

Toward Integrated and Automated Management of Government Affairs

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Abstract

An efficient government office automation system, which contributes significantly to social supervision, administrative efficiency, administrative quality, and service capacity, has been an important criterion for assessing the development of a country. With the rapid development of the global economy, more and more such systems are designed and implemented. However, few of them could take into unified account ever changing requirements of government affairs. In this paper, we develop an integrated and automated management system for government affairs. In the beginning, we analyze why we need the new system by introducing the overall background of the electronic governments and the office automation system. Then, according to system requirements, we divide the system into four functional modules, i.e., the login module, the approval flow module, the document management module, and the system management module. After that, we present many details about the architecture, the modules, and the database for the system design. Finally, illustrating both processes and interfaces of required modules, we implement the system based on the well known three-tier B/S architecture.

Keywords: office automation system, government affairs, three-tier B/S architecture

1. Introduction

The government has always played more and more important roles, such as expediter and manager in social and economic progress, and provided various social entities with support by issuing laws or policies. In order to promote social supervision, administrative efficiency, administrative quality, and service capacity, many countries have made strategies to construct powerful electronic governments (E-Gov) by employing the Internet to deliver useful information and services to their citizens. The aim of the E-Gov is to liberate government staff from intricate government affairs, improve work efficiencies, and reduce operation costs. The only way to achieve the E-Gov is to develop an efficient government office automation system, by introducing the computer network technology in modernized office system. Under the assistance of the office automation system, the government could improve their work efficiency, track affairs through paperless process, manage remotely archives, manage effectively electronic bulletin boards, and manage efficiently daily meetings, to maintain excellent public relations.

Broadly speaking, there are three generations in the development of the office automation system, where the first generation realizes digital texts and sharing resources, the second generation realizes sharing and interactive information in large scale, and the third generation mixes information processing and knowledge management. As the foundation of the E-Gov, the government office automation system has entered a new

stage. The current status of government office automation system in China can be summarized as follows, (1) Systems of different regional governments vary considerably, due to the unbalance in the development of regional economy. (2) Although the Chinese central government has made substantial investments, few achievements on related systems have been obtained by regional governments. (3) Once systems are implemented, few emphases are put on system management and system maintenance.

Although there are various types of government automation systems available, few of them could adapt timely to ever changing requirements from government affairs. In this paper, we developed an integrated and automated management system for government affairs. We implement the system by four functional modules based on the well known three-tier B/S architecture of ASP.NET. The rest of the paper is organized as follows. In Section 2, we analyze the system requirements. Section 3 talks about the system design. Section 4 describes in detail the system implementation. Finally, we conclude what we have done and what we should do next in Section 5.

2. Requirement Analysis

Requirement analysis, in software engineering, is the first stage in the development cycle. Although different government departments have different businesses and functions, *e.g.*, project approval and meeting arrangement, principal requirements of their office automation systems have been concentrated on handling official documents, managing official businesses and providing personalized services as well as information communication.

Functional requirement, by defining necessary functions of a system for system users, is one of the most important branches in the requirement analysis. Aiming at providing government users with integrated and automated management of their daily affairs, we divide the system into four functional modules, which are the login module, the approval flow module, the document management module, and the system management module, as follows.

(1) The login module. Being similar to other web based systems, the integrated and automated management system of government affairs needs also a login module to identify roles, *e.g.*, system administrator and other government staff, of different legal users and display them with according web pages. The login module of is used as an access through of embedding the management system into the government portal website.

(2) The approval flow module. This module is used for modeling all approval flows of various applications, such as maintenance application, in government affairs, and can be divided further into the approval management sub-module, the draft application sub-module, the unapproved application sub-module, and the approved application sub-module. For the approval management, the system is required to provide users with flow management and template management. For draft applications, the system should provide drafters with application templates. Once they finish editing required templates, they can dispatch them to related leaders. For unapproved applications, the leader could make comments and then signatures. For approved applications, the leader could search them by input conditions.

