

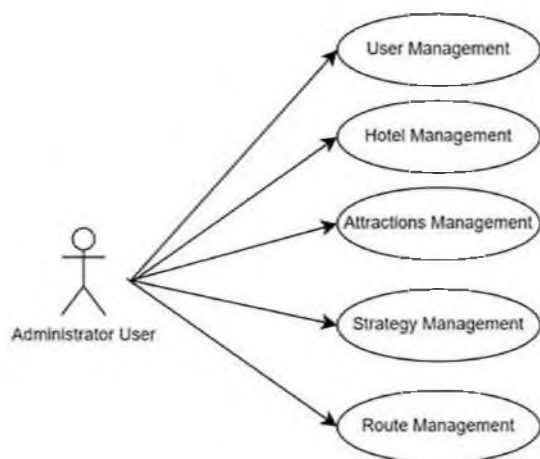


Figure 2 – Administrator User Use Case Diagram

common users;

- hotel management: add tourist attraction hotels, modify the basic information of tourist attraction hotels, enable or disable tourist attraction hotels;

- attraction management: add tourist attractions, modify basic information of tourist attractions, enable or disable tourist attractions;

- guide management: review travel guides posted by ordinary users;

- route management: add tourist attraction routes, modify basic information of tourist attraction routes, enable or disable tourist attraction routes.

After comprehensive system function testing, all functions of the system performed normally and reached the expected quality and stability standards. User login and registration functions,

tourism information management functions, hotel reservation and management functions, scenic spot reservation and management functions, travel route management functions and travel guide management functions have all been verified, and all functions are running well, and no major defects have been found. During peak hours and high traffic conditions, the system still maintains a stable operating state, and has sufficient security protection measures to effectively protect user information.

The tourism management system developed in this paper realizes the all-round management of the tourism industry through information technology. The system provides a visual interface and rich functional modules to facilitate customer operation and administrator management. The test results show that the system has good performance and stability, and is expected to play an important role in practical applications.

Reference

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UDC 004.415

DEVELOPMENT AND OPTIMIZATION OF THE UNIVERSITY LABORATORY MANAGEMENT SYSTEM

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Abstract. *The paper analyzes the current situation and problems of university laboratory management, studies the use of digital management tools in laboratory management, studies the development and implementation of intelligent management systems and proposes possible solutions for managing university laboratories.*

Keywords: information system, university laboratory, digital management.

In the university laboratory management system, we adopted Spring Boot architecture design, combined with MyBatis persistent layer framework and MySQL database, at the same time integrated a variety of mainstream technology stack, forming a fully functional, scalable project architecture. The system realizes the laboratory information management, equipment asset management, experiment course management, security management, data statistics and analysis, reservation management and

consumables management and other core function modules (Fig. 1, 2). These modules ensure that the system effectively supports the daily operation and management of the laboratory, and improve the use efficiency and management level. For example, the laboratory information management module allows managers to fully record and manage the basic information of the laboratory, including laboratory equipment, appointments, use records, etc., through systematic management, improve the efficiency of laboratory management, reduce the errors caused by human management.

The screenshot displays the 'Laboratory Information Sheet' interface. It includes search filters for Laboratory Name, Campus affiliation, Unit Name, Nature, Security level, and Laboratory Area. The main table lists 12 laboratories with columns for Laboratory Number, Laboratory Name, Campus affiliation, Unit Name, Nature, Security level, Laboratory Area, Manager Name, and operate buttons. The footer shows 'Showing records 1 to 10, total 12 records. Display per page: 10 Records'.

Laboratory Number	Laboratory Name	Campus affiliation	Unit Name	Nature	Security level	Laboratory Area	Manager Name	operate
S2S201	University Physics Laboratory (I)	Campus A	Unit 1	Basic Laboratory	Level 1	108m²	Zhang San	Operate
S2S202	University Physics Laboratory (I)	Campus A	Unit 1	Basic Laboratory	Level 1	108m²	Zhang San	Operate
S2S301	Digital and Analog Electronics Laboratory (I)	Campus A	Unit 1	Basic Laboratory	Level 1	108m²	Li Si	Operate
S2S302	Digital and Analog Electronics Laboratory (II)	Campus A	Unit 1	Basic Laboratory	Level 3	108m²	Li Si	Operate
S2S303	Digital and Analog Electronics Laboratory (III)	Campus A	Unit 1	Basic Laboratory	Level 1	108m²	Li Si	Operate
S3B431	Sensor Laboratory (I)	Campus B	Unit B	Basic Laboratory	Level 1	116m²	Zhang San	Operate
S3B432	Network-based electrical laboratory	Campus B	Unit B	Basic Laboratory	Level 4	116m²	Zhang San	Operate
S2S401	PLC Laboratory (I)	Campus A	Unit 1	Basic Laboratory	Level 3	108m²	Zhang San	Operate
S2S411	Microcontroller Laboratory (I)	Campus A	Unit 1	Basic Laboratory	Level 1	108m²	Zhang San	Operate
S2S303	Signal and System Simulation Laboratory	Campus A	Unit 1	Basic Laboratory	Level 2	108m²	Zhang San	Operate

