Design of Intelligent Security Inspection System for Airport Passengers' Carry on Luggage Based on Machine Learning

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Abstract. When carrying out the airport passenger baggage intelligent screening, due to the complexity of the algorithm, there are errors in the screening results. Therefore, the design of the airport passenger carry-on baggage intelligent screening system based on machine learning is studied. The hardware design of the system is completed by designing the interface between the security system and the departure system, the external interface between the security system and the baggage system, and the airport passenger carry-on baggage intelligent screening module; In the software design, the computer vision technology in the machine learning algorithm is used to identify the carry-on baggage of airport passengers, and the airport passenger carry-on baggage security detection algorithm is designed, which effectively realizes the intelligent security check of airport passenger carry-on baggage. The test results show that the change of ASII code value of the system designed in this paper is relatively stable, and the memory occupancy is always within 25%, which can effectively meet the requirements of users and improve the performance of the system.

Keywords: Machine Learning · Airport Passengers · Personal Luggage · Intelligent Security Check

1 Introduction

Since the 9/11 incident in the United States, all countries have attached great importance to airport security inspections. In order to ensure aviation safety, many additional security inspection measures have been added, resulting in a lot of manpower and material resources spent on airport security inspections. With the development of social economy and the continuous increase of airport passenger volume in recent years, new requirements have also been put forward for the service time and service links of security inspection work [1]. Considering the limited internal space of the terminal building, the long cycle time and high cost of the new terminal building, the simple method of adding security check channels will not be effective in the short term.

B. Wang et al. (Eds.): ICMTEL 2023, LNICST 532, pp. 82–99, 2024.
https://doi.org/10.1007/978-3-031-50571-3_7

The development of air transport industry can not only promote the cultural and trade exchanges between different regions and countries in the world, but also an important symbol of national modernization and the embodiment of national comprehensive strength. With the rapid and rapid development of civil aviation industry, civil aviation safety has become a problem that cannot be ignored. The disasters caused by civil aviation accidents are often serious, and the loss of life and property often exceeds people's expectations. Therefore, safety is the basis and guarantee for the development of the civil aviation industry and the basis for all the work of the civil aviation industry [2]. Among them, airport security inspection is an important portal to ensure the safety of passengers travelling by air, an important checkpoint to ensure aviation safety and the safety of passengers' lives and property, and one of the important factors related to civil aviation safety.

In terms of practical application, the International Air Transport Association and the International Airports Association have jointly developed a future airport security inspection system - intelligent security inspection. This security inspection system will classify passengers into three categories: high-risk, medium-risk and low-risk passengers according to the risk level. And set up three corresponding levels of security channels.

With the continuous improvement of the security level, passenger security inspection is more strict, which leads to long waiting time for passengers and low passenger satisfaction, affecting the development of the civil aviation industry. In addition, the airport needs to invest a lot of manpower, material resources and financial resources every year to ensure the reliability of the airport security inspection system, so as to ensure the safety of passengers. Such large-scale investment can improve the reliability of the security inspection system, but there is also excessive consumption of human, material and financial resources, which increases the operating cost of the airport security inspection system. Therefore, how to ensure the reliability of the airport security inspection system while ensuring the efficient and fast operation of the airport security inspection system, and also save the operation cost of the airport security inspection system, has become the most important and noteworthy problem to solve the current situation of the airport security inspection system.

The relevant research of domestic scholars on the airport security system is as follows: Xu Yong et al. [3] analyzed the amplitude nonuniformity error, clock jitter and sampling trigger jitter of the acquisition system, and proposed the acquisition system structure of the active terahertz human body security detector. Under the condition of determining the allowable range of clock jitter in the acquisition system, a high-precision programmable delay clock tree network structure is designed to realize the output of seven channels of the same source, low jitter and phase consistent sampling clock, sampling trigger signal and synchronous clock. Liu Bode et al. [4] introduced the two-level management and three-level control architecture of the security inspection system of urban rail transit based on networked big data, described the solutions and functions of the security inspection information management system at the line network level, station level and site level, and introduced the expanded functions of the networked security inspection system. However, when the above methods are used for baggage intelligent screening, the algorithm is relatively complex, which leads to differences in screening results and has limitations.

Foreign scholars pay attention to the importance of passengers in security inspection and the application of passenger classification. Zhu Y et al. [5] proposed a GAN-based image data enhancement method for X-ray prohibited items. Use GAN-train and GAN-test to evaluate the images generated by our model, However, this method has strong limitations.

