International Journal of Early Childhood Special Education (INT-JECSE)
DOI: 10.9756/INT-JECSE/V13I2.211194 ISSN: 1308-5581 Vol 13, Issue 02 2021

SMART AGRICULTURE WITH INTERNET OF THINGS (IOT)

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Abstract - *Because of the Internet of Things' importance, traditional agriculture is transitioning into smart agriculture (IoT). The fundamental variables in making any IoT network effective and acceptable to farmers are low cost and low power. We propose a low-power, low-cost IoT network for smart agriculture in this study. We employed an in-house built sensor to measure the moisture content of the soil. The IITH mote is utilised as a sink and sensor node in the proposed network, allowing for low-power transmission. We compared our network to other state-of-the-art networks that have been proposed for agricultural surveillance. The two measures used to evaluate these networks are power and cost.*

Results show that the proposed network consumes less power and has on average 83% prolonged lifetime at a lower cost compared to previously proposed network in the agriculture fie.

I. INTRODUCTION

Agriculture parameters make use of Internet of Things (IoT) technology and system availability to gather and distribute data from these things. "Things selected recognized or potentially forced remotely crosswise over completed the process of existing configuration, manufacture open gateways for all the more obvious merge of the substantial earth into PC based frameworks, in addition to acknowledging overhauled capacity, precision, and cash interconnected favored stance are all enabled by the Internet of Things." When IOT is enhanced with sensors and actuators, it becomes part of the broader category of electronic physical structures, which also includes advancements such as smart grids, beautiful homes, intelligent transportation, and smart urban communities [1]. All is especially specific through its introduced figuring configuration anyway can interoperate within the current Internet establishment.

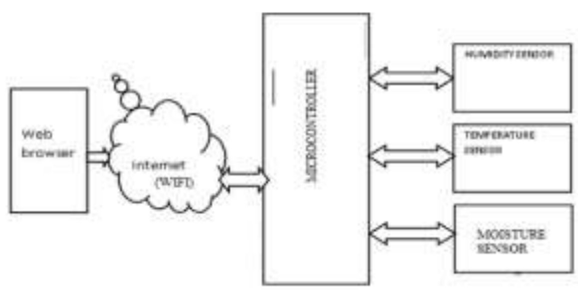

Figure1.1: Block Diagram

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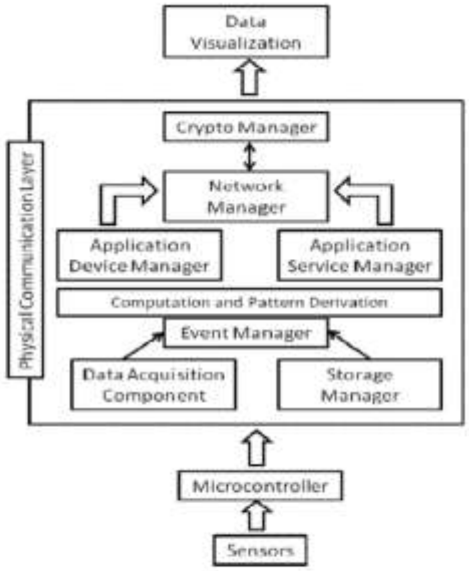

Figure 1.2: System Architecture And Functional Layers Send Sensor Data Privately to the Cloud

There are sensors all around—in our homes, smart phones, automobiles, city infrastructure, and industrial equipment. Sensors detect and measure information on all sorts of things like temperature, humidity, and pressure. And they communicate that data in some form, such as a numerical value or electrical signal.

Sensors, or things, sense data and typically act locally. ThingSpeak enables sensors, instruments, and websites to send data to the cloud where it is stored in either a private or a public channel. ThingSpeak stores data in private channels by default, but public channels can be used to share data with others. Once data is in a ThingSpeak channel, you can analyze and visualize it, calculate new data, or interact with social media, web services, and other devices.

Data stored in the cloud is accessible from anywhere. You can study and visualize data using online analytical tools. In data, you can find links, patterns, and trends. You have the ability to generate fresh data. Plots, charts, and gauges can help you visualize it. Data stored in the cloud is accessible from anywhere. You can study and visualize data using online analytical tools. In data, you can find links, patterns, and trends. You have the ability to generate fresh data. Plots, charts, and gauges can help you visualize it.Thingspeak Provides Access To Matlab To Help You Make Sense Of Data. You Can: Convert, combine, and calculate new data

- Schedule calculations to run at certain times
- Visually understand relationships in data using built-in plotting functions

Combine data from multiple channels to build a more sophisticated analysis

II. EXISTING SYSTEM

Horticulture is the backbone of our country. Agriculturists used to determine the ripeness of soil and affected presumptions about which type of product to produce in the past. They didn't consider the dampness, the amount of water available, or the climate, which are all factors that make farming more difficult. They use pesticides based on a few assumptions, which can have a significant impact on yield if the assumption is incorrect. The agriculturist's profitability is dependent on the last phase of the crop.

