



A Review on Advancing Food Safety Through Iot: Real-Time Monitoring And Control System

Sharyu Khebde, Mayuri Thorat, Rupesh Kalekar, Prof. S. K. Said.

Department of AI DS Engineering, Jaihind College of Engineering, Kuran Email: sharyukhebade46@gmail.com

Department of AI DS Engineering, Jaihind College of Engineering, Kuran Email: thoratmayuri158@gmail.com

Department of AI DS Engineering, Jaihind College of Engineering, Kuran Email: kalekarrupesh00@gmail.com

Department of AI DS Engineering, Jaihind College of Engineering, Kuran Email: shubhangisaid285@gmail.com

Abstract: This paper proposes the development of an Internet of Things (IoT)-based real-time monitoring and control system for food safety management. By leveraging IoT sensors and devices throughout the food production and distribution process, this system aims to continuously monitor food safety parameters, providing immediate data to prevent contamination and ensure compliance with safety standards. In response to the critical need for enhanced food safety measures, this concept paper proposes the implementation of IoT (Internet of Things) technology to advance food safety through real-time monitoring and control systems. The global food industry faces significant challenges in ensuring food safety throughout the supply chain, including inefficiencies, delays in response to potential hazards, and increased risks of contamination. Traditional methods of monitoring and controlling food safety often lack real-time capabilities and are prone to human error. The proposed solution focuses on introducing an IoT-based system for real-time monitoring of critical food safety parameters such as temperature, humidity, and the presence of pathogens.

Index Terms—Food Safety, Monitoring, Real Time, Authority.

I. INTRODUCTION

In today's globalized food industry, ensuring the safety of food products is paramount. Traditional food safety methods often involve manual inspections and periodic checks, which can be time-consuming, labor-intensive, and prone to human error. To address these challenges, the Internet of Things (IoT) has emerged as a powerful tool for revolutionizing food safety practices. IoT technology enables real-time monitoring and control of various aspects of the food supply chain, from production and processing to storage and distribution. By integrating sensors, actuators, and cloud-based platforms, IoT systems can collect and analyze data on temperature, humidity, pH levels, and other critical parameters. This data-driven approach empowers stakeholders to proactively identify and mitigate potential food safety risks, ultimately protecting public health and consumer confidence. This paper will delve into the application of IoT in advancing food safety. It will explore the key components of an IoT-based food safety system, discuss the benefits and challenges associated with its implementation, and present case studies demonstrating its effectiveness. By understanding the potential of IoT in this domain, we can envision a future where food safety is more robust, efficient, and sustainable. This paper explores the potential of IoT-enabled systems in advancing food safety. We will delve into the key benefits of real-time monitoring and control, discuss the specific applications within the food industry, and examine the challenges and opportunities associated with implementing such systems.

II. PROBLEM STATEMENT

“To develop an IoT-based system that enables real-time monitoring and control of food safety parameters in various stages of the food supply chain, ensuring compliance with regulatory standards and minimizing foodborne illnesses”.

III. OBJECTIVES

The objective of advancing food safety through IoT is to implement a real-time monitoring and control system that ensures the safety and quality of food products throughout the supply chain by continuously tracking and managing critical factors like temperature, humidity, and contamination levels.

IV. METHODOLOGY

This project aims to develop an IoT-based system to monitor and control food safety parameters in real-time. This would involve using sensors to collect data on temperature, humidity, and other relevant factors and then using that data to trigger automated responses like adjusting temperature or alerting staff. Developing a project on advancing food safety through IoT with a real-time monitoring and control system involves several key methodologies.

Approaches used for building System :

- ✚ [1]. Determine the most critical factors that can compromise food safety, such as temperature deviations, excessive humidity, or contamination. Define project objectives: Clearly outline the goals of the project, including improving food safety, reducing waste, and enhancing operational efficiency.
- ✚ [2]. Choose appropriate sensors to measure temperature, humidity, pH, and other relevant parameters. Consider factors like accuracy, cost, and power consumption. Design the data flow architecture, including data collection, transmission, storage, and analysis.
- ✚ [3]. Model Selection and Training Choose appropriate AI models for different tasks. For natural language processing tasks, such as understanding requirements and generating test cases, models like GPT-4 can be highly effective. Train these models on your collected data to ensure they understand the context and can generate relevant test cases.
- ✚ [4]. Strategically place sensors in critical areas of the food processing or storage environment. Integrate the IoT system with existing equipment (e.g., refrigerators, freezers) to enable automated control..

