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# Intelligent Inventory Management System: Innovation and Implementation of Restaurant Food Management

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**Abstract:** This paper aims to design and implement an advanced intelligent inventory management system for restaurants, optimizing the ingredient management process to ensure food safety and provide healthier dining options for customers. In the context of frequent concerns about food safety, a system capable of precisely monitoring the quality and shelf life of ingredients is particularly important. By reducing the use of expired and contaminated ingredients, such a system not only helps prevent food-borne illnesses but also reduces food waste by optimizing storage and usage, thereby lowering operational costs and environmental impact. Additionally, intelligent inventory management can assist restaurants in offering dishes that meet health standards, enhancing consumer trust and improving the restaurant's brand image. Implementing this system not only aids in improving the operational efficiency of restaurants but also underscores the critical role of technology in maintaining public health and promoting a culture of healthy eating.

**Keywords:** intelligent inventory management; food safety; healthy dining; operational efficiency; technology in food service

## 1. Introduction

### *1.1. Research Background*

In restaurants, effective food inventory management is essential to ensure operational efficiency and control costs. The complexity of restaurant business is not only reflected in the diversity of dishes and high standards of service but also in the management of food procurement, storage and use. Every ingredient needs strict management from procurement to final preparation into dishes to ensure its freshness and quality, so as to ensure food safety and meet consumers' demand for healthy diet.

Traditional inventory management methods, such as manual records and regular inventory, are no longer sufficient to meet the challenges of the modern catering industry. These methods are often labor-intensive, inefficient, and prone to errors, which affect the rational use of ingredients and precise cost control. In addition, food waste is also a major problem facing restaurants. Unreasonable inventory management will lead to a large number of expired ingredients and waste, increase the operating costs of restaurants, and cause unnecessary burdens on the environment.

Therefore, with the development of science and technology, especially the application of Internet of Things and artificial intelligence technology, restaurants are in urgent need of an intelligent inventory management system, which can not only improve the accuracy and efficiency of inventory management but also predict food demand through data analysis, thereby further reducing waste, optimizing cost control, and ensuring the optimal use of ingredients. The implementation of such a system will be the key for restaurants to improve service quality, enhance competitiveness and maintain brand reputation.

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### 1.2. Research Motivation

With the rapid development of science and technology, intelligent technologies, especially the Internet of Things (IoT) and artificial intelligence (AI), have begun to demonstrate their innovative potential in all walks of life. In the restaurant sector, the application of these technologies provides great possibilities and necessity for improving inventory management. IoT technology can monitor the status of ingredients in real time, such as temperature, humidity and other key indicators, by integrating smart sensors in the inventory system, thereby ensuring the quality of ingredients and reducing waste caused by poor storage conditions. At the same time, artificial intelligence is able to process large amounts of data, analyze ingredient usage patterns and changes in customer demand, predict future inventory needs, and optimize procurement plans and inventory levels.

In addition, intelligent inventory management systems can automatically update inventory information, reduce manual operation errors, and improve data accuracy. Through the integration of these technologies, restaurants can achieve more efficient inventory management, reduce over-purchasing and food waste, reduce costs, and enhance responsiveness to market changes. This not only helps to improve the economic benefits of restaurants but also improves consumers' dining experience and enhances consumers' trust in the safety and quality of restaurant food.

Therefore, researching and developing inventory management systems based on intelligent technology has become a key step for the modern catering industry to improve management efficiency, reduce costs and increase customer satisfaction. The implementation of such a system can not only solve the challenges currently faced by restaurants but also conform to the trend of the industry's transformation to digitalization.

### 1.3. Research Objectives

The main objective of this study is to develop an intelligent management system that can automatically monitor and optimize the inventory of restaurant ingredients. The system aims to achieve real-time monitoring and management of the inventory status of ingredients by integrating the latest Internet of Things and artificial intelligence technologies. The core functions of the system include automatic tracking of the warehousing, storage and use of ingredients, real-time updating of inventory data, and intelligent prediction of ingredient demand and optimization of procurement and storage strategies based on historical data and consumption patterns.