Based on the above research background, this paper applies machine learning to the design of airport passenger carry-on baggage intelligent security system, uses computer vision technology in machine learning algorithm to identify airport passenger carry-on baggage, designs airport passenger carry-on baggage security detection algorithm, and completes the design of airport passenger carry-on baggage intelligent security system in combination with system software and hardware. The experimental results show that:, The change of ASII code value of the system designed in this paper is relatively stable, and the memory occupancy is always within 25%, effectively realizing the intelligent security check of airport passengers' carry-on baggage.

2 Hardware Design of Airport Passenger Baggage Intelligent Security Inspection System

2.1 Design the Interface Between the Security Inspection System and the Departure System

The interface between the security inspection information system and the departure system is mainly to obtain the baggage information of passengers from the departure system. When the passengers check in, the departure communication server sends the message information containing passengers and baggage to the security inspection information system communication server. The security inspection information system communication server receives the information, stores and processes it, and establishes the corresponding relationship between passenger records, baggage records and security inspection results.

The communication between the security information system and the departure system uses the message queue MQ middleware to exchange data in XML format or BSM format. The departure system is the server side of MQ. In the operating environment of the MQ server, there are queue managers, queues, message channels and other objects, which provide comprehensive message services; the security information system, as the client side of MQ, is implemented through the API of MQ. Development and operation of an MQ application. The system provides data by triggering events such as passenger check-in and printing boarding passes, and places the data in the MQ target queue; The security information system takes data from the queue in time.

As shown in Fig. 1, the MQ mode interface flow chart of the security inspection system and the departure system.

The closed box represents the queue; the closed rounded box represents the two processes of the interface program of the departure system and the interface program of the security inspection information system; the connection with an arrow represents the event and its sending direction, and the beginning of the arrow points to the event Reader, the tail of the arrow points to the event writer.

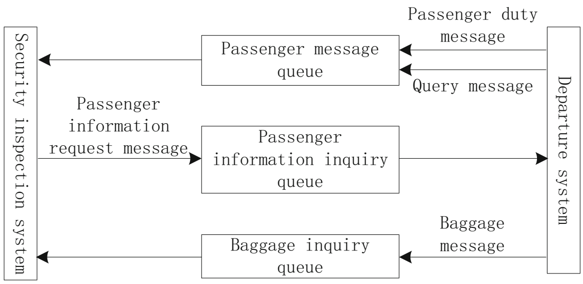

Fig. 1. Flow chart of the MQ mode interface between the security inspection system and the departure system

2.2 Design the External Interface Between the Security Inspection System and the Baggage System

The interface between the security inspection information system and the baggage system is mainly responsible for sending the security inspection results of checked baggage to the baggage handling system, which determines the baggage movement according to the received interpretation result signal. The interface mode adopted is Socket mode, and the security inspection information system will use an open TCP/IP protocol socket to maintain communication with the baggage handling system [6]. Here, the security inspection information system is the server side and the baggage handling system is the client side. The connection is established by the baggage handling system. After the information is sent, the connection will remain active. As shown in Fig. 2, the interface flow chart of the security inspection system and the baggage handling system in Socket mode is shown.

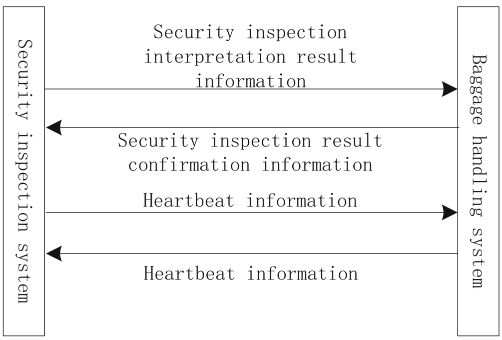

Fig. 2. The interface flow chart of the Socket mode of the security inspection system and the baggage handling system

All message information here is in XML format. After interpreting whether the baggage has been inspected, the security inspection information system sends an inspection result message to the baggage system, and the baggage system sends an inspection result confirmation message to the security inspection information system. Each of the two systems sends heartbeat packets at a certain frequency.

2.3 Design an Intelligent Security Check Module for Passenger Carry-on Luggage at the Airport

The security inspection module of the airport passenger carry-on baggage intelligent security inspection system is composed of three large modules, namely the verification workstation, the unpacking workstation, and the basic operation. This security check module is the key point of the intelligent security check system for passenger carry-on luggage at the airport. Whether this security check module can operate normally is also related to the success or failure of the system design. The functional design diagram of the security check module is shown in Fig. 3.