(3) The document management module. There are two chief functions required for the module, namely document dispatching management and document receiving management. Specifically, the document dispatching management involves drafting documents, auditing documents, approving documents, registering documents, and issuing documents. At first, relevant drafters or drafting departments are responsible for initiating designated documents which are then sent to their leaders for auditing and approving. After this, those documents can be registered and then issued. Besides, different users can choose different document types, document templates and dispatching flows according to their roles. On the other hand, the document receiving management involves registering

documents, pending documents, approving documents, assigning/undertaking/co-processing the task, and completing the task as well as archiving documents. For registering documents, relevant receivers or receiving departments obtain firstly dispatched documents, then save and record them into the local receiving document database. When integrated with necessary items, such as receiving date, dispatching department, and document title, these documents become pending. Furthermore, documents approved from relevant leaders can be assigned, undertook or processed cooperatively by related institutions, leaders, or departments. Finally, those completed documents are archived for further queries. Besides, details regarding processing progresses of received documents, such as processing date, undertaking institute, approved date, opinions of related entities and processing status, are recorded by a receiving register form.

(4) The system management module. There are four major functions provided by the module, *i.e.*, user management, role management, permission management and database management. For user management, the system allows its administrator to perform regular database operations on fields, such as user name, user department and user role, of the user Table. For role and permission management, the system allows its administrator to maintenance a reasonable amount of roles and associate different roles with their permitted functions. For database management, the administrator should create several related tables during the implementation of the system.

3. System Design

3.1. Architecture and Modules

Once we have analyzed the system requirements, we can design the system architecture. In this paper, we adopt the well known three-tier B/S architecture of ASP.NET, *i.e.*, user presentation tier, business logic tier and data access tier, as shown in Figure 1. Specifically, the user presentation tier receives access requests of users and returns processing results to them by means of web applications, such as ASP, JSP, and PHP. Usually, the user presentation tier presents a unified interface but with different menus and controls to users based on their roles. The business logic tier encodes the real-world business rules by business controls and serves as an intermediary for data exchange between the user presentation tier and the data access tier, where the latter provides the business logic tier with data services by accessing all kinds of databases and data sources. The separation between the data access tier and the business logic tier could improve the performance of database access even though they are actually located on different servers and could also adjust well to frequent variations in database platforms yet relative fixed business logics. Besides, systems using the three-tier B/S architecture have many other advantages, such as capability of cross platform, scalability of system interfaces, and efficiency of data access.

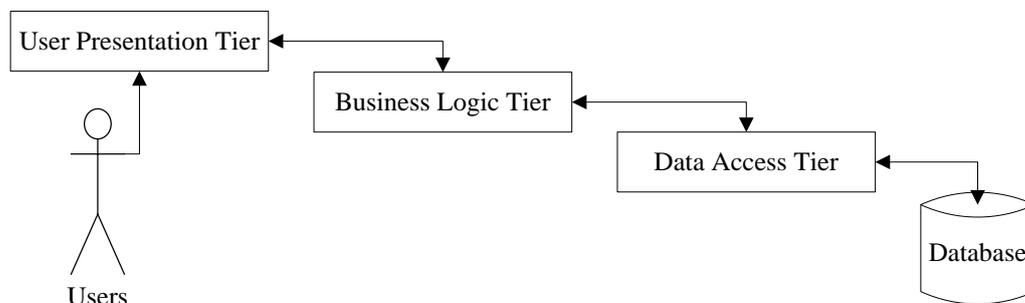


Figure 1. Three-tier B/S Architecture

Once we know thoroughly system requirements and choose appropriately the system architecture, we can divide the integrated and automated government affairs management system into four major modules, namely the login module, the approval flow module, the document management module and the system management module. Accordingly, Figure 2 shows the hierarchical modules of the system.

