



Design and Implementation of Public Security Document Transfer Management System

Na Li, Ming Li*, Yujie Shao

Tangshan University, Tangshan 063009, Hebei, China.

How to cite this paper: Na Li, Ming Li, Yujie Shao. (2024) Design and Implementation of Public Security Document Transfer Management System. *Advances in Computer and Communication*, 5(4), 218-222. DOI: 10.26855/acc.2024.10.003

Received: July 30, 2024

Accepted: August 29, 2024

Published: September 29, 2024

***Corresponding author:** Ming Li, Tangshan University, Tangshan 063009, Hebei, China.

Abstract

With the rapid advancement of information technology and the widespread use of the Internet, it has become evident that traditional manual document transfer management systems can no longer meet the demands of official document workflows in public security organizations. To address this issue, we designed and implemented a new information management system for public security document transfer. The system was developed for the Windows environment and executed on the Eclipse platform. Its database was created using MySQL, Mycat is used for the graphical management of the database interface. The system was constructed using web technologies, including HTML, Django, and the Python programming language. This paper presents a detailed exploration of the design architecture, the related technologies used, and the database structure implemented in our Public Security Document Transfer Management System. The results indicate that the new system can significantly improve the efficiency of document transfer in routine office tasks.

Keywords

Office document transfer; management system; public security

1. Introduction

At present, there is a large number of official documents in the workflow of public security organs [1]. Office document transfer is always important and related to ensuring smooth operation. Despite the big data and AI technology rapid development [2], the officer still retains manual receipt, registration, and transfer of documents in real work. It became difficult to deal with such a large number of files or documents relating to all the staff, and the need for storage and processing increased. For those reasons, it is necessary to design and implement a system with the capability of solving slow-processing problems. Zhang F, Wicaksono S R, et al. [3] have conducted a study and developed a web-based application for managing documents in higher education environments. HAN Yanyan et al. [4] propose a blockchain-based electronic file circulation scheme. Compared to the original one [5], the proposed scheme is more secure and enhances the credibility of the circulation information; at the same time, the shorter execution time of the smart contract makes the system better reliability and traceability. Alade S M [6] developed a Web-based Document Management System to improve user happiness, boost productivity, and guarantee time and data efficiency.

From a practical standpoint and experience, this paper uses the Django framework as a development platform to design a Document Transfer Management System that can solve the above problems.

2. The design architecture

2.1 Program flowchart

When the public security organs receive the official documents, it mainly describes the following process.

Fig. 1 is the workflow of office document transfer. The first step is handling and registering official documents. From experience, the officer will propose an opinion about how to distribute documents. Those official documents will be sent to leaders and departments for implementation or comments. After this step, the comprehensive department will take these documents back for registration, storage, and finishing work.

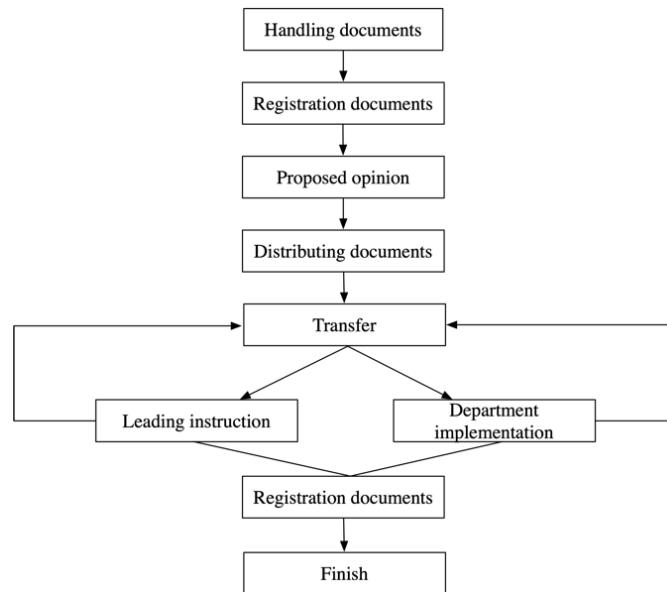


Figure 1. The workflow of office document transfer.

