Cold Storage Data Acquisition and Control System of Industrial Application

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Abstract: *In food industry, cold storage is a must. The main objective of this kind of storage is to preserving the raw foods within for a certain period of time. But, for lack of technology and ignorance about humidity and temperature effect on raw foods; many times, food safety is not maintained well enough. In this paper, the basic objective of this research is to mitigate the man monitoring and to develop an internet based real time monitoring of temperature and humidity using the very available DHT-11 sensor and ESP- 8266 Nodemcu module. This paper also makes compact distinctions between conventional and the IoT based monitoring system of food storages at present, IoT or Internet of Things has become a very popular choice for everyone. This is mainly because of the easy availability of internet, which helps us in many ways. Almost in every administrative or monitoring work internet is a must thing. So, this day's people want to control their many works through internet. For Food or Argo Industries monitoring of the foods or materials which are rotten able are subject to constant monitoring; if just a simple thing goes wrong then it can become a result of a big loss. So, real time monitoring of foods/materials for those industries are very necessary*

Keywords: *Cold Storage, Nodemcu ESP 8266, Temperature, Humidity, DHT-11*

I.   Introduction

We are familiar with the word Cold storage; it is used to preserve something for a longer period of time, just like Refrigerators. Cold Storage is usually use to keep things like food products, agricultural products, Pharmacies, etc. It has been the most effective and the best way to transport products from one place to another until lately when the news has been spreading of products getting spoiled on the way because when it is on its way to somewhere no one knows of the temperature inside the cold storage or even in some cases, no one knows if the product inside it requires a lesser temperature or anything like that.

Basically, when the product is on its way to somewhere, we cannot handle it, and it has been a major concern now. We had the opportunity to talk to Shree Vinayaka Foods Karanja MIDC for the problem facing to monitor the cold storage online and to give the alert message on mobile for some errors like high temp and power failure. So, we decided to work on it. A cold storage system based on IOT, where one can accesses the temperature of the Cold storage from anywhere, anytime. Also, our product will give an alert message if anything goes wrong**.**

II.   Block Diagram
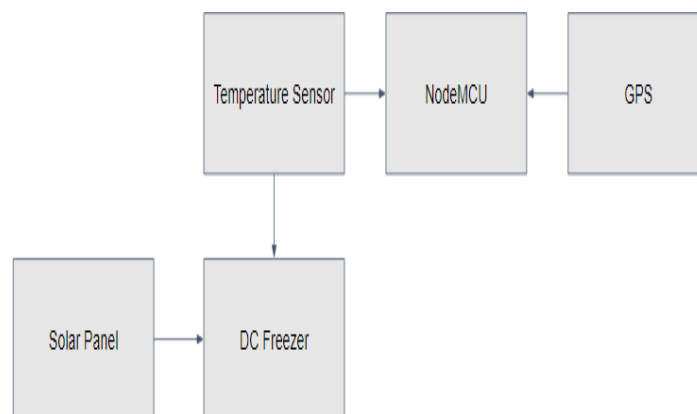
The PT100 Thermocouple is Industrial Temperature sensor we are using for this project The sensor is programmed in Nodemcu to get the temperature of the deep freezer The data will store on cloud server to monitor w.r.t date and time as well as in the form of graph

When the temperature goes above the set value then SMS will send to the respective contact person with GPS location of vehicle

III.   Proposed Plan Of Work

As we came across with this problem statement, we visited different industries which are working on this. After discussing with them we build a framework on which we have to work for solving problems regarding cold storages. So as per our plan of work, initially we will study all the hardware components which are required to build cold storage. After that programming will be done so that we can include different sensors and also other functioning of cold storage. Following is the list of some of the sensors we are including in it:

After this we will implement it using IOT application. Such that data will get stored in data base and cloud will be data base here. This will help us in accessing it through internet. Because of IOT base implementation we can detect different possibilities of problems occurring in hardware without any manual work. After this we will simulate it and try to give a better output product through this

IV.   Problem Statement

The main idea of this concept is to overcome the time complexity and lack of detailed observation which is faced in preserving the crop yield using cold storage management system to stock up the food products or agricultural yields for a longer period. In this proposal we implement a framework for cold storage management system based on IoT (Internet of Things) technology by using heterogeneous IoT devices. This is used to preserve the various parameters of yield such as (degeneration time, temperature parameter, etc.) for longer period. This information system also analyzes the data to report abnormal environmental status and jeopardizes during the storing process. So, the cold storage management systems can be innovative and operated with low cost and in short time interval, hence enhancing the crop obtainability all through the year

V.   Review of Literature

An IoT-based cargo monitoring system for enhancing operational effectiveness under a cold chain environment

Differing from managing a general supply chain, handling environmentally sensitive products (ESPs) requires the use of specific refrigeration systems to control the designated range of storage conditions, such as temperature, humidity, and lighting level in a cold chain environment. In general, third party logistics (3PL) companies are authorized to handle ESPs, who therefore need to have a good cargo monitoring system in the cold chain environment, without which the functional quality is difficult to control and manage. This may result in product deterioration and even inventory obsolescence of the ESPs due to the lack of such systems, so there is a need to develop an effective cargo monitoring system to prevent such situations. This article proposes an Internet of Things-based cargo monitoring system (IoT-CMS) to monitor any environmental changes of ESPs in order to ensure their functional quality throughout the entire cold chain operational environment. Operational efficiency, maintenance strategy, environmental change, and electricity consumption are considered in real-life cold chain operations. Through applying (i) a wireless sensor network to collect real-time product information, together with (ii) fuzzy logic and case-based reasoning techniques to suggest appropriate storage conditions for various ESPs, effective storage guidance can be established. Through conducting the case study in a 3PL company in Hong Kong, the performance in customer satisfaction, obsolescence rate, and inventory visibility after adoption of IoT CMS is evaluated. It is found that the functional quality of ESPs can be effectively assured, and the overall customer satisfaction is increased.

In paper [1], authors have proposed a model that analyses temperature, moisture, and light. A web server is used for storage of data values sensed in real time and also for analysis results. User is alerted via messages along with location of the shipment whenever an emergency occurs.

In paper [2], the authors used Zigbee and other wireless technology to construct warehouse environment monitoring network. The temperature, humidity, smoke, light is auto monitored and controlled. They realized monitoring systems on three platforms, including monitor terminal, base station web application and mobile devices.

VI. Conclusion

Monitoring of cold storage is a tedious task and it is made easy using Internet of things technology. Continuous monitoring by the real owner of the product can be done in almost real time. All the sensors are very economical when compared with the sensors used in the other works and yields almost same results. Computational effort is also greatly reduced by using correlated values of the different sensors

Acknowledgment

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