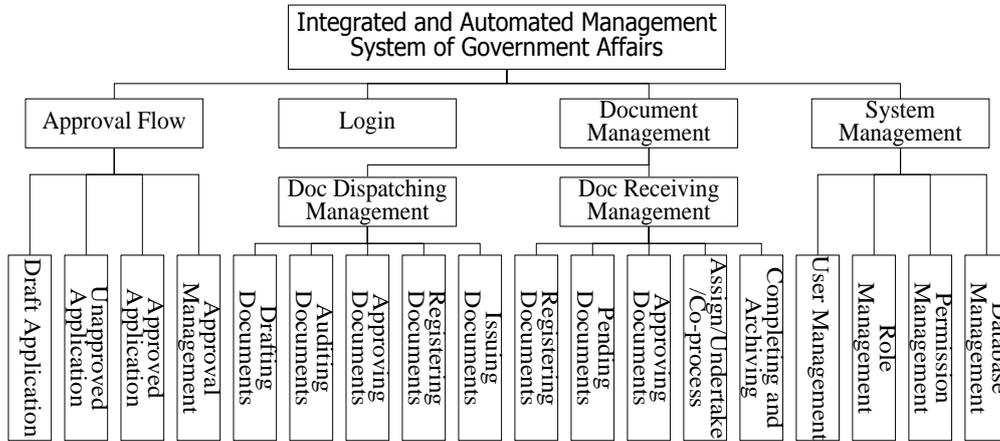


Figure 2. Hierarchical Modules of the System

3.2. Database Design

For the desired system, we design eight entities, which are the user information table USER_TIAM4GA, the role information table ROLE_TIAM4GA, the document receiving register table RECEIVE_REGISTER_TIAM4GA, the document dispatching register table DISPATCH_REGISTER_TIAM4GA, the system function table FUNCTION_TIAM4GA, the document information table DOCUMENT_TIAM4GA, the transfer path information table TRANSFER_PATH_TIAM4GA, and the department information table DEPT_TIAM4GA. Furthermore, we also show their relationships through an entity-relationship diagram in Figure 3 by using one excellent database tool called Powerdesigner according to the requirement analysis.

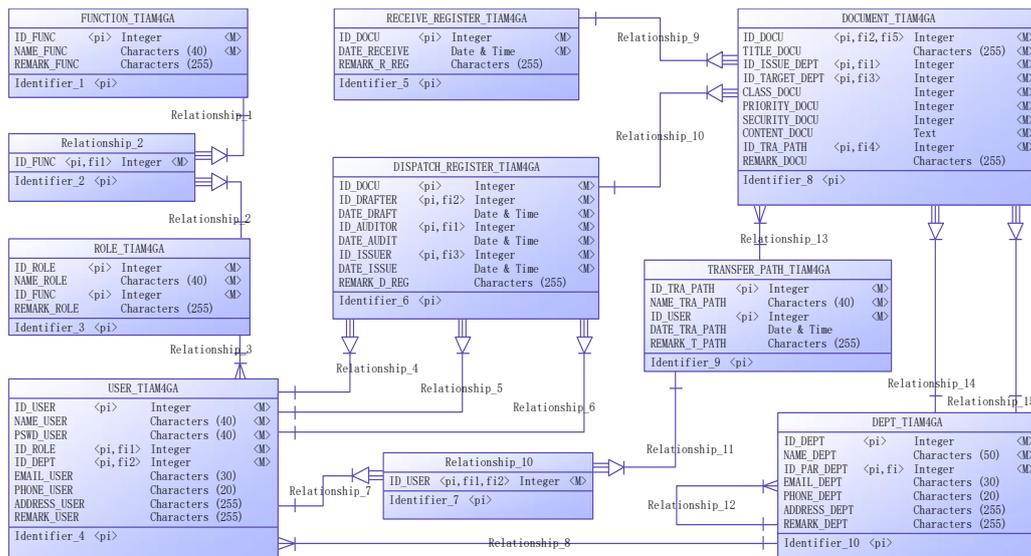


Figure 3. Entity-relationship Diagram of the System

4. System Implementation

According to the requirement analysis, we implement the integrated and automated management system of government affairs from four functional modules, which are the login module, the approval flow module, the document management module, and the system management module. Besides, for implementation environment, we adopt the Microsoft SQL Server 2005 as the relational database management system and the Microsoft Visual Studio 2005 as the integrated development environment of the ASP.NET based web applications.

