Research Article
Design of Food Management Information System Based on Human-computer Interaction

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Abstract: Food safety problem is directly related with public health. This study takes the necessity of establishing food management information system as the breakthrough point, through the interpretation of the overview of human-computer interaction technology, as well as the conceptual framework of human-computer interaction, it discusses the construction of food management information system, expecting to promote China's food safety management process so as to guarantee public health guarantee.

Keywords: Food management, food safety problem, human-computer interaction, information system

INTRODUCTION

Since 1990's, some major food safety incidents that do harm to human life and health continue to occur worldwide, for example, in recent years, the global epidemic of bird flu; by the end of the last century, the invasion of Europe mad cow disease as well as the PRRS that swept the Southeast Asia; in 1999, the dioxin crisis happened in Billy as well as the shrimp products were detected with chloramphenicol residue of the Asian countries exported to the EU and American, etc.

The implementation of file management for the food supply chain, as well as the establishment of food management information system, is the important means to achieve food "from farm to table" in the entire process of safety (Holsapple *et al*., 1993). The implementation of file management as well as the establishment of food information management system means that from the beginning of the source of food production, it should record and file the whole process in detail from food production-processing-storing-transporting-sale, to establish the detailed, continuous and accurate information flow of the various stages from food production to the final consumption, to identify the source and destination of the related food in the process of the production, so as to rapidly and accurately trace the inspected products, achieving the purpose of monitoring and analyzing the effect of food on human and environment.

Food management information system can provide true and reliable information of the products for consumers, producers and government's related institutions; using management information system can quickly and effectively identify the problem of raw materials or the problem of products in the processing stage, clear the responsibility of the relevant departments as well as enterprises, reduce the cost of recalling the products, give the enterprises punitive measures. It becomes a international development trend to set up the multi-network food management information system and the traceability information sharing platform by using information technology (Ho and Chang, 2001). One of the important measures to solve the problem of food quality safety is to establish management information system, the key points of the food production and circulation in the process of information must be effectively monitored and managed, so that the early warning and traceability in food quality and safety problems can be achieved, the scope of food borne diseases can be controlled. Moreover, it can stimulate the food enterprises to produce safety foods with high quality and improve food quality as well as safety.

MATERIALS AND METHODS

Overview of human-computer interaction technology: Human-Computer Interaction (HCI) study on the exchange and communication of mutual understanding between people and computer, so as to complete the functions of information management, service and processing for people to the maximum extent, so that the computer can really become a science and technology assistant to help people with study and work in harmony (Hisao *et al*., 1995). Its development is accompanied by the birth of computer. In the modern and future society, as long as people use technology such as communication, computer information processing technology, etc., taking activities for the society, economy, environment and resources, human-computer interaction will be the eternal issue. In view of its importance to the development of science and technology, to study how to realize natural human-computer interaction conveniently is the high goal of the modern information technology and the artificial
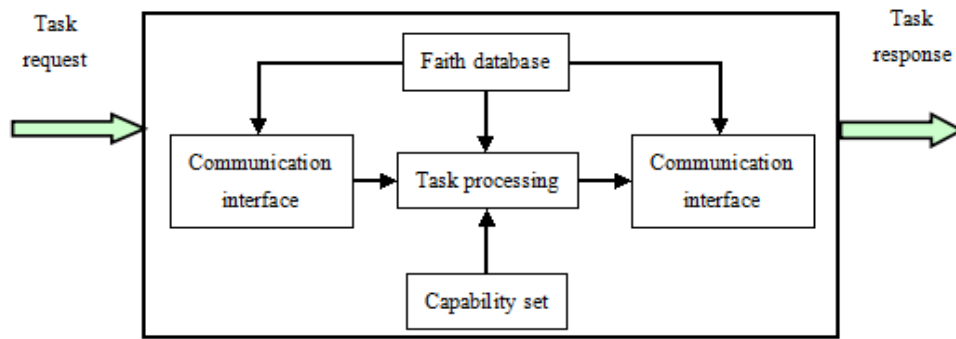
Fig. 1: The basic model of human-computer interaction

intelligence technology, which is also the new combination between mathematics, information science, intelligence science, neuroscience, physiology and psychology and other subjects, guiding the direction of the popular research on information and computer in the early twenty-first century.

