International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 10 Issue: 06 | Jun 2023 www.irjet.net p-ISSN: 2395-0072

A review of the literature on IOT-based smart agriculture monitoring and control systems

Dipti D. Desai[1], Priyanka B. Patil [2], Prof. S. M. Nadaf [3]

[1]*Dipti D. Desai Dept. of Electrical Engineering Nanasaheb Mahadik College of Engineering, Peth*
[2]*Priyanka B. Patil Dept. of Electrical Engineering Nanasaheb Mahadik College of Engineering, Peth*
[3] Prof. S. M. Nadaf Dept. of *Electrical Engineering Nanasaheb Mahadik College of Engineering, Peth*

Abstract -*The agricultural sector in India is losing ground on both sides every day, which affects how productive the environment is. Finding a strategy to revive agriculture and put it back on a path of higher growth is becoming more and more important. A large- scale agricultural system necessitates extensive upkeep, knowledge, and management. A network of interconnected devices known as the Internet of Things (IoT) allows for the sending and receiving of data over the Internet and the completion of activities without the assistance of a human. A large number of data analysis factors are available in agriculture, which increases cropyields. IoT device use in smart farming contributes to the upgrading of information and communication. We can suppose that there are more elements, like light and minerals.*

1.INTRODUCTION

India is mostly an agricultural country. Farmers currently irrigate the region manually at regular intervals. Because of higher water demand or longer transit times for the water to its destination, there is arisk that the crop will get dry. Real-time temperature and humidity monitoring is critical in many agricultural sectors. The old wired detecting control system, on the other hand, is stiff and has numerous application limitations. This project automates irrigation, which is a vital answer to the problem. To dothis, a Raspberry Pi is used, and input is used to control the moisture and temperature sensors. This is accomplished by constructing an automated plant watering system that employs moisture sensors. The key goals of our project are to eliminate continuous monitoring and simplify supervision. We can implement smart agriculture with the help of our system. This system integrates agricultural monitoring with IoT technology. The Internet of Things (IoT) is revolutionizing agriculture by addressing the major challenges and limits that farmers face today in the field. If the soil moisture level is low, the relay unit linked to the motor switch should be checked on a regular basis. The engine begins when the earth is dry,and it shuts down when the soil is wet.

As we all know, Traditional farming involves a lot of manual labor and takes a lot of time. Effective problem detection and resolution are challenging in conventional farming. We are moving towards intelligent farming as a result.

1.Provide a IOT based solutions for smart agriculture monitoring and control: Traditional farming practices employed antiquated and ineffective farming techniques. Both the soil monitoring and livestock management are done manually. These processes take a lot of time. Early outbreak detection is quite challenging. We can control and manage agricultural production by utilizing smart farming techniques based on IoT technologies. To monitor the fields, crops, and cattle, it makes use of geolocation, GPS tracking, sensors, and drones.

1 G. Sushanth, and S. Sujatha

This paper provide , to develop a smart agriculture system using IoT. Smart agriculture is a unique concept in which IoT sensors offer information about agricultural regions and then act on it in response to human input. The purpose of this study is to develop a smart agricultural system that makes use of cutting-edge technologies such as wireless sensor networks, the Internet of Things, and Arduino. Through automation, the research takes advantage of emerging technologies such as smart agriculture and the Internet of Things (IoT). Monitoring environmental variables can enhance crop efficiency. The purpose of this study is to develop a system that can use sensors to analyze temperature, humidity, wetness, and even the movement of animals in agricultural areas that could harm crops. If an error happens, the system will send an SMS message to the farmer's smartphone as well as a notification to the app developed for it through Wi- Fi/3G/4G. An Android app can be used to inspect and change the watering schedule of the system's duplex communication channel, which is based on a cellular Internet interface. Because of its energy independence and inexpensive cost, the gadget has the potential to be useful in water-scarce, distantlocations.

2 Mahmoud Abbasi, Mohammad Hossein Yaghmaee, Fereshteh Rahnama

In this survey, challenges and applications in agriculture examined. Precision agriculture is the use of information technology in agriculture as a result of increased food consumption, customer demand for high-quality food, and agricultural environmental effects. The Internet of Things (IOT) is a rapidly evolving technology that has various advantages for agriculture. Because of the varied and large

amount of datacollected by IoT sensors, cloud computing is critical to the future of internet of things (IoT) agricultural applications. Microcontrollers will simultaneously enhance the capabilities of the internet of things (IoT). The IOT applications in agriculture, as well as the research trend, concepts, and basic IOT components, are assessed in this paper. First, an appraisal of the number of publications published in this field. Second, an overview of IOT definition and architecture, covering levels. The main difficulties in IOT and precision agriculture (PA) are then addressed, followed by a comparison of some IOT-related technologies.