V. WORKFLOW

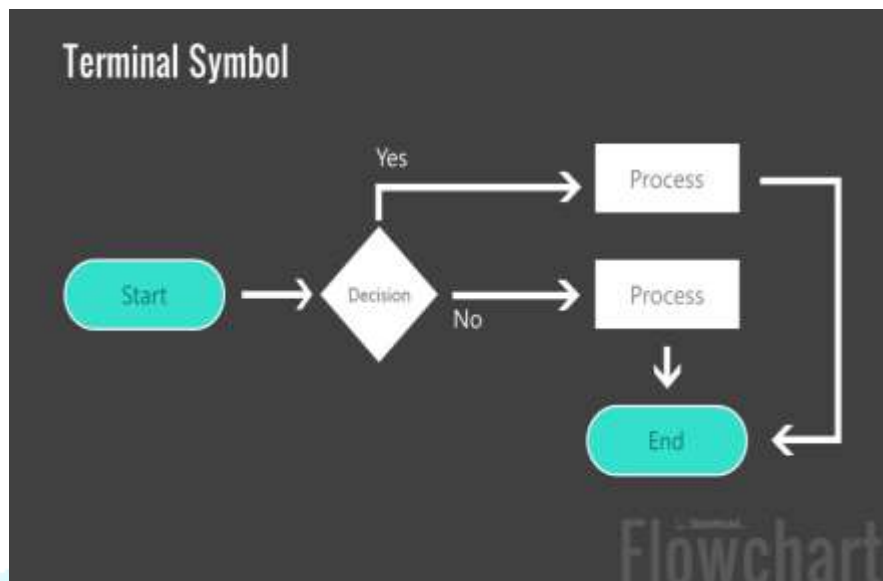


figure 1. work flow

VI. SYSTEM ARCHITECTURE

1) Sensor Selection:

Choose appropriate sensors to measure temperature, humidity, pH, and other relevant parameters. Consider factors like accuracy, cost, and power consumption.

2) Data Flow and Processing:

Design the data flow architecture, including data collection, transmission, storage, and analysis.

3) Wireless Technology :

Wi-Fi, Bluetooth, LoRaWAN, or cellular networks for sensor connectivity.

4) User Interface:

Develop a user-friendly interface for monitoring real-time data, setting alerts, and controlling equipment.

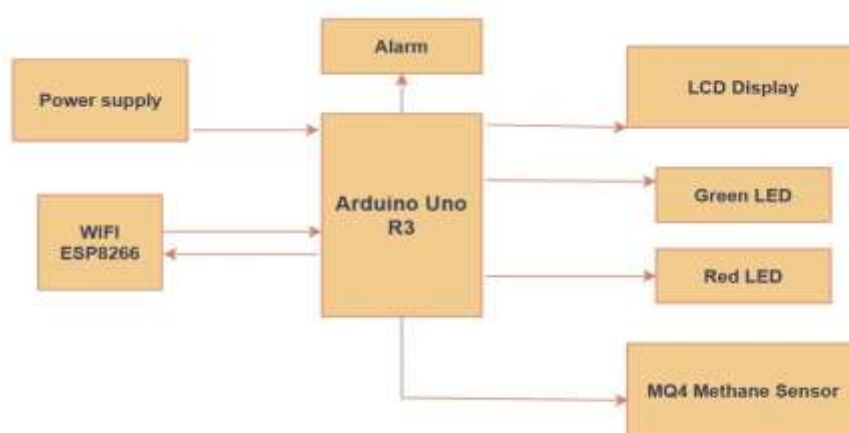


figure 2. system architecture

VII. CONCLUSION

The conclusion of this reference paper states that study presents a compelling case for leveraging IoT technology to revolutionize food safety management across the supply chain. The proposed solution addresses critical challenges facing the global food industry, including inefficiencies, delays in response to potential hazards, and increased risks of contamination associated with traditional monitoring methods. By introducing an IoT-based system for real-time monitoring of critical food safety parameters, such as temperature, humidity, and the presence of pathogens, stakeholders can gain unprecedented visibility and control over the safety and quality of food safety.

VIII. FUTURE SCOPE

The future of food safety lies in IoT-enabled real-time monitoring and control systems, ensuring safer food products and enhancing consumer trust.

IX. REFERENCES

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