Agricultural Product Traceability System Based on QR Code

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Abstract: In the market, the phenomenon of counterfeit goods and stockpiling of agricultural products is serious, and the safety supervision of relevant departments is weak and the implementation efficiency is low. Therefore, in response to the above problems, this paper develops a traceability system based on two-dimensional code, and consumers scan the two-dimensional on the product packaging. The code traces the production process of the product and comprehensively understands the relevant information of the product; the regulatory department quickly records the record data of each link in the production process by logging in to the back-end management system, which is conducive to improving the quality and safety supervision level of agricultural products and realizing the traceability link. Open and transparent

1. Introduction

The quality and safety of agricultural products is a common concern of the society. China has a large agricultural population, and most of them are individual traders or small enterprises. It is difficult to guarantee the quality of products in the production process of products, and often pay attention to the interests and ignore the products themselves. Accidents such as "poisoned milk powder", "hormone chicken", "ditch oil" and "clenbuterol" have emerged endlessly, seriously endangering consumers' lives and have a huge impact on consumers' physical and mental health. In most cases, the company's safety supervision system is opaque, and safety supervision is weak. At every stage of production, disclosure may occur, and it cannot be traced back to specific links in a timely manner. Secondly, the phenomenon of stockpiling and stockpiling is serious, and there are criminals. In order to benefit a large number of goods, the distribution of goods is uneven; in addition, consumers cannot fully enjoy the right to know about the products they purchase, and they cannot be dealt with and solved in time when they encounter product quality problems.

2. System framework implementation

2.1 Overall design architecture

This paper designs a two-dimensional code based agricultural product traceability system to achieve production transparency, improve the safety supervision level of agricultural products, ensure product quality, safeguard the legitimate rights and interests of consumers, and bring economic benefits and social benefits to enterprises. This paper has two main lines of origin:

(1) In the production process, the information of each stage of the product is entered into the back-end database, and new product information data is continuously added to the database. The manufacturer follows up the product information in real time through the background management system, and then generates the QR code data of the product information. For companies and consumers to trace. According to the actual situation of the production line, the QR code information of each product can also be decoded one by one, and then grouped according to six or eight, and then the two-dimensional code is re-encoded to form a total box code, which is convenient for classification and integration. Traceability process.

(2) After the consumer purchases the product, the mobile phone APP or WeChat applet scans the QR code on the outer packaging of the product and enters the traceability system to know the production date, raw materials, batch, destination and manufacturer's information. The product production is transparent, and at the same time, after the permission, the merchant can obtain relevant information such as the geographical location, access time, model, and number of times of the consumer. The analysis and processing of the collected big user data can calculate the consumer's consumption habits and judge whether there is any stocking and cargo hoarding in the area.

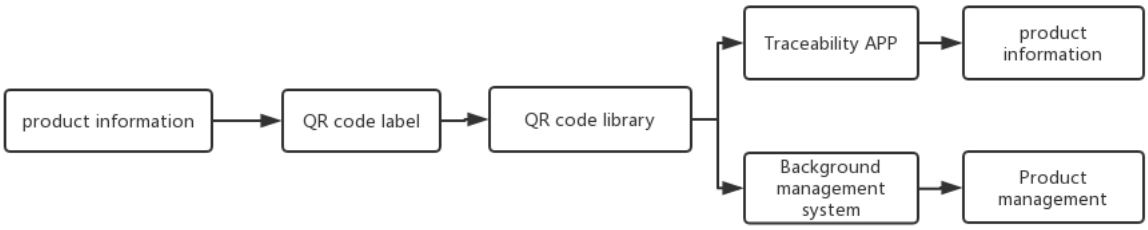


Figure 1. Overall design architecture

2.2 functional module

According to the problems that may occur in the actual production process, this paper designs the following four functional modules: information entry module, enterprise supervision module, two-dimensional code management module and consumer channel module to complete the implementation of traceability management system.

(1) Information entry module. Information entry mainly includes the following contents: basic information of products, quality inspector information, product origin information, user information, and enterprise related information. In the production process, the basic information of the product, the quality inspector information, and the origin information of the product are entered into the back-end management system of the enterprise, which is convenient for the enterprise to achieve evidence in all aspects of production, and when the user scans the two-dimensional The code can have the authority to record the user's basic information to prevent the occurrence of stocking and stocking incidents. In addition, the consumer has the right to obtain relevant information of the enterprise on the traceable APP.

The basic information of the product includes the production date, shelf life, production batch, and origin of the product; the quality inspector's information includes the name, telephone number, contact information, and the production link of the quality inspector; the origin information of the product includes the product. Origin, medication records, planting records, feed application and material cycle; user information includes the user's location, access time, model, number of times, etc.; corporate information includes company name, business license, production base, etc.

(2) Enterprise supervision module. It mainly includes product management, packing management, traceability management, query management and authority management. The enterprise has the right to add and delete products in the background, update processing in real time, secondly query the packing records and production processes of the products, and know the production process well. In addition, the enterprise can obtain the query records of the consumers, including the coding of the products and the current products. The city, query time and query results, analysis and processing of these data, can roughly determine whether the city has the phenomenon of stocking and stocking.

(3) Two-dimensional code management module. In the production process of the assembly line, the product prints a two-dimensional code on the package. When the product is boxed at the end of the assembly line, the two-dimensional code generated on the tank in the assembly line is identified, the relevant information of the product is entered, and a two-dimensional image is generated. The code is associated with multiple products, and the unique ID code information is printed on the box. After the assembly box is assembled, the product is coded with the box ID to form a parent-child relationship, and the basic information such as the production date, shelf life, and quality personnel is added, and the information is uploaded to the package. In the database.

