to cope with Malaysia's changing weather. The microcontroller of this system is Raspberry Pi 4 model b. Temperature and humidity in the surrounding area, as well as soil moisture levels are monitored using DHT22 and soil moisture sensors. The data will be available on both smartphones and computers , As a result, smart farming systems based on the Internet of Things (IoT) and Raspberry Pi are having a significant impact on how farmers work. It will also have a good effect on agricultural productivity. This will save money on labor expenses while preventing water wastage in daily needs

Divya J., Divya M.,Janani V. [7]:

Agriculture is essential to India's economy and people's survival. The purpose of this project is to create an integrated soil and irrigation monitoring system that will reduce manual field monitoring and provide information via a mobile application. This method aims to help farmers increase their agricultural production. A pH sensor, a temperature sensor, and a humidity sensor are among the tools used for soil testing. Based on the results, farmers may grow the best crop for the land. Sensor data is sent to the field manager via Wi-Fi, and crop advice is generated with the help of a mobile app. When the soil temperature is high, an automatic watering system is used. A crop photograph is collected and sent to the field manager for advisories.

H.G.C.R. Laksiri, H.A.C. Dharmagunawardhana, J.V. Wijayakulasooriya [8]:

Developing an efficient smart irrigation system based on fresh water outlets is a crucial requirement for farmers in the field of agriculture. This research develops a low-cost, weather-dependent smart watering system. To begin, an efficient drip irrigation system must be put in place that can automatically regulate the flow of water to plants based on soil moisture levels. Then, to make this water-saving irrigation system more efficient, an IoT-based connectivity feature was added, allowing a remote user to monitor soil moisture conditions and manually adjust water flow. The system also includes temperature, humidity, and raindrop sensors, which have been upgraded to allow these parameters to be monitored remotely via the Internet. In real time, these field

weather variables are stored in a remote database. Finally, based on the current weather conditions, a weather forecast algorithm is used to manage the water distribution. Farmers will be able to irrigate their crops more efficiently using the proposed smart irrigation system.

Anushree Math, Layak Ali, Pruthviraj U[9] :

India is a country where agriculture plays an important role. Therefore, it is very important to water the plants wisely so that they can bear fruit in one area and thus get a good yield. Irrigation is the process of giving certain plants water at a time. The objective of this project is to plant trees in the campus of National Institute of Technology, Karnataka with irrigation system. To do this, an open platform is used as the first system operator. Various sensors are used to provide current information about factors that affect plant health on an ongoing basis. By controlling the solenoid valve, water is supplied to the plants at regular intervals depending on the information obtained from the RTC unit. The web page can be used to monitor and manage the complete irrigation system. This website has a function that allows you to manually or automatically control the watering of plants. The health of the plants is monitored using a Raspberry Pi camera that provides a live feed to the webpage. The controller receives water flow data from the water flow sensor over a wireless network. The controller analyzes this data to see if there is any leakage in the pipe. Weather forecasting is also done to limit the amount of water given, making it more efficient and predictable.

Dweepayan Mishra, Arzeena Khan, Rajeev Tiwari, Shuchi Upadhaye [10]:

Agriculture is a major source of income for Indians and has a significant impact on the Indian economy. Crop development is essential to increase yields and provide the highest quality. As a result, crop beds with ideal conditions and adequate moisture can have a significant impact on production. Traditional irrigation systems are usually used, such as the stream flowing from one end to the other. As a result of this delivery, moisture levels in the fields can change. A designed irrigation system can help improve water system management. This paper proposes a terrain-specific programmable water system that would save human labor while simultaneously improving water efficiency and agricultural productivity. The setup consists of Arduino assembly, humidity sensor and Wi-Fi module. Data is obtained by connecting our experimental system to a cloud framework. Then, cloud services analyze the data and take action.

R. Nageswara Rao, B.Sridhar [11]:

Agricultural countries like India are highly dependent on agriculture for their development. Agriculture has always been an obstacle to the country's development. Smart farming, which includes modernizing existing agricultural systems, is the only solution to this challenge. As a result, the proposed strategy attempts to use automation and Internet of Things technologies to make farming smarter. Monitoring crop growth and selection, assisting in irrigation decisions, and other uses are possible thanks to the Internet of Things (IoT). To upgrade and increase crop yield, an independent irrigation IOT system based on Raspberry Pi is proposed. The main purpose of this project is to produce crops using the least amount of water possible. Most of the farmers waste a lot of time in the fields in order to focus on the water available to the plants at the right time. Water management must be improved and system circuit complexity reduced. Based on the data collected from the sensors, the proposed system determines the amount of water required. Two sensors detect soil moisture and temperature, as well as humidity, temperature and length of sunshine each day, and send the data back to the base station. Based on these characteristics, recommended systems should calculate the amount of irrigation water. The main advantage of the system is the integration of Precision Agriculture (PA) and cloud computing, which will reduce water fertilizer consumption while increasing crop yields and help assess weather conditions in the field.

