Design of Cold Chain Logistics Information Real Time Tracking System Based on Wireless RFID Technology

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Abstract. In order to improve the proportion of cold chain distribution, effectively control transportation links and information, and ensure the quality of cold chain food, it is necessary to establish an effective monitoring and tracking mechanism in all aspects of cold chain transportation. Therefore, a real-time tracking system of cold chain logistics information based on wireless RFID technology is proposed. The tag data sensing terminal, reader data transfer terminal and background server data management terminal are used to construct the real-time tracking system framework of cold chain logistics information, and the wireless RFID card reader is used to obtain the real-time temperature of food, vehicle running position information, agricultural product information and other data, so as to realize the real-time tracking and monitoring of cold chain logistics information. The experimental test shows that the function of the system meets the needs of real-time tracking of cold chain logistics information, achieves the system design goal, and ensures the quality of cold chain food.

Keywords: Wireless RFID technology · Cold chain logistics · Information tracking system

1 Introduction

Under the wave of global economic integration, many industries in China, such as dairy products, cold drinks, raw and fresh meat products, have made great progress. The rapid development of these food industries has triggered and driven the development of cold chain logistics business [1]. Cold chain logistics is a kind of logistics system that keeps perishable and fresh food in the specified low temperature environment in all links of production, processing, storage, transportation, sales and final consumption, so as to ensure food quality and reduce food loss by the best logistics means. It is an essential safeguard measure to ensure that fresh food can be safely delivered to consumers from the production source. At present, China's annual demand for fresh agricultural products is about 100 million tons, but due to the inherent perishable characteristics of agricultural

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S. Liu and X. Ma (Eds.): ADHIP 2021, LNICST 416, pp. 440–453, 2022.
https://doi.org/10.1007/978-3-030-94551-0_35

products, and the logistics distribution is usually carried out under normal temperature, resulting in excessive loss in the logistics process [2]. According to relevant data, the loss rate of agricultural products caused by improper production, transportation and storage is more than 100 million yuan, and the direct economic loss is about 100 million yuan [3]. Not only that, in recent years, malignant incidents of food quality and safety problems have also occurred constantly, such as the frequent occurrence of food decay, the discrepancy between the quantity of goods delivered and the quantity of goods delivered, and the inability to trace the source after the occurrence of food poisoning events, which lead to the safety of cold chain food has become the focus of public attention. Therefore, the demand for effective cold chain monitoring and tracking management of fresh products is becoming more and more obvious. On the background of this social demand, it is necessary to vigorously develop cold chain logistics to reduce unnecessary consumption of fresh products. At the same time, it is necessary to establish the whole process monitoring mechanism of cold chain supply chain and optimize and improve its tracking process. At present, scholars in related fields have carried out research on the cold chain logistics information real-time tracking system, and achieved certain research results. In reference [4], a real-time monitoring and traceability system of Tricholoma matsutake cold chain was designed. Using the Internet of things technology, a real-time monitoring traceability system is developed and tested to monitor the company's cold chain logistics environment parameters. The system can track and monitor the fluctuation of temperature, humidity, oxygen and carbon dioxide in the cold chain in real time.

Based on the above background, a cold chain logistics information real-time tracking system based on wireless RFID technology is designed. Using tag data sensing, reader data transmission and background server data management terminal, the real-time tracking system framework of cold chain logistics information is constructed. RFID tags with temperature sensors are placed to record and monitor the temperature in the cold storage, and labels are pasted on each container or paper bag. At the same time, record the freezing state change data, and immediately detect the temperature condition through visual inspection. If the temperature of the food in the car is abnormal, it should be detected immediately, and the problem should be stopped immediately. Realize the real-time tracking and monitoring of cold chain logistics information. So as to improve the distribution proportion of cold chain, effectively control the transportation links and information, and ensure the quality of cold chain food.

2 Key Technologies of Cold Chain Logistics Information Real Time Tracking System

The main research object of this paper is the design and implementation of cold chain logistics information real-time tracking system, which mainly uses satellite positioning technology, RFID technology and GPRS wireless transmission and other key technologies.

