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The Combined Application Technology of the Bank's TwoDimensional Aggregate Payment Code and the Vegetable Field Traceability System

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Abstract

With the rapid development of social economy, people's living standards and quality of life are getting better and better, and food safety is getting more and more attention. Aiming at the problem of vegetable traceability, this paper analyzes the bank's QR code scan code aggregation payment model. Secondly, it designs a green food traceability system and elaborates the realization of the main functions of the system. Practice has proved that the traceability system of green food can allow consumers to consume with confidence, and at the same time, it is convenient for the competent government departments to trace the source in time and control the quality.

Keywords: QR Code Aggregation; Green Food; Traceability

1. Introduction

With the rapid development of social economy, people's living standards and quality of life are getting better and better, and food safety is getting more and more attention [1-2]. However, food safety incidents at home and abroad have occurred from time to time, which have caused considerable impact on people's daily lives. Therefore, build a food traceability system to provide guarantees for food safety, ensure that the quality of life and living standards do not decline, and effectively prevent the recurrence of food poisoning incidents [3-5]. Under the trend of "Internet +", QR code-based scanning payment methods have been widely used due to their convenience and speed. They have changed daily life while also achieving great commercial success. Due to the first-mover advantage of QR code payment promotion, three-party payment institutions currently occupy most of the market share. At the same time, banks, UnionPay, third-party payment institutions and other parties have participated in them, showing their magic in channels and applications. [6-8]. However, while providing convenience for customers to pay, it also caused problems such as the merchant's checkout counter being filled with various code scanning or card swiping devices, cumbersome docking procedures of different payment platforms, and incompatible interfaces. The fragmentation and diversification of the offline scan code payment market makes the research on the business model of aggregate offline scan code payment significant [9-10].

This paper studies the green food traceability system of the two-dimensional code, adopts the technology of multi-code integration, and collects the traceability information of food through one code scanning. If there is a food safety problem, it can easily find the source, aiming to lay a practical foundation for green vegetable management and serving people's livelihood.

2. Analysis of QR Code Aggregation Payment Model

2.1. Data Mining Technology

2.1.1. Main scan

The main scan mode is that the payer scans the code, which means that the payer uses the mobile terminal to read the barcode displayed by the payee to complete the payment. In the main scan mode, the merchant can pre-order transaction information such as the collection account number, product code, and product price to the payment institution, and the payment institution will feed back the payment link and compile it into a QR code. The user can scan the merchant terminal through the mobile phone client. The generated QR code can realize the transmission of payment instructions with the merchant and the settlement of transaction funds.

2.1.2. Scanned

The scanned mode is the payment scan code, which refers to the behavior that the payee completes the payment by reading the barcode displayed on the payer's mobile terminal. In the scanned mode, the user's mobile phone generates a payment QR code or barcode based on the bank account or payment account. The merchant uses a code scanner or other code scanning terminal to scan the user's mobile phone QR code or barcode to realize the transmission of payment instructions. Enter the payment password or other verification instructions in the mobile network payment application for the initiated payment instruction to complete the transmission of the payment instruction and the settlement of the transaction funds.

2.2. QR code recognition process

2.2.1. Main scan

1) Scan the code; Analyze, every time you use the scan to identify the QR code, it will prompt "Processing", which means that the back-end server is parsing the content of the QR code, and different payment institutions are in the QR code. The information injected in the rules is inconsistent, and the corresponding server needs to be parsed according to its encoding rules, such as checking whether the link address carried by the QR code is legal (such as WeChat parsing out that the Alipay link will be blocked), whether it belongs to a payment link or an external link URL Wait.
2) Verification: After the server verifies the payment link belonging to its own company, it will obtain the merchant information contained in the payment link, and then determine whether the merchant exists and whether the merchant status is normal, etc.;
3) Deduction: After all verification passes, The back-end server will return the merchant's name to the mobile app of the initiating user, and at the same time tell the app that the server has passed the verification, and the app can call up the cashier. Enter the payment password, and the background continues to verify the correctness of the payment password.

2.2.2. Scanned

1) Order submission: The merchant submits the order to WeChat or Alipay through the cash register system, including merchant information, payment amount, etc;
2) Scan code: The merchant uses a barcode scanner to scan the user's payment code;
3) Analysis: Identify the barcode scanner The information that comes out is passed to WeChat or Alipay, and the user's payment code is parsed to include a unique ID that identifies the user;
4) Verification: verify the user's balance, etc.
5) Deduction: They find the corresponding user based on this exclusive ID. If there is no password, the payment will be directly deducted through withholding. If a password is required, enter the password by calling the cashier of the mobile client to confirm the deduction.

