Construction and Application of Intelligent Supervision Platform for Food Safety in Colleges and Universities Under Big Data Technology

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Abstract. In this paper, the application system of intelligent supervision platform for food safety in colleges and universities is developed by combining the advantages of big data technology to efficiently process massive data. The purpose of this paper is to provide a supervision platform for campus food safety data for different personnel through javaweb system based on computer terminals. The bottom layer of the platform is provided with data processing function by hadoop data cluster and query function of data required by users by mysql database. The main functions of the application are developed by SSM development framework and displayed by jquery tool design page to complete the system construction. The application of big data technology in food safety supervision can realize the comprehensive management of video monitoring of operation, traceability of raw material information, food quality inspection data and complaints from students and teachers.

Keywords: Big data technology · Hadoop cluster · Network construction · Food safety in colleges and universities

1 Introduction

Food is the material basis for people's survival, and students, as the hope group of the country's future, their food safety is the most important issue concerning people's livelihood in China at present, and food is the guarantee for students to engage in all activities.

Due to the large customer group in the canteen, the required ingredients need to be diversified, and the quality of the channels is uneven. There are too many staff involved in food safety, the quality of staff is not high, and the production links are too complicated. The manpower of the food safety supervision departments in colleges and universities is relatively limited. So the supervision system of the school will be difficult to implement, which leads to difficulties in the supervision process of colleges and universities, and it is difficult to achieve all-round inspection and management [1].

Through the above analysis, the author of this paper believes that it is possible to develop an intelligent supervision platform for food safety in colleges and universities

V. Balakrishnan et al. (Eds.): ICMEIM 2022, AHSSEH 6, pp. 810–814, 2022.
https://doi.org/10.2991/978-94-6463-044-2_101

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2 Key Technologies

2.1 Hadoop

The Hadoop is a distributed infrastructure, which is mostly used to deal with various problems of storage, analysis and calculation of massive data in big data technology. The concrete components of the framework mainly include NDFS distributed file system and mapreduce's transformation model which is compiled and developed in a distributed and parallel way. More and more developers are using hadoop and put forward optimization suggestions. Apache Foundation began to continuously optimize and improve hadoop platform, and designed more functional components such as Hive, Hbase, sqoop, Flume, which finally formed hadoop ecosystem together [2].

2.2 Jquery Technology

The Jquery is a development front-end framework library, which is specially used to assist JavaScript development. In the way of Jquery assisting JavaScript, it is realized by encapsulating a large number of commonly used JavaScript function codes. So it is convenient for developers to write less code, focus more on the effect of implementation, and solve some browser compatibility problems. In addition, Jquery can also improve the efficiency of developers' operation with HTML documents, provide the processing mechanism of various events on the page, and combine ajax technology to realize the function of asynchronous processing of requests [3].

2.3 Development Environment

In this paper, the author briefly introduces the related technologies of platform development and use. In the intelligent food safety supervision system of colleges and universities, Hadoop is used as a big data server cluster to process data and store it in MySQL database, and the corresponding application platform is developed by using JavaWeb technology [4].

According to the data volume and overall operation requirements of the system, this paper chooses to build a Hadoop cluster with four nodes. The distributed collaboration system zookeeper-3.4.1, distributed file system HDFS 2.6.5, flume1.9.0, Hive 0.13.1 and Hbase2.6.5 are installed and deployed to these four nodes synchronously, and the initial construction of hadoop cluster is completed. The cluster will be developed under Linux system. This paper selects Centos6.5 Server release version of Linux operating system [5].

The front-end development tool used in the JavaWeb application of this system is boomstrap+jquery, and the development language is JavaScript+HTML+CSS. At the

back end, the Java development tool is IDEA 2021.1.3 (Ultimate Edition), the development environment is JDK 1.8, and the framework is spring+springmvc+mybatis based on J2EE. The development language is Java, Apache Tomcat 9.0 is selected for server building, and MySQL 8.0.28 is selected to help manage data.