2.1 Satellite Positioning Technology

The logistics of fresh food products requires the whole process cold chain control, and the temperature environment is extremely strict, so the requirements of logistics tracking

technology also need to be improved accordingly. The information system not only needs to obtain the geographical location information of the transported goods, but also needs to monitor the temperature information in real time as the guarantee of food safety and tracking evidence. Logistics tracking technology is usually applied to the following technologies: geographic information system (GIS) and global positioning system (GPS). GIS is an information system based on geographic spatial data, which can feed back spatial dynamic geographic information and provide decision-making service for relevant personnel through model algorithm. Combined with the corresponding software system, the distribution route model can be established to provide routes for transportation and positioning for monitoring, so as to better improve the logistics efficiency.

GPS uses satellites to realize the continuous and high-precision monitoring of ground distribution vehicles, which can effectively understand the location and trajectory of ground targets, and according to the needs, with the corresponding software, set a more reasonable geographical route, shorten the transportation time and reduce the transportation cost.

2.2 RFID Technology

RFID (radio frequency identification) radio frequency identification technology, also known as radio frequency identification, is a non-contact automatic identification technology. Through the radio frequency identification signal transmitted by the reader antenna, the target object can be automatically identified, so as to transmit the data from the electronic tag attached to the object, so as to achieve the purpose of automatic identification of the information in the electronic tag. The recognition process does not need manual intervention, and the reader can work in harsh environment, and can penetrate ice, snow, rain, fog and so on. At the same time, RFID technology can not only accurately identify high-speed moving objects, but also realize multiple tags reading at the same time, which is convenient to collect a large amount of data at one time, so as to improve work efficiency [5]. At present, long-distance RFID technology is widely used in airport security and intelligent transportation, such as its automatic toll system on expressway. Short range RFID products overcome the inconvenience of paper bar code in the dirty, dust and other harsh environment, can completely replace the paper bar code in this environment, and have a wide range of uses, such as the object tracking system on the factory assembly line.

RFID technology is widely used in logistics management. It mainly realizes the identification and management of goods information in the process of product transportation, so as to achieve the purpose of rapid, accurate and timely transportation of products. The electronic label is fixed on the surface of the product, and the whole process of goods tracking is realized in the process of goods delivery, loading and unloading, and transit.

2.3 GPRS Wireless Communication Technology

GPRS is the abbreviation of general packet radio service. It is a new packet data carrying service. It is the combination of GSM wireless access technology and internet packet switching technology. The most fundamental difference between GSM and the existing GSM Voice system is that GSM is a circuit switching system, while GPRS is a packet

switching system [6]. GPRS service is suitable for most mobile Internet, and its data transmission characteristic is that it can be used for intermittent, sudden or frequent, small amount of data transmission.

The GPRS network covers a wide area. All the places where the GPS network can be used can use the GPRS network. It has high stability, powerful network functions, and relatively low cost in industrial applications. The specific advantages are as follows:

(1) Real-time online: Real time online means that GPRS service users can keep in touch with the network at any time. When users access the Internet, the mobile phone will send and receive data on the wireless channel. Even if there is no data transmission, the mobile phone will also keep the network unblocked.
(2) Billing by traffic: The charging method of GPRS service is calculated according to the number of packets received and sent by the user. Even if the user is online all the time, there is no need to pay any fee when there is no packet sent and received.
(3) High speed transmission: In theory, the data transmission of GPRS packet switching technology can reach 171.2 kb/s, but due to the limitation of coding and terminal function, the actual transmission rate will decrease. However, compared with the 9.6 kb/s of circuit switching data service, the transmission rate is significantly improved.
(4) Switch freely: Free switching means that users can simultaneously access the Internet and make voice calls on mobile devices, that is, data transmission function and voice call function can be switched at the same time or freely with each other.

3 Framework of Cold Chain Logistics Information Real Time Tracking System

The system consists of tag data sensing end, reader data transfer end and background server data management end as Fig. 1.

According to Fig. 1, the Tag data sensing terminal is to obtain the real-time temperature data of fresh food. The Tag is pasted on each packaging box to obtain energy from the RF signal sent by the nearby reader and work according to the instructions sent by the reader. The data transfer terminal of the reader should realize two functions: one is to control the Tag entering the reader communication range and obtain the sensing data. The second is to push the collected data to the server in real time. The data management end of the background server is to realize the centralized management of all monitoring data, provide user-friendly operation interface, realize the data tracking query function and simple data processing function. In addition, it also provides emergency alarm function. In case of an emergency, such as fresh food exposed to high temperatures for a long time. The background system will send a warning message to the designated staff according to the temperature overrun time.

