

# Construct Food Safety Traceability System for People's Health Under Internet of Things and BIGDATA

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## Abstract:

In the context of epidemic interference and management, food safety watching, knowledge analysis and food safety traceability became a lot of vital. At constant time, the foremost vital reason for food questions of safety is incomplete, opaque, and uneven data. the foremost elementary thanks to solve these issues is to try to a decent job of traceability, and establish an inexpensive and reliable food safety traceability system. The traceability system is presently a vital means that to confirm food quality and safety and solve the crisis of trust between customers and therefore the market. Therefore, this analysis takes rice as associate degree example and proposes a food safety traceability system supported RFID two-dimensional code technology and massive knowledge storage technology within the web of Things. this text applies RFID technology to the complete system by analysing the wants of the system, coming up with the system info and info tables, encryption the two-dimensional code and generating the planning for data entry.

*Keywords* - Two-dimensional code technology, Internet of Things, big data, artificial intelligence, food safety traceability system.

## I. INTRODUCTION

As the world new crown virus (COVID-19) epidemic intensifies, there area unit additional and additional cases of COVID-19 spreading through cold chain provision channels. COVID-19 has become the foremost vital supply of hazards to food safety within the was cold chain provision method. though the general hindrance and management state of affairs of our country's new coronavirus respiratory disorder epidemic continues to boost, the accelerated unfold of the overseas epidemic has diode to the domestic epidemic hindrance state of affairs of "foreign import and internal prevention" continues to be severe. within the context of epidemic hindrance and management, food safety observance, information analysis, and food safety traceability became additional vital. particularly for cold chain food foreign from

overseas, each food ought to be monitored and copied to forestall the unfold of COVID-19 virus and shield the health and safety of the population. Therefore, the institution of a secure and reliable food safety traceability management system is associate degree imperative demand of the society and therefore the individuals, and it's conjointly a good thanks to basically solve the post-epidemic era and shield the health of the population. The food safety traceability management system is predicated on automatic identification info and knowledge and data technology to integrate information within the entire chain of food production, processing, storage, transportation and sales. A comprehensive service management platform that's conferred to users and shoppers in real time through the net, terminals, phone calls, and text messages. At an equivalent time, the food safety traceability system involves

food planting (breeding) purchase links, enterprise process (packaging) links, storage and provision links, and sales links. Through the data traceability mechanism, the accountable body of every link of food production and circulation may be processed, therefore on additional effectively management the protection and responsibility of breeding (planting), processing, and transportation, and so stop varied food safety risks, and shield the people's safety and health. Therefore, this analysis planned a food safety traceability system supported RFID technology and massive information storage technology within the web of Things.

## II. RELATED WORK

The technology of the web of Things chiefly depends on communication and perception technology, which may be wide utilized in fashionable production and life. the web of Things is thought to be a product of the organic combination of device networks, the web, and mobile networks It is divided into a perception layer, a network layer, and an application layer, with device network technology because the core. The sure-fire application of massive information must be combined with technologies like automatic identification and network communication. It plays a task through 5 main links: information capture, information storage, processing, data processing, and information show. Combined with the analysis of the necessities and characteristics of the food safety traceability system, the subsequent technologies is utilized in the web of Things.

### 1) INDIVIDUAL AUTOMATIC IDENTIFICATION TECHNOLOGY

The automatic identification technology of food labeling uses computers and related software and hardware to encode, identify, collect, input and output individual food labels that need to be traced. These processes are all carried out automatically. The radio frequency identification (RFID) in the individual identification technology is a technology that can remotely identify a target object without direct contact and collect relevant information. Combined with an effective database system and network system, the tracking and information sharing of items on a global scale can be realized. The principle is shown in Figure 1A. 2-Dimensional barcode technology is one of the automatic identification technologies for individuals. Using the concept of "0" and "1" bit streams that constitute the internal logic of the computer, it can be automatically read through image input electronic equipment or through photoelectric scanning equipment to realize automatic processing of information, thereby achieving one-to-one tracking and Traceability.

### 2) SENSORS AND WIRELESS DATA TRANSMISSION

Sensors belong to the nerve endings of the net of Things, and become the core elements for humans to totally understand nature. The large-scale preparation and application of varied sensors is an imperative basic condition for the net of Things.

The wireless information transmission chosen during this analysis is especially through ZigBee technology, that may be a short-distance, low-complexity, low-power, low-rate, low-priced twoway wireless communication technology. it's primarily used for information transmission between varied electronic devices with short distances, low power consumption and low transmission rates. The crawler parses the Response, encapsulates the primary processing into associate Item, and obtains many links that require to be visited within the next step. Item is bimanual over to the Pipeline for ballroom dancing process, and also the link is bimanual over to the engine for processing; Entity information is circulated to the pipeline for more information clean up and persistence.

