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Research Article

Establishment of a Source Tracing Database for Food (Eggs)

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Abstract: Based on the techniques and constantly improved information, the study analyzed the tracing database which will be helpful to compare the similarity of isolates, it can estimate the food variations timely and effectively. The database will provide scientific information for tracing the source of food. The source tracing database can be used to develop systematic research about the food type and for comparative analysis of different typing methods.

Keywords: Database, food type, systematic research, tracing

INTRODUCTION

The development trend of food tracing at home and abroad was introduced. The present situation and the prospect of the RFID technology were analyzed. Through analyzing China's practice application, the development prospect of egg tracing was predicted. From the development of the food tracing in recent years, key technologies and problems were described (FAO-WHO, 2006). Moreover, the important significance of the RFID technology used in food tracing such as egg was clarified and definited.

The data connection of all the parts can be realized through the network. Workers use electronic tag reader to collect food information, through the network to a central server. And the information about food and code attached on the product packaging, consumers can land on a central server to query.

MATERIALS AND METHODS

The data in this system are videos of egg production and collected data, IOT data collections of egg production, data management of production link, IOT data collections of transportation and sale links and data management of sale link and data in other aspects (Dziuk, 2003). And the corresponding two-dimensional code is generated in accordance with the information of packing traceability data. The functional modules of background data system are shown in Fig. 1.
The steps are as follows:

- Videos of egg production and data collections system, that is to collect videos of every production link and save it through a series of complex storing processes in order that consumers can watch and recall the videos conveniently via the server.
- IOT data collections system of egg production is used to record every detail of egg production generally by means of wireless Internet techniques, including the name, time and staff and so on to be queried by consumers conveniently.
- Data management system of production link is mainly responsible for providing the management staffs of egg manufacturer with the detailed information of egg production, as well as offering them some modified and deleted permissions so that they can trace and monitor the production link of chicken house overall.
- IOT data collections and quality control system of transportation link, just like IOT data collections system of egg production, will record every detail of transportation production generally by means of wireless Internet techniques, including the name, time and staff and so on to let consumers query conveniently.
- Data management system of transportation link, is similar to the function of data management system of production link, provides the management staffs of egg shipper with the detailed information of egg transportation, as well as offers them some modified and deleted permissions so that they can trace and monitor the transportation link of chicken house overall.
- Comprehensive query and management system of platform will monitor the data via a background platform and directly make query, modification, deletion or some other operating commands of the data of the database to keep the database operate normally.

The analysis of the server's database structure: This system combines the basic functions of traceability

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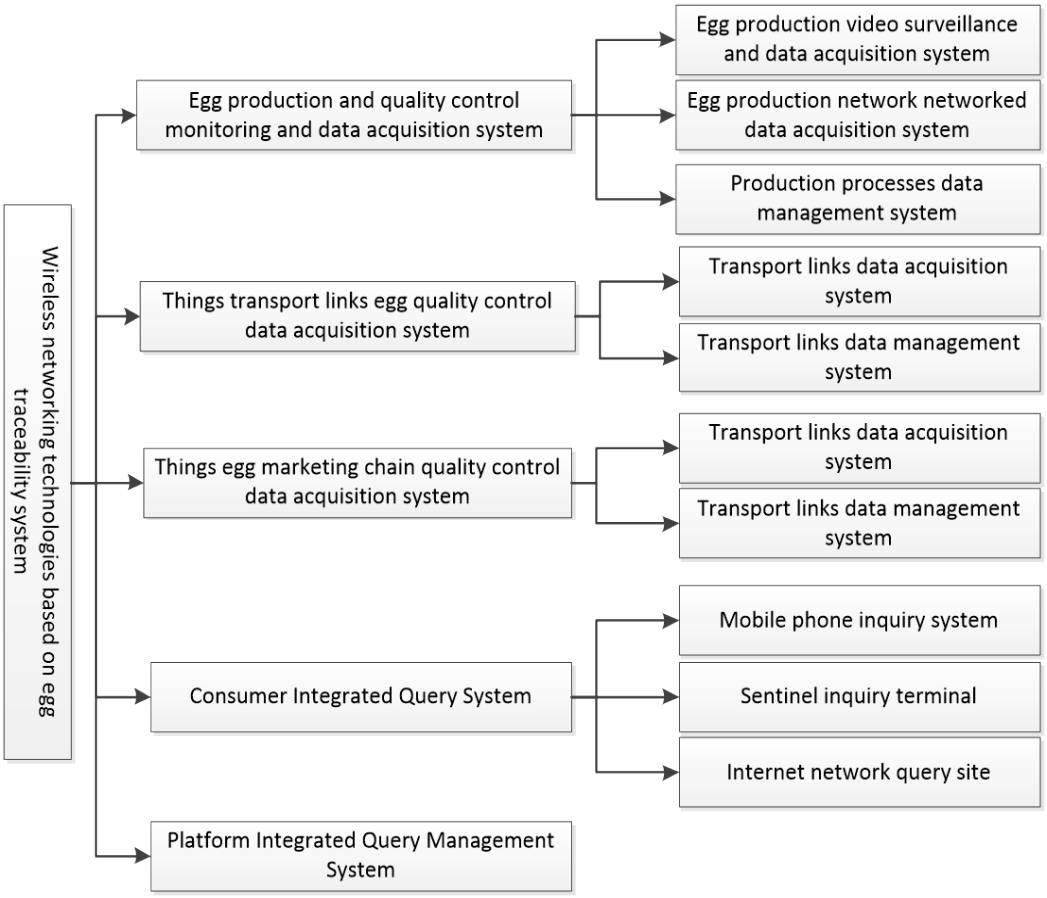