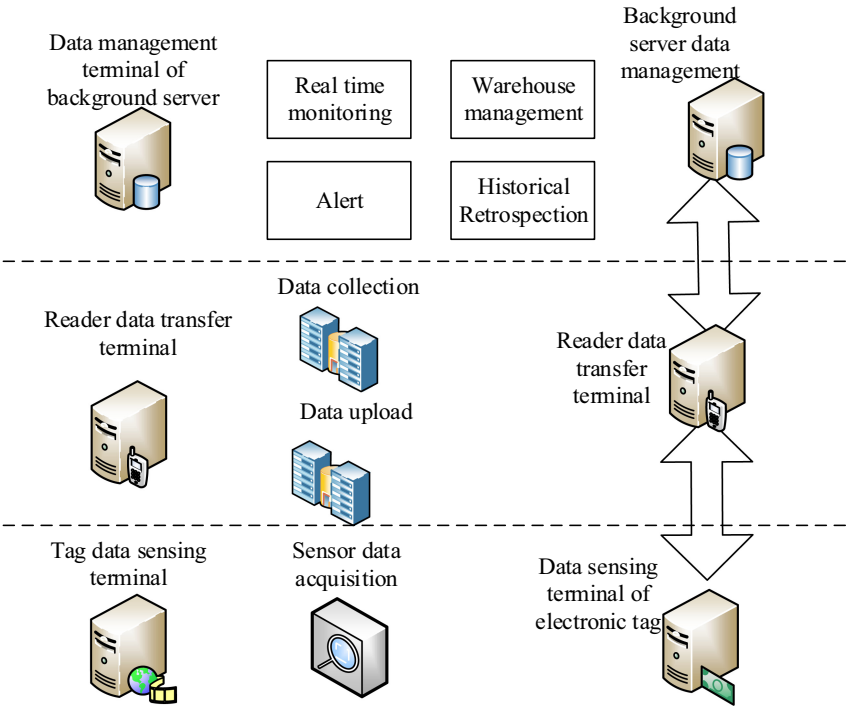

Fig. 1. Framework of cold chain logistics information real time tracking system

4 System Hardware Design

In the hardware part of the system, through the selection of microprocessor and the design of peripheral circuit, the main functions are the analysis and storage of GPS navigation message, the collection and storage of RFID logistics cargo information. Temperature and humidity data are collected and stored, and the collected data are sent to the server and mobile terminal of the monitoring center through GPRS network for users at all levels to query and process. At the same time, the collected information is displayed on the LCD of the vehicle terminal in real time [7]. The hardware structure is as Fig. 2.

4.1 MCU Processor

MCU (micro controller unit) processor, also known as single-chip microcomputer or single-chip microcomputer. It is to reduce the frequency and specification of the CPU, and integrate the peripheral interfaces such as memory, counter, USB, A/D conversion, UART and LCD driver circuit into a single chip to form a chip level computer, which can do different combination control for different applications.

The selection of processor chip is very important for any control system. For any type of processor, it is necessary to have corresponding peripherals and development methods to give full play to its maximum efficiency and bring the maximum efficiency to the whole control system [8]. The processor chip in this system is a 32-bit