3 Function Realization

3.1 Consumer Client

When the consumer rights and interests of teachers and students in food safety are infringed, they can log in to the system to complain about the food. In order to ensure the rapid handling of complaints, consumers can query and obtain relevant information and data according to the system. When consumers find that the problem belongs to the food processing process, they can click on the canteen monitoring module to trace the video to find the reason. The system will also provide the design of video fast-forward, backward, accelerated and decelerated playback to help users quickly find the key information. The implementation code for operating the video is shown in the Fig. 1. The design of the video capture function of consumers is complicated. At first, we need to get the multimedia push-pull stream data of the monitoring system server in the school kitchen. These data are obtained by flume from the monitoring system server, and then cleaned by mapreduce and saved in habse. The system directly calls these data to generate videos for playing.

```
function setTime(tValue) {
try {
if(tValue== 0) {
video.currentTime = tValue;
}
else {
video.currentTime += tValue;
} catch (rr) {
errMessage("Video content might not be loaded");
}
}
//Back up for 10 seconds
document.getElementById"rew").addEventListener("click", function 0 {
setTime(-10);
}, false);
//Fast forward 10 seconds
document.getElementById("fwd").addEventListener("click", function( {
setTime(10);
}false);
//Slow down
document.getElementById"slower").addEventListener("click", function 0 {
video.playbackRate = .25;
}, false;
//Speed up
document.getElementByIdf"faster).addEentListener("click", function 0 {
video.playbackRate += .25;
}, false);
//Return to normal speed
document.getElementByIld'"nomal"),addEventLitener("click", functionO {
video.playbackRate= 1;
}, false);
```

Fig. 1. Code implementation of controlling video player.

```
public Map <String,String> getByRowKey(String key){
Result result-null; //Create a query result set object
Map <String,String> res=new HashMap<String, String>0; //the result collection of the created.
Configuration conf= HBaseConfiguration.create0; /Create HBase configuration object
conf.set("hbase.master","172.20.6.56:60000"); //Create HBase Ip of the master node .
conf.set("hbase.zookeeper.quorum",
"172.20.6.56:2181,172.20.6.55:2181,172.20.6.54:2181"); // set up
Zookeeper node ip
try {
conn= ConnectionF actory.createConnection(conf); //connect to HBase database
admin-conn. getAdmin);//Establish connection mapping
tablename=TableName.valueOf( "sheep:s2"); //Building the mapping object of s2 table
Table table-conn.getTable(tablename); //Establish a table mapping object according to the table
name
Get get new Get(key.getBytes(); //Set query object according to row key.
result-table.get(get); //Get the query results in Table 3.
//Traverse the query result and store it in the final result set
for (Cell cell : result.listCellsQ)) {
res.put(Bytes.toString(CellUtil.cloneQualifer(el1)),
Bytes.toString(CellUtil. cloneValue(el) );
```

Fig. 2. Implementation of query function

3.2 Regulatory Department Client

When the complaint module of the supervision department receives the consumer's complaint information, the system will send out a special pop-up window to remind the supervision department to deal with the complaint in time. In the process of food and beverage production, the supervision department monitors the food and beverage department in real time. When problems are found in the information submitted by the food and beverage department or quality inspection, the supervisors can click the warning button to inform the food and beverage department to stop the production process in time, and inform consumers to pay attention. The query function engine of the supervision client is the most extensive and comprehensive, because this port needs the most data to be queried, and the query function implementation code is shown in the Fig. 2. In addition to the data of mysql database, the query object of the function can also query the related data stored in hadoop cluster. First, create the object of the set of query results, and create the storage place with almost returned results. It is also necessary to configure the configuration object of Hbase and set the ip of Hbase master node. However, after the connection mapping between the system and Hbase database is established, different forms can be queried sequentially by traversal algorithm and the query results can be saved to the result set. If the query result is empty, the page will display a "400" error code, which means that the request failed.

3.3 Catering Department Client

The catering buyer needs to enter the menu information by clicking the menu information, click Start Scan, and scan the GSI code attached to each vegetable. The system will automatically jump to the query results on the page of China Food (Product) Safety Traceability Platform. After the buyer verifies the correctness, click Save Results to save the source information of the food. The entered information will be saved in the database of supervision system for inquiry and traceability. Because of the large amount of data, SDD-1 algorithm and GA-PSDD-1 algorithm are selected as the information tracing query algorithms in this system. Selecting 10 records to query, the research results show

that the average total time consumption is 4136 ms without any algorithm, 2761 ms with SDD-1 algorithm and 2024 ms with GA-PSDD-1 algorithm. The GA-PSDD-1 algorithm not only shortens the query time by 2402 ms, but also improves the query speed by 58.07% compared with the traditional SDD-1 algorithm. It can be seen that GA-PSDD-1 algorithm greatly improves the query speed, and the optimization effect is remarkable.

4 Conclusion

In order to solve the problems existing in food traceability and improve the performance of large-scale data storage and processing in the food industry, this paper studies and implements the intelligent supervision platform of food safety in colleges and universities under the big data technology. The initial realization of this system has important guiding significance for establishing and perfecting the traceability system of campus food safety problems in our country, and has important reference significance for improving the supervision mode reform of campus food safety. Due to my limited ability, the system still has many shortcomings. The system lacks the supervision of the transportation process. I hope professionals can join the GSP positioning function to supervise the whole transportation process.

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