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IoT Based Agrimon System

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Abstract:

The main aim of this paper is to monitor and control the ambient atmospheric conditions for proper food grain storage. We have implemented a monitoring and controlling system that monitor and control the weather parameters like Temperature, Humidity, fire and Light intensity. Agrimon is an IOT based product which helps the users in monitoring the grains and controlling the parameters.These parameter values are sent to cloud. This system is applicable for single storage house. When the values of these parameters get exceed by specified limit then the owners of the Agri warehouse can take an action against the condition. Finally, the sensor data can be viewed on cloudplatform(ThingSpeak) and can be controlled.

Keywords —DHT11,Gas Sensor,Buzzer,ESP32,LDR,ThingSpeak.

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I. INTRODUCTION

In the past decade, all human life changed because of the internet. The internet of things has been heralded as one of the major developments to be realized throughout the internet portfolio of technologies. The Internet of Things (IOT) is concerned with interconnecting communicating objects that are installed at different locations that are possibly distant from each other. Internet of Things represents a concept in which, network devices have ability to collect and sense data from the world, and then share that data across the internet where that data can be utilized and processed for various purposes. The internet of things describes a vision where objects become part of internet: where every object is uniquely identified and access to the network. IOT communication is quite different from the traditional human to human communication, bringing a large challenge to existing telecommunication and infrastructure. Furthermore, IOT provides immediate information regarding access to physical objects with high efficiency.

The concept of Internet of Things is very much helpful to achieve real time monitoring of sensor data. Internet of Things (IOT) is a kind of network technology, which is based on information sensing equipment's such as RFID, infrared sensors, GPS, laser scanners, gas sensors and so on, can make anything join the Internet to exchange information, according to the protocol, which gives intelligent identification, location and tracking, monitoring and management. In proposingsystem, we introduce cloud computing technique for monitoring sensor values on the internet. Cloud computing provides the access of applications as utilities, over the internet. The cloud computing characteristic and development approaches.

Cloud computing is a large-scale processing unit which processes in run time and it is also a very low-cost technology based on the IP. The application area of IOT includes building and home automation, smart city project, smart manufacturing of various products, wearable's, health care systems and devices, automotive etc.

Devices include networked things, such as the sensors and actuators found in IIoT equipment, particularly those that use protocols such as Modbus,Bluetooth,Zigbeeor proprietary protocols, to connect to an Edge Gateway.The Edge Gateway consists of sensor data aggregation systems called Edge Gateways that provide functionality, such as pre-processing of the data, securing connectivity to cloud, using systems such as WebSockets, the event hub, and, even in some cases, edge analytics.

II. LITERATURE REVIEW

The existing method and one of the Oldest Ways in which the Real Time Monitoring of the grain storage godowns by using ARM7 using GPS/GPRS as mentioned in [1] author which improves the level of Grain storage and then Reduces the Grain Losses during the procedure of the Storage and reduces the man power and labour Intensity.

WSN Based Zigbee Network developed by [2] author in order to monitor the different workstation at the industries using the Zigbee devices. Here it has been the major traditional working method of the weaving industry is to be discussed and the stability of the Zigbee is monitoring and the direct load controlling.The control action is derived from the microcontroller and the CC213 MODULE.

The monitoring and Controlling is done through the Inbuilt Application Software as per the [3] author discussed by using this Blynkapplication Tool the user after uploading the source to the Device Module needs to upload the code to the Blynk for which it has the specific Authentication keys and passwords by which we can access the entire system.

A real time monitoring and controlling system for grainstorage was designed by author [4]. The system uses the humidity and temperature sensor to measure the quality ofthe food grains. The sensors sensethe humidity and temperature and send the data to the administrator throughEthernet or wireless devices. The administrator then takes necessary actions according to information. The system gives humidity and temperature of the grain which when exceeds the threshold value, the grain starts getting decomposed.

GrainTac is the remote developed by the author [5] from which when and where we can monitor the grains in the godowns due to the damage if any occurred.The crucial data from it can be monitored through it.Models like Partial Least Square (PLS) and Takagi sugeno (TS) are available to track thequality of the grain and to predict how long thefood grainswill sustain[3]. The dynamic PLS system with decoupling and dimension reduction represents the multi input multi output system

ascombination of many single input single output system as discussed by [6] author.

The system to identify the Quality of the food grain is measured using the factors like Humidity, Temperature and Ammonia gas sensors and sent through Wireless Communication to the server by the author[7] and the server makes the decision and alarms about the quality of the food grain to the maintenance people.The standard of Identifying the food quality can be done using the different sensors and used in the Food Storage Industry.

