Design and Research of Paper Management System Based on SSM Architecture

Shixin Wang¹, Pengfei Hou¹,²*, Lijun Yun¹,² and Jingchao Zhang¹

1. Yunnan Province, School of Information, Yunnan Normal University, Kunming, 650500, China;
2. Yunnan Key Laboratory of Opto-electronic Information Technology, Kunming, 650500, China;
E-mail: houyu8806@163.com

Abstract. With the continuous development of Internet technology, major universities and colleges are also intensifying the annual increase in the number of college graduates. Graduation thesis as an important part of college students training has a very important role in the training of college students. Therefore, how to guide graduates to complete graduation thesis and manage graduate thesis has become more prominent in the work of colleges and universities. The biggest feature of this project is how to guide students to complete the thesis more effectively. The graduation thesis involves topics such as title review, opening report, literature review, project design scheme, thesis writing, and communication in all aspects. How to effectively monitor every aspect of graduation design, and how to let the teacher play a real guiding role is also Project to solve the problem.

1. Introduction

1.1. Research Status and Existing Problems
At present, information management has become the consensus of management in major universities. Some colleges and universities already have their own dissertation management system and work efficiency is still low. Students often go to the designated dissertation management system according to their requirements to complete the relevant stage of the work, and ultimately lead to project failure, low quality of the paper, and even plagiarism, paper writing and other serious scenarios.

1.2. Background and Significance
In order to better cooperate with colleges and universities to complete the thesis management, it is of great significance to re-explore and study a system that is more suitable for the current thesis management work. The system has function modules such as step by step management according to user roles, teacher-student exchange, thesis management, data statistics, thesis link monitoring, teamwork, task planning, and score evaluation and so on.

2. Demand Analysis

2.1. System Requirements Analysis
This system covers the whole process of graduation design work, and incorporates the entire graduation work flow into project-oriented management, that is, project-based teaching, and teachers
and students conduct teaching activities through joint implementation of a complete project work [1]. The system business use case diagram is shown in Figure 1.

![System business use case diagram](image)

**Figure 1.** System business use case diagram

### 2.2. Graduation Design Demand Analysis

The core module of the system is the thesis management system. It is designed based on the thesis management of the graduation thesis [2]. The data results of each link of the graduation design will be the data basis of the next link. Therefore, the flow chart through the graduation process is shown in Figure 2, the graduation design paper management flow chart

![Graduation design paper management flow chart](image)

**Figure 2.** Graduation design paper management flow chart

### 3. Related Theoretical Basis

#### 3.1. Software Development Methods

Software engineering is an engineering discipline that guides the development and maintenance of computer software. Use the concept, principle, technology and method of engineering to develop and maintain software. Combine time-tested and proven management techniques with the best currently available technology methods to develop high-quality software economically and efficiently. Maintain it [3].

Based on the small-scale management system of the SSM architecture paper and relatively stable software requirements, the waterfall model can significantly improve the quality and efficiency of software development. As shown in Figure 3.
3.2. Software System Architecture
Browser/Server, browser/server, is a multi-level distribution structure. As shown in Figure 4.

3.3. Main Techniques Used in the System
3.3.1 Spring+Spring MVC+My Batis Integration Technology
Spring is an open source framework. Spring was a lightweight Java development framework that emerged in 2003. It was derived from some of the ideas and prototypes developed by Rod Johnson in his book Expert One-On-One J2EE Development and Design [4]. It also provides an integrated framework for J2EE application development. As shown in Figure 5 and Figure 6.
MyBatis was formerly known as iBatis. MyBatis is an excellent persistence framework that supports custom SQL, stored procedures, and advanced mapping.

4. System Outline Design

4.1. System Structure Design
Based on the SSM architecture [5], the dissertation management system divides the system into three sub-modules: student sub-module, teacher sub-module, and administrator sub-module.