### 3) PYTHON PROGRAMMING LANGUAGE

In the method of victimization the Python language functions or alternative info written into the file and compiled into bytecode by the Python interpreter. Finally, it's handed over to the Python virtual machine for execution. Usually, the compiled bytecode file is within the format of additionally, Python are often directly interactively operated on thought operational systems like UNIX system, windows and mackintosh, creating development and debugging easier.

### 4) SCRAPY CRAWLER FRAMEWORK

Scrapy is AN open sources net crawler framework supported the Python language. it's the characteristics of complete functions, low development issue, and very robust expandability. Scrapy uses the Twisted network asynchronous framework to method network requests. the operating design is shown in Figure 1B. The engine obtains a page link from the hardware, encapsulates it as an invitation and sends it to the downloader for download; The downloader encapsulates the net content process into a Response and sends it to the crawler for processing; The crawler parses the Response, encapsulates the primary processing into AN Item, and obtains many links that require to be visited within the next step. Item is bimanual over to the Pipeline for ballroom dancing process, and also the link is bimanual over to the engine for process.

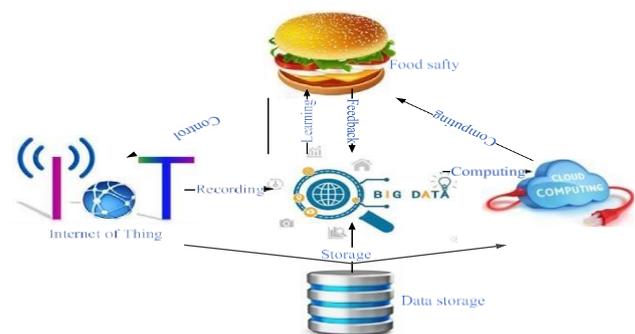


FIGURE 2: The combined advantages of the Internet of Things and big data technology in the food safety traceability system

## III. EXISTING SYSTEM

The proposed system implements a food safety traceability system based on RFID technology and big data storage

technology in the Internet of Things. The use of the Internet of Things and big data technology has realized the data collection of various food data. The use of RFID technology to realize automatic recording of relevant parameters avoids the contamination of food product traceability information caused by manual data input. At the same time, a set of small food industry data search engine was designed and implemented by using big data analysis technology. The traditional traceability system is integrated with the Internet of Things and big data technology to realize the traceability of the entire agricultural production process of agricultural and sideline products such as planting, processing, testing, warehousing, transportation, and sales. This ensured that the source of agricultural and sideline products can be traced, flow can be traced, information can be inquired, and responsibilities can be held accountable to protect people's health and food safety. The food safety traceability system constructed in this research has a perceivable realization process, traceability of the source, and early warning of risks. This is of great significance for improving the management level of China's food quality and safety, preventing food safety accidents, maintaining the balance of supply and demand, and ensuring people's health and safety.

**IV. PROPOSED SYSTEM**

The proposed system implements a food safety traceability system based on RFID technology and big data storage technology in the Internet of Things. The use of the Internet of Things and big data technology has realized the data collection of various food data. The use of RFID technology to realize automatic recording of relevant parameters avoids the contamination of food product traceability information caused by manual data input. At the same time, a set of small food industry data search engine was designed and implemented by using big data analysis technology. The traditional traceability system is integrated with the Internet of Things and big data technology to realize the traceability of the entire agricultural production process of agricultural and sideline products such as planting, processing, testing, warehousing, transportation, and sales. This ensured that the source of agricultural and sideline products can be traced, flow can be traced, information can be inquired, and responsibilities can be held accountable to protect people's health and food safety. The food safety traceability system constructed in this research has a perceivable realization process, traceability of the source, and early warning of risks. This is of great significance for improving the management level of China's food quality and safety, preventing food safety accidents, maintaining the balance of supply and demand, and ensuring people's health and safety. The system is more effective since it involves in five steps such as data capture, data, data processing, data mining, and data knowledge display.

**A) DATA COLLECTION AND PROCESSING OF FOOD SAFETY TRACEABILITY UNDER THE BACKGROUND OF BIG DATA AND THE INTERNET OF THINGS**

In the food safety traceability system, multiple data forms such as numbers, images, and videos are involved. In order to

extract effective information from it, it is necessary to use various data mining tools and techniques to filter and analyse large amounts of data according to specific individual needs, so as to realize the accuracy and personalization of data, and provide users with good data support. There are three types of data exchange systems used in this study.

**(1) Python social auth:**

A social account authentication registration mechanism that supports multiple development frameworks including Django, Flask, Webpy, etc. It provides authorization and authentication support for more than 50 service providers, such as Google, Twitter, Sina Weibo and other sites, and the configuration is simple.