Fig. 1: Backstage system data module

system with the standard norms of database to design its attributive data and spatial data and the relationship between data and database in a unified manner, thus achieving the seamless integration and sharing among data (Arana *et al*., 2002). The server system of this system is composed of foreground and background mobile client server systems. The database of this system is relatively independent which not only ensures data security, but also improves their own expansibility to provide support to the following-up design and development of new functions. The main running process of the database in this system is that the foreground system is primarily responsible for querying the database and returning the results to the mobile client software in json format according to the requests of query sent through mobile client software, while the background server system of website client management mainly responds to the requests of each ejb to achieve the interaction between web client and the database (Moreda-Piñeiro *et al*., 2003). The database is not only the server-side for extracting data, but also the client for collecting data. What's more, it is the carrier of storing data in client and server programs of traceability system. The background database management is primarily responsible for recording and processing the data and service requests from the above links. Each of the above link has their own data management system to make sure of the sending of their data to the backend server wholly and rightly. The relationship between the traceability system and the database system is shown in Fig. 2.

RESULTS AND DISCUSSION

Redundant processing of the database: During the trial of this system, we found that the data of practical use is really in a small amount, although the collected labeling data of mobile client is very much. Therefore, data normalization is usually taken to reduce data redundancy while designing the database. If not, it will bring burdens in four aspects. First, the transmission of large amount of labeled data will bring huge network load. Second, establishing much association in inserting tables, updating and deleting will consume system resources. And third, the processing of a large amount of labeled data will bring burden to the data server. Fourth, the extra labeled data will bring large storage burden. Thus, the data of egg package should be filtered before sending to the system. It supposes that the labeled data collected by mobile client can be

