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Smart Agriculture Monitoring System using IoT

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Abstract: Agriculture is critical to the agricultural country's development. In India, farming employs over 70% of the population and accounts for one-third of the country's GDP. Agriculture-related issues are constantly a hindrance to the country's progress. The only existing solution to the current problem is intelligent agriculture, which involves updating current agricultural processes. As a result, the project's goal is to use automation and IoT technology to make agriculture smarter. The concept of smart-e-farming was created to make farming easier. It is powered by electricity. It comes with a variety of sensors for testing soil parameters, including the following: Sensor for measuring temperature. Moisture in the soil, for example. The key benefit is that it has an autonomous operating covering that adjusts to the soil depth and temperature.

Keywords: Raspberry Pi, Internet of Things (IoT), DC Pump, Web application

I. INTRODUCTION

The magnificent Agriculture making model is a dependable checking structure that monitors dirt features such as temperature, stickiness, and soil moisture. By using IOT, it is feasible to operate numerous field exercises indirectly from anywhere, at any time. It provides a cutting-edge manner of living in which an individual can operate his electronic devices using a high-tech cell phone, as well as efficient energy management. It's used in a variety of industries, including savvy agribusiness, beautiful design biological noticing, clinical benefits transportation, and others. India is one of the world's largest freshwater consumers, consuming significantly more new water than any other country.

Instead of homegrown and mechanised areas, a lot of water is used in the farming field. Groundwater contributes 65 percent of all of our water. Water is now one of the most important resources on the planet, with a considerable percentage of it being used in agriculture. The framework can provide data to the remote organization since the dirt dampness sensor and temperature sensor are installed in the root zone of the plants. The Raspberry Pi serves as the system's brain, and the webcam is connected to it through a Wi-Fi module. Python is a programming language that is used to automate tasks. The system consists of a network of wireless sensors and a wireless base station that may be used to send data from the sensors to the irrigation system's controller. Sensors such as a soil moisture sensor, a soil temperature sensor, and a ph sensor can all be employed by the system. The raspberry pi model is programmed such that the irrigation system is automated if either the soil moisture or temperature parameters exceed a specified threshold level, i.e. the relay attached to the raspberry pi turns on or off the motor. Irrigation is the process of transferring water to fields in order to meet their water requirements. Dams, ponds, lakes, canals, tube-wells, and even wells are used as water supplies for this procedure. Irrigation supplies the required moisture to the soil for growth, development, germination, and other associated processes. Water moistens the soil, allowing roots to penetrate even in a dry environment. Irrigation frequency, pace, amount, and time change for different crops, as well as depending on the soil type and season. Summer crops, for example, require a higher rate of water than winter crops. India may be a large country with a large population that requires a large amount of food. Rainfall is irregular and scarce, resulting in a slew of issues such as famines and droughts. Furthermore, in desert places, there are a limited amount of utilities available for farming and they are densely packed. External infrastructure, such as canals and dams, is unquestionably required. With a typical temperature of 25 degrees Celsius, India is an equatorial and equatorial country. This accelerates the evaporation process.

IoT Technology and Agriculture

Things-on-the-internet The Internet of Things (IOT) is made up of two words: internet and things. Things in the IoT refer to a variety of IoT devices with distinct identities and the ability to perform remote sensing, actuation, and live monitoring of specific types of data. IoT devices can also share data in real time with other connected devices and applications, either

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directly or indirectly, or collect data from other devices, process it, and send it to different servers. The other term for the internet is a global communication network that connects trillions of computers throughout the world, allowing information to be shared. Thus, the Internet of Things (IoT) can be defined as "a dynamic global network infrastructure with self-configuring capabilities based on standard and interoperable communication protocols where physical and virtual things have identities, physical attributes, and virtual personalities, use intelligent interfaces, and are seamlessly integrated into the information network, and frequently communicate data associated with users and their environment." An ideal Internet of Things device has multiple interfaces for connecting to other devices, which might be wired or wireless.

IoT Enabling Technologies

Wireless Sensor Networks, Cloud Computing, Big Data, Embedded Systems, Security Protocols and Architectures, Protocols Enabling Communication, Web Services, Internet, and Search Engines form the backbone of the Internet of Things.

Wireless Sensor Network (WSN): A WSN is a collection of sensors and nodes that work together to monitor various types of data. Cloud computing, often known as on-demand computing, is a sort of Internet-based computing that allows computers and other devices to access shared processing resources and data on demand. It can take many different forms, such as IaaS, PaaS, SaaS, DaaS, and so on. Big Data Analytics is the act of studying big data sets comprising diverse sorts of data—i.e. Big Data – to identify hidden patterns, unknown relationships, market trends, customer preferences, and other relevant business information.

Communication Protocols: These protocols enable data exchange formats, data encoding, and addressing, and they form the backbone of IoT systems to enable connectivity and coupling to applications. They also facilitate data exchange over the network because they enable data exchange formats, data encoding, and addressing. Embedded Systems: An embedded system is a type of computer system that combines hardware and software to fulfil a specified task. Microprocessor/microcontroller, RAM/ROM, networking components, I/O units, and storage devices are all part of the system.