2.2 Main frame

According to our practical working experience and knowledge of the network, we designed the main frame of the Public Security Document Transfer Management System as follows.

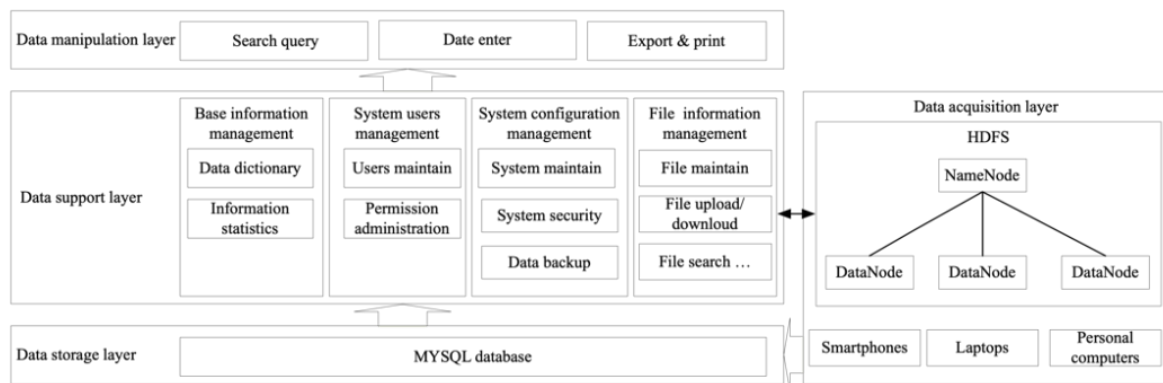


Figure 2. The main frame of the Public Security Document Transfer Management System.

As Fig. 2 shows, the four layers in this system are the data acquisition layer, data storage layer, data support layer, and data manipulation layer.

In the data acquisition layer, officers enter information about official documents into this system effectively by smartphones, laptops, personal computers, and so on. At the same time, HDFS in this layer provides underlying storage support for electronic documents and provides the information to the data storage layer and file information management model.

The data storage layer is mainly responsible for the data inputting function. In this layer, we have adopted MySQL, which has the advantages of scalability and flexibility, high availability, robust transactional support, web and data

warehouse strengths, strong data protection, comprehensive application development, management ease, and open-source freedom [7]. MySQL is very suitable for the work of public security.

The data support layer mainly realized all of the functions in daily office document transfer information. The authorization policies in this system control access based on the system administrator, common user, and leaders. This layer includes file information management, system user management, base information management, and system configuration management. Implement connections to MySQL database by using database access techniques.

In the data manipulation layer, based on different work characteristics and office document transfer requirements of officers, we design and implement an easy and simple interface for the web page. We choose more multi-option, checkboxes, and drop-down boxes, which can carry on convenient inputting to the management. Officers can carry on the inquiry about, revising, deleting, and withdrawing in this layer.

2.3 Design of database

The database used in this system is MySQL8.0.26. Fig. 3 shows a part of the physical data model.

