COLD STORAGE MONITORING SYSTEM USING IOT

TEAM MEMBERS:

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ABSTRACT:

Cold Storage Monitoring System uses sensor-based IoT technology to offer remote **monitoring** and tracking of produce. It provides early warning alerts and notifications to preempt critical conditions and enables end-to-end visibility and accountability across the entire produce value chain. Perishable goods will often need to travel thousands of miles via land, sea, and air to reach their final destination, putting enormous pressure on trucking companies, cold storage transporters, and food distributors to log, maintain, and report temperature, humidity, and other relevant environmental conditions throughout the duration of the journey. This causes business owners in the food industry to panic since disruptions in freezer or refrigerator temperatures during storage can cause a major loss of precious inventory and time.

INTRODUCTION:

Food service organizations require scalable, easy-to-use monitoring systems to protect both perishable and non-perishable consumer goods in-storage. A fully automated monitoring system helps restaurant chains, school districts, food manufacturing facilities, and many other organizations improve food safety and ensure quality control for complete regulatory compliance. old storage is a computer system or mode of operation designed for the retention of inactive data. Examples of data types for which cold storage may be suitable include information a business is required to keep for regulatory compliance, video, photographs, and data that is saved for backup, archival or disaster recovery purposes.

High-performance primary storage is generally considered too expensive for inactive data that is retained on a long-term or indefinite basis. Design priorities for cold storage may include low cost, high capacity and data durability. Data retrieval and response time can be significantly slower for a cold storage system than for devices or systems designed for active data.

CHALLENGES:

Maintaining requirement of various products:

Various products that are kept in different sections of one facility require unique temperatures to be maintained to prevent decay and extend its shelf-life. Along with constant monitoring, whenever a deviation is detected, adjustments must be made immediately as weather changes and temperature fluctuations affect the environment and can have adverse effects on the stock

Strictly adhere to industry standards and compliance:

There are certain regulatory compliances that manufacturers, wholesalers and retailers must maintain for which they need to record the data periodically and ensure that items have been maintained under specified conditions.

Difficulty in tracing products and labeling racks:

Considering the huge size of warehouses, it is not easy to trace products. This makes it difficult to locate products and move them quickly through the warehouse and monitor the changes happening to these goods.

ADVANTAGES:

Real-time monitoring:

Implementation of an IoT solution for cold storage facilities helps to monitor the necessary parameters and adjusts them when deviation occurs from their preset values. This helps to prevent food decay. The solution also sends alerts via SMS text and email whenever an anomaly is detected. Hence, preserving the item and maintaining regulatory compliance becomes easy.

Employee and asset safety:

Smart IoT sensors send you alerts whenever they detect a system failure. It helps you to address risky scenarios in real-time and enables you to take immediate action to avoid a disaster. IoT-enabled systems maintain a detailed record of every activity to improve the security of cold storage facilities.

Well-organized stock management:

A cold storage management system keeps you informed about the empty spaces in your cold storage for its optimal usage. Also, the IoT sensors collect data and record the movement of assets and other items to send alerts in case they detect any abnormal movement suspecting a theft. Not only that, but the system also sends alerts about the expiry of a product to make sure that it is moved out for selling in time.

Minimizes human involvement:

An IoT-enabled monitoring solution automates several processes in your cold storage facility and ensures that you don’t have to involve many staff members for stocking and dispatching goods.

