

Research and Implementation of Animal Husbandry Product Source Cloud Platform based on Internet of Things Technology

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Abstract. Due to various potential risks in the breeding, management, picking, storage and transportation of livestock products, the quality and safety of food are threatened by various factors. Therefore, this paper aims to establish a traceability control mechanism for agricultural products, and propose a complete solution for the traceability system of agricultural products. Consumers can trace the agricultural products according to the two-dimensional code information on the label, and the government departments can also do a good job in agricultural product supervision. To ensure that agricultural products can be traced and quality managed throughout the supply chain.

Keywords: control mechanism; agricultural products; traceability system of agricultural products.

1. Introduction

This paper provides a traceability system and method for livestock products to solve the problem that the information of animal husbandry products cannot be made public and transparent, to ensure the safety of products, to shorten the time of finding the source of the problem products, to ensure timeliness and to eliminate counterfeit and shoddy products. Circulate in the system to ensure the authenticity of the product.

The animal product traceability method implemented in this thesis is used in the animal product traceability system. The livestock product traceability system includes: livestock product breeding base part, processing and packaging part, transportation part, sales part, data collection part, supervision part, storage part, Cloud platform, website, mobile terminal, database.

2. Traceability Platform Design

Figure 1 is a block diagram of the entire livestock product. The entire livestock product traceability system is centered on the cloud server and the transfer point. The data of the farm, processing and packaging plant, warehousing, transportation, sales and supervision are collected and stored in the database. Among them, when the consumer queries, the cloud server recalls the data from the database and presents it to the consumer.

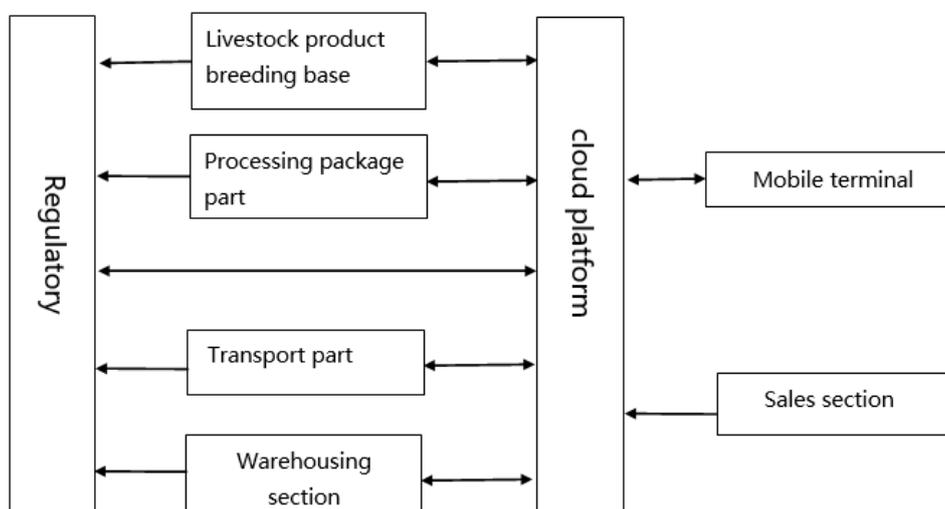


Figure 1. A Block Diagram of the Entire Livestock Product.

2.1 Regulatory Part

The supervision part is composed of the regional supervision department, the traceability system supervision, the farm supervision, the production processing factory supervision, the warehousing supervision, and the sales supervision. The supervision part has the identity of the cloud platform and the database background administrator, and can view the background data at any time and make a schedule.

2.2 Processing Package Part

The processing and packaging part include access control system, monitoring system, temperature and humidity detection, oxygen detection, carbon dioxide detection, water quality detection, and biological information collection. After the production of the product is completed, it must be strictly checked, and the sample needs to be sent to the testing organization for testing.

For products that can be shipped from the factory, each product should be printed with the product QR code and traceable product label. Consumers can view all the information of the product through the product QR code and traceable product label, including: variety, breeding Time, administrator, product production license, scale, basic job information, harvest job information, affiliated merchants, trademark registration and other information. Through the two-dimensional code of the origin, you should also upload the basic information of the processing plant, including: address, processing plant scale, processing plant owner, processing plant infrastructure, processing equipment information, etc. uploaded to the cloud server database for consumers to view.

2.3 Warehousing Part Design and Data Acquisition System

The processed and finished products enter the warehousing, and have different storage environments for different products. The required sensors include temperature and humidity sensors, light sensors, and smoke sensors. Through the sensor, the data is uploaded to the monitoring system and the cloud server database in real time, which can be dispatched by the regulatory authorities at any time, and the consumers can view it at any time. If the detected data exceeds the preset range, the alarm device is touched and the warehouse is processed at any time.

2.4 Transport Part

The transportation part is composed of transportation vehicles, GPS or Beidou positioning system.

The transportation vehicle includes a container. After the product is packaged into a box, the container is uniformly loaded into the container, the container is closed, the alarm system is turned on, and the middle container is prevented from being stolen. Only when the destination alarm system is closed, if it is opened in the middle, it needs to be supervised. The department agrees and uploads information to the supervision system, cloud platform, and database backup.

2.5 Traceability Information Query

Information query methods include traceability websites and mobile terminals (mobile APP). Consumers can scan the traced products purchased in the mall or supermarket by scanning the QR code of the product on the package, or input the source code, on the trace source website or mobile terminal (Mobile phone APP) can find the detailed information of traceability, including product name, place of origin, time to market, shelf life, business, production license, variety, feed details, feeding details, and honor.