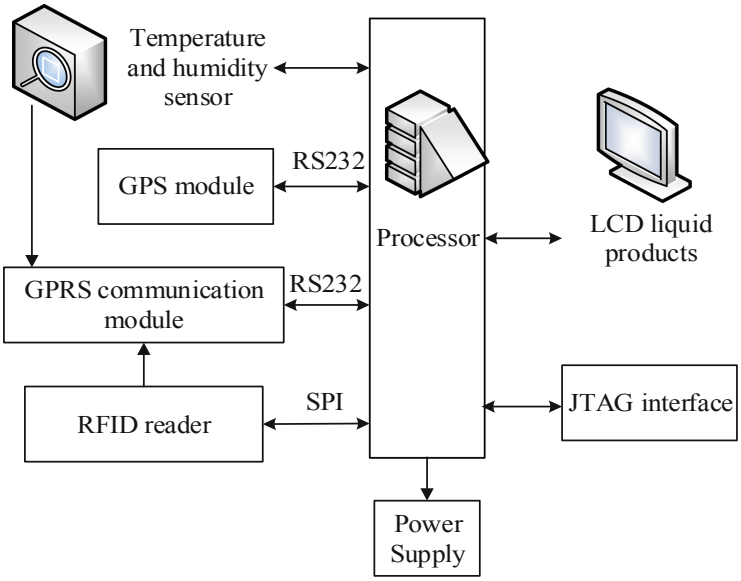

Fig. 2. Hardware structure

low-power, high-performance STM32F107VCT6 microprocessor produced by ST. Its standard peripherals include 10 timers, 2 AD analog-to-digital converters, 2 DA digital-to-analog converters, 5 USART interfaces, 3 SPI interfaces, 2 CAN2.OB interfaces, 2 full-speed USB (OTG) the interface, two I2C interfaces and Ethernet 10/100MAC module can fully meet the needs of industrial and medical products. Two USART interfaces of STM32F107VCT6 processor are used to complete the circuit design of GPS module interface and GPRS module interface. Use one of the pins of the microprocessor (here PA 11 pin) to complete the data transmission function with the temperature and humidity sensor. The SPI serial interface of the microprocessor is used to complete the data transmission function with the RFID reader module [9]. The hardware interface circuit design of these modules are introduced in detail in the follow-up content. According to the function design of the refrigerated cargo tracking system that the hardware design of the vehicle terminal needs to realize, the software flow of each module is developed. The experimental chapter verifies that the processor selection is correct, which can realize the functional design requirements of the vehicle terminal.

4.2 GPS Module Hardware

GPS receiving module is used to receive satellite signals, and send the information to the processor through the serial port for analysis, so as to obtain the required three-dimensional position coordinate information for subsequent storage, display and transmission. GPS module plays an important role in the vehicle terminal tracking system. According to the analysis of longitude, latitude, time and other information, we can know the location coordinates of the transport vehicles.

GPS positioning system consists of three parts: space part, ground monitoring part and user part. The space part is composed of 24 GPS satellites with an altitude of about 20200 km. The orbits are nearly circular, and the operation period is about 11 h and 58 min. They are evenly distributed on six orbital planes, with 4 satellites distributed on each orbital plane, and the orbital inclination is 55°. This distribution of satellites makes it possible for more than four satellites to be observed at any time and anywhere in the world at the same time, and can ensure good geometric figure of positioning calculation accuracy, so as to provide global navigation capability.

4.3 DHT11 Temperature and Humidity Sensor

DHT11 temperature and humidity sensor combines digital technology with sensing technology to ensure high reliability and excellent long-term stability. The sensor is composed of humidity sensing element and NTC temperature measuring element, and is connected with a high-performance 8-bit MCU [10]. Through the processor connection, the local humidity and temperature can be collected in real time. The communication mode between DHT 11 and STM32 adopts a single bus type, and only one I/O port is required. The 40-bit data of humidity and temperature data inside the sensor are transmitted to the processor at one time, and the data is verified by a checksum method, which effectively ensures the accuracy of data transmission. DHT11 has low power consumption, with an average maximum current of 0.5 mA under 5 V supply voltage. The main application areas include automobiles, home appliances, weather stations, humidity regulators, etc.

The humidity detection of DHT11 uses capacitive structure, and uses "micro structure" detection electrode system with different protection and polymer coating to form the capacitance of the sensor chip, which can not only ensure the original characteristics of the humidity sensitive parts of the capacitance, but also resist the interference from the outside world. Because it combines the temperature sensor with the humidity sensor to form a single individual, the measurement accuracy is high and the dew point can be accurately obtained, and the error caused by the temperature change can be avoided [11]. The sensor integrates signal amplifier, analog-to-digital converter, calibration data memory and standard IIC bus into one chip.

In order to achieve the purpose of accurate measurement, the calibration method of the sensor is different from the general sensor, which is calibrated in an extremely strict temperature and humidity closed room. It can fully meet the temperature monitoring requirements in the refrigerated cargo transportation, especially for fresh flowers whose fresh-keeping temperature requirements are between 0–10 °C, and the fresh-keeping temperature of general fresh flowers is 5 °C.

4.4 Wireless RFID Reader

The reason why the wireless RFID reader is called wireless is that it does not need to rely on the communication interface to exchange data between PC like the ordinary portable data collector, but can directly carry out real-time data communication with PC and server through the wireless network. Wireless RFID card reader has the advantage of online data acquisition. Its communication with the computer is realized by radio

waves, which can transmit the data collected on site to the computer in real time [12]. Compared with the ordinary portable bar code scanner, it further improves the work efficiency of the operator, and makes the data from the original local verification and storage into remote control and real-time transmission.