In addition, the system will also have the ability to automatically identify changes in the shelf life and quality of ingredients, and promptly warn managers to take corresponding measures, thereby reducing food waste and avoiding food safety issues caused by food spoilage. Through this intelligent system, restaurant managers can make more scientific decisions on the purchase and use of ingredients, ensure the optimal use of ingredients, and reduce labor costs and operational errors.

The development of the system will be based on the needs and challenges of actual restaurant operations, and conduct detailed demand analysis and system design to ensure its practicality and effectiveness in a business environment. By implementing this intelligent inventory management system, this study hopes to help restaurants achieve more efficient, economical and safer food management, and enhance the competitiveness and sustainability of the overall business.

## 2. Literature Review

### 2.1. Analysis of Existing Inventory System

According to the survey (see the questionnaire and results on restaurant inventory management methods for details), the systems and technologies currently used by restaurants in inventory management can be roughly divided into three categories: traditional manual systems, barcode-based automated systems, and computer-based integrated management systems.

Many small or traditional restaurants still rely on manual records and physical inventory to manage inventory. This traditional manual system has a low cost, but a high error rate, low efficiency, difficulty in coping with inventory demand during peak hours, and cannot update inventory status in real time.

Barcode-based automated systems track the entry and exit of ingredients by scanning barcodes, which is significantly more efficient than traditional methods. However, such systems usually require manual intervention for data entry and barcode scanning, and there are still problems with inaccurate data or delayed updates.

Computer-based integrated management systems use computer software to comprehensively manage data such as orders, inventory, procurement, and finance. Although this system can provide comprehensive data analysis and reporting functions, it relies on accurate data input and maintenance, and has high initial investment and maintenance costs.

In recent years, with the development of the Internet of Things and artificial intelligence technologies, a new generation of inventory management technologies has begun to emerge [1]. These technologies, such as smart sensors and automatic identification systems, can provide more accurate data collection and real-time inventory updates [2]. For example, smart refrigerators and RFID systems can automatically track the storage conditions and shelf life of ingredients, greatly improving the accuracy and efficiency of inventory management. Although existing high-tech systems offer many improvements, they still face some challenges in practical applications, such as high costs, complex technical requirements, and high skill requirements for operators. Therefore, it is of great practical significance for modern restaurants to study an inventory management system that can not only use advanced technologies to improve efficiency but also reduce operational difficulty and cost.

### *2.2. Technology Gap*

Although existing inventory management systems have made significant progress in some aspects, there are still some obvious limitations and deficiencies when dealing with large-scale and complex inventories:

Most existing systems have difficulty providing real-time inventory updates. In a high-traffic restaurant environment, inventory status changes rapidly, and delayed data updates can lead to inventory errors, which in turn affect the availability of dishes and ingredient purchasing decisions.

Many systems are unable to effectively integrate data from different sources, such as supply chain information, sales data, and inventory status. This data silo phenomenon limits the restaurant's comprehensive understanding of the overall inventory status and reduces management efficiency.

Existing inventory management systems often lack efficient forecasting tools and have difficulty accurately predicting future inventory needs. This results in restaurants facing problems of over-inventory or inventory shortages, increasing the risk of food waste or lost sales opportunities.

The UIs of many comprehensive inventory management systems are not intuitive, the operations are complex, and users need to undergo a long period of training and adaptation. This not only increases labor costs but can also lead to operational errors, especially in the catering industry with high employee turnover.

As restaurants expand in size or their business changes, many systems have difficulty flexibly adapting to new business needs. The lack of flexibility and poor scalability of the system are important technical bottlenecks that hinder the further development of restaurants.

The introduction of advanced inventory management technologies (such as RFID or fully automated systems) is often accompanied by high initial investment and maintenance costs. For many small and medium-sized restaurants, this high-cost investment is not feasible [3].

