Innovation of Agricultural Products Trace-ability System in Internet + Eco Agriculture

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Abstract. With the rapid development of economy and the continuous improvement of people's living standards, the Chinese dream of building a moderately prosperous society in 2020 will come true. At present, people's concept and pursuit are also changing imperceptibly. It is especially obvious in people's normal consumption of agricultural products. People are not worried about basic food and clothing problems, but more about the pursuit of "green, safety and health" of food quality. As China is a large agricultural country, there are many kinds of agricultural products, many employees selling agricultural products, weak awareness of agricultural product safety, blind pursuit of immediate interests, interest edification, and weak legal knowledge. With the rapid development of Internet technology, it is an inevitable trend to combine the Internet with the security of traditional agricultural products. Therefore, it is necessary to establish a set of agricultural product tracking and tracing system based on RFID technology in the Internet + era. Through the traceability system of agricultural products, the production records can be stored and the flow direction of products can be traced.

Keywords: Agricultural Products, Trace-ability System, Internet + Eco Agriculture

1. Introduction
At the beginning of 2010, led by the Central Committee, three deputy prime ministers and 15 ministers formed the agricultural product safety committee of the State Council to guide and deploy the national agricultural product safety work as a whole, focusing on supervising and implementing the agricultural product safety supervision mechanism[1]. In December 2010, the Ministry of Commerce and the Ministry of Finance studied and formulated the overall plan for the construction of the trace-ability system of meat and vegetable circulation, and finally determined 10 cities such as Shanghai, Chongqing, Dalian, Qingdao, Ningbo, Nanjing, Hangzhou, Chengdu, Kunming, Wuxi as the first batch of trial through expert review, considering the city will, circulation infrastructure, operation and maintenance cost guarantee, etc Point City. The central finance specially arranges funds to support the retroactive system construction.
"Traceability system of agricultural product quality and safety" is an information management system that can connect all links of production, inspection, supervision and consumption, let consumers understand the production and circulation process in line with health and safety, and improve consumer confidence[2]. The system provides a "from farmland to table" traceability mode, extracts the public traceability elements concerned by consumers in the supply chain such as production, processing, circulation and consumption, and establishes the agricultural product safety information database. Once problems are found, the system can effectively control and recall according to the traceability, so as to protect the legitimate rights and interests of consumers from the source[3].

2. Demand Analysis of Agricultural Products Trace-ability System

2.1. Data acquisition system
A. RF information scanning and archiving system
   Bind the scanning equipment to the warehouse keeper (material warehouse, intermediate warehouse, finished product warehouse), operators of all links, quality inspectors, production managers, API information bound by express logistics platform, API information bound by retail, and collect the RF card or QR code information. All information is aggregated into the core database.
B. Express logistics platform binding API collection system
   Build the API collection system of express logistics platform, combine the binding information and API return information, and write them into the core database[4].
C. Retail platform binding API collection system
   Build the API collection system of the purchase, sale and stock system of the retail platform, merge the binding information and the API return information, and write them into the core database.

2.2. Core database
Build the core database system based on Hadoop. Including central database, API desensitization intermediate database (collection intermediate database, service intermediate database).

2.3. Data mining system
It provides production environment data visualization system, express delivery logistics efficiency analysis system, retail platform efficiency analysis system, customer portrait system, customer distribution thermal analysis system, product flow analysis system, distribution inventory early warning system and distribution expert system, Cross shipment automatic alarm system, etc.

2.4. Data service system
A. Official website (APP)
   The official website (including APP) publishes enterprise news and industry news, displays some basic data visualization reports, and provides contract entry for other paid services.
B. Online signing interface
   Electronic signature technology is used to provide online signing interface for enterprises to join in. Including data engineering appointment, data push service signing, data report purchase appointment, etc.
C. Data packaging service interface
   Provide package desensitization data service for customers who want to package and purchase big data. Provide data packaging service interface for scientific research institutes, think tanks, product development and brand operation enterprise planning departments.
D. Customized API service interface
   Provide customized API service interface for all kinds of downstream data customers.
3. Design Scheme of Trace-ability System for Agricultural Products

3.1. Fixed production scene acquisition system

Figure 1. Module Diagram of Field Data Acquisition System

The hard shell system supported by 4-core 8g embedded system runs Linux operating system. Provide temperature, humidity, noise, dust (PM10, PM2.5), harmful gases (CO, CO2, H2S, F2, etc.), configure four-way panoramic camera, and write all the collected data into the central database for other data calls. VR technology can be used in app for customers to observe at any time.

3.2. Walking production scene acquisition system

The fixed production scene acquisition system is installed on the tracking walking robot to provide a mobile production scene acquisition system. At the same time, two walking modes, autonomous walking and remote control walking, are provided. Other functions are the same as the fixed production scene acquisition system (as shown in Figure 1).

3.3. Chip embedded RF paste

The two-dimensional code paste with built-in passive RF chip is set, which supports three reading modes, i.e. code gun printing visual identification information, two-dimensional code direct scanning and RF scanning. The temperature is -35 °C ~ 45 °C, and it can be immersed in water for 1 meter for 24h without discoloration and deformation.

3.4. Special code scanning gun

The hard shell system supported by 4-core 8g embedded system runs Linux operating system. Portable code scanning gun with RF and QR code scanning capability. It is equipped with a touch screen of no less than 2.4 inches, a 12 grid entity key, a GPS dual-mode module and a laser gyroscope module. The system can be installed with SIM card, providing water-proof function of 5m 24h, anti-seismic function, direct intercom and real-time data synchronization function.

3.5. Door scanner

The door type RF scanner is used for all kinds of conveyor belts to ensure that the hardware to complete the chip can not stay scanning. The door scanner is a hard shell system under the 4-core 8g embedded system, running Linux operating system. With RF function, infrared counting function. If the scanning of objects passing through the door scanner fails, an alarm will be given and the wrong
object will be pointed out.

4. Summary
ZigBee wireless technology has the characteristics of long-distance transmission. Shunzhou technology adopts the enhanced ZigBee technology and the ZigBee wireless data transmission module, which conforms to the industrial standard application of wireless data communication technology. It has the advantages and characteristics of small installation size, long communication distance, strong anti-interference ability and flexible networking: it can realize the transparent transmission of data between multiple devices; it can group mesh network In the traceability system of agricultural products, it is mainly to realize the transmission of relevant data and information interaction.

The agricultural products traceability management system will use RFID advanced technology and rely on network technology and database technology to realize information fusion, query and monitoring, provide reasonable decision-making for each product safety, agricultural products composition source and inventory control in each production stage and in the process of distribution to the final consumption field, and realize the agricultural products safety early warning mechanism. RFID technology runs through all aspects of agricultural product safety, including production, processing, circulation and consumption. The whole process is strictly controlled, and a complete agricultural product safety control system of industrial chain is established, forming a closed-loop production of production and sales of all kinds of agricultural product enterprises, so as to ensure the provision of high-quality and assured agricultural products to the society, and ensure the high-quality data exchange of supply chain, so as to let agricultural product banks The industry thoroughly implements the source tracking of agricultural products and the ability to provide full transparency in the supply chain of agricultural products.

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