The conceptual framework of human-computer interaction: As the new generation of natural HCI system, it should have the following four functions:

- Multi-mode perceptual function
- Function of intelligent agent interaction
- Knowledge processing function
- Function of visual display

The four functions are also embodied the interaction between human beings (Fig. 1). We know that the interaction between human beings is multi-model; human beings use vision, hearing, touch and smell all the time, which can be said that multi-model is the reflection for human beings to have natural interaction. In addition, the interaction between human beings is based on knowledge, which is mainly communicated through the exchange of language. In fact, the function of intelligent agent in human-computer nature interaction is to simulate the interactive objects of the users, which can make it like people with a multi-modal perception with knowledge processing ability and communicate with people in the form of dialogue. While visualization function is mainly to show the realistic and immersive feeling for man-machine interactive display. If there is no real scene with visualization, the process of human-computer interaction will appear dull and boring. In a word, it can be said that these four aspects are indispensable.

The construction of food management information system: Food safety management was developed in the 90's of the last century, it was early proposed by France and other parts of European Union countries at the special work meeting for biotechnology foods among

governments on the international Codex Alimentarius Commission, which was intended to be as food safety management measures to help people to identify the identity of the food, the circulation links as well as the source of food. According to the information of each link from raw material production to final consumption in the process must be recorded, at the same time, the source and destination of the products in the food production chain must be traced, in case of food safety problems, it can quickly lock the link where there is problem, thus it can cut off the source, recall the non-consumption food, eliminate hazards and reduce the loss effectively (Yen, 2002).

From the angle of information management, the capability of recording the identification (information) to trace the history, the usage, as well as the position is the plan that can be set up to transfer and exchange all aspects of information in each links of the management system, which can effectively identify, record and save the information of its attributes as well as the information of the participants in the system according to this plan and then it can combine the information with the real matters, through the information flow management, it can realize the real function of the logistics tracking and tracing, food traceability monitoring means to have effective management with the information flow in the key points of the food production and circulation process of the supply chain, tracing and tracking all the links with food raw materials, processing, packaging, storage, transportation, sales and other links, so as to prevent and reduce the emergence of the problems, once the problem is occurred, it can quickly trace it back to the source. Therefore, information plays an important role in the monitoring process. The information flow is as shown in Fig. 2.

The realization of the user's login module: In the process of using management information system, it is the user's login module that is firstly shown, this module requires users to enter a user name and password and some other information. The purpose is to confirm the user's identification of the system. By
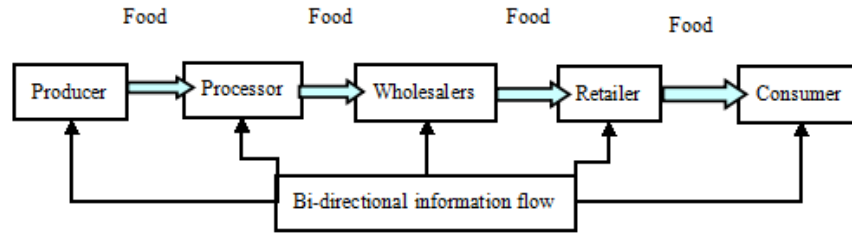
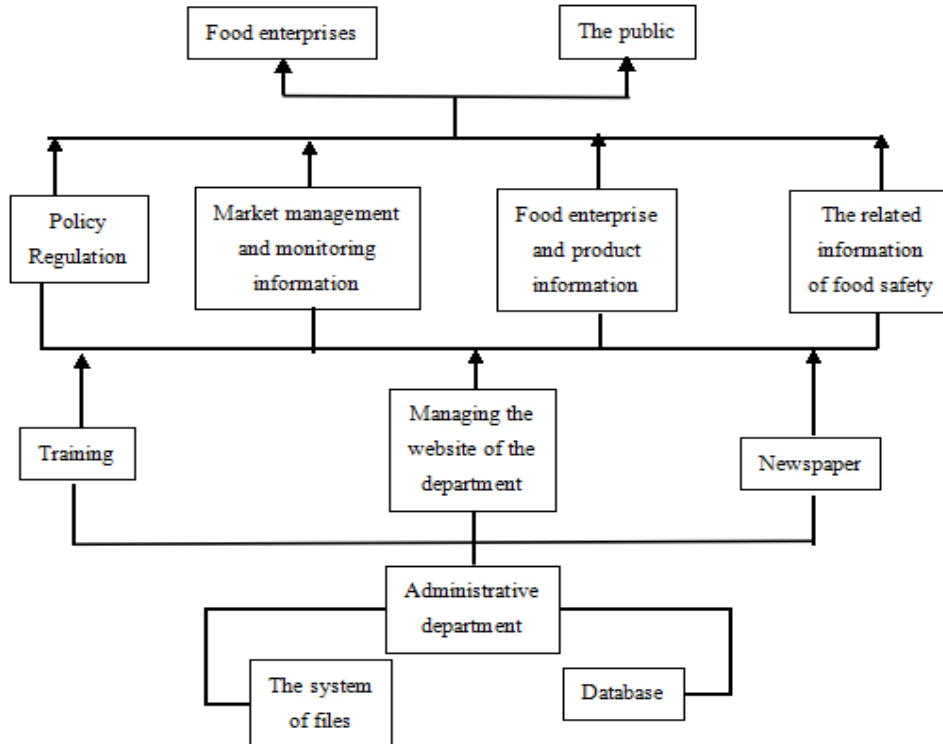Fig. 2: Food management information system and information flow