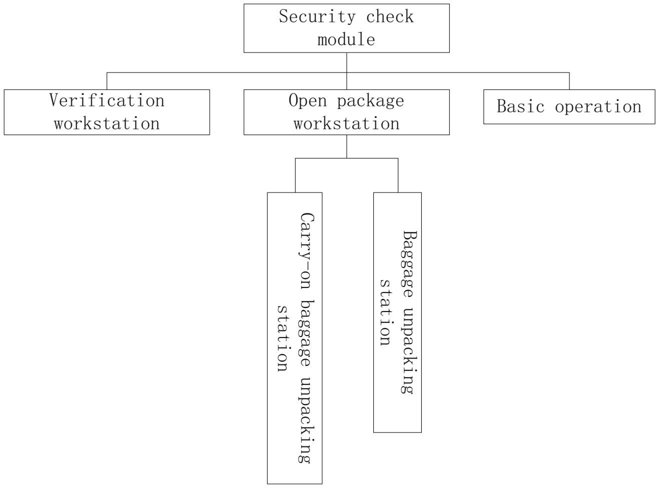

Fig. 3. Functional design diagram of the security inspection module

2.3.1 Basic Operation

In the basic operations of the security check module, the main operations involved are the opening and closing of the security check channel, staff commuting management, and system settings. Generally speaking, the opening and closing of the security inspection channel is mainly a switch problem. When the security inspection channel needs to be opened, click to open the security inspection channel, and when the security inspection channel needs to be closed, click to close the security inspection channel. For the management of employees' commuting, it refers to the fingerprint swiping on behalf of employees at work and the fingerprint swiping on behalf of employees at work is used to sign in. This fingerprint operation can avoid the occurrence of others on behalf of the post. After all, everyone's fingerprint is unique, so using fingerprint or iris to sign in can be more effective and reasonable for the security check employees' commuting management. As for system settings, almost every system is inseparable from system settings, and the system settings here are no exception. They are all about the operation settings of the entire system, such as intermittent time settings, system language settings, and system settings. Switch settings, etc. These three function modules constitute the basic operation function module of the security inspection module.

2.3.2 Baggage Detection

Passengers' luggage is generally divided into carry-on luggage and large checked luggage, but no matter what kind of luggage, it needs to go through security inspection. Therefore, the entire security inspection process for passengers' luggage is divided into the security inspection process for passengers' carry-on luggage. As well as the security screening process for passengers' bulky checked baggage. But for the security inspection process, in fact, the entire security inspection process for luggage is the same.

For the whole baggage security inspection process, it is mainly divided into three steps: radiographic transmission inspection and picture collection, reminder of problematic baggage, and baggage information entry and processing. First of all, after the baggage enters the security inspection equipment, the equipment will emit X-rays, and use the penetration ability of X-rays to collect the image of baggage information without opening the bag. The obtained pictures and passenger information shall be stored and saved accordingly for the inquiry and evidence collection by the national security department.

After the image obtained by the X-ray irradiation, the security inspection module will check the dangerous goods in combination with the manual comparison method. Once one of the two finds dangerous goods, the system will automatically alarm and create a query result log at the same time. Write results at any time to ensure the integrity and consistency of query records. At the same time, the system will automatically open the safety box and put the dangerous luggage into the safety box for inspection by security personnel. At this time, the passenger's information will also be stored in the dangerous goods query database together with the video pictures during the luggage security inspection.

Then, the security department will conduct a whole process video inspection of suspicious dangerous goods, and record all videos in the database, which can not only ensure security, but also protect the personal privacy of passengers, and when necessary, retain evidence to maintain the respect of the law [7]. Figure 4 shows the baggage security check procedure.

2.3.3 Passenger Verification

At the same time as baggage inspection, passengers also have to pass the security check themselves, from boarding pass verification to ID card verification to facial image collection and comparison, which is also a key business process.