(4) Consumer channel module. For consumers, this paper designs traceability APP or WeChat applet to facilitate consumers to scan QR code, obtain relevant information about products, enterprise information and relevant information of origin, so that the traceability process is open and transparent.

3. Key technology

3.1 QR code technology

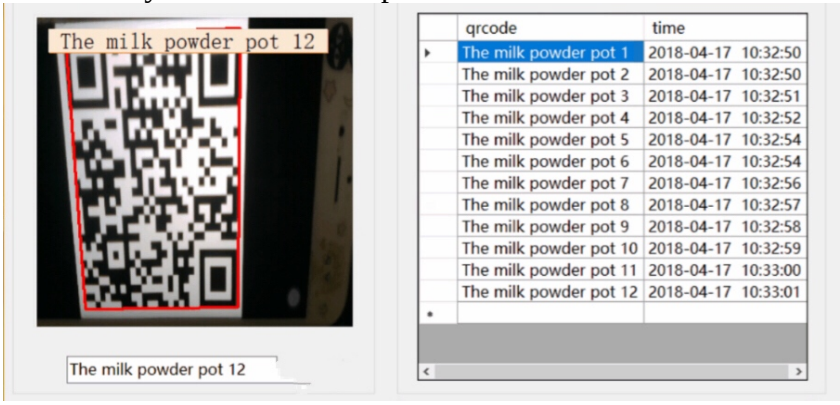
One-to-one code technology is to use the cloud platform to connect the relationship between consumers, enterprises and connected people, thus providing product traceability and anti-counterfeiting control. One-to-one code technology is to attach a unique QR code to each product, each product has its own independent identity tag. In the market, the emergence of counterfeit and shoddy products often captures the non-uniqueness of products. Many companies attach a QR code to multiple products in order to save costs. This method causes the identity of the product to be unclear, and it is easy to be counterfeited and forged. Generally, the information of the product two-dimensional code is obtained by copying, and the copying method is likely to have the problem of repeated authentication. From another angle, the company is also reminded to intensify the monitoring of the duplicated product.

3.2 Database Technology

The database realizes the storage of a large amount of data, and provides the function of adding, modifying, and deleting information. The database is the core of the system operation, and is an organized, large-scale, shareable data collection that is stored in the server for a long time. All users share and have minimal redundancy and high data and program independence. The tool used in this article is MySql platform, which records the basic information of the product, such as product number, production date, shelf life, etc., on the database. With the advancement of the production process, new information is continuously added to the database, such as the quality information of the quality inspectors, the status information of the products in various links, etc., and the information of the products can be deleted for the unqualified products. Database technology makes a large amount of data orderly and regular presentation, which reduces the trouble of data statistics and integration. It is a very common technology.

4. System implementation and application

(1) This paper develops a Windows industrial inspection software based on C# Winform, which is developed by Visual Studio and contains the decoding and encoding of two-dimensional code. It is intended to generate a total box code with 12 QR codes as a group. Detailed information on the link for traceability. First, identify the two-dimensional code generated on the tank in the pipeline, enter the relevant information of the product, and generate a two-dimensional code to associate multiple products, print unique ID code information on the box, and assemble the product and box after assembling the box. The body ID code forms a parent-child association.



qrcode	time
The milk powder pot 1	2018-04-17 10:32:50
The milk powder pot 2	2018-04-17 10:32:50
The milk powder pot 3	2018-04-17 10:32:51
The milk powder pot 4	2018-04-17 10:32:52
The milk powder pot 5	2018-04-17 10:32:54
The milk powder pot 6	2018-04-17 10:32:54
The milk powder pot 7	2018-04-17 10:32:56
The milk powder pot 8	2018-04-17 10:32:57
The milk powder pot 9	2018-04-17 10:32:58
The milk powder pot 10	2018-04-17 10:32:59
The milk powder pot 11	2018-04-17 10:33:00
The milk powder pot 12	2018-04-17 10:33:01

Figure 2. Industrial inspection software

(2) Web traceability management system, developed with Visual Studio Code, the front end uses the latest version of React technology stack, ES6 syntax, create-react-app build tool, react-router route, Axios data request, including the following functions: product management, Packing management, traceability management, query management and authority management, for the background management system designed by the administrator, it is convenient to update and master the relevant information of the product at any time, complete the analysis and processing of information, and realize the intelligentization of the traceability process.

(3) Traceability App, developed by Android Studio for consumers to use, consumers can scan the QR code on the product packaging, understand the product related information, realize traceability scanning function, and the APP will launch the cooperation with the merchant. Activities, to achieve interaction with consumers, to bring accurate targets to the business, so that consumers can enjoy the fun while shopping.

5. Conclusion

This paper designs and implements the traceability management system of agricultural products based on two-dimensional code, solves the phenomenon of counterfeit goods and stockpiling in the market, the lack of supervision of enterprises, the quality of products, the realization of transparency in the production process, and the quality inspection link can be relied upon. It brings economic and social benefits to the enterprise. At the same time, it compares and analyzes the big data after the consumer scans the QR code, understands the purchasing habits of consumers, adjusts the consumption strategy, and consumers do not have to worry about the quality of the products. The production process can be traced back, the origin of the product can be traced, the quality of the product is strictly controlled, and the physical and mental health and safety of the consumer are guaranteed.

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