The RFID reader module uses the MFRC522 contactless (13.56 MHz) reader card chip produced by NXP (NXP semiconductor) company. It uses the principle of modulation and demodulation, and integrates them into various contactless communication methods and protocols. The function of the RFID module is to record the quantity change and transit situation of goods in transit.

MFRC522 reader supports ISO 14443A/MIFARE working mode. The internal transmitter of MFRC522 can drive the reader's antenna to communicate with ISO 14443A/MIFARE card and transponder. The receiver part provides a powerful and efficient demodulation and decoding circuit to process the signals of ISO 14443A/MIFARE compatible cards and transponders, and the digital circuit part processes the complete ISO 14443A frame and error detection. MFRC_522 supports MIFARE Class devices and MIFARE's higher-speed non-contact communication, with a two-way data transfer rate of up to 424 kbit/s.

4.5 GPRS/ GSM Hardware

The SIM900A module is an Internet of Things communication product produced by SIMCom. The module is a compact GPRS/GSM module with built-in user applications. The module's working frequency bands are 900 MHz and 1800 MHz, which can be used normally all over the world. It adopts industrial-grade interface standards and can provide voice, short message and other service functions. The TCP/IP communication protocol is embedded, and the extended TCP/IP AT command makes it convenient for users to use the TCP/IP protocol. The main features of SIM900A module are as Table 1.

Table 1. SIM900A module parameters

Parameter	Description
Power supply	Single voltage: 3.2 V–4.8 V, low power consumption mode is only 3.5 mA
Working frequency band	Can automatically search for 900 MHz/1800 MHz working frequency band, or set working frequency band through AT command
GPRS data characteristics	GPRS data downlink transmission: up to 85.6 kbps GPRS data uplink transmission: up to 42.8 kbps
Short message SMS	MT, Mo, CB, Text and PDU modes SMS storage device: SIM card

5 System Function Design

The cold chain logistics tracking system is based on the Internet of things technology, based on electronic coding, through the electronic label technology to collect the attributes, status and physical environment parameters of cold chain food in real time, so as to realize the safety warning and product tracking of cold chain food logistics process, and support the monitoring of enterprises and government departments on cold chain food. From the above analysis, it is clear that the tracking system is located in the logistics among the supply chain enterprises, with the production and processing enterprises, logistics enterprises, sales enterprises and government management departments as the service objects, and mainly completes the data collection and monitoring management of the production, delivery, transportation and receipt of cold chain food [13]. Therefore, under the guidance of the system objectives of tracking and real-time monitoring, the functional objectives of the food cold chain logistics information tracking system mainly include:

(1) For the upstream and downstream enterprises to achieve seamless transmission of information, to solve the cold chain broken phenomenon;
(2) Improve the efficiency of cold chain operation, reduce the system cost and loss;
(3) In case of safety problems, it can quickly determine the source of products, provide convenience for product recall, and determine the responsibility of enterprises in the cold chain.

5.1 Logistics Information Collection Function

According to the flow of information in the cold chain supply chain, the completion of fresh product tracking must include three stages of key information, namely, the production and processing process of fresh products, the time information of transportation and sales stage, the location information, and the electronic label information of fresh products. Through the establishment of the relationship between the three, the data is organically combined to determine the tracking information needed by the final data query platform. Among them, the information of the electronic tag includes the unique identification number of the pig in the breeding stage, including the temperature and humidity information generated in each process. There are also such data information in fresh distribution center and sales terminal. The reader and the antenna are used to write the data in the village label. Here, writing the data to the electronic label means updating the information change of the electronic label in the database where the electronic label number is located in real time. The electronic label is the carrier of information, and the reader is the tool for updating the information of the electronic label. The following describes how to read and store the information generated in the supply chain by electronic tags and readers, and how to bind all kinds of data together to achieve tracking management.

Firstly, each tag and reader has three unique dimensions: number, time information and location information.

(1) Introduction to the attributes of electronic labels:

ID number: The unique identification of a fresh product.