3 Junhu Ruan, Yan Shi, Felix Tung Sun Chan

In this paper , survey on bring out emerging trends in both applied IoT techniques and agriculture is carried out. As a result of the Internet of Things (IoT) age, our modern world has experienced a revolution. Precision agriculture will eventually become a practical, cheap, and sustainable technique of increasing agricultural yields and quality with the ongoing deployment of IoT methods in agriculture. In order to facilitate implementation, we use records from 3168 documents and their 100,205 references in Web of Science to build a visualization assessment of the farm IoT literature over the preceding ten years. The dynamics of research fronts and intellectual bases reveal emerging trends in both applied IoT technology and agriculturally linked areas of concern. The amount of contributions in cooperative networks is used to identify outstanding nations, institutions, and authors. Furthermore, from 2009 to 2018, the citation networks identified notable papers and authors, indicating hot topics and trends in the farm IoT literature. We also make future recommendations as part of the review, such as building infrastructure for the Internet of Things in agriculture, data security and sharing, sustainable energy solutions, economic analysis and operation management in the Internet of Things in agriculture, and IoT-based financing and e-business models. These findings will be useful to researchers and industry professionals in their future efforts to develop IoT-based precision agriculture.

4 Mohamed Amine Ferrag, Lei Shu

It carried out challenges on security and privacy issues in the field of green IoT based agriculture. This paper discusses security and privacy research problems in the context of IoT-based green agriculture. We begin by summarizing current smart agriculture surveys and outlining a four-tier green IoT-based farm architecture. The threat models against IoT-based green agriculture are then classified into five categories, with intrusions into authentication, confidentiality, availability, and integrity aspects being included in each. Furthermore, we provide a taxonomy and a side-by-side comparison of the most sophisticated methods to secure and privacy-preserving IoT technologies, as well as how they will be adjusted for environmentally friendly IoT-based agriculture. Furthermore, we investigate privacy-focused blockchain-based solutions and IoT application consensus approaches, as well as how they will be adjusted for long-term IoT-based agriculture. Based on the results of the current survey, we address prospective future research directions in the security and privacy of green IoT-based agriculture, highlight open research topics, and emphasize these challenges.

5 Vippon Preet Kour, Sakshi Arora

It contribute towards recent IoT technologies in agriculture sector along with development of hardware and software systems. Because of population growth, the agricultural industry's need has expanded dramatically. With the advancement of technology, this decade has seen a shift from traditional to cutting-edge ways. Because of the Internet of Things (IoT), the agriculture sector has altered in terms of both quality and quantity. The farms' real-time monitoring and species hybridization enabled resource optimization. Scientists, research groups, academics, and the majority of governments worldwide are moving towards the practice and execution of joint efforts in order to explore the potential of this sector to serve humanity. The IT industry is competing to provide even better solutions. Combining IoT with cloud computing, big data analytics, and wireless sensor networks can provide you ample room to predict, process, and analyze events while also improving your real-time operations. The notion of device heterogeneity and interoperability is also presenting new possibilities in this domain by delivering adaptive, scalable, and durable techniques and models. As a result, together with the growth of hardware and software systems, this study contributes to modern IoT technologies in the agriculture business. The projects and businesses developed by the public and private sectors around the world to provide smart and sustainable precision agriculture solutions are also discussed. A brief assessment of the current situation, applications, research potential, restrictions, and future aspects is provided. A precision agriculture framework based on IoT concepts is also proposed in this research.

6 Ashok Kumar Das, Anusha Vangala, Neeraj Kumar

It provide information security using blockchain technology. Agriculture is vital to humanity's survival since it encompasses manufacturing, security, traceability, and long-term resource management. Because resources are rapidly running out, developing innovative techniques to promote agricultural subsistence is vital.The expansion of the Internet of Things (IoT) and blockchain technology, two fast growing domains, have the potential to improve the current state of the food chain. This report does a thorough literature review to analyze the most recent advancements in systems that leverage blockchain technology to ensure information security. Following the identification of smart agriculture's main requirements, a general blockchain- based security architecture has been provided. The plans under consideration have been assessed. A thorough comparison analysis revealed the limitations of previous studies. A thorough examination of the literature has also aided in identifying new topics for future artificial intelligence

research, as well as the security objectives on which the research has been focused.

