IOT ENABLED RISK MONITORING SYSTEM IN COLD SUPPLY CHAIN

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ABSTRACT

The quality management of horticultural agricultural goods in the food and beverage industry is a crucial concern. The main problem is to maintain a consistent cold chain from supplier to customer, and for that it is important to count with adequate tracking, control and assurance schemes, as well as techniques of collection and review of accurate data. At present, FAO reports that one third of the world's food supply is lost, principally because the measuring systems used do not include truthful details about the state of the goods and under which circumstances they are; control systems do not function properly or are not implemented as rigorously necessary. Therefore, this study discusses the use of modern management strategies and methods for the cold chain and the use of new technology to mitigate the effect of environmental variations on perishable goods.

I.   INTRODUCTION

The requirement to reduce food losses will be addressed by a fully integrated smart supply chain. The primary purpose of such a method is to establish complete traceability of the temperature across all the agents engaged in quality control. By improved accountability, these programs have the ability to counter such high levels of food waste directly, while at the same time increasing the sustainability, protection and credibility of global supply chains. The transport involves different transfers of the goods between firms, as well as legislative concerns in the tariffs, boundaries and seaports. This is specific to perishable food items that have to be shipped from one area to another. Basically in such locations as the seaports or transfers in airports, containers may get subjected to different adverse

conditions. High losses are unreasonable and it's for this purpose that is required a "smart" chain large monitoring sensor device that is fully automated. The aim of such device is to control and track the temperature across the entire supply chain to enforce a complete chain of custody over all stakeholders. By - the accountability of such processes, such damages may be specifically targeted.

BLOCK DIAGRAM
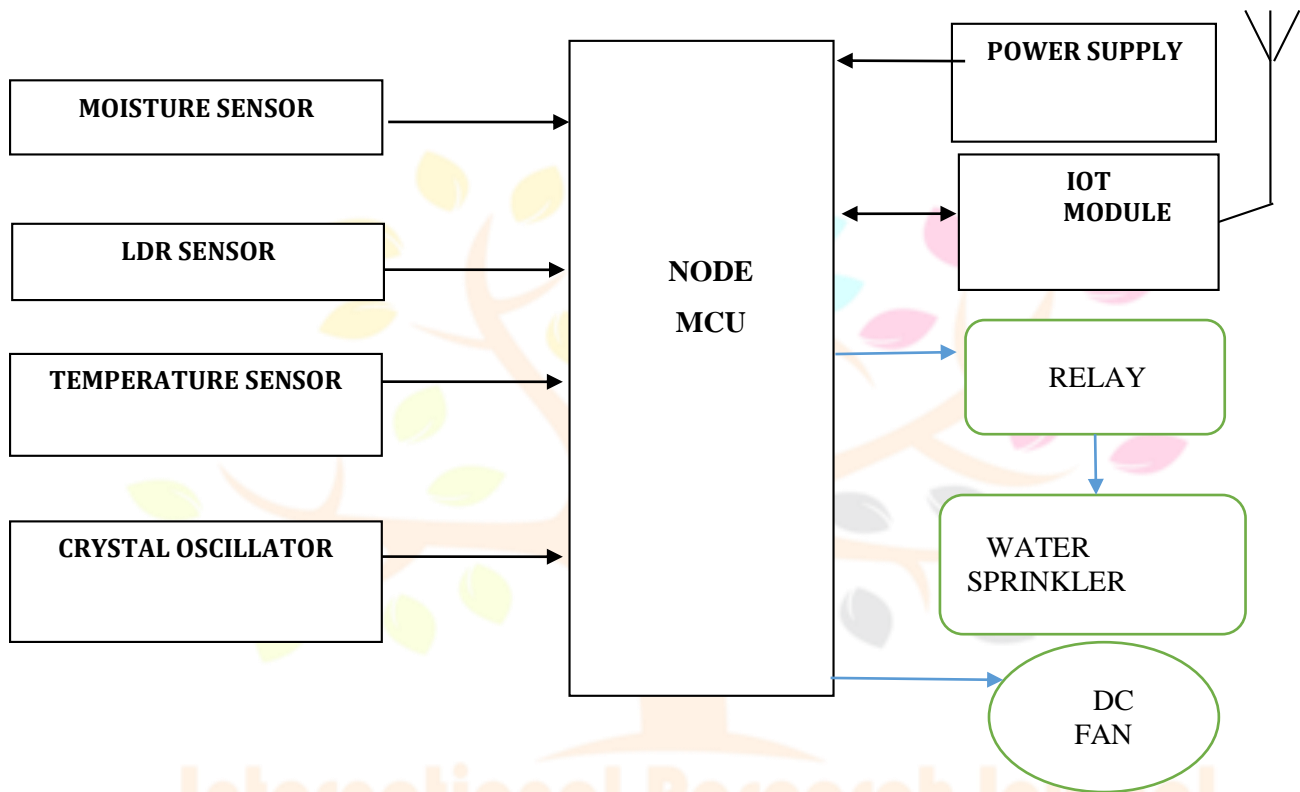
DISADVANTAGES

- Difficulty in maintaining the specified range of temperature throughout the supply chain.

- Lack of understanding about cold supply chain best practices.

- Ensuring compliance with temperature requirements.

- Lack of effective security measures affecting supply chain's auditability and integrity.

- Choosing the right equipment to preserve temperature sensitive products.

- Lack of visibility at the store level creating a blind spot for manufacturers.

- Distribution and delivery risks encountered in cold chains.

- Impact of increased regulations in cold supply chain management.

- Despite the obvious challenges, few life science enterprises have a fully integrated logistics network that incorporates the design, deployment, and quality assurance of cold supply chain strategies.

- By leveraging digital solutions like IoT with cold chain management, enterprises can expect higher revenues, reduced costs, and increased speed-to-market.