Time information: in the process of production, processing and circulation, fresh products need to go through inspection, freezing, sorting, refrigeration, transportation, sales and other links. Each link is the update time point of RFID information. The update of RFID information is interval, which takes the completion of operation as the node. It does not mean that the data should be updated in real time in the slaughtering link.

Location information: Refers to the specific geographical location of fresh products in each link of the cold chain, and the update method is the same as the time information.

(2) Introduction to reader properties:

ID number: The unique identification of a reader.

Time information: the RFID reader is installed in some links of inspection, freezing, sorting, refrigeration, transportation and sales of fresh products. When the electronic tag passes through these links, the reader will actively update the information of the electronic tag within its reading and writing scope. The specific time point of information update is the time information of the reader.

Location information: the specific geographic location of some fresh products in the supply chain where readers are installed.

5.2 Information Tracking Management Function

This paper describes in detail how the system captures all kinds of information needed, and then mainly introduces how to use this information to realize the monitoring and tracking management of the supply chain. At present, there are mainly two kinds of information exchange between enterprises in the cold chain supply chain: transfer type and sharing type. Among them, the transitive interaction means that each enterprise independently collects and stores relevant product information, and according to the unified coding rules and storage form, it will be extended to the next enterprise along with the supply chain process. The shared interaction means that the supply chain information is transferred to the third-party monitoring center, and the enterprise has no right to change the specific information content, and the monitoring center uniformly manages and maintains it. The data handover method proposed in this paper is a combination of the two. Enterprises need to record and save relevant information, and also provide key logistics information and temperature and humidity information for the third-party monitoring center.

5.3 Real Time Monitoring and Management Function of Refrigerated Vehicle

In view of the current operating environment of the cold chain, the logistics distribution link is the most vulnerable part. Therefore, it is necessary to strengthen the monitoring and management of refrigerated vehicles, so as to solve the problem of fresh products

in normal temperature transportation. In order to ensure the integrity of the cold chain, RFID scanning equipment and humidity sensors are required to be installed on the left, right and top of the refrigerator car door to identify the transportation environment and logistics status of goods. One or two cameras need to be installed inside the cargo door to track the door opening and closing, and to record the loading and unloading conditions; GIS, GPRS system and communication system need to be installed in the cockpit to realize real-time data transmission. RFID tags and readers need to be installed in front of the vehicle to indicate the vehicle identity information and read the terminal store information. Through the fixed reader installed in the car, the temperature data in the car is read in real time and transmitted to the third-party monitoring center, which is responsible for the information exchange, storage and forwarding with the vehicle terminal in the driving ship, and the data is transmitted to the supermarket fresh center; at the same time, the whole logistics network is monitored and managed.

The system adopts positioning technology and combines with the third-party visual monitoring platform, which can strengthen the real-time monitoring of the cargo transportation process and effectively solve the current closed logistics mode. When each refrigerated vehicle carries out loading business, the identity information of the refrigerated vehicle will be bound to the remote logistics real-time visual monitoring system, and automatically match the cargo Waybill Information, mainly including the cargo list, receiving address, contact information, scheduled arrival time, vehicle online landmark, on-way door opening process, duration and other data. If the order information is not transmitted to the monitoring center after the loading operation, the system will send a warning to the production of logistics enterprises from time to time. On the way of logistics, the monitoring center can query and understand the working status of refrigerated vehicles at any time according to the relevant information received. The actual location of refrigerated vehicles is displayed in real time on the electronic map of the monitoring center. In case of emergency, the monitoring center can issue relevant safety service instructions to the target vehicle.

6 System Test and Analysis

System testing is a very critical step after the completion of a system, testing can see whether the system has achieved the purpose of the initial design from the design to the final implementation. Through the test, we found some problems in the system and how to improve them. This paper will test whether the communication between the server and the vehicle terminal is normal, and whether the data transmission is normal. Finally, test whether the overall function of the system achieves the expected effect.

6.1 Test Environment

Due to the limited conditions, only the laboratory can test, in the early stage of the test, we need to build a good test environment. The environment is as follows:

Server: Alibaba Cloud Server, the system is Windows Server 2012 R2 Data Center Edition 64-bit Chinese version. Database: MySQL5.5, built on the server, and created various data tables as required. Hardware equipment: vehicle-mounted equipment

(responsible for detecting data and sending it to the server). System operation carrier: This system runs on the computer side, and the computer system is the Win7 flagship system.