The first is the extraction of the passenger's ID card information. The passenger's name, gender, ID number, home address and other information are obtained through the second-generation ID card reader that is very commonly used in the industry. Compare

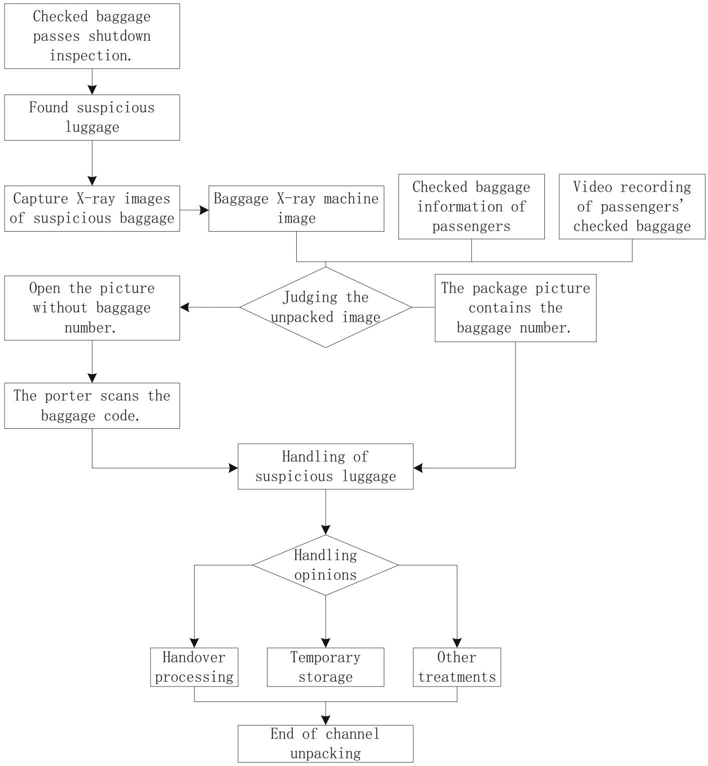

Fig. 4. Baggage unpacking security inspection process

the information obtained with the data of the public security organs on the Internet to confirm the true identity of the passenger. In this way, the exact information of the user can be left in the airline's passenger boarding record, so as not to affect the personnel contact in the event of a special situation.

Secondly, it is the information collection of passenger boarding passes. The QR code or barcode of the ticket is scanned to obtain the passenger's personal information and ticket information (including flight number, departure time, passenger seat number, passenger baggage number, etc.) when purchasing the ticket. Compare the obtained user's boarding pass information with the passenger's ID card information obtained in advance, and finally confirm whether the passenger's information is consistent. If it is consistent, the user is allowed to board. If it is not consistent, the user is refused to pass the security check and is refused to board. In addition, it is also necessary to set the manual input and query of the passenger ID number. If some users have handled temporary ID cards or no ID cards, they only have household registration books. At the same time, the security checkpoint is specially set up for foreigners to compare the identity information of foreigners manually. If the temporary identity of foreign passengers is consistent with the ticket information, they can pass the security checkpoint. If not, they will be refused to pass the security checkpoint, as shown in Fig. 5.