**(2) Django OAuth Toolkit:**

It can help Django projects implement data and logic OAuth2 functions, and can be perfectly integrated with the Django REST framework.

**(3) Celery:**

It is used to manage asynchronous and distributed message job queues and can be used in production systems to handle millions of tasks. Django-celery is the best choice for executing asynchronous tasks or timing tasks in Django web development. Its application scenarios include: Asynchronous tasks: When the user triggers an action that takes a long time to complete, it can be given to celery as a task for asynchronous execution, and then returned to the user after execution.

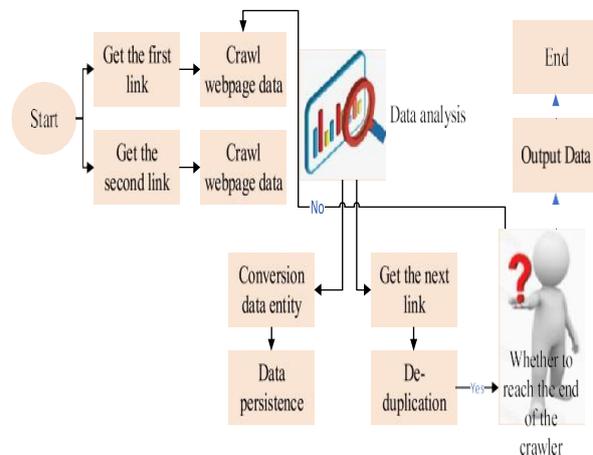
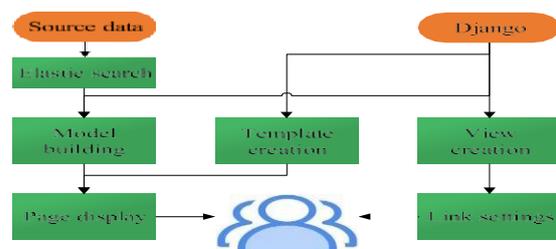


FIGURE 3: The flow chart of the web crawler in this study



## B) CONSTRUCTION OF FOOD SAFETY TRACEABILITY SYSTEM

Building a food safety traceability system to appreciate method perception, supply traceability, and risk early warning. this can be of nice significance for up the management level of China's food quality and safety, preventing food safety accidents, maintaining the balance of offer and demand, and promoting people's health. The food safety traceability system could be a safety assurance system that uses data technologies like article cryptography and often identification to manage relevant data within the food offer chain. supported the most structure of the net of Things and therefore the information integration and sharing perform of huge information, the food safety traceability system model beneath the background of the net of Things and large information made during this study. the complete is split into support (hardware) layer, network layer, data layer, show layer, and user layer. Among them, the support layer (hardware layer) provides computer code and hardware support for the system, and uses RFID readers and different instrumentation to observe and track the complete method of rice production and circulation in real time to gather and write information. this needs computer code and hardware devices like servers, storage devices, network devices, operative systems, and databases. {the information the info the information layer receives an oversized quantity of basic data through the server, analyses, organizes and analyses and at last stores it within the info. And supplemented by a tiny low quantity of manual information entry to produce complete information support for the complete traceability system. The network layer aggregates the info carried by every node to the Zigbee entrance through the Zigbee node self-organising network, then the Zigbee entrance sends the aggregate information to the GPRS entrance. The GPRS entrance converts the info into a computer memory unit array format and sends it to the server via the network. The system layer implements varied functions of the food safety traceability system, and therefore the thematic information and business information utilized by the system return from the info layer. The user layer is that the users WHO use the system and perform corresponding operations per completely different permissions. The structure style provides a stable and safe question terminal for customers WHO finally purchase the merchandise. victimization the distinctive identification code on the food packaging bag on the web site to seek out vital data regarding food planting, production, and transportation. victimization B/S server to make a traceability platform, so users will question through computer browser shopper, tablet/mobile shopper, give corporations with data to guide production, and supply customers and regulative authorities with food ingredients, production, process and circulation processes data.

## V. MODULES

### A. Service Provider:

In this module, the Service supplier needs to login by exploitation valid user name and arcanum. once login in he will

do some operations like Login, Browse Food merchandise knowledge Sets and Train & check, read Trained and Tested Accuracy in chart, read Trained and Tested Accuracy Results, read Prediction of Food merchandise sort, read Food merchandise sort quantitative relation, transfer Food merchandise foretold knowledge Sets, read Food merchandise sort quantitative relation Results, read All Remote Users.

### B. View and Authorize Users:

In this module, the admin will read the list of users UN agency all registered. In this, the admin will read the user's details like, user name, email, address and admin authorizes the users.