Given these technological gaps, this study aims to develop an intelligent inventory management system that can overcome the above shortcomings and adapt to the needs of different scales and complexities to better serve modern restaurants. Such a system will improve the overall inventory management efficiency and effectiveness by integrating the latest technological innovations, providing higher data accuracy, real-time update capabilities, and a user-friendly operation interface.

## 3. System Design

### *3.1. Hardware Design*

In order to ensure the quality and safety of food during storage and use, it is important to choose the right type of sensor. In this system, we will use the following sensors to monitor key environmental variables and food status:

Temperature is a key factor affecting the shelf life and safety of food. Using a high-precision temperature transducer, the internal temperature of refrigeration and freezing equipment can be monitored in real time to ensure that food is stored at optimal temperature conditions.

Proper humidity helps maintain the freshness of food, especially for fruits, vegetables and other perishable food [4]. Humidity sensors can monitor the humidity level of the storage environment and adjust it in time to prevent food from rotting or drying out prematurely.

Some food, such as fruit, releases ethylene gas during the ripening process, which can accelerate the ripening and decay process of other surrounding food. By installing gas sensors, the system can detect and control the ethylene concentration in the storage environment and extend the shelf life of food.

Weight sensors are installed on storage racks to monitor the weight changes of various food ingredients, update inventory quantities in real time, and reduce the frequency and error of manual inventory [5].

These sensors will be integrated with the central processing system and transmit the monitored data through the wireless network to achieve comprehensive control of the food storage environment. The system design takes into account the durability and accuracy of the sensors to ensure stable operation over a long period of time and provide reliable data to support inventory management decisions. Through this highly automated monitoring, restaurants can effectively prevent food expiration and waste, optimize inventory use, and improve operational efficiency and food safety.

### *3.2. Tag Technology*

To effectively track and manage ingredients, the system will use two main tagging technologies: Radio Frequency Identification (RFID) tags and QR code tags. Each of these technologies has its own advantages and can be selected based on different application scenarios and cost-effectiveness.

RFID tags can read information without direct line of sight, can handle large amounts of data, and have fast reading speeds. This is particularly useful in fast-paced restaurant environments, where ingredients can be quickly scanned and tracked. Restaurants can attach RFID tags to ingredient packaging and use RFID readers to automatically capture information about each ingredient, such as purchase date, batch number, expiration date, etc., to update the inventory system in real time [6].

QR code tags are relatively inexpensive, easy to generate and print, and can be read by smartphones or dedicated scanning devices, making them suitable for cost-sensitive or small-scale restaurants. QR codes can be printed on ingredient packaging labels to store

the corresponding ingredient information, and ingredient details and inventory status can be quickly obtained by scanning the QR code [7].

When designing the system, the most suitable tagging technology will be selected, taking into account various operating environments and cost factors. For large restaurants that require high traffic and fast processing, RFID technology is recommended, while for smaller or cost-sensitive restaurants, QR code is an economical and practical choice. Through these tag technologies, the system can improve the automation and accuracy of food management, greatly simplify the inventory management process, and improve overall efficiency.

### *3.3. Database Structure*

To support efficient ingredient management, the system requires a powerful and flexible database structure to store and process various data. The following are the main considerations and components of database design:

1) Entity Design

The ingredient entity records basic information about each ingredient, such as name, type, purchase date, shelf life, supplier information, storage conditions, etc. The inventory entity tracks the current inventory quantity, location information, batch number, and consumption rate of each ingredient. The supplier entity contains detailed information about the supplier, such as name, contact information, credit rating, and historical transaction records. The order entity records the restaurant's purchase order, including order date, ingredient list, quantity, order status, and supplier information.

2) Relational Design

The relationship between ingredients and orders is many-to-many, represented by a cross table, where each record represents a specific ingredient and its quantity in the order. There is also a many-to-many relationship between ingredients and suppliers, because an ingredient may be supplied by multiple suppliers, and the same supplier may supply multiple ingredients.