As in this era of Technology Advancement everything requires to be monitoring and controlling.As in the present scenario discussed by author[8] is to be maintained for monitoring by using the Arduino and the web server is used and the user is alerted via messages which can be sent for any danger issues.In [9] Cloud computing is defined as storing the data in the cloud and running the applications which are connected with it. Everything is hosted in the cloud, which is connected to many computers and servers through internet.In [10]authors presented a home monitoring system by using ESP32 module. It helps the user to monitor various conditions in the home like room temperature, gas leakage, water levels in the tank and person detection and control various appliances such as light, fan, motor, gas knob and take decision based on the feedback of sensors remotely. In [11] authors proposed a smart food quality testing and ordering system using Bluetooth technology. In[5] authors presents the monitoring of atmosphere at nuclear power plant using ARM microcontroller , Wireless Sensor Network , Zigbee and Ethernet Communication Protocols.

III. PROPOSED SYSTEM

Internet of Things or IoT is an architecture that comprises specialized hardware boards, Software systems, web APIs, protocols which together creates a seamless environment which allows smart embedded devices to be connected to internet such that sensory data can be accessed and control system can be triggered over internet.

Also, devices could be connected to internet using various means like WiFi, Ethernet and so on. Furthermore, devices may not need to be connected to internet independently. Rather a cluster of devices could be created (for example a sensor network) and the base station or the cluster head could be connected to internet. This leads to more abstract architecture for communication protocols which ranges from high level to low level.

ThingSpeak is an open-source Internet of Things application and API to store and retrieve data from things using the HTTP and MQTT protocol over the internet or via a Local Area Network. ThingSpeak enables the creation of sensor logging applications, location tracking applications, and a social network of things with status updates.ThingSpeak has integrated support from the numerical computing software MATLAB from MathWorks, allowing ThingSpeak users to analyse and visualize uploaded data using MATLAB without requiring the purchase of a MATLAB license from MathWorks.

All the Sensor Devices are Designed accordingly with the Block Diagram And then every Single Sensor was respectively verified with the Source Code. The Source Code Simulated and Transfers the Data to the Cloud Network Here it is Thing speak.Cloud networking is a type of infrastructure where network capabilities and resources are available on demand through a third-party service provider that hosts them on a cloud platform.Companies can either use cloud networking resources to manage an in-house network or use the resources completely in the cloud.

Now -a-days we people are storing all the food grains in the warehouses, unaware of the conditions of the products in the godowns. Due to the long-time storage of the grains it leads to the damage of the food material and waste of its production cost and storage time. The climatic conditions of the warehouses should be as comfortable and as their storage would not affect. Every time there should be a person to look after the grains.So, in order avoid this problem we are here with the solution of Agrimon System.

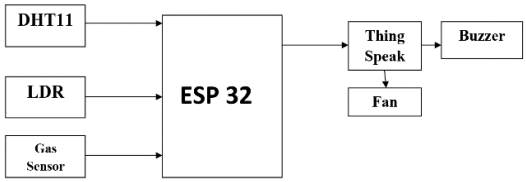


Fig. 1 The Architecture of Agrimon System

Step 1: After constructing the block diagram in the software and giving the hardware connections, click run simulation.

Step 2: The functional process of this project has 5 main conditions. Firstly, DHT11and LDR detects the Temperature and Humidity.

Step 3: Then the Gas Sensor is connected to detect the Gas in the Area of the Godowns.

Step 4: Now the entire code after running should be uploaded to the Cloud. Here the Cloud used is Thing Speak.

Step 5: After uploading to the Cloud the conditions that are given in the code should be checked and proper precautions to be taken.

Step 6: So, in this order as the Temperature is high the fan should be ON and then if Gas value was more than the desired level the Buzzer should be ON. In this order the Godown conditions are to be Controlled.