2.3. Scan code payment aggregation solution

2.3.1. Main scan

1) The cashier generates an order based on the amount of the product type and sends it to the merchant's cashier;
2) The cashier communicates with the customer to confirm the payment method, and at the same time selects the corresponding payment method through the merchant's cashier to initiate a pre-order request to the merchant backend;
3) The merchant backend sends The aggregate payment platform initiates a pre-order request;
4) The aggregate payment platform initiates a pre-order request to the payment institution backend;
5) The payment institution returns a QR code link to the aggregate payment platform;

6) The aggregate payment platform produces according to the QR code link The QR code is returned to the merchant backend;
7) The merchant backend returns the QR code information to the merchant cashier counter; the cashier shows the QR code information to the user, and the user opens the corresponding payment institution to use it and scans the code to confirm the payment.

2.3.2. Scanned

1) The cashier generates an order according to the amount of the product type and sends it to the merchant's cashier;
2) The cashier communicates with the customer to confirm the payment method, and scans the user's payment code with the scanning device;
3) The scanning device uploads the relevant barcode information to the merchant's cashier
4) The merchant backend initiates a payment request to the aggregate payment platform;
5) The aggregate payment platform initiates a payment request to the payment institution backend;
6) The payment institution backstage returns the payment result to the aggregate payment platform;
7) The aggregate payment platform returns the payment result to the merchant backend.

3. System Design

3.1. The design of the system frame structure

The food traceability system must be pertinent, so for green food, the system needs to be organically combined with the characteristics of green food, and at the same time the two-dimensional code technology is applied to it to establish a green food traceability system. The overall structure of the green food traceability system designed based on the two-dimensional code technology is shown in Figure 1, and the network diagram is shown in Figure 2. The general working mode of this system is as follows: First, it is necessary to collect data related to green food, and to ensure the authenticity and accuracy of the data, in order to establish a database that meets the traceability requirements of green food; then, establish a database for traceability of green food, And transfer the database to the green food traceability platform. Secondly, grasp the characteristics of green food, use the green food traceability platform to generate a two-dimensional code, and make the two-dimensional code into a label on the green food packaging or print the two-dimensional code directly on the green food packaging. Thirdly, the green food is sent to various sellers, and the sellers should feed back the sales information and logistics information of the green food to the green food traceability platform in time. Finally, consumers can use mobile handheld terminals to scan the QR code of green food to obtain the food information they want to inquire, so as to complete the food traceability.