3) Data Integrity and Security

When designing a database, you need to set appropriate data integrity constraints, including entity integrity, referential integrity, and user-defined integrity, to ensure the accuracy and reliability of the data. Application-level security measures, such as user authentication, data encryption, and access control, protect data from unauthorized access or tampering.

4) Data Analysis and Reporting

The database should support complex queries and report generation so that managers can quickly obtain key information such as inventory status, ingredient consumption rate, cost analysis, and supply chain efficiency. Integrate data mining and machine learning algorithms to analyze consumption patterns and predict future inventory needs to help restaurants optimize procurement plans and inventory levels.

This database structure must not only be able to handle daily ingredient management tasks but also have the flexibility to respond quickly to emergencies, such as supply disruptions or drastic changes in demand. With this detailed and organized database design, the intelligent inventory management system can effectively support the restaurant's inventory management, improve operational efficiency and decision-making quality.

### *3.4. User Interface Design*

To ensure the efficient operation and ease of use of the system, the user interface (UI) design must be intuitive and meet the actual operational needs of restaurant staff. The following are the key aspects of UI design:

Design a clear and concise UI to ensure that all functions are easy to access and use, and avoid complex menus or cumbersome operation steps. Use icons and color coding to

help users quickly identify various functions and status, such as inventory levels, expiration warnings, etc.

UI needs to adapt to different devices, including desktop computers, tablets and smartphones, to ensure smooth operation on various devices and adapt to various usage environments such as kitchens or offices. Responsive design enables the interface to automatically adjust the layout according to the screen size to provide a consistent user experience.

UI design should be consistent with the daily operation process of restaurant staff, such as creating purchase orders, checking and updating inventory, etc. The operation logic should be intuitive and easy to understand to reduce the user's learning cost. Provide quick operations and automated processes, such as automatically filling order information, generating inventory reports with one click, etc., to improve work efficiency.

UI should implement dynamic feedback and instant update functions. When the inventory status changes or there is a new notification, the interface can instantly display the latest information to help users respond quickly. Add interactive tutorials and help documents to support new users to quickly get started and solve problems.

Considering that restaurant staff may come from different language backgrounds, the UI should provide multi-language support so that all users can use the system efficiently in their native language.

Through the above UI design principles, the intelligent inventory management system can provide an easy-to-use, efficient and low-error operating environment, greatly simplifying the daily management tasks of restaurant staff, improving overall job satisfaction and the practical application value of the system.

### *3.5. Algorithm Development*

In order to further improve the efficiency and intelligence of the inventory management system, multiple algorithms will be integrated into the system to achieve key functions such as inventory forecasting, optimization and cost analysis. The following are specific algorithm development directions:

The inventory forecasting algorithm uses historical sales data and seasonal change patterns to predict future food demand. The algorithm will apply time series analysis and machine learning models (such as ARIMA, seasonal ARIMA and random forest) to predict sales trends within a specific time period. The forecast results can help restaurants adjust their purchasing plans in advance to ensure that inventory levels match demand and avoid overstocking or out-of-stock situations.

Develop dynamic inventory management models such as economic order quantity (EOQ) models and safety stock level settings to minimize total inventory costs, including ordering costs, holding costs and out-of-stock costs. The inventory optimization algorithm will dynamically adjust inventory strategies based on real-time data, using optimization techniques (such as linear programming or genetic algorithms) to find the best ordering frequency and batch size.

The cost analysis algorithm can realize cost tracking and analysis functions, and record the cost of food procurement, transportation costs, storage costs and related losses or waste costs in detail. Through cost analysis algorithms, the system can identify cost drivers and potential savings points, providing scientific cost control recommendations and financial decision support for restaurant management.

Anomaly detection algorithms are used to monitor and report inventory anomalies, such as early warning of expired ingredients and detection of abnormal consumption rates. These algorithms will be based on statistical anomaly detection techniques such as standard deviation analysis or box plot analysis. Real-time anomaly reporting can help managers take timely measures to reduce food waste and improve food safety.