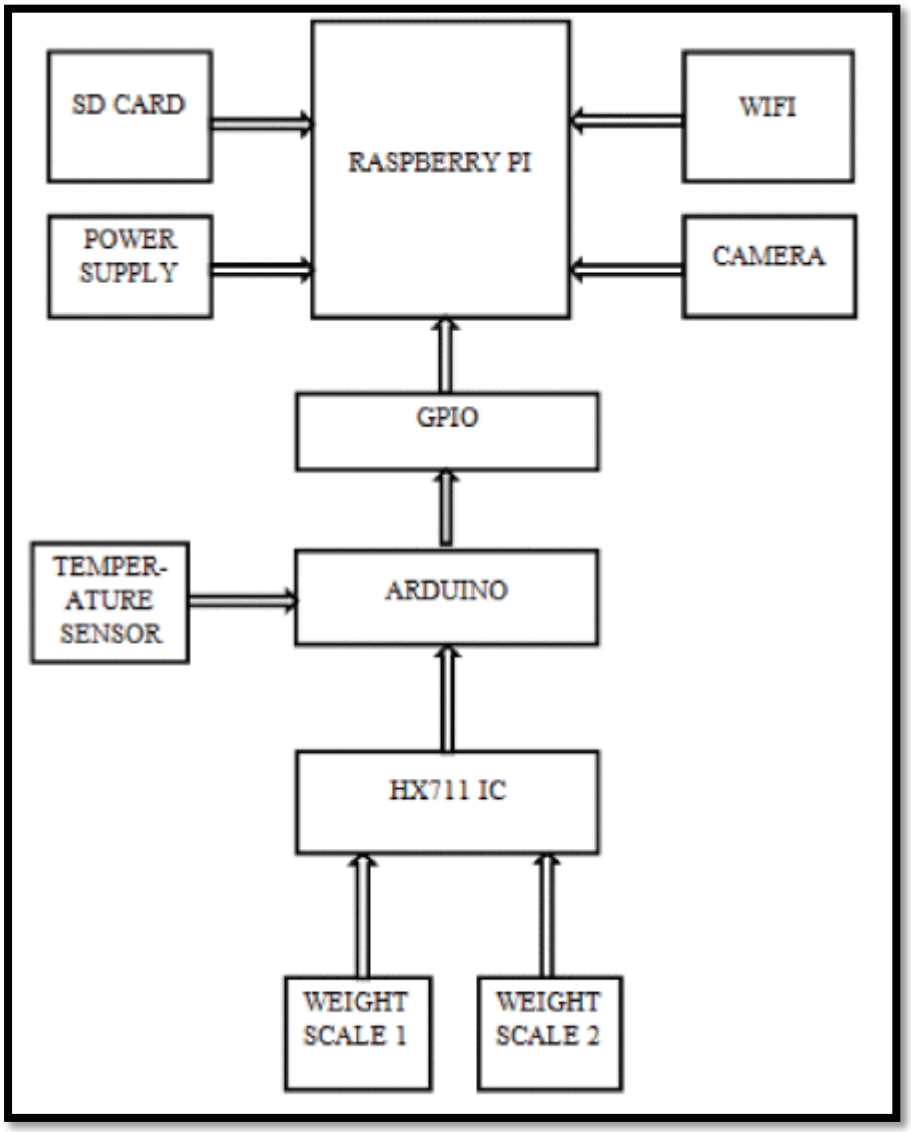
Cold storage temperature monitoring:

As said above, a temperature monitoring solution is beneficial for industries that deal with temperature-sensitive and perishable goods. Furthermore, this solution also helps in maintaining the temperature of goods in the cold chain as well.
A cold storage temperature monitoring solution includes thermostats and sensors that constantly measure the temperature of a closed system, capture data and send it to a centralized platform over a network. This helps the logistics manager to monitor the shipment remotely and ensure the maintenance of optimum temperature.
The implementation of a cold storage temperature monitoring solution is helpful for climate-sensitive perishable items. **Smart warehouse solution** is easy to incorporate, convenient to use and ensures that the quality of goods does not degrade in warehouse and shipping.

A cold storage monitoring solution would be most beneficial for:

- Agriculture industry
- Blood banks
- Food & beverage industry
- Healthcare industry
- Pharmaceutical facilities
- Restaurant chains
- Food manufacturing facilities
- Educational institutions that provide meals to students, etc.

BLOCK DIAGRAM:



CONCLUSION:

The implementation of an IoT-based cold storage monitoring system leads to the optimum utilization of space and resources. It helps to track the usage pattern and power consumption of devices, minimize wastage, detect anomalies within the facility and monitor and control the intensity of light as per the changes in daylight.

An IoT-enabled monitoring solution brings terrific value to businesses and enhances profitability. To know more about how IoT-enabled cold storage monitoring helps to increase your ROI, please talk to our experts.

FUTURE SCOPE:

Even though our smart cold storage system is more efficient, the camera coverage area is limited. So the camera capturing range has to be increased. By using more advanced algorithms for detection and recognition, irrespective of the position of the products the system should be able to detect and recognize them accurately. The processing speed can be improved.