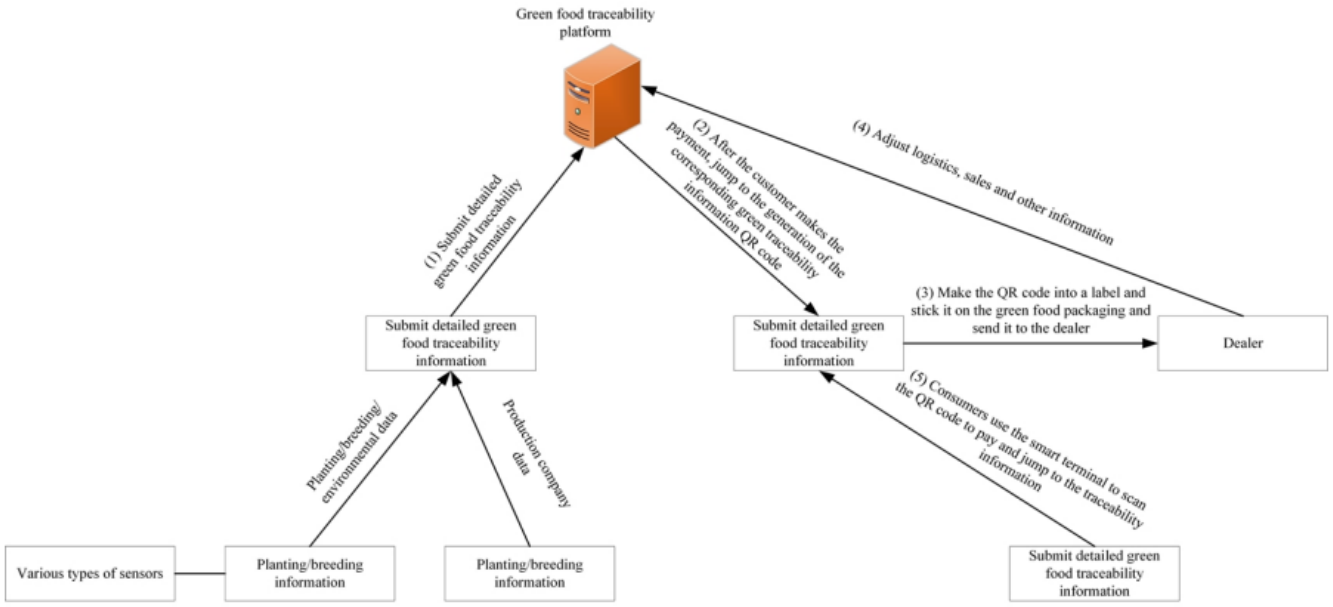

Figure. 1. System frame structure.

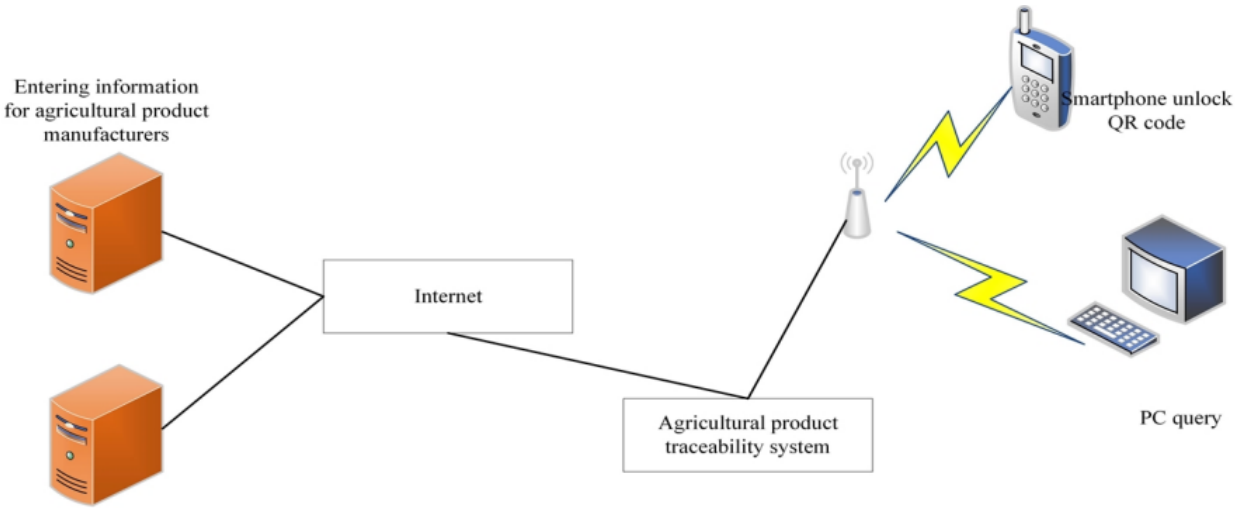

Figure. 2. Network diagram of agricultural product traceability system.

3.2. Design of two-dimensional code encoding method

In order to facilitate the traceability of green food, the encoding method of the QR code must be standardized. The two-dimensional code that the author encodes in this system is composed of the name of the product, the food manufacturer, the production date of the food, the shelf life of the food, and the batch number of the food production. Among them, the product name, manufacturer, production date, and shelf life are used as direct record information, that is, it can be directly scanned through the mobile phone terminal, and the production batch number is used as the database retrieval information, which needs to be scanned according to the mobile handheld terminal. For batch number information, query the information database of green food traceability to obtain traceability information of green food.

Assuming that the quantity to be determined (the traceability information of green food) x is the mathematical expectation E(ξ) of the random variable ξ, then the ξ can be randomly sampled N times according to the probability distribution function of ξ to generate a sequence of independent ξ values $\xi_1,\xi_2,\xi_3,\ldots.\xi_N$,calculation Its arithmetic mean.

$$\overline{\xi} = \frac{1}{N}\sum_{i=1}^{I} \xi_1 \tag{1}$$

When N is sufficiently large, there is

$$P\ (lim_{N\to\infty} = x)1 \tag{2}$$

According to the experimental results, the number of fields for writing a QR code cannot be increased indefinitely due to the total number of characters 4K and the hard speed of the encoding and decoding, and it cannot contain special characters such as ";,', =, &,?". Otherwise, the program script will report an error, causing the QR code to fail to decode or to wait for a long time for recognition. Therefore, the fields or links for writing QR codes must be streamlined. The total number of characters should be set according to the size of the QR code, high, medium, and low error correction requirements and decoding speed, as far as possible without special characters, according to the QR code Whether the image contains LOG or not, the high-efficiency universal coding template is preferred for encoding and imaging to ensure that the handheld mobile terminal quickly decodes the translation, and the size of the LOG should not exceed 1/7 of the size of the two-dimensional code. Due to the large number of codec templates, designers should not directly use the QR code codec components for programming. Instead, they should design personalized components that meet the actual application requirements based on a full understanding of the principles of QR code coding and decoding to improve actual application efficiency.