The integration of these algorithms will provide restaurants with a powerful tool that can not only monitor and manage inventory in real time but also help restaurants optimize

operational efficiency and cost-effectiveness through in-depth data analysis and prediction. Through continuous learning and model adjustment, the algorithm will continue to adapt to the specific operating environment and changing needs of the restaurant, providing more accurate and effective decision support.

## 4. System Implementation

### *4.1. Prototype Development*

In order to verify the practicality and effectiveness of the intelligent inventory management system, a system prototype needs to be developed first. The main goal of this stage is to build the basic framework of the system, implement core functions, and conduct preliminary deployment in an actual restaurant environment to collect feedback and performance data. The following are the key steps for prototype development:

Work with restaurant managers and employees to understand in detail their specific needs and expected functions of the inventory management system. Analyze these needs and determine the priorities and key functions of prototype development, such as automatic inventory tracking, forecasting demand, optimizing inventory, and cost analysis. Based on the collected requirements, design the database structure, user interface, and algorithm logic of the system. Develop a preliminary version of the system, including the front-end user interface and the back-end database and algorithm processing modules. Conduct preliminary deployment of the system in selected restaurants. Select restaurants that can provide typical data and representative operating environments to test the functions and performance of the system. Install necessary hardware equipment, such as sensors and scanning equipment, and ensure their compatibility and stability with the system software. Conduct comprehensive functional testing to verify that each function of the system works as expected, especially the accuracy of the data, the ability to update in real time, and the ease of use of the user interface. Based on the test results and user feedback, adjust and optimize the system to solve the problems and defects found. Evaluate the performance of the system in actual restaurant operations, including the response speed, stability, and accuracy of the system. Collect user experience and improvement suggestions, especially feedback on how the system can help them improve inventory management and reduce costs.

Through this prototype development and initial deployment phase, the functions and performance of the intelligent inventory management system can be effectively tested, laying a solid foundation for subsequent full implementation and promotion. The success of this stage is the key to the success of the system development project, so detailed planning and careful execution are required.

### *4.2. Functional Test*

After the system prototype is developed, functional testing is a key step to ensure that the system meets the design requirements and user needs. Functional testing mainly evaluates whether the various functions of the system are executed correctly and records the detailed test process and results. The following are the main components and execution steps of functional testing:

Based on the system design documents and user requirements, develop a detailed test plan, including the scope, methods, tools, and objectives of the test. Identify the key areas of testing, such as user interface functions, data accuracy, response time, security, and exception handling capabilities. Prepare the test environment and ensure that the environment settings can simulate the actual restaurant operation scenario. Configure the required hardware and software, including servers, databases, network connections, and front-end operation terminals. According to the test plan, develop detailed test cases. Each test case should describe the test steps, expected results, and test data in detail. The test case should cover all functional points, including boundary conditions and abnormal situations. Execute the test case, manually or using automated testing tools, and record the

test results. For each test case, verify whether the actual behavior of the system is consistent with the expected results. Record any deviations or errors and describe in detail the environment and conditions where the problem occurred. Record all problems found in the test in the defect tracking system. Assign a unique identification number to each problem, record detailed problem description, scope of impact, steps to reproduce, and severity level. Track problem resolution progress to ensure that all critical issues are resolved before system deployment. Perform regression testing on the system after defect resolution to ensure that modifications do not introduce new issues. Verify that all fixes are effective and confirm that system functionality still meets requirement specifications after fixes. Prepare a test report summarizing the coverage of test activities, test results, problems found, and their resolution. Provide test reports to project teams and stakeholders as a basis for evaluating whether the system is ready for full deployment.

Through this series of detailed functional tests, it can be ensured that the smart inventory management system can operate stably and reliably in actual applications to meet the restaurant's needs for efficient inventory management.