### C. Remote User:

In this module, there area unit n numbers of users area unit gift. User ought to register before doing any operations. Once user registers, their details are going to be hold on to the information. once registration eminent, he needs to login by mistreatment approved user name and secret. Once Login is eminent user can do some operations like register and login, Predict Food Safety kind, read Your Profile.

## VI. SYSTEM DESIGN

System design refers to the position of those computer code elements on physical machines. 2 closely connected elements are often co-located or placed on completely different machines. the placement of elements will impact performance and reliableness. The ensuing art form ultimately determines however elements area unit connected, knowledge is changed, and the way all of them work along as a coherent system.

Model no.	Model	Method	Package	Tuning parameters
Model1	Bagged Model	Bag	Caret	Vars
Model2	Bayesian Generalized Linear Model	bayesglm	Arm	None
Model3	Boosted Linear Model	BstLm	bst, plyr	mstop, nu
Model4	cXtreme Gradient Boosting	xg-bLinear	Xgboost	nrounds, lambda, alpha
Model5	Generalized Linear Model with Stepwise Feature Selection	glm-StepAIC	MASS	None

## VII. OUTPUTS



FIGURE 4: Login Page of User and Service Provider

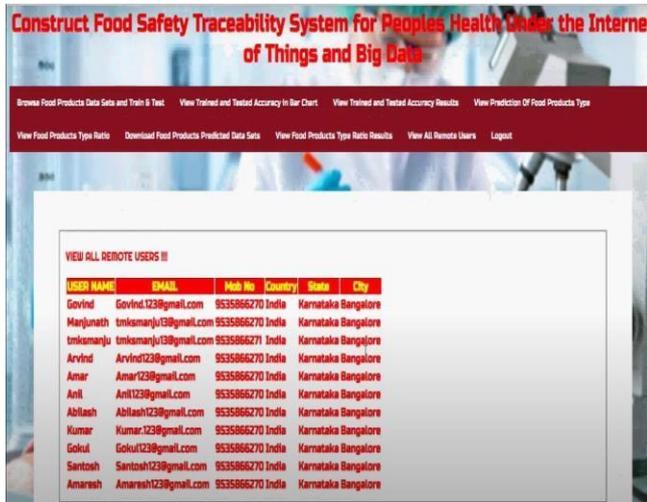


FIGURE 5: Details of the Users



FIGURE 6: Pie Chart based on Food Products

## VIII. CONCLUSION

In the context of epidemic prevention and control, strengthening food safety data analysis based on the application of food safety traceability technology can effectively improve the effect of food safety management, which is conducive to the development of epidemic prevention and control, and has practical value for the solution of future food safety issues in China as a whole. So as to better protect people's life, health and safety. The use of Internet of Things technology to regulate food safety can effectively curb the emergence of major food safety incidents. Moreover, the problem can be diagnosed more real-time and accurately, and the source of the hazard can be quickly identified, so that the quality of the food is more guaranteed. This will have a huge impact on the food supply chain. At the same time, under the intelligent monitoring of big data, it is difficult for companies in the food supply chain to tamper with the data, ensuring the authenticity of the data. Combining big data, the Internet of Things, the Internet and the food traceability system will truly achieve openness, transparency, and completeness of information, and strictly

control the various steps of the food traceability system, so that the value of the food traceability system can be truly realized. This research uses IoT technology, wireless sensor technology, RFID technology, crawler technology, database technology and other related technologies to design and implement a set of food traceability system using rice as an example. It has initially completed the trace-ability requirements for the entire process of food products, and also provided network data information for food-related industries. The implementation of traceability is not only a practical need to ensure food safety, but also the main means of current and future food safety measures. Through combing and researching the existing food safety traceability system, drawing on advanced domestic and foreign experience and achievements, strategically, systematically and structurally, establish a unified and standardized food safety traceability standard system, and establish a food safety traceability system for the government and enterprises Provide standardized technical guidance, it also provides standard support for the establishment of third-party certification, thereby improving the level of food safety traceability and people's health. This will have a huge impact on the food supply chain. At the same time, under the intelligent monitoring of big data, it is difficult for companies in the food supply chain to tamper with the data, ensuring the authenticity of the data. Combining big data, the Internet of Things, the Internet and the food traceability system will truly achieve openness, transparency, and completeness of information, and strictly control the various steps of the food traceability system, so that the value of the food traceability system can be truly realized.

## IX. FUTURE SCOPE

Recognizing however challenges in one space have an effect on all others, as an example, however food insecurity drives poor health as will deficiency of water thanks to global climate change. customers consciously have faith in the impact their selections having on the globe around them. At an equivalent time, successive generation would love to trace all aspects of their lives mistreatment personalized pursuit. However, movability and pursuit isn't enough. they'd conjointly love it to be personalized to fulfill their tastes and lifestyles, as an example, however associate iPod or iPhone will be tailor-made with apps to match one's tastes.

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