During the test, first simulate the order placement operation on the computer, that is, place an order to the carrier through the simulation entrustment, and the carrier then processes the order to simulate the transportation process of the refrigerated truck. Then put the vehicle-mounted equipment in the laboratory to detect the temperature and humidity in the air to simulate the temperature and humidity in the cabin. Finally, test the key functions of the system.

6.2 Vehicle Tracking Test

(1) Test conditions: the carrier successfully logs in to the system.
(2) Test steps: click the add vehicle information menu item in the main interface, fill in the relevant information in the pop-up interface, and click the confirm button to complete the addition of vehicle information; right click the selected vehicle, and click to modify and delete functions in the pop-up menu item. Fill in the modification information in the modification interface and click OK to complete the modification.
(3) Expected results: the functions of adding, modifying and deleting vehicles are successfully completed.
(4) Actual results: after the actual test, the system successfully achieved the expected results.

6.3 Real Time Monitoring Test

(1) Test conditions: the vehicle terminal equipment works normally, and the server data management function is turned on.
(2) Test steps: check whether the vehicle terminal of the server data management interface is connected successfully. If the connection is successful, check whether there are data records. Then, the client enters the main interface to observe the temperature and humidity data in the interface and view the vehicle position through the map interface. Change the environment of vehicle terminal and observe whether the alarm is given.
(3) Expected result: the vehicle terminal successfully connects with the server and starts to transmit data. The client can observe the temperature and humidity data change and position change through the main interface. After the environment of vehicle terminal changes, you can view the alarm information by clicking the alarm information button.
(4) Actual result: the connection between vehicle terminal and server is normal. Temperature and humidity data and position display are normal. The alarm information is checked successfully.

The function of the temperature and humidity sensor in the vehicle terminal is to monitor the temperature and humidity information in the refrigerator car in real time, display it through the LCD terminal, and finally transmit it to the remote terminal through the GPRS module.

6.4 Information Collection Test

The temperature and humidity sensor test mainly verifies whether DHT 11 can complete the indoor temperature and humidity data acquisition. Here, the processor is connected with the PC through the serial port, and the data acquisition results are displayed on the serial port terminal in real time. The temperature and humidity data acquisition results are as Table 2.

Table 2. Temperature and humidity data collection results

Acquisition times/time	Current temperature/°C	Current humidity/%RH
1	28	31
2	29	30
3	29	30
4	29	30
5	30	31
6	29	31

According to Table 2, when the acquisition time is 6 times, the current average temperature collected by DHT11 temperature and humidity sensor is 29 °C, and the current average humidity collected is 30.5% RH. The experimental results show that DHT11 temperature and humidity sensor can complete the collection of temperature and humidity data, and the accuracy of temperature and humidity acquisition is high.

7 Conclusion

At present, the construction of cold chain logistics can not meet the needs of development. The main problems include incomplete cold chain system, backward hardware and software equipment, complex types of supply chain enterprises, scattered information systems, etc. At the same time, due to the low proportion of cold chain distribution, excessive food loss caused by normal temperature transportation and uncontrollable operation links, the food quality and safety problems are also aggravating. In view of the above problems, this paper designs a cold chain logistics information real-time tracking system based on wireless RFID technology. After verification, the functions of the system meet the needs. By using tag data sensing, reader data transmission and background server data management terminal, the real-time tracking system framework of cold chain logistics information is established, and the real-time temperature of food, vehicle running position and agricultural product information is obtained by using wireless RFID card reader to realize the real-time tracking and monitoring of cold chain logistics information. It can effectively improve the proportion of cold chain distribution, control transportation links and information, and ensure the quality of cold chain food. However, due to the limitation of time, experience and other conditions, the cold

chain logistics tracking system proposed in this paper is too idealistic. In theory, this system can largely solve the shortage of the existing tracking system in the field of cold chain. In the future, there are many areas that need to be improved. First, the implementation cost of the current system may be too high, leading to some difficulties in the later promotion. Second, when the designed tracking system is combined with the business system, it will change the existing business process of the enterprise. Here we need to do further study to minimize the loss.

Fund Projects. The research results of 2020 Guangxi Young and middle-aged University Teachers' scientific research basic ability improvement project (Humanities and Social Sciences) research on the docking and circulation mode of agricultural supermarket in Baise City from the perspective of agricultural products cold chain, Project No.: 2020ky19027.

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