SRI VENKATESHWARA COLLEGE OF ENGINEERING

(Affiliated to VTU, Belagavi, Approved by AICTE New Delhi, NBA* Accredited)

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Project Proposal Reference No.: 46S_BE_4324

"TEMPERATURE MONITORING IN PHARMA/FOOD APPLICATIONS"

Bachelor of Engineering
in
Mechatronics and Electronics & Communication

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KEYWORDS

Temperature monitoring, Cold-chain logistics, IoT, NodeMCU, Pharma/Food industry, Supply chain management.

INTRODUCTION

The temperature monitoring system in the pharma/food industry is crucial for ensuring the safety and quality of products. In this project, we aim to develop a real-time temperature monitoring system that utilizes NodeMCU processor and DHT11 temperature sensor. The system will also include a GPS module that will provide real-time location data along with temperature data. The collected data will be transmitted to the ThingSpeak cloud platform using the GSM module. This will allow for easy access to the data from anywhere with an internet connection. The system will help in monitoring temperature and location during transportation of products, providing an efficient way to maintain the quality and safety of the products.

OBJECTIVES

- Prevent the damage at its early stage.
- Ability to sense and control the temperature of the product.
- Prevention from damage caused by temperature.
- Wireless, light weight, small size with accurate and stable sensor.
- Continuous monitoring and real time food safety data gathering.
- Sending the result to the cloud automatically so that can be viewed online.
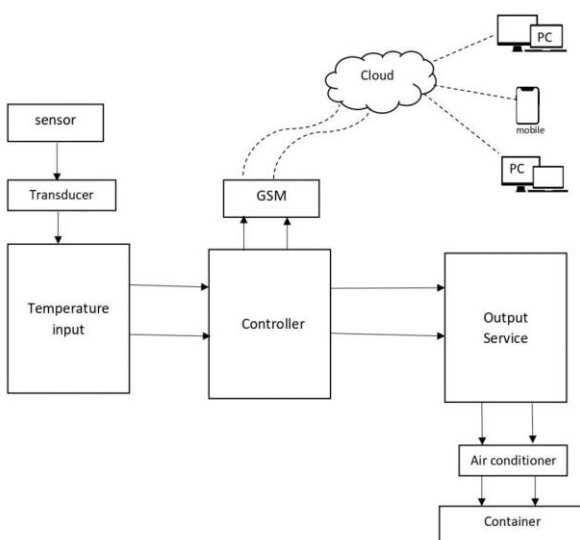
METHODOLOGY

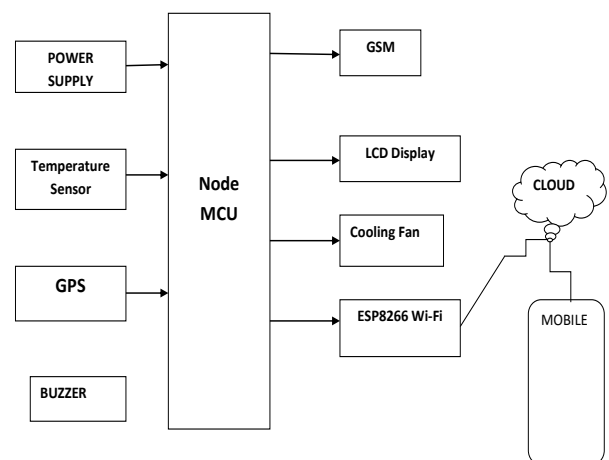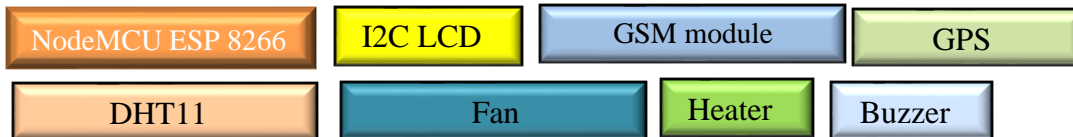Fig. 1: The architecture of the proposed system.   Fig. 2: Block Diagram of Temperature monitoring in pharma/food.

The proposed temperature monitoring and control system utilizes Node MCU controllers, temperature sensors, and a web-based dashboard for remote monitoring and control.

The Node MCU controllers, equipped with temperature sensors, are placed in the shipping containers, storage facilities, and other key locations in the cold-chain logistics process. These Node MCU controllers continuously monitor the temperature and send the data to a centralized web-based dashboard in real-time. The web-based dashboard provides a user-friendly interface for remote monitoring and control of temperature conditions. Users can access the dashboard through a website, allowing for real-time monitoring of temperature data, data logging, and alerts for out-of-range temperature conditions. The system is automated and can also be further integrated as remotely controlled.

Hardware requirements:

NodeMCU ESP 8266	I2C LCD	GSM module	GPS
DHT11	Fan	Heater	Buzzer

Software requirements:

Arduino IDE	Embedded C	Thing Speak

EXPERIMENTAL RESULTS AND OUTCOME

1. Real-time temperature monitoring: The proposed system allows for real-time temperature monitoring and data logging, which can help identify temperature-related issues before they become critical.

2. Alert system: The system includes an alert system that sends notifications to a mobile device or laptop in the event of an out-of-range temperature condition, enabling timely intervention to prevent product spoilage or contamination.

3. Remote temperature control: The system allows for remote temperature control, which ensures that the desired temperature conditions are maintained throughout the supply chain.

4. Cost-effective and scalable: The proposed system is cost-effective and scalable, making it an ideal solution for small and large-scale pharma/food industry businesses.

CONCLUSION

The significance of temperature monitoring in the pharmaceutical and food industries cannot be emphasized, in my opinion. We can guarantee that goods are secure, of the highest caliber, and beneficial to everybody by utilizing cutting-edge technology to maintain the right temperature along the whole supply chain. The possibility of ever more sophisticated and precise temperature monitoring systems employing Node MCU processors makes the future of temperature monitoring appear promising. Let's keep innovating and give our goods' safety and quality top priority.