Design on Educational Administration Management System based on SSH Framework

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Abstract: The educational management work under the traditional manual management method is increasingly unsuited to the development needs of the new era. Relying on the latest information technology such as Big Data and "Internet +", it must fully optimize the educational administration management methods and processes, and develop advanced educational administration management systems, so as to achieve efficient, systematic and automated educational administration. This article is based on software engineering ideas and methods to provide a complete solution for the development of educational administration management systems. The design content includes three aspects: one is to design the SSH technology framework integrated with Struts, Spring and Hibernate. The second is to design a functional framework composed of 20 subsystems. The third is to design a course scheduling process based on genetic algorithms, Improved the intelligence level of class scheduling.

1. Introduction

Educational administration management refers to the management of colleges and universities in accordance with the training objectives, in accordance with certain management principles, procedures and methods, to organize and coordinate the human, material, financial, time and information in the teaching process, to establish a stable teaching order, to keep the teaching process smooth, to make the teaching process coordinated, efficient, and optimized, ensure the completion of teaching tasks, and cultivate outstanding talents with comprehensive development of moral, intellectual, and physical education. In the new era, college education administration management presents new characteristics: First, the educational administration management concept is more scientific and advanced. The traditional management of student status, performance management, course scheduling, and examinations have undergone profound changes, requiring the educational administration to be guided by new ideas to adjust the talent training model and the quality standards of teaching in a timely manner. The second is that the content of educational administration management is more sophisticated and complicated. A series of teaching reforms such as the credit system, tutor system and elective system are being promoted, and the content of educational administration management is also undergoing drastic changes, and it is moving towards a more complicated and sophisticated direction. The third is that the management of educational administration is more flexible and diverse. With the popularization of big data and educational information technology, the time and space boundaries of educational administration have been broken, and educational administration is no longer a simple superposition of mechanical and repetitive work in the traditional sense, and new methods and new technologies are constantly emerging. In recent years, with the successive development of national quality engineering construction projects, some advanced educational ideas and concepts have begun to be implemented in colleges and universities, and educational administration has achieved promising results, but there are still many problems: increasing demand for teaching resources and increasing pressure on the operation of educational administration. The construction of educational administration

management team is lagging behind, and the overall quality needs to be improved. The educational administration management concept is backward, and the level of management services needs to be improved. Facing the new characteristics of college educational administration management in the new era and the existing problems of educational administration management, the specific measures for optimizing educational administration management in colleges and universities: lead by reform and comprehensively reform the educational administration management concept; take system as the starting point and comprehensively improve educational administration management System; relying on technology to comprehensively optimize the educational administration management process; taking culture as the guarantee to create a smooth management atmosphere of government regulations. The implementation of these measures in universities depends on advanced educational administration management systems.

The development of educational informatization and smart educational technology has injected new vitality into the reform of educational administration in universities. Colleges and universities should use large numbers Based on the latest information technology such as "Internet+", the educational administration management methods and processes are fully optimized. Colleges and universities use advanced computer information technology, network technology and storage technology to achieve efficient, systematic and automated teaching management systems. Through in-depth development and personalized customization of the educational administration system, the service-oriented educational administration network platform with the integration of "network approval, network registration, network printing, and network push" is further improved. A systematic, planned and automated educational administration management system can meet the query, statistics and analysis functions of educational administration information, and comprehensively improve the quality of education. This article is based on software engineering ideas and methods to provide a complete solution for the development of educational administration management systems.

2. Design on Technical Framework

The framework is a reusable design component, specifies the application architecture, and clarifies the dependencies and control processes between system components. MVC is currently the most popular software development framework. It divides the system into three parts: model, view, and controller. Each part is independent of each other. It has the characteristics of low coupling, high reusability, easy maintenance, and easy expansion. Developers can concentrate their energy. In business logic, it is conducive to software engineering management and enhances development efficiency. The J2EE field contains a variety of MVC framework technologies. Struts2, SSH, and SSi are mainstream application development frameworks. This system is developed based on the SSH framework. The technical framework structure is shown in Fig. 1.

Struts technology is based on the MVC framework. The implementation of Struts relies on Servlet and JSP implementations. EJB and JavaBean components are the basic components of Struts framework business function implementation. Action and ActionServlet components are important components of the framework to achieve control capabilities. The view part is organically composed of several internally connected JSP files to achieve system functions. Struts define a generic Controller. The configuration file Struts -config.xml isolates Model and View, and encapsulates user requests with the concept of Action, making the code more legible.