According to the design of this paper, the data of the whole process of breeding, production, processing, transportation and warehousing are uploaded to the cloud server database, which can be used by the regulatory authorities to make schedules based on these data, and can also be viewed by consumers in real time. If the product has quality problems, you can use Big Data technology to compare the data stored in the cloud server database in real time, quickly find the source of the problem, and solve it in time.

3. Farm Design and Data Collection

In order to better obtain the traceability information of the products, the farm has also been designed separately in this platform.

3.1 Access Control System

The access control system of the farm uses radio frequency identification (RFID) technology to prevent unidentified persons from entering the farm.

Each person entering the farm will have an access card. The access card needs to be encrypted and has personal information. For those who have lost the access card, they should go to the supervision system to report the loss and re-submit. The access control for each entrance should have different levels of restrictions for the personnel of the farm. A high-grade access card can open a low-level door, and vice versa. In the case of an emergency, the regulatory authorities will open access control rights or even close the access control system according to the situation.

3.2 Surveillance System

The use of wireless monitoring equipment is mainly used to record the growth of livestock and the production workshop, upload and save to the cloud database, and analyze the livestock with special behavior according to the behavioral characteristics of the livestock, and the information of the animals with special behavior Send it to the regulatory authorities to remind the regulatory authorities to take precautionary measures. The monitoring system should also have a section installed around the farm to monitor the situation around the farm to prevent accidents.

3.3 Lighting System

The lighting system of the farm includes: supply lighting system, street lighting system.

This lighting system is to install a photosensitive sensor in the farm. According to the different illumination required by the farm animals, the photosensitive sensor is used to detect the darkness of the day, and then the illumination system is turned on to provide the animals with weak illumination to facilitate the work at night.

This street lighting system is designed with a light-sensitive resistor to realize intelligent energy-saving livestock ranch lighting or street lighting. When the ambient light is dimmed and the infrared sensor is used, when no pedestrians or vehicles pass by 10 meters away from the street light, part of the street light is on; when the ambient light is dark and a pedestrian or vehicle is detected 10 meters away from the street light The street lights are all lit. After ten minutes, the street light is restored to the original, so as to achieve energy saving. When the ambient brightness is high, the street light is automatically turned off. Secondly, when a certain street light of the road section fails, it will automatically alarm, which solves the complexity of manual detection. The streetlight's power supply system uses a solar power supply mode to further save power resources.

3.4 Environmental Monitoring System

The monitoring of the environment in this system is mainly the monitoring of air quality, water quality and temperature and humidity.

The system uploads the measured data of the temperature sensor, the humidity sensor, the oxygen sensor, and the carbon dioxide sensor to the regulatory department and the cloud server database in real time, and is associated with the QR code information of the origin for the consumer to view.

Water quality monitoring, the water quality of the farm needs to be tested every day, and the test data is uploaded to the regulatory department and the cloud server database, which can be adjusted by the regulatory authorities and linked to the QR code information of the production area for consumers to view in real time.

3.5 Animal Heart Rate Monitoring

The heart rate monitoring in the paper is only for large-scale farm animals, such as cows. Each heart needs to install a heart rate detection device to detect the real-time heart rate of the farmed animals, prevent disease occurrence, and upload the data to the monitoring system and cloud server database for adjustment by the regulatory authorities and associated with the QR code information of the place of origin. For consumers to view.

The farm should also upload the feed information of the farmed animals to the cloud server database, and the feed information is uploaded to the cloud server database for storage. For the feed entering the farm, each batch must be sampled and the detected data uploaded to the cloud server database for consumers to view.

4. Traceable QR Code

The QR code in this traceability platform includes the QR code of the origin and the QR code of the product. The QR code of the origin is to replace the new two-dimensional code of the production area after the completion of a batch of products. The QR code of the product is the same batch, and the same product can use the same product QR code or traceable product code.

The product information of the origin two-dimensional code, the transportation two-dimensional code and the product two-dimensional code or the traceable product code are associated together. At the same time, the monitoring system is connected to the product QR code or the traceable product code to facilitate the consumer to view the breeding process. At the same time, the surveillance video is saved for the consumer to view. The saved videos are classified into categories, including breeding videos, processing package videos, and transportation videos, which are presented to consumers through websites and mobile apps.

Through the two-dimensional code of the production area, the farm needs to upload the information of the culture process of the farmed animals to the cloud server. The information of the culture process includes: the time and type of vaccination, the time of entering the farm, the number of breeding, the breeding personnel, the playing time, the growth situation, etc. The information is uploaded to the cloud server database and provided to the consumer for viewing.

5. Conclusion

This study uses animal husbandry products as the source of investigation and carries out quality supervision. This study uses animal husbandry products as the source of investigation and carries out quality supervision. The traceability system combines the characteristics of animal husbandry products, such as breeding, transportation and sales. It uses the technology of Internet of Things and two-dimensional code to design the traceability management system of animal husbandry products, and establishes a multi-role quality and safety control and traceability system.

This solution enables enterprise users to capture and collect information on the traceability of agricultural products in their territories according to their respective authorities, and all enterprises are managed by the regulatory authorities. Providing services to consumers through various forms such as networks and smart terminals, effectively and effectively trace the source and tracking of agricultural products, and satisfy the most basic right to know of ordinary people. At the same time, the animal husbandry product traceability system also provides reference and reference for traceability tracking of other types of agricultural products such as aquatic products and planting.

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