3.3. Research on consumer experience technology

In the traditional food safety traceability system, consumers can only passively accept the information of the food traceability system, and cannot promptly feedback their opinions and views on the food and the traceability system

itself. Due to various factors, the traditional food safety traceability system lacks an interactive feedback system, or even no interactive feedback system is designed at all. Therefore, consumers cannot complete information feedback in time after completing food traceability. In the process of designing a green food traceability system based on two-dimensional code technology, it is necessary to pay attention to consumer health technology, conduct in-depth research, and build a software platform for communication and interaction in this system, so that consumers can timely obtain the information they have obtained Feedback to the green food traceability data platform. Due to various factors, consumers' consumption habits and focus on traceability information are not the same, so it is necessary to enter the questionnaire in the green food traceability system, and to consult the analysis questionnaire in time to understand the real situation of consumers in time, So as to choose an interactive evaluation system that consumers are willing to accept. The interactive evaluation system plays a pivotal role in the entire green food traceability system, and must be highly valued and implemented in practice.

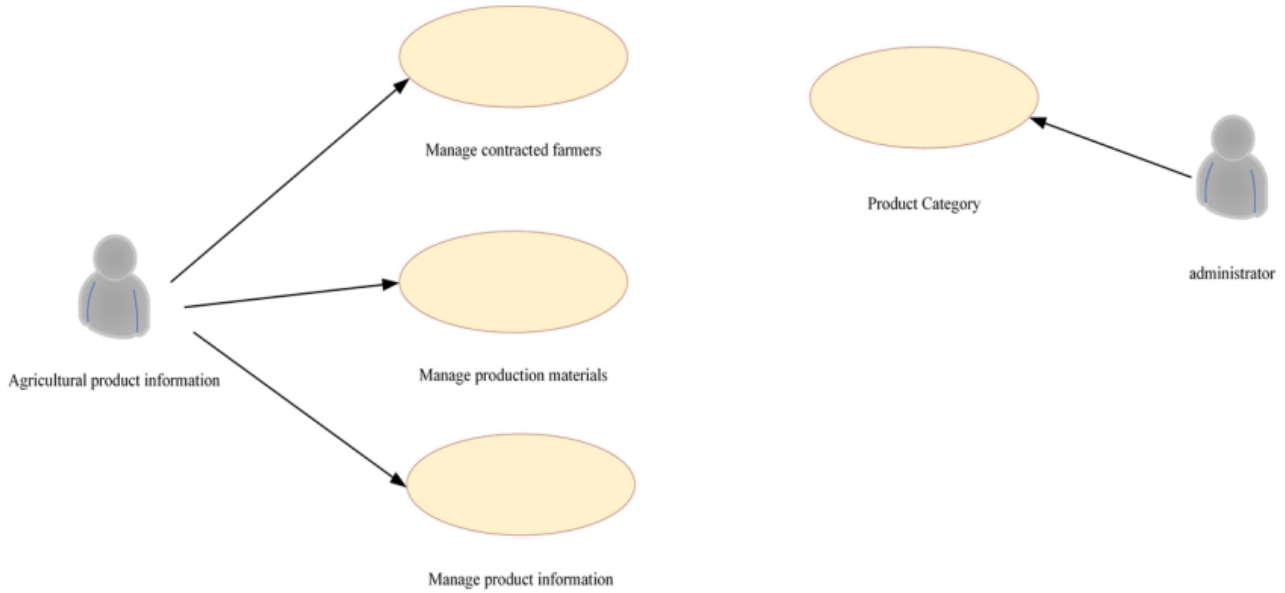

Figure. 3. Data management diagram

4. Realization of key functions of the system

4.1. Realize the QR code generation function

The text content, picture type and size of the QR code graphics that need to be generated are all transmitted in the form of parameters to the QR Code Create method of the custom QRCode class. At the same time, the current more practical QR code information encoding and decoding is also selected. The Qrcode class in the core library core.jar creates an object. Do not create a QR code blindly, but set the error rate, content and size of the QR code according to the specific object to be created, and use the fillRect method of the Graphics2D class to cyclically generate a Bufferedimage type of QR code image.

