**Smart Farmer**- **IoT Enabled Smart Farming Application.**

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**Abstract -** Agriculture provides a living for about 58% of India's people. Its full potential is unrealised due to a lack of systematic technology. Agriculture is practised in many places of the world in traditional methods. However, many farmers are unaware of how to make the process erratic. A larger number of agricultural and farming operations rely on forecasts, which frequently fail. Due to this, farmers have to go through heavy losses. Scientific input and daily interventions can help get more yield and quality. Hence, the project covers the fundamentals of Agile methodology and IoT in order to create a smart farming application with IoT capabilities. This is an IoT-based agriculture system that uses sensors to let the farmer monitor several characteristics of the land, such as soil moisture, temperature, and humidity. Farmers may use a web or mobile application to monitor all sensor metrics even while they are not in their field. One of the most crucial jobs for farmers is to water their crops. They may decide whether or not to irrigate the crop by monitoring sensor data and operating motor pumps from the mobile application.

***Key Words*:** *Agriculture, Internet of Things, Smart Farming, Mobile Application.*

**I. INTRODUCTION**

New ideas and technologies are continually presented and deployed in order to suit humanity's current global demands. As a result, the Internet of Things (IoT) has emerged. IoT is described as a network of all items contained within devices, sensors, machines, software, and people that connect, share information, and interact via the Internet environment to give a holistic solution between the real and virtual worlds. IoT has been used in a variety of fields in recent years. In recent years, various agricultural solutions and technologies have been launched in order to boost agricultural productivity. The use of IoT and big data is an emerging trend. Smart agriculture will be enabled through the use of IoT and big data, which is projected to increase efficiency and production. Wireless sensor networks (WSN) have been widely used in agriculture throughout the years, laying the groundwork for the development of smart agriculture. Environmental monitoring, machine control automation, and traceability are among the applications targeted by the WSN. The adoption of the IoT has been driven by the urgent need for innovative solutions and technologies aimed at enhancing production and efficiency in the agricultural sector, as well as the advancement of science and technology. The fundamental reason for their applications is smart agriculture's breakthrough advancement and its unavoidable position as the future of smart and sustainable environmental management. IoT combines several existing solutions and technology. Automation solutions and technologies, mechanical machinery, information, decision-making tools, services, and software are seamlessly integrated with the smart agriculture sector to assist farmers to enhance productivity, product quality, and profitability.

**II. LITERATURE REVIEW:**

**Zuraida Muhammad, Muhammad Azri Asyraf Mohd Hafez, Nor Adni MatLeh, Zakiah Mohd Yusoff, Shabinar Abd Hamid [1]** The term "Internet of Things" refers to the connection of objects, equipment, vehicles, and other electronic devices to a network for tata 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 technology is combined with an irrigation system to deal with Malaysia's variable weather. This system's microcontroller is a Raspberry Pi 4 Model B. The temperature and humidity in the surrounding region, as well as the moisture level of the soil, are monitored using the DHT22 and soil moisture sensor. The data will be available on both a smartphone and a computer. As a result, the Internet of Things (IoT) and Raspberry Pi-based Smart Agriculture Systems have a significant impact on how farmers work. It will have a good impact on agricultural productivity as well. In Malaysia, employing IoT-based irrigation systems saves roughly 24.44 pper centper year when compared to traditional irrigation systems. This would save money on labour expenditures while also preventing water waste in daily needs.

**Divya J., Divya M., Janani V. [2]** Agriculture is essential to India's economy and people's survival. This project aims to create an embedded-based soil monitoring and irrigation system that will reduce manual field monitoring and provide information via a mobile app. The method is intended to help farmers increase their agricultural output. A pH sensor, a temperature sensor, and a humidity sensor are among the tools used to examine the soil. Based on the findings, farmers may plant the best crop for the land. The sensor data is sent to the field manager through Wi-Fi, and the crop advice is created with the help of the mobile app. When the soil temperature is high, an automatic watering system is used. The cropped image is gathered and forwarded to the field manager for pesticide advice.

**R. Nageswara Rao, B.Sridhar [3]** Agrarian countries like India rely heavily on agriculture for their development. Agriculture has always been a roadblock to the country's development. Smart agriculture, which comprises modernising present agricultural systems, is the only answer to this challenge. As a result, the suggested strategy attempts to use automation and Internet of Things technologies to make agriculture smarter. Crop growth monitoring and selection, irrigation decision assistance, and other uses are possible thanks to the Internet of Things (IoT). To modernise and boost crop yield, a Raspberry Pi-based autonomous irrigation IoT system has been proposed. This project's main purpose is to produce crops using the least amount of water possible. Most farmers waste a lot of time in the fields in order to focus on water available to plants at the appropriate time. Water management should be improved, and the system circuit's complexity should be minimised. Based on the data collected from the sensors, the suggested system determines the amount of water required. Two sensors detect the humidity and temperature of the soil, as well as the humidity, temperature, and length of sunshine each day, and send the data to the base station. Based on these characteristics, the recommended systems must calculate the irrigation water quantity. The key benefit of the system is the integration of Precision Agriculture (PA) and cloud computing, which will reduce water fertiliser consumption while increasing crop yields and assisting in the evaluation of field weather conditions.