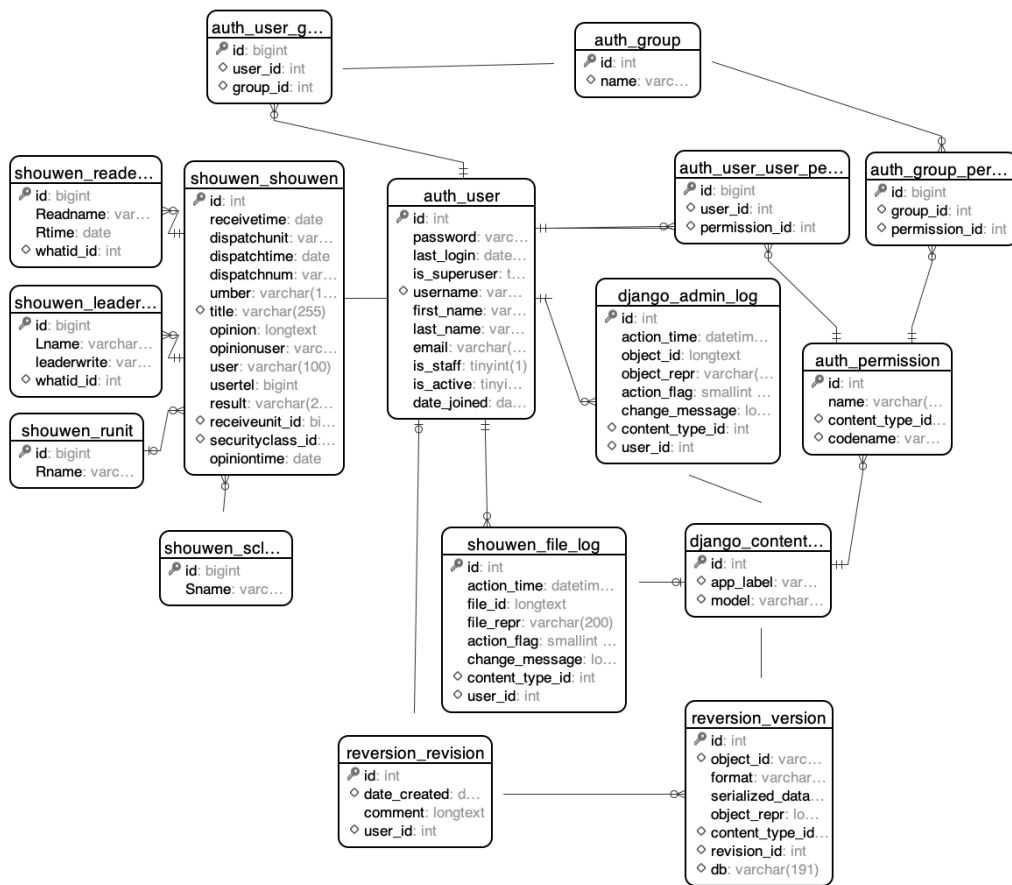


Figure 3. The physical data model of the Public Security Document Transfer Management System.

In Fig. 3, denotes Primary Key, denotes Foreign Key. There are 16 tables in the database including the official documents information table, login users information table, Stored file information table, user permissions information table, leader opinion information table, and so on.

Detailed information about some tables is described below:

- (1) Official documents information table

The table name is shouwen_shouwen. Record the official documents' information from the officer received.

- (2) Login user's information table

The table name is auth_user. Record the information of login users such as the name of officers, password, last login time, active state, joined date, and so on.

(3) Stored file information table

The table name is `shouwen_file_log`. Record the information of stored files such as the name of the file, user ID, upload time, change message, location information, and so on.

(4) User permissions information table

The table name is `auth_user_user_permissions`. Record the permissions information of all users in this system, such as permission ID.

(5) Leader opinion information table

The table name is `shouwen_leaderwrite`. Record the Leader's opinion information about the office document.

3. The implementation of system

Development of the Public Security Document Transfer Management System has been finished primarily and the anticipated result is achieved. The system is now running in Tangshan Municipal Public Security Bureau, Tangshan, Hebei, China. The operation of the system has greatly improved the working efficiency of the police officers.

3.1 Requirements analysis

Understanding public officers' requirements is an integral part of the Public Security Document Transfer Management System design and is critical to the success of interactive systems. Traditional manual document transfer mainly has the following problems.

(1) Heavy workload

In the comprehensive department's daily work, officers deal with a large number of official documents from external and internal sectors. Official documents are manually processed according to internal policies and procedures at each step. Due to a lack of time and staff, it is easy to cause errors, missing files, and wrong conclusions.

(2) Low efficiency

There are rules to follow in the process of office document transfer from different departments. However, a large amount of files is not normalized, bringing repetitive work which reduces work efficiency and causes waste of resources.