Spring is a powerful lightweight framework that solves many common problems in J2EE development and can replace EJB technology, providing a comprehensive solution for application development. Aiming at the shortcomings of traditional software development and deployment, such as complex deployment, slow running speed, many internal services, and difficulty in testing, Spring is based on the lightweight concept that all applications are configurable and selectable, removing unnecessary components and reducing the difficulty of using the Java EE API prevents excessive program coupling caused by hard coding.

Hibernate shields programmers from underlying database operations by encapsulating JDBC, allowing programmers to focus on object-oriented program development, which helps improve

development efficiency. The mapping file is the bridge between the Java objects in the persistence layer and the tables in the database. The job that the programmer needs to do to access the database is to prepare an Xml mapping file for the persistent object, which greatly reduces the time for manually using SQL and JDBC to process data during development. Through the configuration of a series of XML elements, the persistent classes are mapped to database tables, and the attributes of the persistent classes are mapped to data columns.

The basic business process of the SSH framework is: at the presentation layer, first implement the interactive interface through the JSP page, responsible for receiving requests and transmitting responses, and then Struts delegates the Request received by the ActionServlet to the corresponding Action according to the configuration file (struts-config.xml) deal with. In the business layer, the Spring IoC container that manages the service component is responsible for providing the business model component and the collaboration object data processing component of the component to complete the business logic, and provides container components such as transaction processing and buffer pools to improve the completeness of system performance and ensure data. In the persistence layer, it relies on Hibernate's object-oriented mapping and database interaction, processes the data requested by the DAO component, and returns the processing result.