II. RELATED WORK

Sensor advancement and distant associations mix of IOT development has been considered and investigated subject to the certified situation of cultivating system. A got technique together with web and remote trades, Remote Monitoring System (RMS) is proposed. Huge objective is to accumulate progressing data of agribusiness creation environment that gives straightforward permission to cultivating workplaces, for instance, alerts through Short Messaging Service (SMS) and advices on environment configuration, crops and so forth [1]

Proposed a system joining the advantages of the huge qualities of emerging advances, for instance, Internet of Things (IoT) and Web Services to assemble a capable method for managing handle the colossal data drew in with agrarian yield. The procedure uses the blend of IoT and disseminated figuring that propels the speedy improvement of rustic modernization and helps with recognizing sharp response for agribusiness and viably settle the issues related to farmers. [2]

Proposed improvement of a structure which can screen temperature, moisture, clamminess and surprisingly the advancement of animals which might pound the yields in agrarian field through sensors using Arduino board and assuming that there ought to be an event of any uniqueness send a SMS cautioning similarly as a notification on the application made for the identical to the farmer's PDA using Wi-Fi/3G/4G. The structure has a duplex correspondence associate ward on a cell Internet interface that thinks about data audit and water framework intending to be altered through an android application. Considering its energy autonomy and facilitate, the structure might perhaps be useful in water limited geologically separated regions [3].

This structure [4] gives a shrewd checking stage framework and system structure for office agriculture climate subject to IOT. This will be a catalyst for the advancement from regular developing to introduce day developing. This in like manner gives event to making new advancement and organization improvement in IOT (web of things) developing application.

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III. PROBLEM STATEMENT

As more farmers commit suicide as a result of enormous losses due to natural calamities or a lack of resources, this concept was designed to provide assistance to farmers by overcoming this problem and providing some technology to avoid such problems.

IV. SYSTEM ARCHITECTURE

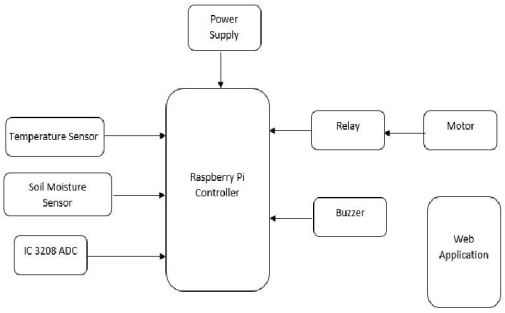

Fig: - System Architecture

V. METHODOLOGY

The suggested system block diagram is depicted in the diagram below. Sensors, Raspberry Pi module, water level, relay, and motor are the major components of this diagram. All other sensors are controlled by Rpi, which is the main controller. A water level sensor is used to determine the amount of water in a tank or well. We have two options for controlling the system: manually or via a web application. The Raspberry Pi has been connected to a variety of sensors. When the soil moisture level exceeds the specified threshold, the motor turns on. The relay is used to turn on and off the engine. The system can also be turned on remotely by logging into the system and pressing the "Motor On" button on the web application, which is dependent on the soil and temperature sensor results. The values obtained from sensors are stored in MySQL database. The Python IDE is used for system development.

VI. CONCLUSION

Low-complexity circuitry is used to create a precision agriculture irrigation system. The Raspberry Pi microcontroller and two sensors have been successfully interfaced. All observations and experiments show that the proposed method is a complete solution to field activities, irrigation problems, and other issues. Implementing such a system in a field will undoubtedly aid in the improvement of the crop field and overall production. The irrigation system may be totally automated with the help of this system, which also offers real-time information about the land and crops, allowing farmers to boost their production rate.

REFERENCES

[1] Reuben Varghese and Smarita Sharma,“ Affordable Smart Farming Using IoT and Machine Learning ”, IEEE Xplore Compliant,2018
[2] K.A. Patil and N.R. Kale, ”A Model for Smart Agriculture Using IoT”, International Conference on Global Trends in Signal Processing Information Computing and Communication, 2016
[3] M.K.Gayatri, J.Jayasakthi, Dr.G.S.Anandhamala, “Providing Smart Agriculture Solutions to Farmers for Better Yielding Using IoT”, IEEE International Conference on Technological Innovations in ICT for Agriculture and Rural
[4] Dr. Sanjay N. Patil1 , Madhuri B. Jadhav , “Smart Agriculture Monitoring System Using IOT”, International Journal of Advanced Research in Computer and Communication Engineering Vol. 8, Issue 4, April 2019
[5] K. Jyostsna Vanaja, Aala Suresh and S. Srilatha, “IOT based Agriculture System Using Node MCU” .International Research Journal of Engineering and Technology (IRJET). Volume: 05 Issue: 03—Mar-2018, e-ISSN: 2395-0056