

SMART FARMING SYSTEM USING ZIGBEE

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ABSTRACT

Agriculture is the economic sector that consumes the most water in Brazil and in the world, according to the National Water Agency of Brazil. Precision farming is increasingly essential for the sustainable development of agriculture. The automation of information management and data collection in agriculture through sensor networks is extremely important for the sustainable agriculture development. These data guided the project that had the objective of developing a wireless, flexible and simple sensing system that can be applied in any environment, transmitting its information to a central device where the data can be stored and analyzed, besides providing a more accurate irrigation system for saving water resources. This project did not aim at the analysis of sensor data, but only the tests with modules of radio frequency transmission working with microcontrollers. This study allowed the development of a system with low energy consumption, using the Zigbee communication protocol with

wireless Zigbee modules, and conducting tests involving soil temperature and soil moisture measurements, also making possible through the collected data, future academic studies in the agronomic area.

INTRODUCTION

As we all know, ZigBee Alliance is the standardization organization for the international important Internet of Things industry (Wireless Sensor Networks), formulated the ZigBee standards in the wireless sensor network technology are recognized widely as authoritative standard of the Internet of Things, a ZigBee is a low-cost, low-power, wireless mesh networking standard. The low cost allows the technology to be widely deployed in wireless control and monitoring applications, the low power-usage allows longer life with smaller batteries, and the mesh networking provides high reliability and larger range. As a brand-new information acquisition and the processing technology, the ZigBee has seeped gradually into the agricultural environmental

monitoring domain [1-3]. The ZigBee technologies allow the identification of pests in the crops, drought or increased moisture. Having such information at a real-time interval, automated actuation devices can be used to control irrigation.

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pest control in order to offset the adverse conditions.

LETTERATURE SURVEY

Zuraida Muhammad, Muhammad AzriAsyrafMohd Hafez, Nor AdniMatLeh, ZakiahMohdYusoff , ShabinarAbd Hamid [1] 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 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, 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 percent per year when compared to traditional irrigation systems. This would save money on labour expenditures while also preventing water waste in daily needs.

Divya J., DivyaM.,Janani V. [2] Agriculture is essential to India's economy and people's survival. The purpose of this project is 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 crop image is gathered and forwarded to the field manager for pesticide advice.

H.G.C.R. Laksiri, H.A.C.
Dharmagunawardhana, J.V.
Wijayakulasooriya [3] Development of an effective IoT-based smart irrigation system is also a crucial demand for farmers in the

field of agriculture. This research develops a low-cost, weather-based smart watering system. To begin, an effective drip irrigation system must be devised that can automatically regulate water flow to plants based on soil moisture levels. Then, to make this water-saving irrigation system even more efficient, an IoT-based communication feature is added, allowing a remote user to monitor soil moisture conditions and manually adjust water flow.

The system also includes temperature, humidity, and rain drop sensors, which have been updated to allow remote monitoring of these parameters through the internet. In real time, these field weather variables are stored in a remote database. Finally, based on the present weather conditions, a weather prediction algorithm is employed to manage water distribution.

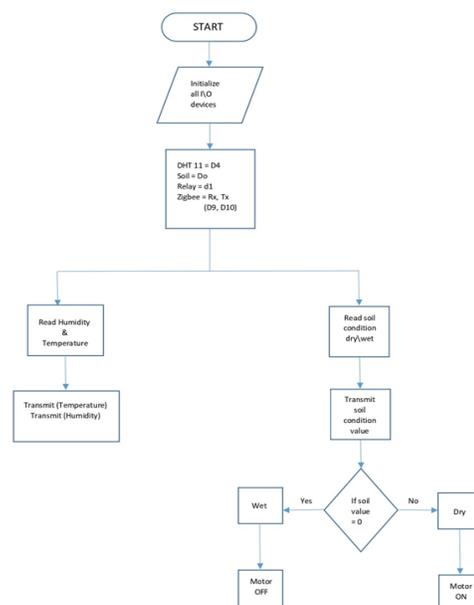
Anushree Math, Layak Ali, Pruthviraj U[4] India is a country where agriculture plays a vital role. As a result, it's critical to water the plants wisely in order to maximise yield per unit space and so achieve good output. Irrigation is the process of providing a certain amount of water to plants at a specific time. The purpose of this project is to water the plants on the National Institute of Technology Karnataka campus with a smart drip irrigation system. To do this, the