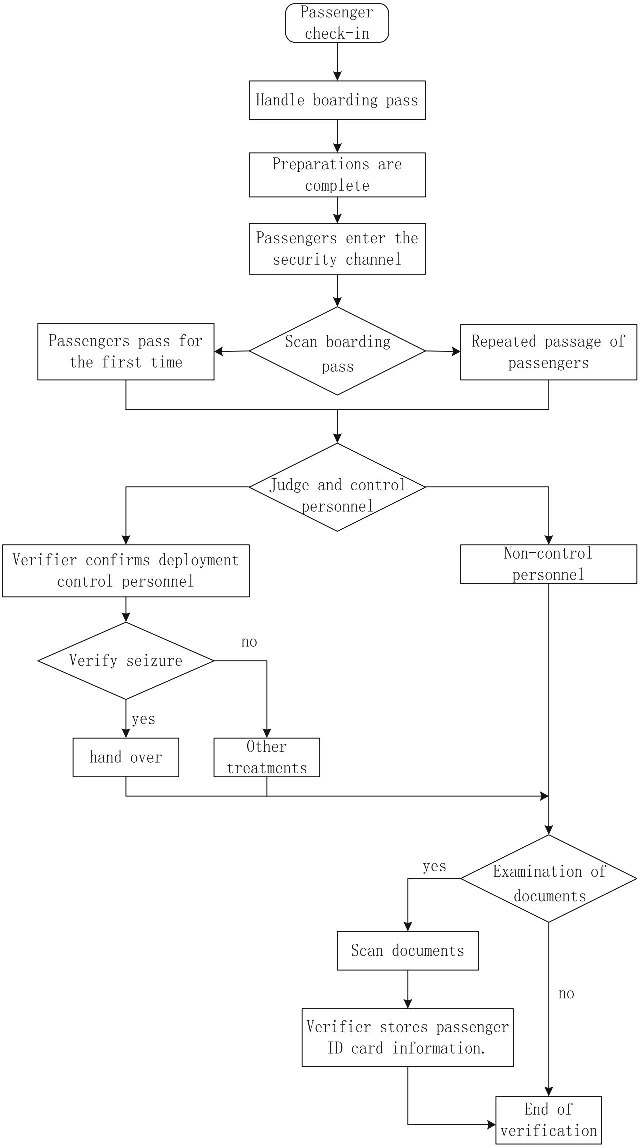

Fig. 5. Passenger verification process

Finally, it is to obtain the passenger's facial information for later verification. Through simple facial recognition technology, the facial information of passengers is initially obtained, and the collected facial information of passengers should be stored in the database, and the size of the pictures should be compressed as much as possible. This is not only for the convenience of storage, but also saves the resources of the server-side database, but also to ensure that the system can run smoothly. The passenger's facial information obtained shall be compared with the criminal fugitives or wanted criminals obtained through the Internet. If the facial conditions are consistent, the security personnel at the security check station shall be notified, and the public security organ stationed at the airport shall be notified through the Internet to assist the public security organ to stop the criminal fugitives or wanted criminals and maintain social stability, which is also for the flight safety of the airline.

3 Software Design of Airport Passenger Baggage Intelligent Security Inspection System

3.1 Identify Airport Passenger Carry-on Luggage Based on Machine Learning

In the identification of airport carry on baggage, the traditional method is to obtain the image of the items in the baggage by judging the R value, but it can not directly determine whether the items in the baggage are dangerous goods. Therefore, this paper introduces machine learning algorithm to design the identification algorithm of airport passenger carry on baggage.

In the security inspection system, the position and orientation of the inspected items in the aisle are unknown. Even regular objects have thickness differences due to different incident angles [8]. In an imaging system with a fan-shaped X-ray beam like this paper, the thickness of the transmitted X-ray detected by each detector array is not necessarily the true thickness of the object. Computer vision technology using machine learning algorithms is needed to memorize The position and orientation information of the object can accurately identify the object.

Assuming that h is the thickness of the ray passing through the object in the passenger's luggage, and h_0 is the true thickness of the object in the passenger's luggage, which depends on the transmission angle of the ray, then h can be calculated by Formula (1):

$$h = h_0 \frac{\sin(180 - \beta)}{\sin(\beta - \theta)} \tag{1}$$

The interactions between X-rays and passenger luggage include photoelectric effect, coherent scattering and incoherent scattering. When the input energy E_{in} of the X-ray is the same, the machine learning algorithm is used to learn the principle of X-ray, and the integral of the transmission signal in the energy range is calculated:

$$T(x, y) = \int_0^{E_{in}} N(E) e^{-\int dz \mu_t(x,y,z)\rho(x,y,z)} \tag{2}$$

Among them, $T(x, y)$ represents the transmission signal detected by computer vision technology, $\mu_t(x, y, z)$ represents the total absorption coefficient without occlusion, and $\rho(x, y, z)$ represents the density of the detected object.

Since the orientation of passenger luggage in the security inspection system is arbitrary, the computer vision technology of the machine learning algorithm is used to identify the orientation of the passenger's carry-on luggage at the airport, and combined with data mining technology, the orientation information of the luggage is extracted and the transmission signal is eliminated. The influence of spatial coordinates on the identification of passenger carry-on luggage at the airport is expressed as:

$$T = \int_0^{E_{in}} N(E)e^{-\mu(E)t} \tag{3}$$

It can be seen from Formula (3) that the transmission signal is affected by the thickness of passenger baggage. Using the data mining technology of machine learning algorithm, the length, width and thickness information of passenger baggage is extracted to realize the identification of airport passenger carry on baggage, which is expressed as:

$$\begin{cases} T_H = \int_0^{E_H} N(E)e^{-\mu(E)t} P_d(E)EdE \\ T_L = \int_0^{E_L} N(E)e^{-\mu(E)t} P_d(E)EdE \end{cases} \tag{4}$$

According to the above calculation process, a machine learning algorithm is used to design an airport passenger carry-on luggage identification algorithm.

3.2 Security Inspection of Carry-on Luggage of Passengers at Airports

Dangerous goods detection algorithm is the core of the software design of the airport passenger carry on baggage intelligent security inspection system, which is used to automatically detect various dangerous goods in the X-ray image. Deploy the dangerous goods detection algorithm on the algorithm server through TensorFlow Serving. The CPU of the dangerous goods detection algorithm server is Intel i7-6850k, the memory is 32G, the GPU is GTX 1080Ti, and the operating system is Ubuntu 16.04.