(3) More errors

During the manual processing of official documents, there may be office document misregistration or incorrect registration due to shift exchange, which waste of time and inefficiency. Responsibility cannot be distinguished.

(4) No tracking

Because of the scattered storage methods of the registry and official documents, there is no complete and unified record of the transfer process, making it inconvenient to track the location of the official documents.

This system considers these public officers' requirements and selects appropriate methods to solve these problems.

3.2 System architecture

The Public Security Document Transfer Management System is developed based on the Windows environment, using Python + Django to realize development, the code is developed using the Eclipse platform. The database uses MySQL, and we establish a connection to the database instance using Navicat. This system is mainly divided into several function modules as follows:

(1) Official documents information model

The function here is mainly to realize the information entry of official documents received from different departments. Including the official documents information, the leader's opinion information about the office document, opinion information about distributing documents, and so on. In addition, the printing function uses the LODOP print plug-in. Users can make a series of adjustments to print content, control paper size and continuous printing, export data to Excel files, and so on.

(2) Statistics and inquiries module

This module can implement query functions according to the conditions set by the user and export the content to Excel. It also can implement statistics functions based on data. Users can download the result for printing.

(3) System management module

The system management module provides logins and permissions for authorization. The administrator has the authority to add, delete, modify, and query the data and authorization in the system.

4. Conclusion

The operation of the Public Security Document Transfer Management System has greatly improved the working efficiency of the comprehensive department in the public security bureau. Compared to the previous manual working mechanism, it almost doubled the work efficiency. In this system, the officers can browse and inquire about the information on official documents at any time. This system can also automatically publish analysis reports of official documents, such as the number of documents, storage location of documents, status of documents processing, and so on. It gives a valuable reference to department heads.

4.1 Higher performance

Those functions realized by this system bring convenience to users. Each retrieved file has a unique serial number registered in our management system. Users can easily process documents in a short amount of time and can also search for the desired document using some keywords.

4.2 Higher service level

This system has changed the mode of the manual workflow of official documents. It can print online, which is convenient for typesetting and modification. It has the advantages of portability, simple operating environment requirements, and strong stability. When signing and receiving official documents, it realizes the automatic signing of official documents.

4.3 Higher security

In this system, different users have different permissions, which enhances the security of documents. During the file transfer process, the system will automatically record the user information and document information of each step. File storage uses HDFS, and makes sure the files are not tampered with during the transfer process and can be traced.

The purpose of implementing the Public Security Document Transfer Management System is to serve official document transfer management. It helps free officers from hard work. This system is very important in comprehensive department work, but there are many aspects that need improvement. We shall continue our work to explore how to make the Public Security Document Transfer Management System better.

Funding

This work was financially supported by Tangshan University Doctoral Innovation Fund No. 1402302.

References

- [1] Li N, Du Y. Design and implementation of a cloud-based Forensic Science Information System Model [C]//2013 International Conference on Cloud and Service Computing. IEEE, 2013: 140-145.
- [2] Zhang F. Design and Implementation of Industrial Design and Transformation System Based on Artificial Intelligence Technology [J]. *Mathematical Problems in Engineering*, 2022.
- [3] Wicaksono S R. Implementing Collaborative Document Management System in Higher Education Environment [J]. *Prosiding SNATIKA*, 2015, 3: 22-25.
- [4] Han Y, Zhang Q, Yan X, et al. Design and implementation of electronic file circulation based on blockchain [J]. *Journal of Computer Applications*, 2020, 40(11): 3357.
- [5] Ismael A, Okumus I. Design and implementation of an electronic document management system [J]. *Mehmet Akif Ersoy Üniversitesi Uygulamalı Bilimler Dergisi*, 2017, 1(1): 9-17.
- [6] Alade S M. Design and Implementation of a Web-based Document Management System [J]. *International Journal of Information Technology and Computer Science*, 2023. DOI:10.5815/ijits.2023.02.04.
- [7] Oracle Corporation. "What is MySQL?" <https://www.oracle.com/mysql/what-is-mysql/>.