Fig. 3: Schematic diagram of food management information

using the user's login operation, it can effectively improve the safety of the system, which is very suitable for the system as well. It can avoid the non-authorized users who can have access to the system.

The realization of the food management module: Food management module is the key function module of the system to input the basic food data food, through the module, it can realize the basic information management for the food production of the food enterprises. The basic information management of food enterprise for products relies on the product management module to achieve. Through the food sales management module, it can realize the effect, in the operation process of the module, firstly it needs to input the basic information about the food. The basic information is included the product name, product specifications, product batch number, production time, etc., (Fig. 3). At the same time, according to the special needs of food, it can design the information of the concentration of the product, the purity of the product, the storage mode of the product, as well as the best mode of transportation and so on, which can really realize a full range of management over the product. After inputting the information, click the button to save the information, then the system will check the legitimacy of the information. In the precondition of ensuring the input information is complete and accurate, it can save the input information in the database. Thus the work of food management is realized.

RESULTS AND DISCUSSION

Consumer's information inquiry system: Consumer's food information inquiry system mainly provides consumers with two kinds of inquiry information from different ways: mobile inquiry mode and Internet inquiry mode.

Mobile inquiry mode is implemented mainly through mobile phone with Android application software, the application software allows consumers to scan the food information by scanning the two-dimensional code, after scanning the data, it can have analysis and feedback for the information, which can will automatically check out in the database, then the automatic inquiry results can be sent to the consumers at the first time. Consumers can search information with a certain search terms and conditions. Consumers can use advanced mobile devices to see the video of the history and other basic information.

Internet inquiry mode mainly uses the fixed websites that the consumers often use on the Internet to check out the related information, the website can photograph the two-dimensional code and transmit it to the server, it also can also use the computer video equipment to identify two-dimensional code, finally, consumers can use their own computers to check out information and watch video.

Integrated information management system: Integrated information management system is mainly responsible for the integrated management of all the information for the platform, including information inquiry for each subsystem of the platform, video management and other basic operations, which also can continue with the data maintenance work in certain right conditions, since the maintenance work needs to have the legal power to control, it also needs to record the time of maintenance, modifier, at the same time, the historical data of maintenance should have a backup and not be deleted permanently (Liu and Yuan, 2001).

The necessity of establishing food management information system: Food has undergone a series of links and the process from production to consumption, at the same time, it also involves many participating organizations, any problem occurred in one link or organization in food production, processing can be likely to lead to the occurrence of food safety incidents. Food management information system should monitor information of the whole process in food chains, which is considered to be feasible schemes to realize the entire food quality and safety management. Food information management information has great important meaning for the implementation of food safety management.

CONCLUSION

Food management information system is an important part of food quality and safety control system, which is the key to realize information sharing for the implementation of food management information system between consumers, enterprises and government. The establishment of food management information system based on information sharing has very important significance to solve the problem of food quality safety, reduce social cost, safeguard the interests of consumers. In the support of the system of information sharing technology, with the cooperation of each economic subjects, it can set up comprehensive food management information system and achieve good effect.

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