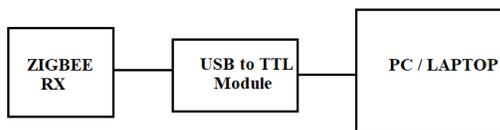
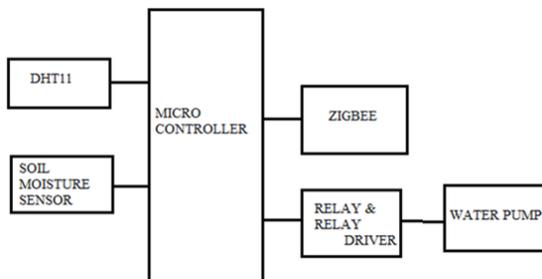
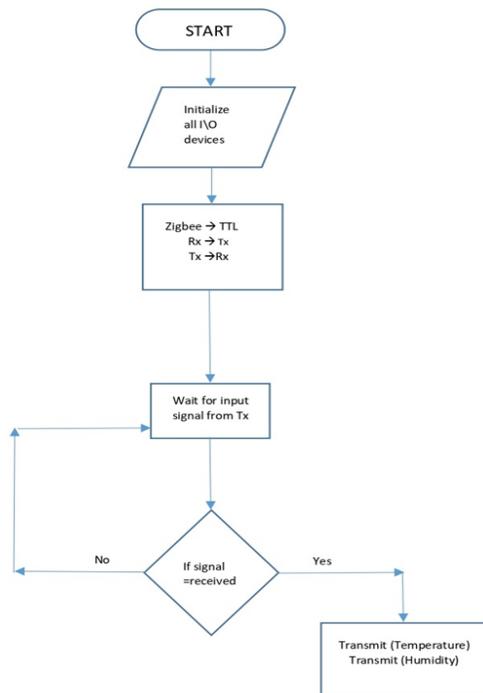
open source platform is used as the system's fundamental controller. Various sensors have been employed to supply the current parameters of components that impact plant healthiness on a continual basis. By controlling a solenoid valve, water is provided to the plants at regular intervals depending on the information acquired from the RTC module. The webpage may be used to monitor and manage the complete irrigation system. This website contains a function that allows you to manually or automatically control plant watering. The health of the plants is monitored using a Raspberry Pi camera that gives live streaming to the webpage. The controller receives water flow data from the water flow sensor through a wireless network. The controller analyses this data to see if there are any leaks in the pipe. Forecasting the weather is also done to restrict the quantity of water given, making it more predictable and efficient.

Dweepayan Mishra, Arzeena Khan, Rajeev Tiwari, ShuchiUpadhaye [5] Agriculture is a substantial source of revenue for Indians and has a huge impact on the Indian economy. Crop development is essential for enhanced yield and higher-quality delivery. As a result, crop beds with ideal conditions and appropriate moisture can have a big

influence on output. Traditional irrigation systems, such as stream flows from one end to the other, are usually used. As a result of this delivery, the moisture levels in the fields can alter. A designed watering system can help to enhance the management of the water system. This research proposes a terrain-specific programmable water system that will save human work while simultaneously improving water efficiency and agricultural productivity. The setup is made up of an Arduino kit, a moisture sensor, and a Wi-Fi module. Data is acquired by connecting our experimental system to a cloud framework. After then, cloud services analyse the data and take the necessary actions.

METHODOLOGY





HC-12 wireless serial port communication module is a new-generation multi channel embedded wireless data transmission module. Its wireless working frequency band is 433.4-473.0MHz, multiple channels

can be set, with the stepping of 400 KHz, and there are totally 100 channels. The maximum transmitting power of module is 100mW (20dBm), the receiving sensitivity is -117dBm at baud rate of 5,000bps in the air, and the communication distance is 1,000min open space.

The module is encapsulated with stamp hole, can adopt at chawelding , and its dimension is 27.8mm × 14.4mm × 4mm (including antenna cap, excluding spring antenna), so it is very convenient for customers to go into application system.

There is a PCB antenna pedestal ANT1 on the module, and user can use external antenna of 433M frequency band through coaxial cable there is also an antenna solder eye ANT2 in the module, and it is convenient for user to weld spring antenna. User could select one of the seantennas according to use requirements.

There is MCU inside the module , and user don't need to program the module separately, and all transparent transmission mode is only responsible for receiving and sending serial port data, so it is convenient to use. The module adopts multiple serial port transparent transmission modes, and user could select them by AT command according to use

5. farmer and more accurate weather reports of agriculture field and garden.
6. Regional language feature can be implemented to make it easy for the farmers who are aware of only their regional
7. Language.

CONCLUSION

IoT will help to enhance smart farming. Using IoT the system can predict the soil moisture level and humidity so that the irrigation system can be monitored and controlled. IoT works in different domains of farming to improve time efficiency, water management, crop monitoring, soil management and control of insecticides and pesticides. This system also minimizes human efforts, simplifies techniques of farming and helps to gain smart farming. Besides the advantages provided by this system, smart farming can also help to grow the market for farmer with single touch and minimum effort.

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