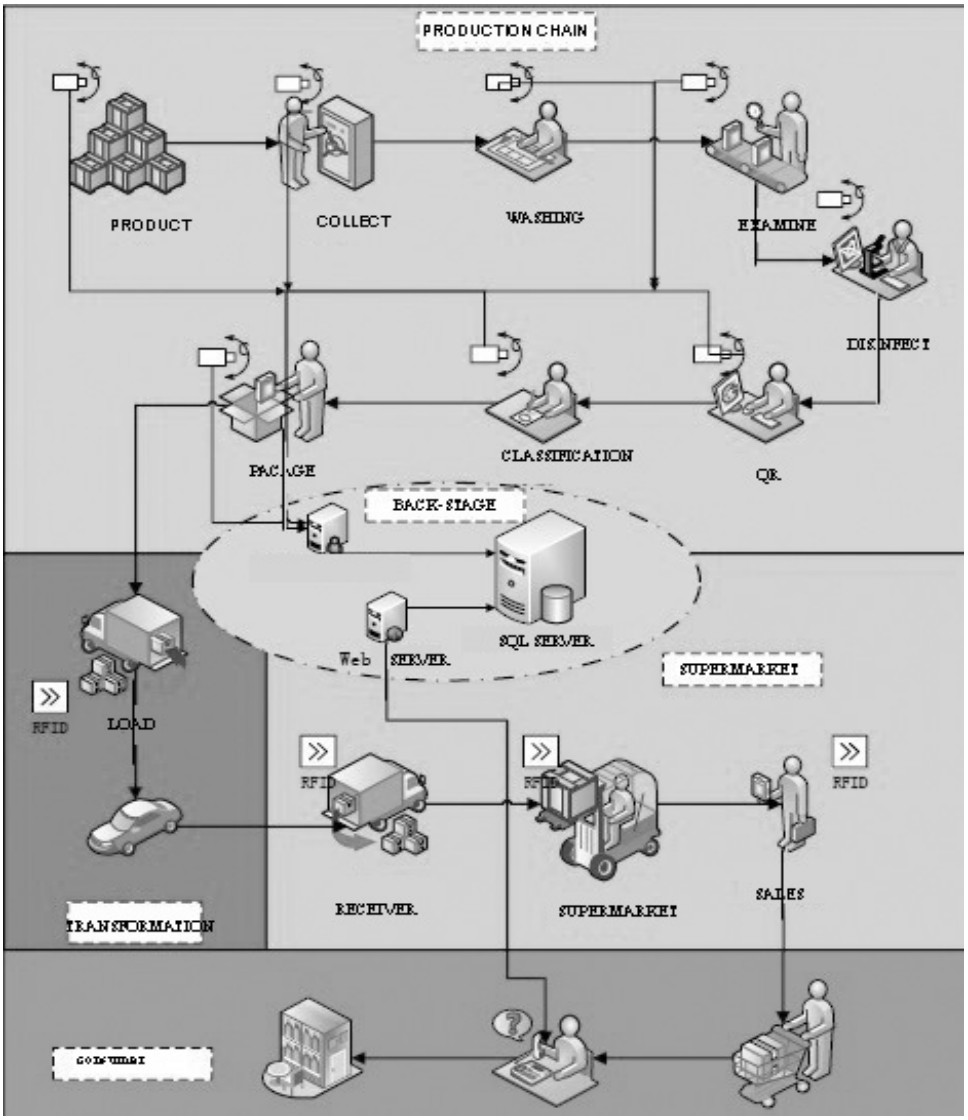

Fig. 2: Tracing system and database diagram

represented as <F, P, M>, so the reader identification number is F and the product identification code is P and M means the time to read the label. Filtering algorithm is as follows.

Firstly, Putting a labeled data of egg into a hash table and viewing the product identification code0303020199 00893567 09988777 08610000000000408220130810090099994 as its keyword, of which 0303020199 field means the CLC of egg products at the National Bureau of Statistics and the second field 086 is the code of Chinese area and the third field 100000000004082 means the business license number of livestock farms and the fourth field 2013081009009999 is the only serial number given to eggs by farms and the last field 4 is checksum. Secondly, assuming an interval as 30 sec, when reading a new labeled data, we should scan whether there is a same label in the hash table, if so and the difference of reading access time between them is less than one second, this new labeled data can be recognized as a duplicated electronic tag data and we can filter it and update the reading access time of it in the hash table at the same time; but if not and the difference of that is longer than one second, this labeled data can be regarded as a new label and we just output it and update the reading access time of it in the hash table in the meanwhile; if not present, just insert it into the hash table, while output this tag.

The database of this system realizes the standardization and normalization of data. We divide the basic data into several labeled data information, such as the farm, egg, quality, transportation, supermarket and personnel and so on. And the keywords of these above information respectively are the farm number, egg number, quality grade number, transport number, supermarket number and staff

number as well. In addition, each of the electronic tag has its only number and each record is relevant to the record time, so the keywords of the tag data are the combination of label number and recording time. Removing the data attributes that are not dependent on the key words of these tables (Tang *et al*., 1998).

CONCLUSION

This study will take different types of eggs analyzing data information as the content and foundation of building database information, we adopted the analysis and the database software, established a relatively tracing analysis database, in order to establish our country important food analysis database provide technical reserves. With the deepening and extension of the research on food, we should gradually strengthen the detection of food, established food safety testing laboratory, in order to get more perfect food tracing information effectively.

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