4.1. The Login Module

4.1.1. Implementation Process: As the first component in the system implementation, the login module is the entrance of the required system. Once inputted user names and passwords are verified in the login page, the system identifies their roles and navigates them to pages of their own. Figure 4 shows the flowchart of the login module.

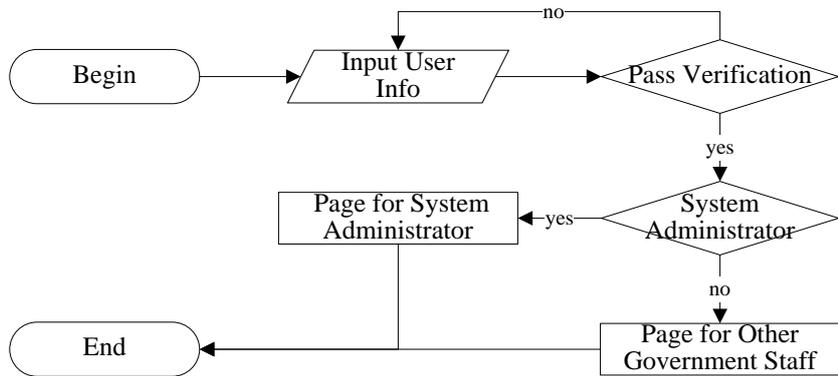


Figure 4. The Flowchart of the Login Module

4.1.2. Implementation Interface: Firstly, we adopt the Microsoft Visual Studio to develop an ASP.NET based system login page, as shown in Figure 5. The system users could enter their user names and passwords in this page. Then, verified users are introduced to their personalized pages. Items, such as announcements, short messages, email messages, and personal address book, are shown in the left catalogue determined by their roles.



Figure 5. The Interface of the Login Module

4.2. The Approval Flow Module

4.2.1. Implementation Process: In this section, we describe in detail how we implement the approval flow module. As we already know that, this module contains the approval management sub-module, the draft application sub-module, the unapproved application sub-module, and the approved application sub-module. Figure 6 shows the flowchart of the approval flow module.

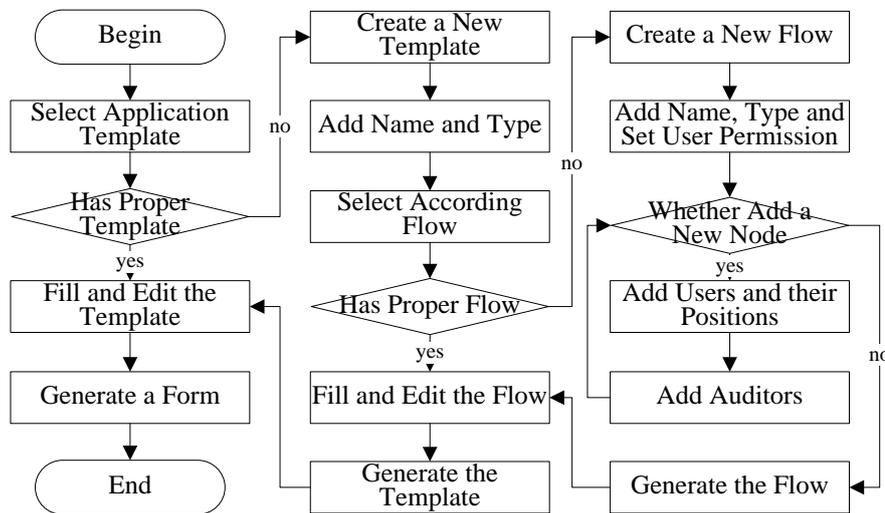


Figure 6. The Flowchart of the Approval Flow Module

4.2.2. Implementation Interface: Both the flows and the templates, as foundations, of the approval management sub-module should be defined by the system administrator before they are used. Usually, items of flows involve flow name, flow type, flow status, allowed roles, and jump conditions. On the other hand, items of templates are comprised of template name, template type, template status, default flow, attached documents, and allowed roles. Figure 7 shows the interface of the approval management sub-module.