APPLICATIONS

- **Real-time product monitoring** – IoT devices that enable real-time monitoring of cold chain products must go through a scaled IoT assurance to achieve better results.

- **Risk assessment in personal occupational safety** – It is mandated to ensure proper risk assessment in personal occupational safety for all IoT enabled devices.

- **Wireless Sensor Network –** All the wireless enabled IoT sensors should be monitored 24×7 to attain seamless process and fix any network lethargies as and when they occur.

- **Seamless data exchange between sensors** – IoT assurance will help create an environment for seamless data exchange between sensors thereby achieving faster time to market.

- **Cloud database services –** IoT assurance of all cloud database services is required to dutifully maintain logger data ensuring enhanced analytics and subsequently achieving customer experience assurance.

- **Accurate Inventory Control** – Wireless automated inventory tracking is less error-prone than standard methods

IMPLEMENTATION

After assembling all components according to the block diagram and uploading the code to the NODE MCU . Here the code is already uploaded in NODE MCU , and the blink app is installed in mobile this connects the code and the sensors where we can have the access oof controlling .Now the NODE MCU is connected to different sensors and control devices . we are using the moisture sensor , ldr sensor , and temperature sensor . the temperature sensor is connected to analog pin and the moisture sensor senses the moisture and the ldr sensor senses the light and these two are connected to the ddigital pins of node mcu and here we get the output like 0 &1 . so if the ldr sensor detect the light it will 0 and when it detect the dark light it gives 1. and coming to the moisture sensor normally it gives the output 1 and when it is detected it gives 0. we can check this outputs in the blink app ,and we are connected the fan to cool the temperature of the products and the relay is also connected for motor pump to sprinkle the water so that the material comes to cool temperature
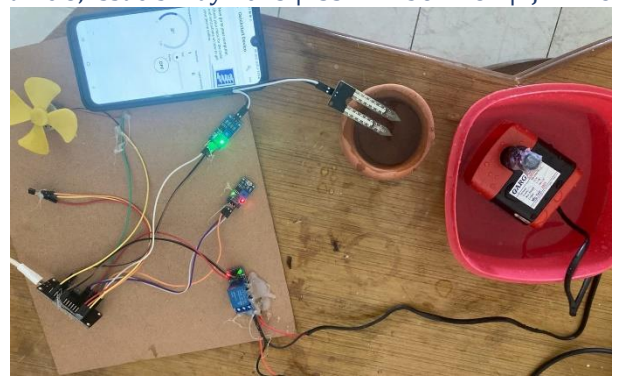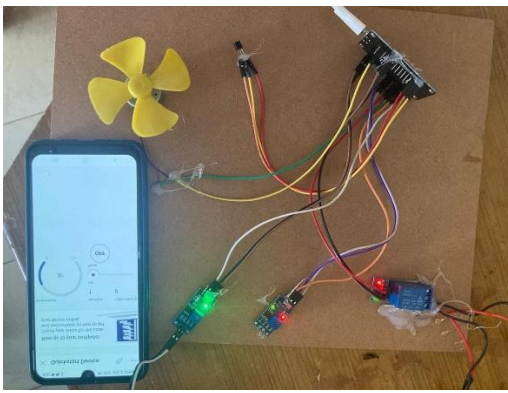
CONCLUSION

The aid of IoTRMS for the various cold chain parties, risk management in product quality and occupational safety can be executed effectively and efficiently. Decision makers can adopt appropriate strategies in maintaining desired product quality and reducing the accident frequency rate. This study provides an applicable method for improving product quality risk and occupational safety risk management in cold chains, where it also contributes to the research on cold chain monitoring and industrial safety. Through the application of IoT, the corresponding data and information can be shared throughout the entire cold chain so as to achieve better cold chain visibility.

FUTURE SCOPE

It is important that any further work in developing the technology core in the field of sensor networks is done keeping in mind the potential users of these networks, and what their needs are. This project is based on Wi-Fi but can be further continued by adding advanced technologies like Zigbee and GSM. Low-power design should be the mantra at all levels, be it hardware or software. Especially, in a field like BMS, where control and monitoring networks already exist, any change in the status quo will only come about if there are obvious benefits in bringing about the change.

REFERENCES

• Amador, C., Emond, J. P., & do Nascimento Nunes, M. C. (2009). Badia-Melis, R., Garcia-Hierro, J., Ruiz-Garcia, L., Jiménez-Ariza, T., Villalba, J. I. R., & Barreiro, P. (2014). Badia-Melis, R., Mc Carthy, U., Ruiz-Garcia, L., Garcia-Hierro, J., & Villalba, J. R. (2018). New trends in cold chain monitoring applications-A review. Food Control, 86, 170-182.

• Cui, Y. (2018). Supply Chain Innovation with IoT. In Multi-Criteria Methods and Techniques Applied to Supply Chain Management. IntechOpen.

- Huang, Q., & Yan, X. (2018, July . In 2018 International Symposium on Communication Engineering & Computer Science (CECS 2018). Atlantis Press.

- Ping, H., Wang, J., Ma, Z., & Du, Y. (2018).

- & López-Luque, R. (2020) Sensors, 20(3), 846.

- Tsang, Y. P., Choy, K. L., Wu, C. H., Ho, G. T., Lam, C. H., & Koo, P. S. (2018). An

- Verdouw, C., Wolfert, S., & Tekinerdogan, B. (2016). Internet of Things in agriculture. CAB Reviews: Perspectives in Agriculture, Veterinary Science, Nutrition and Natural Resources, 11(35), 1-12.

- Wu, L. Z., & Zhao, Y. (2013). Cold chain logistics temperature monitoring system based on internet of things technology. In Applied Mechanics and Materials (Vol. 416, pp. 1969-1973).