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Application of IOT in Cold Chain of Fisheries

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ABSTRACT: The project is based on the premise that the integration of IoT technology in the cold chain can provide numerous benefits to businesses. The project explores how IoT technology can be used to address challenges in the supply chain such as inefficient processes, lack of visibility, and high operational costs. The project aims to provide a proof of concept that demonstrates the effectiveness of using Node MCU in the supply chain. The development of the prototype system involves several stages, including hardware and software development. The hardware development stage includes the selection and integration of various sensors, such as temperature sensors, humidity sensors, and GPS modules. The software development stage includes the programming of the Node MCU microcontroller board to collect, process, and transmit data from the sensors to a cloud-based platform. The cloud-based platform is used to store and analyse the data collected by the prototype system. The project also includes an evaluation of the prototype system's performance, including its ability to collect and transmit accurate data, its reliability, and its ease of use. The evaluation involves testing the system in a real-world scenario, such as monitoring the temperature and humidity levels of a perishable shipment during transportation. The project aims to contribute to the growing body of knowledge on the use of IoT technology in the supply chain. The project's findings are expected to provide insights into the potential benefits and challenges of implementing such systems in the supply chain. The project's outcomes are expected to provide a foundation for further research and development in this area.

KEYWORDS: IOT, Supply Chain, Node MCU, Temperature sensor, GPS module, Microcontroller

I. INTRODUCTION

The Internet of Things (IoT) has revolutionized the way industries operate, and the supply chain is no exception. The integration of IoT in the supply chain has enabled businesses to streamline their operations, reduce costs, and improve efficiency. One of the most popular platforms for implementing IoT in the supply chain is the Node MCU, a microcontroller board designed for building electronic projects. The Node MCU is a versatile and easy-to-use platform that can be programmed to collect and transmit data from various sensors and devices. This makes it ideal for use in supply chain management where real-time data collection, analysis, and communication are critical to success. By using Node MCU, businesses can monitor inventory levels, track shipments, monitor conditions during transportation, and much more. In this era of digitization, businesses that adopt IoT technology in their supply chain can gain a competitive advantage. The integration of IoT in the supply chain helps businesses make data-driven decisions that improve operations, increase visibility, and reduce costs. This introduction will explore the various ways in which the Node MCU can be used in the supply chain to help businesses achieve these benefits.



- The inability to determine the location and the temperature of a shipment of fish can have severe consequences for hotel business owners. One of the most significant problems is the uncertainty of when the shipment will arrive, leading to delays in food preparation and service. This can result in dissatisfied customers and lost revenue.
- Another major problem is the risk of spoilage if the fish is not stored at the proper temperature during transportation. If the temperature is not maintained, the fish can spoil and become unusable, resulting in significant losses for the hotel business.
- Moreover, the lack of visibility into the shipment's location and temperature can make it challenging to coordinate with suppliers and distributors, leading to missed deliveries, miscommunication, and a breakdown in the supply chain.
- Additionally, the lack of real-time data on the shipment's location and temperature can make it difficult to make informed decisions about inventory management and food preparation. Without this data, hotel business owners may not be able to optimize their operations, resulting in inefficiencies and wasted resources.
- In conclusion, the inability to determine the location and temperature of a shipment of fish can have severe implications for hotel businesses, from lost revenue to food safety concerns. It is essential for hotel business owners to have access to real-time data on their shipments' location and temperature to ensure smooth operations and maintain customer satisfaction.

II. LITERATURE REVIEW

- L. Cai et al. (2018) proposed a blockchain-based IoT system for supply chain traceability. The system used sensors and RFID tags to collect data on the location and condition of goods during transportation, which were stored on a blockchain platform for secure and transparent access. The study found that the system improved supply chain visibility and reduced the risk of counterfeiting and fraud.
- N. Bhatt et al. (2019) proposed an IoT-based supply chain management system for the food industry. The system used sensors to monitor temperature, humidity, and other environmental conditions during transportation and storage, enabling better quality control and reducing the risk of spoilage. The study found that the IoT system improved supply chain efficiency and reduced the risk of product losses.
- D. Datta et al. (2020) investigated the use of IoT technology in the supply chain of perishable goods. The study developed an IoT system that combined temperature sensors, GPS tracking, and cloud-based analytics to monitor the transportation and storage of perishable goods.

The study found that the IoT system improved supply chain visibility, reduced costs, and increased efficiency.

- Boza et al. (2019) investigated the use of IoT in the cold chain supply chain for perishable goods. The study proposed an IoT-based monitoring system that used temperature sensors, GPS tracking, and cloud computing to monitor and control the cold chain. The study found that the IoT system improved product quality, reduced spoilage, and increased supply chain efficiency.