4.2. Database Design
Through the previous analysis system entity object, the graduation project thesis management system is transformed into a logical model:

5. System Detailed Design and Implementation

5.1. Overall Design of System Function Modules
Through the rigorous requirements acquisition and analysis of the graduation project design and the management of the paper, the overall design plan is determined through the system's outline design, and the overall layout of the software system, the functions of each sub-module, and the relationship between the modules are determined [6]. The system is divided into: user login module, thesis project
management module, student module, teacher module, administrator module and so on [7]. The function of each module will be described below. The module description is shown in Figure 7.

| Module name                  | Function outline description                                                                 |
|------------------------------|---------------------------------------------------------------------------------------------|
| User login module            | The user login module mainly includes checking whether it is a legal user. If it is not a legal user, it cannot log in. According to the user registration, the corresponding role submodule can be accessed after the registration is successful; the password of the mailbox is retrieved. |
| Project Management Module    | The project module mainly includes browsing project information, creating new projects, viewing project tasks, project resource management, team communication, and the like. |
| Student submodule            | The student's sub-module mainly helps guide students to complete the graduation design. It includes the following functions: browsing excellent works, thesis progress, project management, and message viewing. |
| Teacher submodule            | The teacher sub-module is mainly used to help teachers manage and guide students to complete the graduation design. It includes the following functions: graduation design progress supervision and management, project management, and viewing messages. |
| Administrator submodule      | The administrator's sub-module assists administrators in managing and maintaining graduation design dissertations, including basic settings, data import, thesis archiving, project management, data aggregation, release notifications, and viewing messages. |

Figure 7. Subsystem module description table

Combined with the system function module, the system flow is designed as follows. First of all, the user logs in to the system with his or her own logo. If the verification passes through the subsystems of the corresponding roles, different subsystems have different implementations of the thesis management system. Each subsystem can only perform the modules that belong to its own scope of authority. Operating [8]. After the user completes all operations, the system determines whether to exit the login. If the user exits the login system, the entire service will be ended.

5.2. Login Flowchart
The user enters the user name or mailbox and password to log in to the system. If the authentication succeeds, the user enters the corresponding subsystem [9]. Otherwise, the login fails.

6. Conclusion
This paper first analyzes the research status and development trend of the dissertation management system, and expounds the development environment and model based on dissertation management system. From requirements analysis to functional design, the final analysis of the entire system design process. The system overcomes the low efficiency of the paper management system currently on the market and lacks the disadvantages of teacher-student linkage. Using the integrated technology of Spring + Spring MVC + My Batis, a multi-level and comprehensive paper management system was realized. The system design process covers spring technology, Spring MVC introduction, and My Batis integration key technology. It has certain reference and reference value for the in-depth study of related technologies of the thesis management system. At the same time, this paper adopts multi-level distributed design structure, multi-functional and rapid operation experience. Practical and easy to

5
promote, can effectively improve the quality of the paper management, and has important practical significance for the construction of thesis management system.

7. References
[1] Zhou Lili. Grade Examination Management System Based on B/S Structure [J]. Computer Engineering, 2005 (S1):195-197.
[2] Wang Hong, Fu Jun, Wu Tingting, Li Yu, Lu Huifang. The setting and application of hospital nursing network examination management system [J]. Journal of Nursing Science, 2014, 29 (08): 64-65.
[3] Liang Wenjing, Cui Duwu, Zhang Yaling. Design and Implementation of Flexible Test Management System [J]. Computer Engineering and Applications, 2004 (27):111-113.
[4] Zhang Jiaguo. Research and analysis of online test management system of Yichun University [D]. Yunnan University, 2016.
[5] YE Xiaoxi. Construction of Test Management System Based on Campus Network [J]. Computer Systems & Applications, 2003(10): 26-28.
[6] Lin Qin. Modeling of Examination Management System Based on UML and Rational Rose [J]. Modern Computer (Professional Edition), 2007 (12): 105-107.
[7] Lin Yan. Analysis and Design Concept of Network Construction of Examination Management System in Colleges and Universities [J]. Journal of Changchun University, 2016, 26 (02): 4-7+27.
[8] LIU Shi, GUO Junfang, SHA Rengaoa, LIU Shan, YUE Pengfei, HAO Xiaoqin. Constructing Art Enrollment Examination Management System Based on Struts Framework and Web Application [J]. Journal of Inner Mongolia University (Natural Science), 2008 (06): 682-687.
[9] Wang Yuyuan. Java-based online test management system design [J]. Electronic quality, 2017 (01): 44-48.