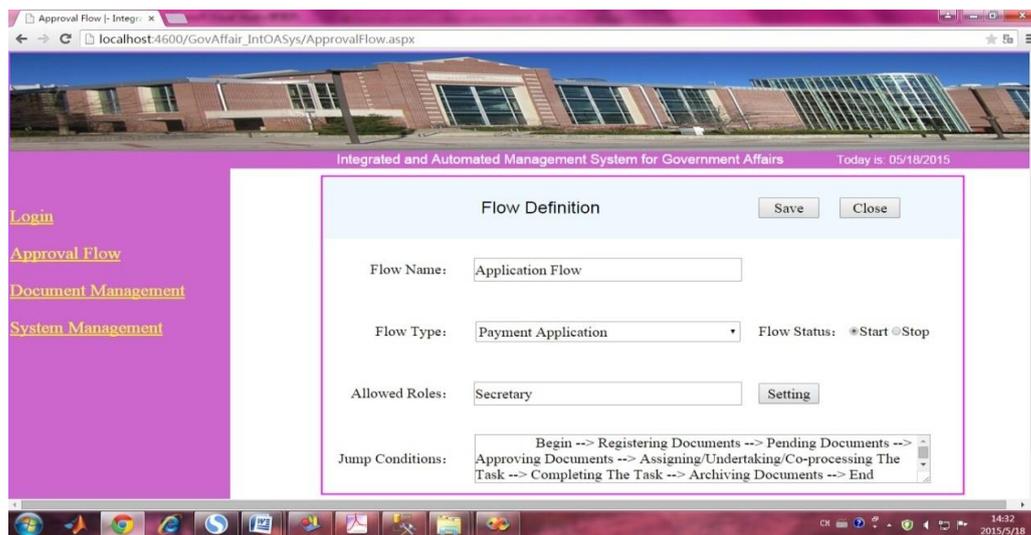


Figure 7. The Interface of the Approval Management Sub-module

Once flows and templates are defined during the approval management, users could draft an application with predefined templates. Then, the system distributes the completed

application to related users according to predefined flows. In this paper, we combine WORD/EXCEL formatted documents and HTML formatted forms as the template type.

4.3. The Document Management Module

4.3.1. Implementation Process: In this module, we need to provide system users with two crucial functions, which are the document receiving management and the document dispatching management. For the first function, the system adopts the document receiving register table RECEIVE_REGISTER_TIAM4GA to record various kinds of document attributes during its transferring processes, *i.e.*, registering documents, pending documents, approving documents, assigning/undertaking/co-processing the task, and completing the task as well as archiving documents. On the other side, the system adopts the document dispatching register table DISPATCH_REGISTER_TIAM4GA to record those attributes during major steps of the second function, *i.e.*, drafting documents, auditing documents, approving documents, registering documents, and issuing documents. Figure 8 shows the flowchart of the document management module.