III. PROPOSED SYSTEM

We need to use innovation that assesses the type of harvest and makes recommendations to improve the efficiency of the product by assisting both rancher and country. The Internet of Things (IOT) is revolutionising agribusiness by involving farmers in a wide range of techniques, such as precision and conservative farming, to overcome obstacles in the field. Harvest web watching engages area of weed, level of water, bug acknowledgment, animal interference in the field, change improvement, and cultivation. IOT advancement aids in social affair information on conditions such as atmosphere, temperature, and soil productivity. IOT utilize farmers to get related with his residence from wherever and at whatever point. Remote sensor frameworks are used for checking the farm conditions and little scale controllers are used to control and robotize the property shapes.

IV. INPUT DESIGN

Input design is one of the most expensive phases of the operation of computerized system and is often the major problem of a system. A large number of problems with the system can usually be traced back to fault input design and method.

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Needless to say, therefore that the input data is the life block of a system and has to be analyzed and designed with the most consideration.

The decisions made during the input design are:

- To provide cost effective method of input.
- To achieve the highest possible level of accuracy.
- To ensure that input is understood by the user.

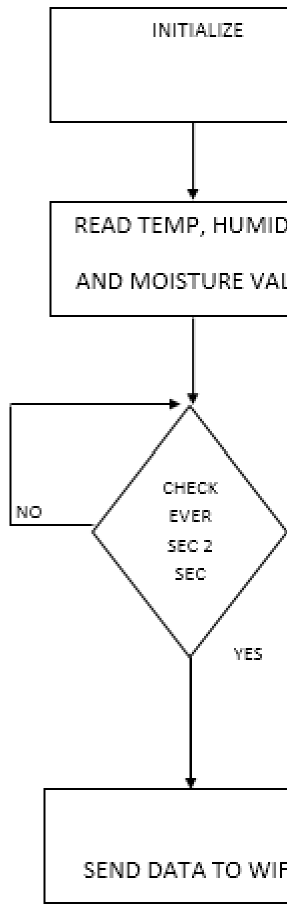

Figure: Transmitter Side

The following input design details are decided by system analysts: what data item to enter, what medium to utilize, how the data should be structured or coded data items and transactions that require validations to detect errors, and finally the conversation to aid users in providing input. A system's input data does not always have to be raw data that was entered into the system from the beginning. These can also be the results of a different system or sub-system. The input design process encompasses all stages of data entry, from ensuring the accuracy of initial data to actually entering the data into the system for processing.

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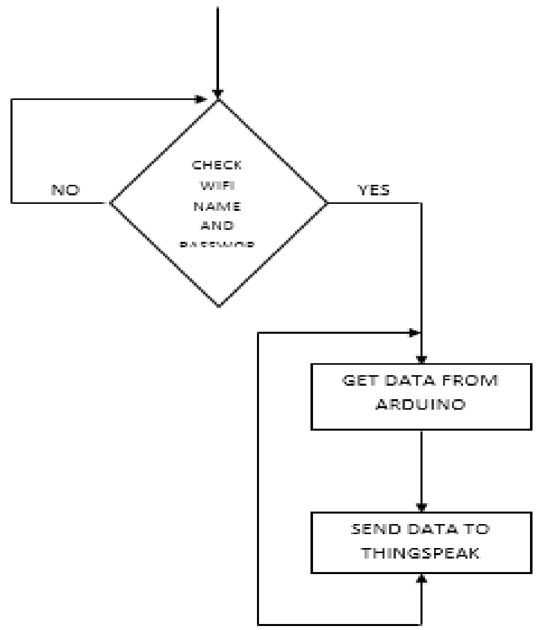

Figure : Reciver Side

Agriculture Irrigation system by using IOT

Field Name	Attribute	Type	Size	Description
Id	Primary key	Int	10	It uniquely store id in the table
Temperature	Null	Int	12	It store Temperature of the Agriculture Irrigation
Humidity	Null	Int	12	It store Humidity of the Agriculture Irrigation
Moisture	Null	Int	12	It store Moisture of the Agriculture Irrigation