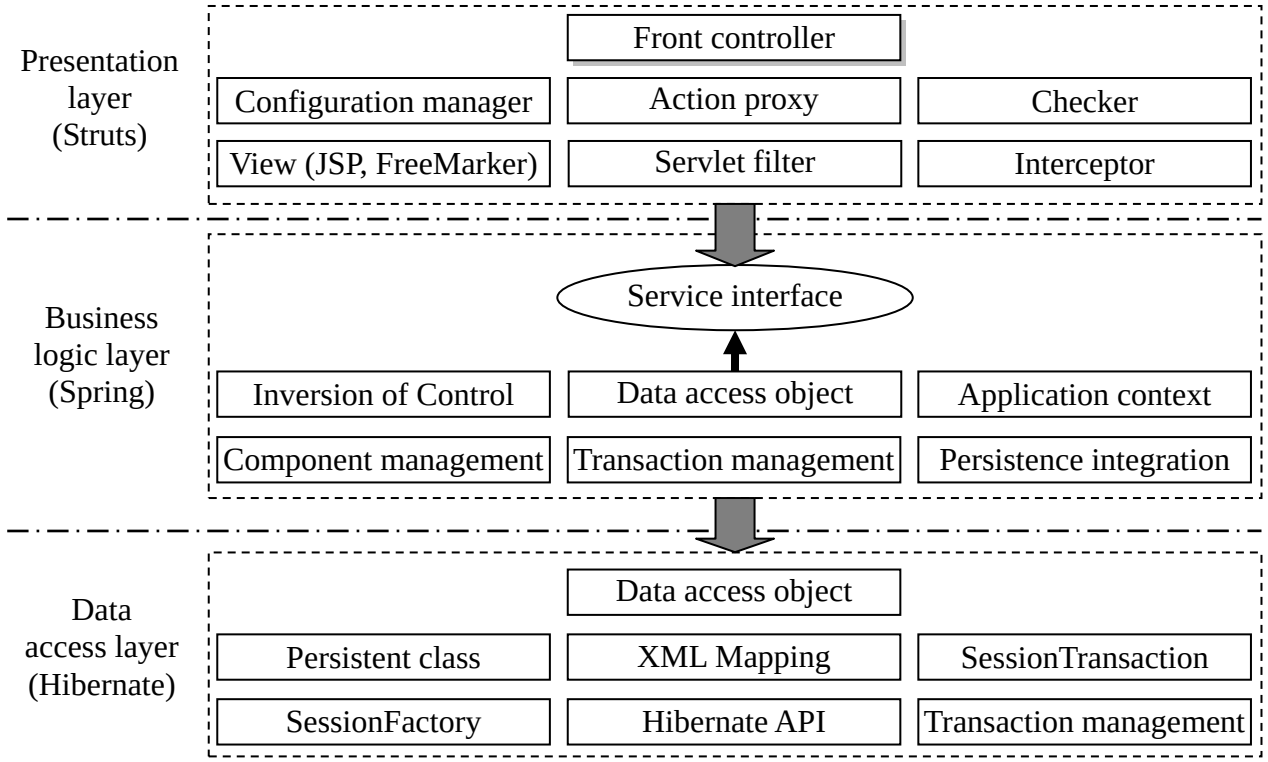

Fig. 1. SSH Framework structure

3. Design on Functional Framework

Software functions are the direct expression of software achievements, and the work done by users using software is realized through software functions. Functional design belongs to the outline design part in the software life cycle. It needs to follow the basic ideas of software engineering, and use the basic principles of abstraction, modularization, progressive refinement, and information hiding. Abstraction is to summarize similar parts and ignore the differences. Modularization is to divide the overall function of the system so that each module completes a specific sub-function. Gradual refinement is a top-down approach. The process details and data details of the software are refined until it is convenient to implement them in a programming language. Information hiding is that the implementation details of each module are hidden from other modules. Based on the above

principles, the function of the educational administration management system is designed into 20 subsystems, and the functional framework is shown in Fig. 2.

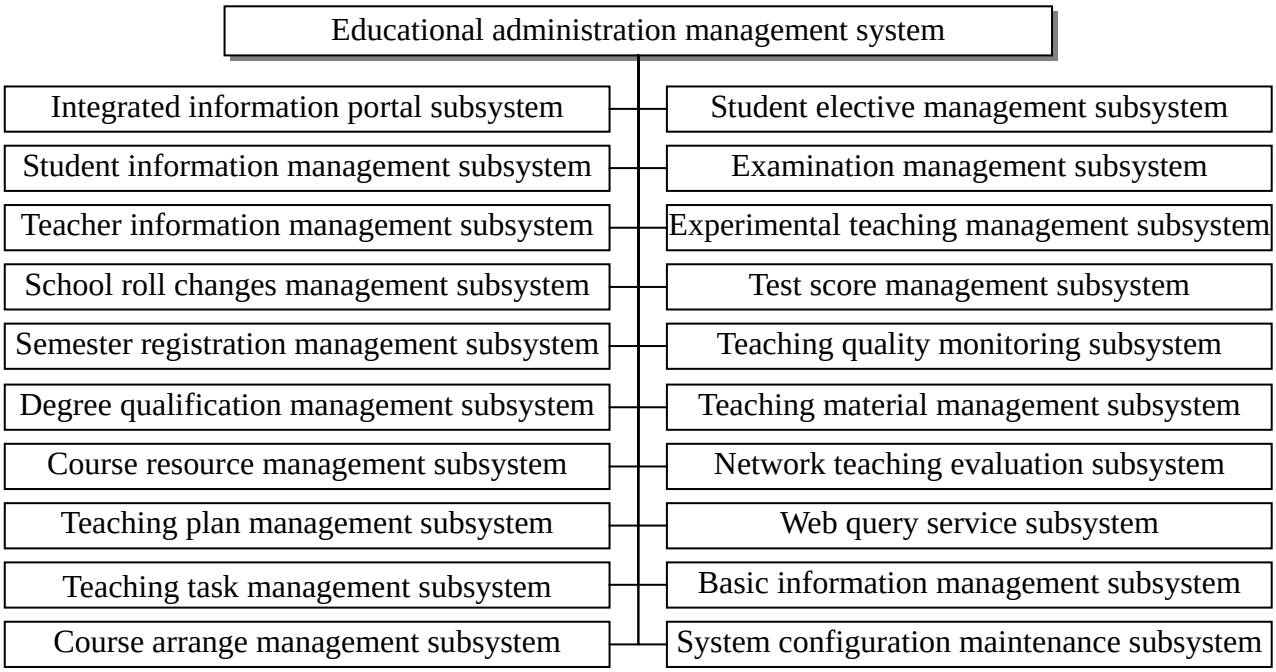

Fig. 2. Function framework on educational administration management system

4. Design on Course Timetabling Algorithm

Course timetabling is the core function of the educational management system. Course timetabling refers to the behavior of class, teacher, curriculum, and school teaching resources to make a variety of schedules for the normal teaching work. Course timetabling is a very complicated task, and the conflict of courses must be resolved, otherwise the teaching work cannot be carried out normally. The course timetabling process has the characteristics of combined optimization of multiple constraints and multiple objectives. In order to find the optimal solution to the problem and avoid conflicts in the schedule of time, classrooms, teachers, and classes, corresponding constraints must be met, including hard constraints and soft constraints. Among them, the hard constraints include: only one course can be arranged at the same place at the same time, the same teacher can only arrange one course at the same time, the same student can only arrange one course at the same time, and different courses of the same major cannot be arranged at the same time. The number of people attending the class cannot exceed the actual capacity of the classroom, and the teaching plan and teaching hours cannot be changed at will. Soft constraints include: all courses are distributed as reasonably and evenly as possible and cannot be arranged in consecutive days. Each teacher and student's daily courses cannot be arranged across campuses; two courses of consecutive sessions on the same day of students that the principle of proximity should be considered when arranging locations. The strong theoretical comparison courses should be distributed reasonably within the interval of each day, and the theoretical learning, practical teaching, and physical education courses should be arranged in succession. The core courses of the major should be arranged in the morning as much as possible, and the elective courses should be arranged in the afternoon or evening. The courses with special requirements are arranged first.