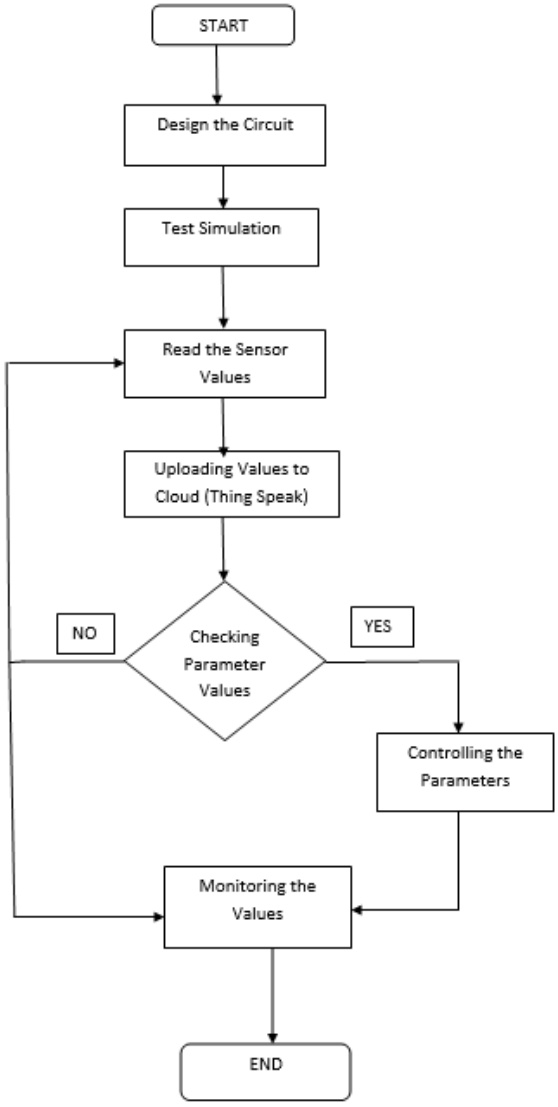


Fig. 2System Process Flow diagram

V. RESULTS AND DISCUSSION

Give the power to the ESP32 by using the Usb Charger. We should connect DHT11, LDR, Gas Sensor to the input pins of Esp32. And the output pins are given to fan and buzzer for controlling. After giving power to the Esp32 it determines the surrounding temperature,humidity, light and any gas flame. These values are set to cloud by using thing speak. Firstly, we have to set a fixed value for

every individual parameter. If the value gets increased than the fixed value it controls with the help of fan and buzzer.

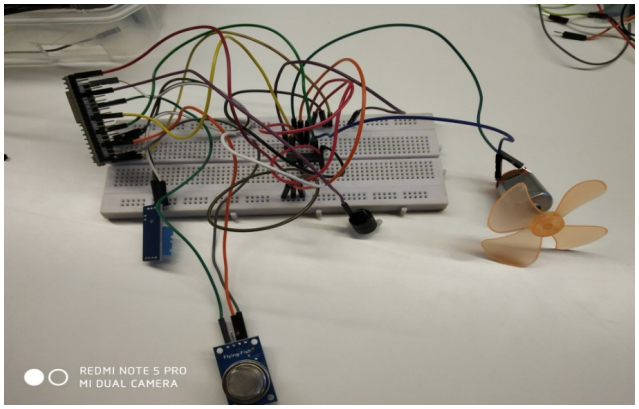
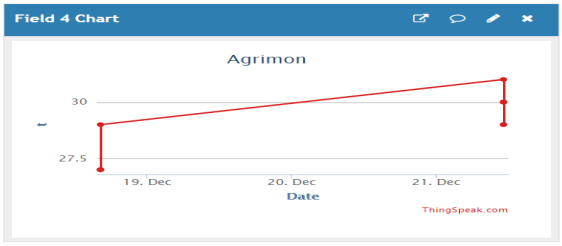


Fig. 3 Complete Agrimon system

Temperature: The Temperature plays an major role in this Agrimon system. As the grains get damaged depending on the temperature conditions it is mandatory to monitor and control the temperature. For this we are using DHT11 to detect the temperature and by the help of ESP32 these values are sent to cloud and then the temperature is controlled depending on the monitoring values.



Humidity: Figure 5 shows the percentage of water present in the air is termed as humidity. Water as gaseous state called vapour. As the temperature of the air increases more water vapour can be generated. By this the grains may get damage so monitoring the humidity is introduced

Fig. 5 Humidity Sensor values

Light Intensity: Figure 6 shows the light intensity we are using LDR which is light dependent resistor. This is used to detect the light in the ware houses and further it will be controlled depending on the monitoring values.

Fig. 6 Light Dependent Resistor sensor

Fire: The ware houses may get fired due to some external conditions are any other condition. This fire is detected by using gas sensor this helps to determine the presence of fire and future it is controlled with in minute.

VI. CONCLUSIONS

Automation in godowns can reduce manpower requirements and also increases the production rate. Farmers to reduce their risk and increase productivity. We integrate sensors, mobile connectivity and decision tools for affordable monitoring and controlling. In order to provide good quality foodgrains parameters should be monitored and should control frequently. It helps farmers to monitor their godowns in a better way and reduce their investments to make it sustainable. We like to conclude with the help of this research paper, to reduce the risk of the farmers and increase their productivity

ACKNOWLEDGMENT

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