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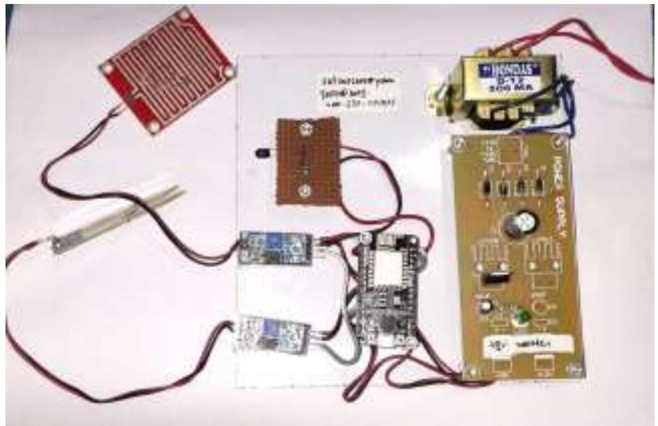

Figure 4.1: Hardware Setup

V. OUTPUT DESIGN

Output design generally refers to the results and information that are generated by the system. For many end-users, output is the main reason for developing the system and the basis on which they evaluate the usefulness of the application.

The output of a system determines the system's goal. The outputs of a system are determined by analyzing the system's goal. A system's outputs can take many different forms. Reports, screen displays, printed forms, graphical drawings, and so on are the most popular. The contents, frequency, timing, and format of the outputs vary. The intended audience for the output, as well as the purpose and sequence of details to be printed, are all taken into account. When creating output, the system analyst must establish what information will be provided, whether the information will be shown or printed, and which output medium will be used to transmit the output to the intended recipients.

Internal outputs are those, whose destination is within the organization. It is to be carefully designed, as they are the user's main interface with the system. Interactive outputs are those, which the user uses in communication directly with the computer.

Figure 5.1: Output design

VI. SYSTEM IMPLEMENTATION

The theoretical design is tuned into a workable system during the project's System Implementation stage. It is possible that the implementation system stage will produce chaos if it is not carefully controlled and planned. As a result, it might be regarded the most important stage in ensuring the success of a new system and giving users trust that it will operate and be effective.The implementation stage in a project involves,

- ✓ Careful Planning investigation of the current system, checking constraints and the implementation.
- ✓ Training the staffs in the newly developed system.

A software application in general is implemented after navigating the complete life cycle method of a project. Various life cycle processes such as requirement analysis, design phase, verification, testing and finally followed by the implementation phase results in a successful project management. The software application which is basically a Windows based application has been successfully implemented after passing various life cycle processes mentioned above.

Various considerations such as application environment, user administration, security, dependability, and finally performance are taken into consideration throughout the design phase because the programme is to be implemented in a high-standard industrial sector. Before the ultimate execution, these aspects are assessed step by step, and the positive and bad effects are recorded. Both at the user and management levels, security and authentication are maintained. The data is kept in MySQL, which is extremely dependable and simple to use; user-level security is maintained by password choices and sessions, ensuring that all transactions are completed safely.

Validations are performed on the application, taking into account the various access levels available in the various modules. Possible constraints, such as number formatting, date formatting and confirmations for both save and update choices, ensure that the database receives the proper data. As a result, all of the aspects are mapped out, and the entire project research is successfully implemented for the end customers.

VII. CONCLUSION

Agriculture is being gradually replaced and augmented by more advanced and precise digital and electronic devices. A large portion of agriculture earnings is lost due to power outages and improper farming methods. The usage of smart sensors helps to reduce this. The proposal is to execute agriculture in a more intelligent and efficient manner. Furthermore, this approach promotes the utilization of the Internet of Things. The Internet of Things has made agriculture crop monitoring simple and effective, allowing farmers to increase crop output and profitability.Sensors of different types are used to collect the information of crop conditions and environmental changes and this information is transmitted through network to the farmer/devices that initiates corrective actions. Farmers are connected and aware of the conditions of the agricultural field at anytime and anywhere in the world.

VIII. FUTURE ENHANCEMENT

Farmers will be able to cultivate enormous expanses of land if this project is improved. It is only possible to use the exact dosage of fungicide and insecticide. The system can be improved even more by including new self-learning algorithms that can be put in the cloud to comprehend how sensing data behaves and make autonomous decisions. The devastation of crops by wild animals is another issue that farmers face. As a result, future development will include the construction of a system that can monitor the farm by installing sensors at the farm's perimeter and a camera module that can take a photo once the sensor detects the entrance and broadcast the real-time images by combining it with other data.

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