The model file generated from the training of dangerous goods detection algorithm based on machine learning is checkpoint, and four files will be generated at the same time when saving. They are checkpoint text files, which record and save the latest checkpoint file and other file lists; The meta file stores the graph structure containing variables, operations, sets, and other information; The index and data files save the binary files of all weights, offsets and gradients in the network.This format file brings convenience to transfer learning, but it is more troublesome to deploy. Therefore, it is necessary to save the model export in the SavedModel model format deployed in TensorFlow Serving, including a saved_model.pb file and a variables folder, where the saved_model.pb file saves the calculation graph from input to output nodes.

The deployment of machine learning on embedded devices requires specifying input/output tensor names for models. SavedModels in machine learning provide SignatureDefs to define the calculation signatures supported by TensorFlow, which simplifies this process and makes it easy to find suitable tensors in the calculation diagram to specify specific input/output nodes.

When the client calls the model, it first converts the X-ray image processing into Tensor format, and then builds a gRPC stub to call the dangerous goods detection algorithm on the server [9]. Then create and set the request object, specify the model name and signature name, and input data to the server in the form of a predefined signature. Since the security inspection software client needs to scan and image the subsequent baggage locally when it requests the dangerous goods detection algorithm module, the Predict.future() method is used to call asynchronously to complete the asynchronous work between the security inspection software and the dangerous goods detection algorithm server, and improve the security inspection efficiency.

The X-ray security inspection system drives the baggage to move relative to the X-ray source and X-ray sensor by the conveyor belt, so as to scan the entire baggage object and obtain a complete X-ray image. In this process, the security inspection software will judge whether the package is completely imaged according to the attenuation of X-ray, and separate different bags and packages for backup. Therefore, the dangerous goods algorithm server needs to monitor whether the software client triggers the event of completing the whole package imaging to obtain the X-ray image data. The specific process is shown in Fig. 6.

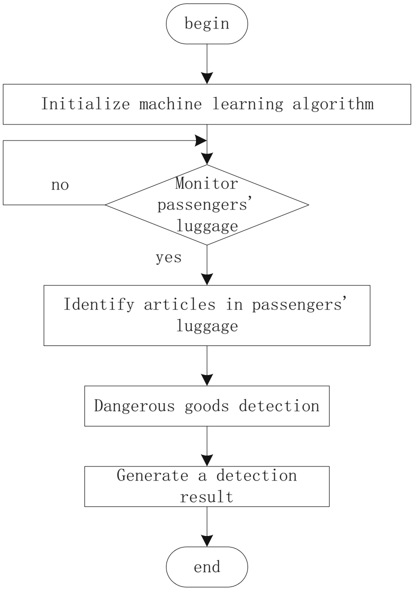

Fig. 6. The security check process of passenger carry-on luggage at the airport

If the imaging of a baggage package is completed, the data will be backed up and transmitted to the algorithm server, otherwise it will continue to monitor whether a baggage package imaging event occurs. After receiving the X-ray image data, the dangerous goods detection algorithm server calls the dangerous goods detection algorithm for detection, and saves the coordinates, categories and confidence results and returns them to the security inspection software client [10].

In addition to real-time dangerous goods detection, the software platform also supports the detection of historical X-ray image data. The user only needs to upload the X-ray image data and complete the detection by calling the dangerous goods detection algorithm module.

4 Test Analysis

4.1 Test Environment

The system test environment refers to the description of the software and hardware environment during the operation of the system, as well as the interactive test with other software. A good test environment can improve the accuracy of system testing, and there are not too many choices for test cases. Requirements, the stability of the test environment can not only save the tester's time, but also reduce the error rate of the system test and ensure the authenticity and reliability of the test results. For the test of the intelligent security inspection system for airport passengers' carry-on luggage based on machine learning, the specific test environment is as follows:

Operating system: Windows 7 Ultimate 32-bit
Processor: Intel (R) Pentium (R) CPU G645 @ 2.90 GHz 2.90 GHz
Memory: 32 GB
Server software: Apache Tomcat 7.0
JAVA environment: JDK 1.8.0_ forty-five
Database software: MYSQL 5.7.16
Browser: Internet Explorer 10

4.2 Functional Testing

The functional test is mainly to test in an orderly manner according to the functional division of the test software or system, mainly to ensure that the functional test part covers the combination of functional conditions. Functional testing is mainly aimed at testing the degree of functional realization and functional usability.