**Shweta B. Saraf, Dhanashri H. Gawali [4]** The Internet of Things (IoT) is the internet-based connectivity of a huge number of devices (IoT). A unique identity links each item, allowing data to be sent without human involvement It makes it possible to develop strategies for improved natural resource management. Smart gadgets with sensors, according to the IoT concept, enable interaction with the physical and logical worlds. The proposed system in this study is built on the Internet of Things and uses real-time input data. Over a wireless sensor network, a smart farm irrigation system uses an Android phone to remotely monitor and regulate drips. Between sensor nodes and base stations, Zigbee is utilised to communicate. A web-based java graphical user interface is used to process and present the server's real-time observed data. Field irrigation system wireless monitoring eliminates human interaction and enables remote monitoring and control using an Android phone.

**Hamza BENYEZZA, Mounir BOUHEDDA, Khaoula DJELLOUT, Amina SAIDI [5]** Water management is currently a global problem for all of us to tackle in near future we need to plan it smartly. As we are living in a modern world filled with lots of useful sensors from which we can design systems with water-saving capabilities. The work in this paper focuses on increasing the effective use of water using field assistance for farmers. Basically, it works with a soil moisture sensor which gives a finding of moisture level in soil and reconnects with Thing Speaks cloud via Wi-Fi module ESP8266 to observation of soil conditions. The proposed system is also set with an algorithm such that on soil moisture pattern data it can predict decisions on irrigation of crops. the system also warns farmers about empty water sources if it occurs. benefits of using this system also include weather prediction through the website. The device has the potential to be beneficial in water-scarce, geographically isolated places due to its energy independence and low cost. The fact that the technology is simple to use for farmers adds to its utility. It also saves water by preventing waste.

**G. Sushanth, and S. Sujatha [6]** Smart agriculture is a novel concept since IoT sensors can offer information about agricultural regions and then act on it based on user input. The purpose of this study is to develop a smart agricultural system that utilises cutting-edge technologies such as Arduino, the Internet of Things, and wireless sensor networks. Through automation, the research tries to make use of emerging technologies such as the Internet of Things (IoT) and smart agriculture. The capacity to monitor environmental factors is a critical component in increasing crop efficiency. The purpose of this study is to develop a system that can monitor temperature, humidity, wetness, and even the movement of animals that might damage crops in agricultural areas using sensors, and then send an SMS notification as well as a notification on the app developed for the same to the farmer's smartphone via Wi-Fi/3G/4G if there is a discrepancy. The system uses a duplex communication link based on a cellular Internet interface, which allows data inspection and irrigation schedule to be changed using an android app. Because of its energy independence and inexpensive cost, the gadget has the potential to be useful in water-scarce, geographically isolated areas.

**Shrihari M[7]** The concept of automating agricultural production has been around since the early 1990s, and one of the primary challenges that both scientists and farmers confront is irrigation. Irrigation is a dynamic system that is heavily reliant on outside influences. This article describes a method that uses a custom-built mathematical model to handle data from wireless sensors on Google Cloud, resulting in a smart system. An IoT-enabled design that can scale up to big farms. According to Holistic Agricultural Studies, around 35 have been damaged by animals and people. This intelligent system uses the Tensor flow and deep learning neural networks to recognise animals depending on their threat level, as well as human intruders who are not authorised on the farm and to alert the farmer immediately. An android application is included with the device, which allows for remote access and surveillance through live video streaming

**Vaishali S, Suraj S, Vignesh G, Dhivya S and Udhayakumar S [8]** From the beginning of time, agriculture has been the most important practice in human society. Traditional irrigation methods, such as overhead sprinklers and flood irrigation are inefficient. They waste a lot of water and may even make people sick by causing fungus growth in the soil due to too much moisture. Due to the scarcity of water, an automated irrigation system is essential for water conservation and, as a result, agricultural profitability. Irrigation consumes around 85% of the world's total accessible water resources. This need is projected to increase in the coming years as the population grows. To meet this need, we must employ creative methods that lower the quantity of water utilised in irrigation. Sensors in the automated system monitor the availability of water to the crops, and watering is done as needed through controlled irrigation. Because of its practically limitless storage and processing capabilities, as well as its fast flexibility, cloud computing is an intriguing solution to the massive amount of data generated. The objective is to focus on factors like temperature and soil moisture. This is a mobile integrated and smart irrigation system based on an Internet of Things-enabled application-controlled monitoring system. The main purpose of this project is to regulate the water supply and monitor the plants using a Smartphone.

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