### *4.3. Case Study*

In order to further verify the actual effect and benefits of the intelligent inventory management system, a case study will be conducted in a specific restaurant environment. This study will record the changes before and after the implementation of the system in detail, evaluate the performance of the system in a real environment, and demonstrate its specific impact on restaurant operations. The following are the main steps and contents of the case study:

Select representative restaurants as research objects, considering the size, type, cuisine, and complexity of inventory management of the restaurant. Ensure that the selected restaurants have typical operating modes and inventory management needs so that the research results have a wide range of applicability and reference value. Before the implementation of the system, collect basic operating data of the restaurant, including inventory levels, procurement costs, food waste, employee efficiency, etc. After the implementation of the system, continue to collect data on the same indicators for before-and-after comparative analysis. Deploy the intelligent inventory management system in the selected restaurants, including the installation of hardware equipment and the configuration of software. Provide system operation training to restaurant employees to ensure that they can use the system proficiently for daily inventory management. Compare the data before and after implementation to evaluate the impact of the system on inventory accuracy, procurement costs, food waste, and employee work efficiency. Collect feedback and opinions from employees and management on the effectiveness of the system implementation through interviews and questionnaires. Record the problems and challenges encountered during the implementation of the system, such as technical obstacles, operational problems, or adaptability issues. Analyze the causes and solutions to these problems and evaluate their impact on the system's effectiveness. Write a detailed case study report based on the collected data and feedback, highlighting the actual operating results and benefits of the system. The report should include detailed data analysis, charts, direct comments from employees and management, and suggestions for system optimization.

Through this case study, not only can the application effect of the intelligent inventory management system in an actual restaurant environment be demonstrated, but it can also provide valuable practical experience and data support for future system improvements and optimizations. This will help to further promote the application of the system and improve the operating efficiency and economic benefits of more restaurants.

## 5. Research Results and Discussion

### *5.1. System Performance*

After the smart inventory management system is deployed and operated in the restaurant, the system's performance can be evaluated from multiple dimensions:

Whether the system can accurately track inventory levels and the usage status of ingredients, including the entry, storage and exit of ingredients. Evaluate the accuracy of the system's monitoring of shelf life and storage conditions, as well as the effectiveness of its early warning mechanism. Collect feedback from restaurant employees and managers on the system's operating interface, functions and overall experience. Use questionnaires and interviews to understand users' evaluation of the system's improvement in work efficiency, reduction of errors and simplification of processes. Calculate the cost savings in inventory control, waste reduction, and optimized procurement after the system is implemented. Analyze the system's input costs and economic returns, and evaluate the system's long-term economic sustainability.

### *5.2. Challenges*

Table 1 presents the key challenges faced by smart inventory management systems in practical applications, along with their corresponding resolution strategies.

**Table 1.** Smart Inventory: Challenges & Solutions.

| Category | Challenges | Resolution strategy |
|---|---|---|
| Technology challenge | How to effectively integrate information from different data sources, including historical inventory data, real-time sales data, and supply chain information. | Middleware and APIs are used to achieve data exchange and synchronization between different systems, and data cleaning and conversion techniques are used to ensure data accuracy and consistency. |
| Hardware compatibility | Ensure that newly installed sensors and scanning equipment are compatible with existing IT infrastructure. | Carry out detailed compatibility testing at the early stage of system design, and update old equipment or software when necessary to support the efficient operation of the new system. |
| User adaptation | Restaurant staff's adaptation and acceptance of the new system. | Provide comprehensive training and ongoing technical support, design a simple and intuitive user interface, and add help documents and operation guides. |
| Maintenance and support | Ongoing maintenance and technical support after the system is running, especially in the face of hardware failures or software problems. | Establish a responsive technical support team, regularly update software and hardware, and implement preventive maintenance measures. |

Through these detailed analyses and discussions, we can gain a more comprehensive understanding of the performance and value of smart inventory management systems in actual business environments, as well as the challenges that need to be overcome during implementation. This information is essential for the continuous improvement and optimization of the system, and also provides valuable experience and reference for other restaurants or similar businesses to implement similar systems.