4.2.1 Platform Login Module

The login module is relatively easy to implement. In order to prevent illegal users from accessing the system, it is necessary to test whether unauthorized users can access the system normally, and whether they can log in when the user's input information is incomplete. If there is an error, relevant login reminders will be given. Table 1 shows the function test of the platform login module.

Table 1 shows that the platform login module of the system in this paper functions normally and can meet the user's requirements for system functions.

4.2.2 User Management Module

The user management module is a module that is prone to errors in the system. This module includes the entry of user information and the management between users, etc. However, if the operator does not know the user's activation process, or there is a need to pay attention during the operation process. Place. It is very likely that an unintentional error by the operator will cause the customer to be unable to operate normally. The test case for the user management module is shown in Table 2.

The results in Table 2 show that the user management module of the system in this paper functions normally and can meet the user's requirements for system functions.

Table 1. Platform login module functional test cases

Test items	Test steps	Test results	Does it reach the requirement
User login	Enter the login page, the user name is empty, the password is empty	Prompt user name does not exist	Meets the
User login	Enter the login page and enter the wrong username and password	Prompt user name does not exist	Meets the
User login	Enter the login page, enter the correct user name, wrong password	Incorrect password prompt	Meets the
User login	Enter an existing username and password, but no permissions have been assigned to the user	Prompt no access rights, please log in again	Meets the

4.2.3 System Security Management Module

The specific testing of the system security management module is shown in Table 3.

The results in Table 3 show that the safety management module of the system in this paper functions normally and can meet the user's requirements for system functions.

4.2.4 Baggage Management Module

The baggage management module of the hand baggage security check information system is similar to the user management above. Some required information needs to be filled in completely, but multiple application types can be customized in the application type module. This function is generally implemented by the administrator. This place mainly tests the application type management function, for example, the baggage management module test is shown in Table 4.

The results in Table 4 show that the functions of the baggage management module of the system in this paper are normal and can meet the user's requirements for system functions.

4.3 Performance Test

4.3.1 Performance Index

In the performance test, the throughput of the system and the number of user requests are taken as independent variables, and the ASII code value index and memory occupancy index are used to measure the performance of airport passenger carry-on baggage security.

(1) ASII code value

Table 2. User management module test cases

Test items	Test steps	Test results	Does it reach the requirement
User name	Save the user information, jump to the user add page, leave the user name field blank	Reminder: The filled data cannot be empty	Meets the
User description	Save user information, jump to user add page, user description is not selected	Reminder: The filled data cannot be empty	Meets the
User function	Save the user information, jump to the user add page, the functions included by the user are not selected	Reminder: The filled data cannot be empty	Meets the
Query user	Select all users to display all users	Display user information in pagination	Meets the
Modify user	Click the Edit button	Tip: Prompt that the modification is successful	Meets the
Delete users	According to the user after the query, click the delete button to prompt whether it is really deleted, click OK button	Tip: Deleted successfully	Meets the

The ASII code of capital letters directly calculates the corresponding binary number. The ASII code of C is 67, which is calculated in decimal system. After converting the decimal 67 into binary, it is exactly 1000011. In the arrangement of the ASII code table, the characters A to Z, lowercase a to z, and numbers 0 to 9 are all arranged in order, so if A is 65, then B is 66, C is 67, D is 68, and E is 69. The higher the fluctuation of ASII code value, the better the system performance.

(2) Memory occupancy

Memory is one of the most important components in the computer. All programs in the computer run in memory. The operation of memory determines the stable operation of the computer. Therefore, the memory occupancy has a great impact on the computer. The lower the memory occupancy, the better its performance. When the memory occupancy is too large, it will affect the overall performance of the system. The memory occupancy formula is as follows:

$$U = \frac{(s - free - buffer/cache)}{s} \times 100\% \tag{5}$$

Among them, U indicates memory occupancy, s represents the total memory size.

Table 3. Security management module test cases

Test module	Test items	Test steps	Test results	Does it reach the requirement
User registration	Username	Do not fill in the user name	Reminder: The filled data cannot be empty	Meets the
User registration	Username	Duplicate username	Tip: The username is duplicated, please re-fill	Meets the
Permission settings	Permission	There is no such authority assigned to the baggage security inspection information system, then log out of the system and log in with this user	Return to the login interface, prompt: No access rights to the system	Meets the

4.3.2 Performance Comparison Results

In order to verify the superiority of the system, The following results are obtained by comparing the security system of the human body security detector with the security system based on networked big data.