Shweta B. Saraf, Dhanashri H. Gawali [12]:

The Internet of Things (IoT) is the Internet-based connectivity of a large number of devices (IoT). A unique identity links each object, allowing data to be sent without human involvement. This makes it possible to develop strategies for better natural resource management. Smart gadgets with sensors enable interaction with the physical and logical world, according to the IoT concept. The system proposed in this study is based on Internet of Things and uses real-time input data. Via a network of wireless sensors, the smart farm irrigation system uses an Android phone to remotely monitor and regulate drips. Between sensor node and base station, Zigbee is used to communicate. A web-based java graphical user interface is used to process and present the server's real-time observation data. Wireless monitoring of field irrigation systems eliminates human interaction and allows remote monitoring and control using an Android phone. Cloud computing is a potential option due to the large volume of data created by wireless sensor networks. This research presents and examines a cloud-based wireless communication system for monitoring and controlling a collection of sensors and actuators to determine plant water requirements.

Shrihari M[13] :

The concept of automation of agricultural production has been around since the early 1990s, and one of the main challenges scientists and farmers face is irrigation. Irrigation is a dynamic system that is highly dependent on external influences. This article describes a method that uses a tailor-made mathematical model to handle data from wireless sensors in Google Cloud, resulting in an intelligent system. An IoT-enabled design that can be scaled to large farms. According to the Holistic Agriculture Study, about 35 percent have been damaged by animals and humans. This intelligent system uses Tensor streams and deep learning neural networks to recognize animals depending on their threat level, as well as unauthorized human intruders on farms, and to notify farmers immediately. An android application is included with the device, which allows remote access and surveillance via live video streaming.

G. Sushanth, and S. Sujatha [14] :

Smart farming is a new concept as IoT sensors can offer information about the area of the farm and then act on it based on user input. The goal of this research is to develop an intelligent farming system that utilizes cutting-edge technologies such as Arduino, Internet of Things, and wireless sensor networks. Through automation, this research attempts to take advantage of new technologies such as the Internet of Things (IoT) and smart agriculture. The capacity to monitor environmental factors is an important component in increasing crop efficiency. The purpose of this study is to create a system that can monitor temperature,

humidity, moisture, and even the movement of animals that may damage crops in the field. The farm uses sensors, and then sends an SMS notification with a notification of the app creation. for the same for the smartphone operator on Wi-Fi / 3G / 4G if there is a difference. The system uses duplex communication based on the mobile Internet connection, which allows data analysis and water time to be changed using an Android app. Because of its independent power and cheap price, the gadget is able to perform well in low water, isolated areas.

Vaishali S, Suraj S, Vignesh G, Dhivya S and Udhayakumar S [15]:

Traditional irrigation methods, such as overhead irrigation and flood irrigation, are ineffective. They waste a lot of water and may make people sick by causing fungal growth in the soil due to excess moisture. Due to the scarcity of water, the automated irrigation system is essential for water conservation and, as a result, agricultural productivity. Irrigation uses around 85% of the world's total usable water supply. This need is predicted to increase in the coming years as the population grows. To meet this demand, we must use creative methods that reduce the amount of water used in the water supply. Sensors in the automated system monitor the amount of water available to the crops, and watering is done as needed by the irrigation control. Because of its unlimited practical potential, as well as its adaptability, cloud computing is a great solution for massive data. The goal is to focus on factors such as temperature and humidity. This is a mobile integrated and smart irrigation system based on Internet of Things-enabled application controlled system. The main purpose of this project is to control the water flow and monitor the plants using Smartphone

III. CONCLUSION

The proposed review paper provides information on various IOT applications for soil parameters including soil temperature, soil moisture and atmospheric temperature to predict water availability. This process will help to identify these poor soils to have a good water ratio for agriculture. The data collected by the sensors is designed to learn using machine learning techniques to ensure a high performance system. Adopting IoT-based smart farming helps to get a good harvest and also reduces human involvement in farming.

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