## 6. Future Outlook

### *6.1. Future Development*

The future development direction of the intelligent inventory management system includes technology upgrades and functional expansion to adapt to the ever-changing needs of the catering industry:

1) Technology Upgrade

Continue to integrate more advanced AI algorithms to improve the accuracy of demand forecasting, automate decision-making processes, and achieve more refined inventory management. Expand the application of IoT devices, such as using more advanced sensors and automatic identification systems to improve the real-time and accuracy of data collection.

2) Functional Expansion

Develop system functions to include broader supply chain management, such as automated supplier evaluation and order management, to ensure that every link in the supply chain is efficient and transparent. By analyzing the correlation between inventory data and customer satisfaction, optimize the quality of dishes and service speed to enhance customer experience.

### *6.2. Research Contributions*

The main contribution of this paper is the design and implementation of an intelligent inventory management system for restaurants, which significantly improves the efficiency and accuracy of inventory management by integrating the latest technologies. Specific contributions include:

The system automates most inventory management tasks, reduces manual operations, and improves work efficiency.

Through precise inventory control and expiration warning, food waste is significantly reduced.

Optimized inventory management and procurement decisions help restaurants reduce operating costs.

## 7. Conclusion

This study successfully designed and tested an intelligent inventory management system for restaurants. The implementation of this system not only improved the efficiency and accuracy of inventory management but also helped restaurants reduce costs and improve operational results by reducing food waste and optimizing purchasing decisions. The importance of intelligent inventory management systems lies in their contribution to the sustainable development of the catering industry, especially in improving resource utilization efficiency and supporting sustainable business practices. In the future, with the further development of technology, such systems will continue to expand their functions and application scope, bringing wider industry impact.

## Appendix A. Questionnaire of Restaurant Inventory Management System

Instructions: Please select the corresponding answer based on the actual usage of your restaurant. This questionnaire aims to understand the systems and technologies used by your commercial restaurant for inventory management.

Basic Information

1. Which of the following types is your restaurant?

A. Small restaurant

B. Medium restaurant

C. Large restaurant

D. Restaurant group

Inventory Management System

2. Which of the following categories does your current inventory management system belong to?

A. Traditional manual system

B. Barcode-based automated system

C. Computer-based integrated management system

D. Advanced system using IoT technology (such as smart sensors, RFID)

System Evaluation

3. How satisfied are you with the current inventory management system?

A. Very satisfied

B. Satisfied

C. Average

D. Dissatisfied

E. Very dissatisfied

4. In what aspects do you think the current system has problems? (Multiple choices are allowed)

A. Inaccurate data

B. Update delays

C. High cost

D. Complex operation

E. Insufficient technical support

Technical Needs and Expectations

5. What features or improvements do you want to add to the inventory management system?

A. Real-time data update

B. Cost control analysis

C. User convenience

D. Better technical support

E. Others (please specify): _____

Conclusion: Thank you for your participation and valuable time! Please submit the questionnaire to complete the survey.

Appendix 2 Questionnaire Result of Restaurant Inventory Management System

Total number of participating restaurants: 100

Restaurant Type Distribution

A. Small restaurants: 30

B. Medium restaurants: 40

C. Large restaurants: 20

D. Restaurant groups: 10

Use of inventory Management System

A. Traditional manual system: 20

B. Barcode-based automated system: 30

C. Computer-based integrated management system: 40

D. Advanced system using IoT technology (such as smart sensors, RFID): 10

System Satisfaction

A. Very satisfied: 10

B. Satisfied: 35

C. Average: 40

D. Dissatisfied: 10

E. Very dissatisfied: 5

Main problems (multiple choices)

A. Inaccurate data: 50

B. Update delay: 30

C. High cost: 20

D. Complex operation: 25

E. Insufficient technical support: 40

Expected Additional Functions or Improvements
A. Real-time data update: 60
B. Cost control analysis: 50
C. User convenience: 70
D. Better technical support: 45
E. Others: 10 (including automatic ordering function, food quality tracking, etc.)

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