The results in Fig. 7 show that when the security inspection system based on terahertz human security detector and the security inspection system based on networked big data are used, the ASII code value fluctuates greatly. When the intelligent security inspection system for airport passengers' carry on luggage based on machine learning is used, the change of the ASII code value is relatively stable, indicating that the system in the text has better security inspection effect. The reason is that the system in this paper can identify passengers' baggage first in the process of security check on passengers' carry on baggage at the airport, ensuring the performance of security detection.

From the results in Fig. 8, it can be seen that when the security inspection system based on the terahertz human body security inspection instrument and the security inspection system based on networked big data are used, as the number of user requests increases, the memory occupancy of the system becomes larger and larger. When the number of requests reaches 1,000, the memory occupancy rates are 57% and 48% respectively; while in the process of using the system in the text to conduct security checks on the passenger's carry-on luggage at the airport, the memory occupancy rate is always within 25%, indicating that the memory occupancy rate of the system in the text can be guaranteed The smoothness of system operation.

Table 4. Baggage Management Module Test Cases

Test module	Test items	Test steps	Test results	Does it reach the requirement
Baggage information location query	Location query	Enter the characters contained in the bag number	Display all the application type information containing this character in the baggage number or prompt that there is no current data	Meets the
Baggage information registration query	Application type name	Enter application type name keyword	Display all application type information containing this keyword or prompt that there is no current data	Meets the
Baggage information registration query	Description of application type	Enter application type description keyword	Display all application type information containing this keyword or prompt that there is no current data	Meets the

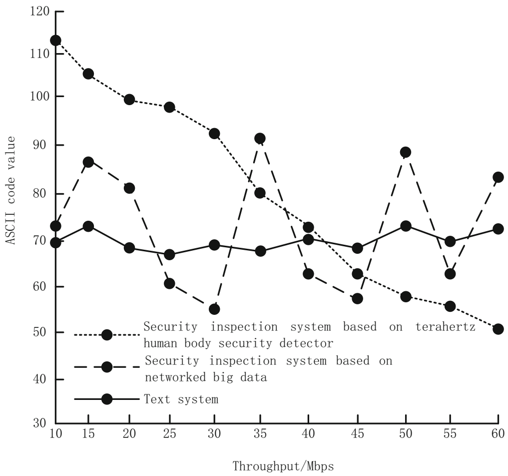

Fig. 7. ASIC code value test results

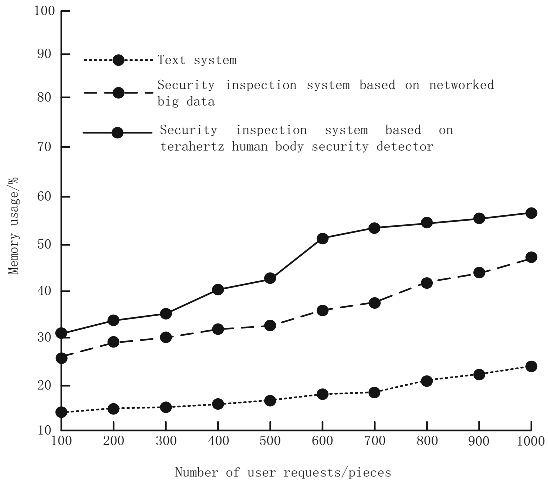

Fig. 8. Memory occupancy test results

5 Conclusion

This paper studies the application of machine learning to the design of the airport passenger carry-on baggage intelligent security system, uses the computer vision technology in the machine learning algorithm to identify the airport passenger carry-on baggage, designs the airport passenger carry-on baggage security detection algorithm, and completes the design of the airport passenger carry-on baggage intelligent security system in combination with the system software and hardware. The experimental results show that the change of the ASII code value of the system designed in this paper is relatively stable, and the memory occupancy rate is always within 25%, effectively realizing the intelligent security check of airport passengers' carry-on baggage. The function and performance of the system can meet the requirements of users. However, the research in this paper still needs to be improved. Because there is a certain distance between the security check point and the boarding office, how to ensure the linkage of the data of the two points is a problem worth studying. In addition, how to coordinate the business relationship between the airport aviation and other administrative organs and ensure the data connectivity is also an important part of the next improvement work.

Acknowledgement. Research on intelligent security inspection technology based on big data and deep learning, No.: KJ2021A1183.

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