Aim and Objective:

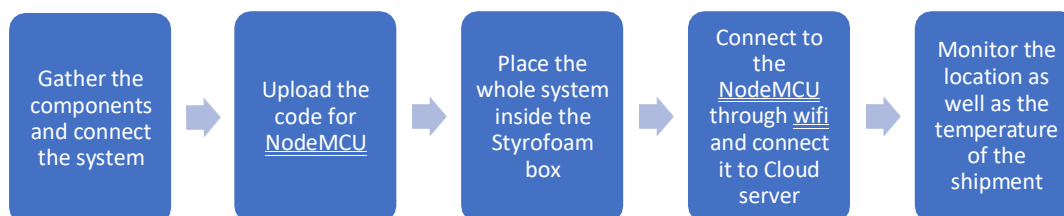
- To develop a prototype system that uses IoT technology to monitor the location and temperature of shipments of



fish during transportation.

- To integrate Node MCU microcontroller board and various sensors to collect real time data on the shipment's location and temperature.
- To develop a user-friendly interface for hotel business owners and supply chain stakeholders to access and interpret the collected data.
- To identify the challenges and limitations of using IoT technology in the supply chain for hotel businesses and propose potential solutions.
- To assess the potential benefits of using IoT technology in the supply chain for hotel businesses, such as increased efficiency, reduced costs, and improved food safety.
- To provide insights and recommendations for hotel businesses and supply chain stakeholders on the practical implementation of IoT technology in the supply chain

III. METHODOLOGY



Hardware and Software Required:

Software Requirement:

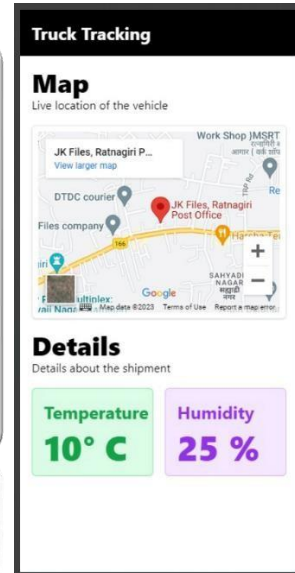
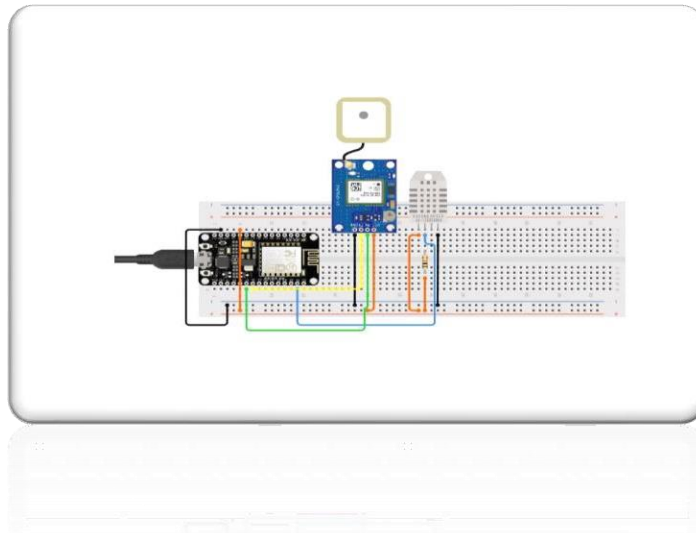
- arduino, blynk cloud

Hardware Requirement:

- NodeMCU
- DHT Sensor
- Resistor
- NEO-6M GPS Module
- Breadboard
- Jumper Wires
- Power supply
- Styrofoam Box

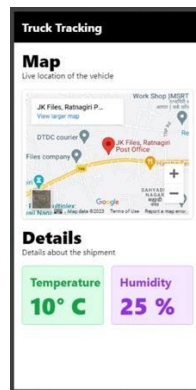


Schematic Diagram :



IV. RESULT

We have successfully able to record the temperature and humidity and the location of shipment. Also we were able to develop a mobile application which indicating details regarding Temperature, Humidity, Also GPS location of shipment in real time.



V. CONCLUSION

- By using different tools of IOT and various arrangement of tools into single setup, the process of monitoring delivery of fisheries and determine the different process parameters like temperature and humidity effectively
- The use of IoT technology in the cold chain of fisheries can improve the efficiency, quality, and safety of the supply of fisheries.
- The project demonstrated the effectiveness of an IoT-based monitoring system for the cold chain of fisheries by using Node MCU and IoT sensors to monitor the temperature and location of the fish shipment.
- The project also highlighted the challenges of implementing an IoT- based cold chain system, such as the cost of sensors and connectivity issues, which should be considered when designing and implementing such systems.
- By implementing an IoT-enabled cold chain, stakeholders can reduce the risk of spoilage, improve product quality, and increase customer satisfaction



VI. FUTURE SCOPE

- The project can be further carried out by change the android application interface by providing extra information about driver who is carrying the shipment.
- Also, further improvement can be done by addition of temperature bar in application which will give in short and direct information about current temperature in the truck with the scale. It will basically show the three temperature regions i.e., Red Green and blue. When the current temperature is in green zone it indicates that correct temperature is maintained in the shipment, when the pointer is in blue then it will indicate that there is moderate temperature, and when the pointer is red zone, it indicates that the temperature is need to be reduce.
- Furthermore, when the red zone is detected then we can provide additional alarming system for driver, which alerts the driver to reduce the temperature.

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