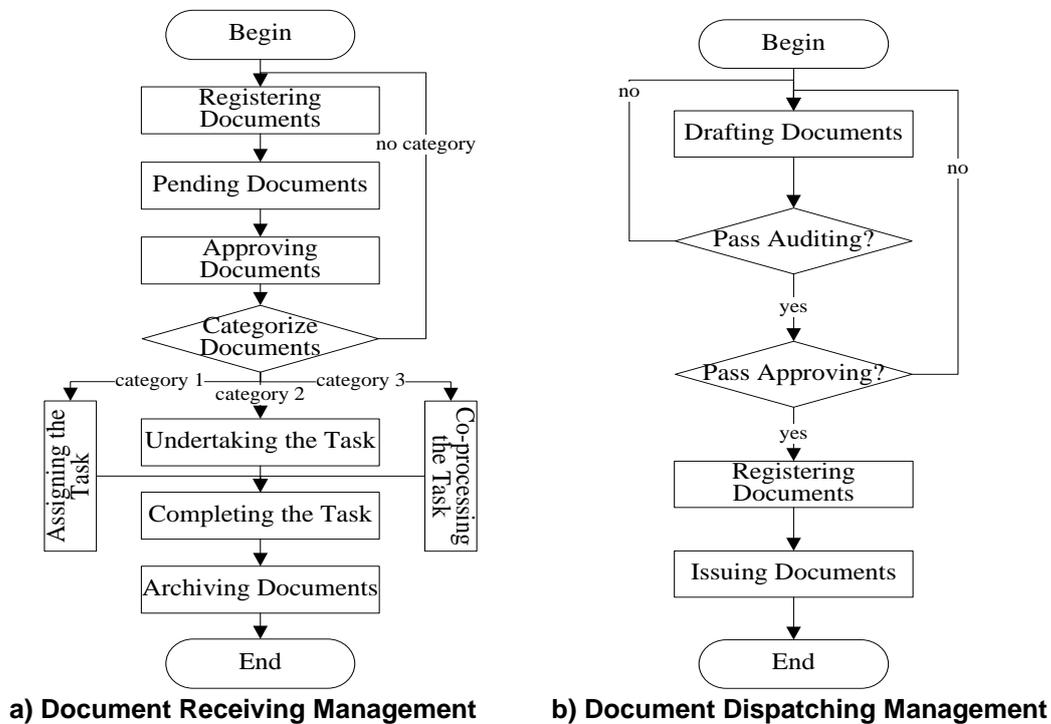


Figure 8. The Flowchart of the Document Management Module

4.3.2. Implementation Interface: For the document receiving management, we take the registering documents as an example to illustrate how we implement this sub-module. Figure 9 shows the interface of the registering documents sub-module. Items, such as upload documents, document type (Email, MS Word documents or scanned documents), and chief staff, are provided in the left. Once the form is filled by relevant handlers or the system, registered documents become pending, requiring further actions.



Figure 9. The Interface of the Registering Documents Sub-module

Furthermore, we take the drafting documents as another example to illustrate how we implement the document dispatching management. In the beginning, the document management administrator should configure dispatching templates and dispatching flows. The system provides users with a dispatching form, where items, such as confidential level, title, and key words, are filled by drafters while items, such as auditors, approvers and issuers, are automatically filled by the system. Then, drafted documents can be retrieved and then showed in terms of dispatching date, dispatching status and drafters.

4.4 The System Management Module

4.4.1. Implementation Process: According to the requirement analysis, the system management module should support the user management (corresponding to the USER_TIAM4GA Table), the role management (corresponding to the ROLE_TIAM4GA Table), the permission management (corresponding to the FUNCTION_TIAM4GA Table) and the database management (*i.e.*, database backup and database restore). Figure 10 shows the flowchart of the system management module, where CRUD refers to four basic functions of persistent storage, namely Create, Read, Update and Delete.

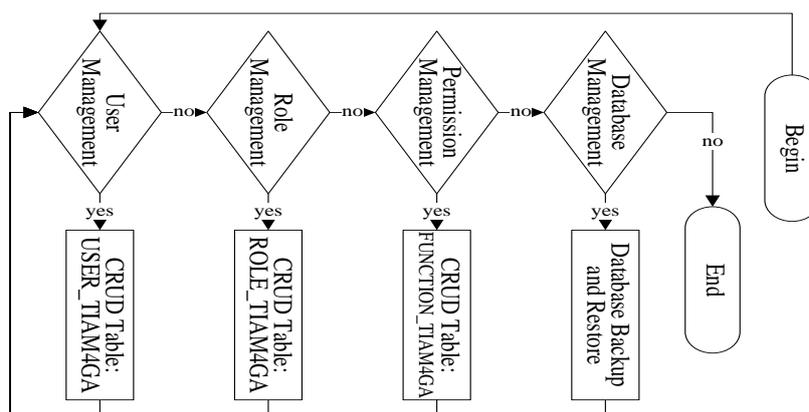


Figure 10. The Flowchart of the System Management Module

4.4.2. Implementation Interface: For the system management module, we illustrate how we implement the system by taking the user management as one example. By means

of the interface as shown in Figure 11, system administrators could perform CRUD database operations for the user management of specific departments or the whole system.