4.2. Realize the recognition of QR code

The recognition of the two-dimensional code is mainly realized by calling the related packages in the core.jar of the two-dimensional code information encoding and decoding core library. Among them, com.zxing.Demo.camera is the camera control package, which is responsible for the flash control and automatic control of the mobile phone camera. Focusing and scanning the QR code: Capture Activity Handler.java in the com.zxing.Demo.decoding QR code decoding package is the decoding processing class, responsible for calling the Decode Handler.java thread for decoding; com, zxing.Demo.view is scanning The interface package of the time is responsible for identifying the words and displaying the callback result on the interface.

4.3. Realize the consumer interactive evaluation function

The green food traceability system based on the QR code should include the consumer interactive evaluation system, because the consumer interactive evaluation system can complete the transformation from a unilateral traceability model to a new interactive model, which can both mobilize consumers' enthusiasm for traceability, To improve the

traceability experience of consumers, it is also convenient to obtain the actual situation of consumers, so as to make targeted adjustments.

The two-dimensional code designed by this system, as long as the consumer uses a mobile handheld terminal to scan one, he can directly jump to the interface of consumer interactive evaluation and describe his true inner thoughts. This not only protects the legitimate rights and interests of consumers and protects consumers' right to speak, but also enables consumers to eat green food more assuredly. The consumption phenomenon of "I buy" enables people to spend objectively. Through the consumer interaction system, consumers can promptly feedback the problems of the green food and the traceability system itself, which helps to improve the quality of green food, and at the same time, it can also provide help to improve the green food traceability system. This system has many benefits for both production and sales.

5. Conclusion

This paper designs a corresponding system for the traceability of green food, and adds a consumer interaction module, which helps to understand the real situation of consumers, and also enables consumers to give feedback on the green food information and traceability system in a timely manner. The quality supervision department or users can use the QR code to check the source of the food, when it was planted and harvested, who the processing company is, and which distribution and logistics links have been passed through. Detailed information: When food safety problems occur, they can quickly be held accountable and responsible. Punishment. Carrying out the research on the QR code scanning aggregation payment model of mainstream payment institutions, aiming to provide a comprehensive payment service of "one-point docking, onecode multi-scanning" by aggregating various third-party payment platform interfaces, which can provide users with faster and more efficient payment services. Convenient and safer service.

References

[1] Aschemann-Witzel J, Peschel A O. Consumer perception of plant-based proteins: The value of source transparency for alternative protein ingredients[J]. Food Hydrocolloids, 2019, 96(11):20-28.

[2] Borges Z, A Teodósio, Oliveira L D, et al. Family Farming, Government and Corporations: A case study about the challenges of rural social enterprises innovations in Brazil[J]. Laryngoscope, 2015, 108(11):1739-1742.

[3] Brunoro J, Lopes M A, Demeu F A, et al. Factors associated with consumer perception and conduct toward certified beef from Brazil[J]. Journal of Food Science, 2020, 85(5):1-8.

[4] Jacobs R, Teunis P, Jan V. Tracing the Origin of Food-borne Disease Outbreaks : A Network Model Approach[J]. Epidemiology, 2020,3(1):1-9.

[5] Li L, Boyd C E, Sun Z. Authentication of fishery and aquaculture products by multi-element and stable isotope analysis[J]. Food Chemistry, 2016, 194(3):1238-1244.

[6] Liu W, Chen Y, Liao R, et al. Authentication of the geographical origin of Guizhou green tea using stable isotope and mineral element signatures combined with chemometric analysis[J]. Food Control, 2021, 125(1):107-114.

[7] Rosculete, Soare, Bonea, et al. Detection and quantification of genetically modified soybean in food and feed traded in the Romanian market[J]. J BIOTECHNOL, 2015, 2015,20 (8):63-73.

[8] Stamatis C, Sarri C A, Moutou K A, et al. What do we think we eat? Single tracing method across foodstuff of animal origin found in Greek market[J]. Food Research International, 2015, 69(3):151-155.

[9] Struben J, Chan D, Dube L. Policy insights from the nutritional food market transformation model: the case of obesity prevention[J]. Annals of the New York Academy of Sciences, 2015, 1331(3):57-75.

[10] Zhang Y Z, Chen Y F, Wu Y Q, et al. Discrimination of the entomological origin of honey according to the secretions of the bee (Apis cerana or Apis mellifera) - ScienceDirect[J]. Food Research International, 2019, 116(3):362-369.