7 Shrihari M

In this survey, automate production of crops and stop intrusion using deep learning is carried out. Irrigation is a fundamental problem that scientists and farmers encounter while attempting to automate agricultural production; this concept has been around since the early 1990s. Irrigation is a dynamic system that is heavily influenced by external events. The method discussed in this article employs a specially constructed mathematical model to manage data from wireless sensors on Google Cloud in order to create a smart system. a design that can be scaled up to big farms and is IoT enabled. According to Holistic Agricultural Studies, 35 have been harmed by both animals and humans. This intelligent system employs tensor flow and deep learning neural networks to identify animals based on their hazard level as well as unauthorized human visitors tothe farm and instantly notify the farmer. The device comes with an Android app that allows for remote access and live video streaming surveillance.

8 Mohamed Rawidean Mohd Kassim

This paper explores the latest trends in IoT agriculture applications. It highlights the issues and challenges for smart agriculture. Tsunamis were caused by the rapid expansion of Internet of Things (IoT) technology almost everywhere on the planet, but especially in agriculture. These big innovations are shaking up present farming practices while also opening up new opportunities. Because of the 30% increase in world population by 2050, there will be a tremendous need for agricultural products. Because of the migration of young people to large cities, there are less human resources available for agricultural growth, and agricultural land is being developed swiftly. The majority of agricultural activities must be mechanized in order to supply the world's food need. IoT and related technologies have the potential totackle the aforementioned agricultural and food demand issues. This paper will look at current IoT agricultural application trends and highlight issues and challenges, namely with network and open source software for smart agriculture.

9 Tamoghna Ojha, Sudip Misra, Narendra Singh Raghuwanshi

This paper investigate the specific issues and challenges associated with IoT and IoT applications for agriculture. The growth of the Internet of Things (IoT) has resulted ina wave of new and improved applications across a wide rangeof industries, including agriculture. The latest push to deploy IoT technology promises a significant boost to the agricultural business in terms of efficiency and scalability. In this post, we will look at a range of IoT-related concerns and challenges, as well as IoT designs, connection, middleware, and information processing technologies. Then, we'll look at several IoT applications for agriculture, covering a variety of case studies to thoroughly investigate the solutions and their benefits. relates to the design and implementation parameters. As a result, we present a thorough overview of the simulation tools, datasets, and testbeds currently available for IoT in agriculture testing. We outline the current open concerns and challenges confronting IoT for agriculture. The paper finishes with research recommendations for the future.

10 Achilles D. Boursianis , Maria S. Papadopoulou, George Salahas

It perform a survey of last research on IoT and UAV technology applied in smart agriculture as well as IoT applications and solutions in smart farming.Unmanned aerial vehicles (UAVs) and the Internet of Things (IoT) are two popular agricultural technologies that are ushering in a new era of precision agriculture by altering traditional farming practises. We perform a review of recent studies on the usage of IoT and UAV technology in agriculture in this paper. This article covers the fundamentals of Internet of Things (IoT) technology, such a intelligent sensors, different types of IoT sensors, networks, and agricultural protocols. We also talk about IoT solutionsand smart farming applications. We also look at how UAVs are used in smart agriculture by looking at how they are used in irrigation, fertilisation, pesticide use, weed control, plant growth monitoring, crop disease management, and field-level phenotyping. Furthermore, the utilisation of UAV systems in difficult agricultural environments. Our conclusion is that the Internet of Things and unmanned aerial vehicles (UAVs) are two of the most important technologies that are converting traditional farming practises into a new intelligence perspective in precision agriculture.

RESULT

By increasing farming's intelligence and connectivity, precision agriculture reduces overall costs while improving output quality and quantity, agricultural sustainability, and consumer experience. Increased production control leads to better cost control and waste reduction. The probability of produce loss is decreased by being able to spot issues with, say, livestock health or crop growth. Productivity is also increased through automation. Smart devices allow for the simultaneous initiation of several operations, and automated services enhance product quality and volume by more skillfully controlling production processes.

CONCLUSIONS

Conclude The proposed study provides data on a variety of soil parameters, including soil temperature, soil moisture, and ambient temperature, in order to forecast whether irrigation will be beneficial. This technology aids in the analysis of soil qualities, resulting in a more successful agricultural irrigation system. Sensor data is made to learn utilizing machine learning techniques to ensure a fully

automated system. Implementing a smart agriculture system based on IoT enhances crop quality while decreasing the demand for human labor in agricultural activities.

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