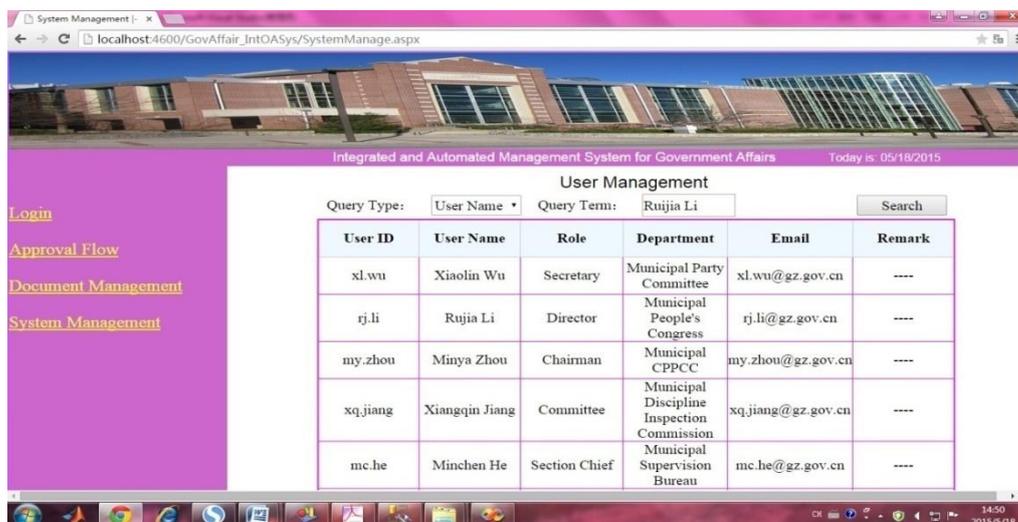


Figure 11. The Interface of the System Management Module

5. Conclusion

We have progressed rapidly in the government information construction during recent couple years. Benefitting both people and country, the emergence of the office automation has improved more or less the management quality, the office productivity, and the affair transparency. In this paper, we realized an integrated and automated management system for government affairs based on a thorough investigation of general government businesses in China. Based on the well known three-tier B/S architecture of ASP.NET, the system encompasses four functional modules, *i.e.*, the login module, the approval flow module, the document management module, and the system management module. However, because of time, energy and ability, only some basic functions are implemented in the system. In order to produce due effects of the system, several other additional functions should be considered in the future, (1) More attention should be paid to the network security management of the government affair management system, such as data backup, antivirus protection, and data encryption. (2) External sharing service interfaces should be provided to governments at all levels according to unified specifications. (3) More intelligent applications, such as data mining, expert system and decision making support, should be involved. (4) A mobile office automation system should be integrated into the traditional desktop office automation system as a supplement to reduce administrative cost and enhance work productivity.

Acknowledgments

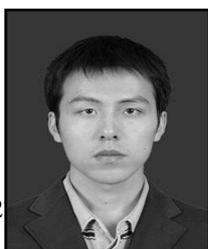
This paper was supported by the National Natural Science Foundation of China under Grant No. 31201135, the Pearl River S&T Nova Program of Guangzhou under Grant No. 201506010081, the Doctor Startup Foundation of Wuyi University under Grant No. 2014BS07, and the Basic Theory and Scientific Research Project of Jiangmen City under the title "Research on complex network evolution model and link prediction". We would like to thank anonymous reviewers for helpful comments.

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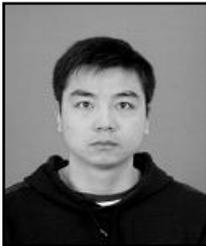
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