In order to find the optimal intelligent processing algorithm and achieve better convergence effect, the course timetabling system must rely on intelligent software. The realization of intelligent software requires detailed description of the existing constraints, and the mathematical description and mathematical model of the course timetabling system. Aiming at the complexity of the course timetabling system, in recent years, various intelligent algorithms represented by genetic algorithms have been widely used, which meets the individual needs of universities and has achieved good

results. Genetic algorithm is a theoretical model that highly mimics biological evolution, following the rules of survival of the fittest and survival of the fittest in nature, and a heuristic intelligent algorithm that simulates biological evolution. Drawing on this basic principle, it is introduced into computational mathematics to deal with various types of applications, so as to obtain an effective method for optimizing search problems. The whole process of genetic algorithm is a process of constantly finding the optimal solution to a problem. Therefore, a new solution will be given the process of each iteration, and each solution will be evaluated using the fitness function, and the chromosomes with high fitness will be retained before iteration. The basic flow of genetic algorithm is shown in Fig. 3.

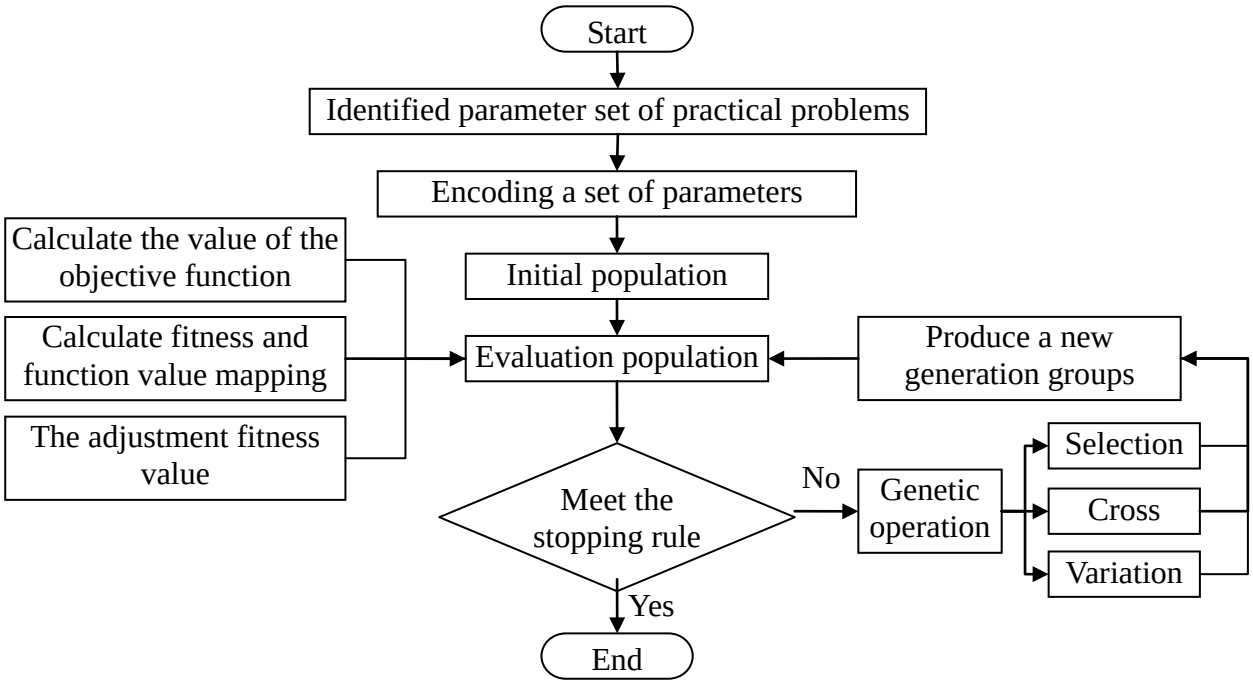

Fig. 3. Basic flow of genetic algorithm

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