Figure 1 – Display of the laboratory control interface

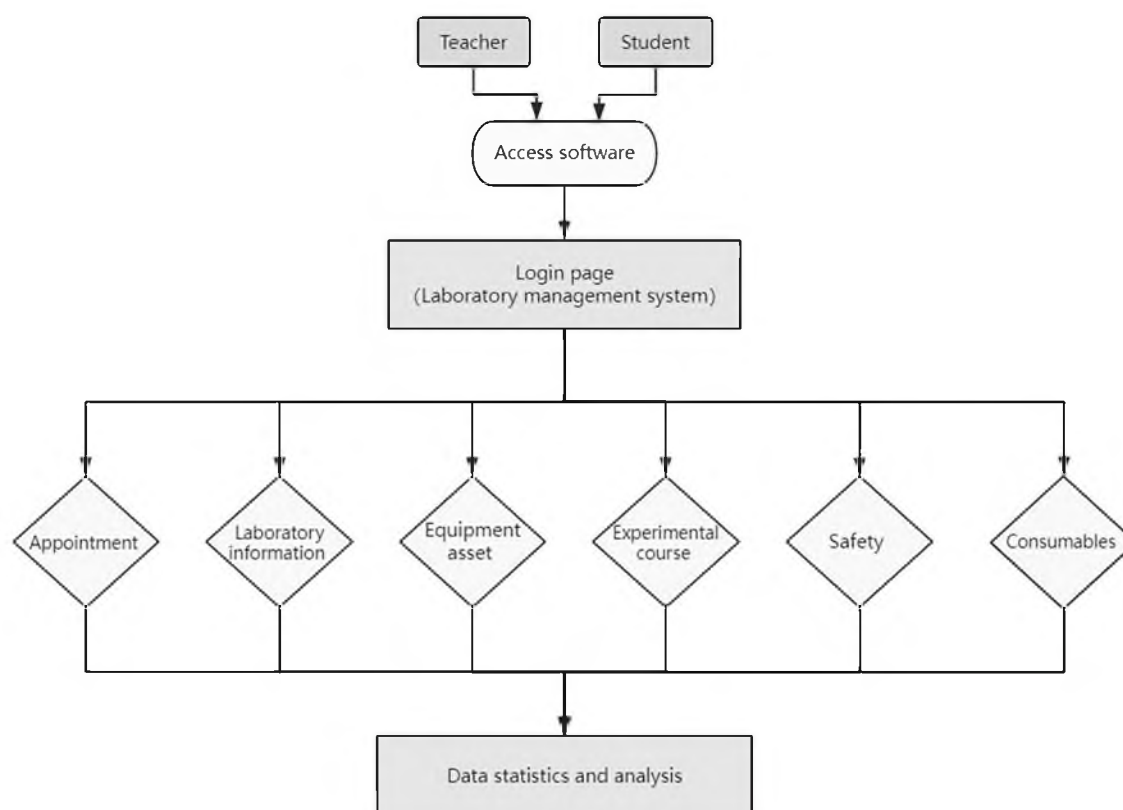


Figure 2 – Management system diagram of university laboratory

Equipment asset management module records the information of laboratory equipment assets, such as equipment information, technical parameters, purchase date, use status, storage location, real-time monitoring and tracking of equipment usage, including equipment maintenance, fault repair and tracking, asset management and audit, provide support for equipment maintenance.

The university laboratory digital management system is deployed in the laboratory management interface in the campus network and WeChat small program, which for users to log in according to the staff number and student number, and users to conduct relevant work and learning use according to the relevant authority.

Application users will be able to use the following features (Fig. 3):

- laboratory information management;
- equipment asset management;
- experimental course administration;
- security administration;
- statistics and analysis of the data;
- appointment management;
- consumable management.

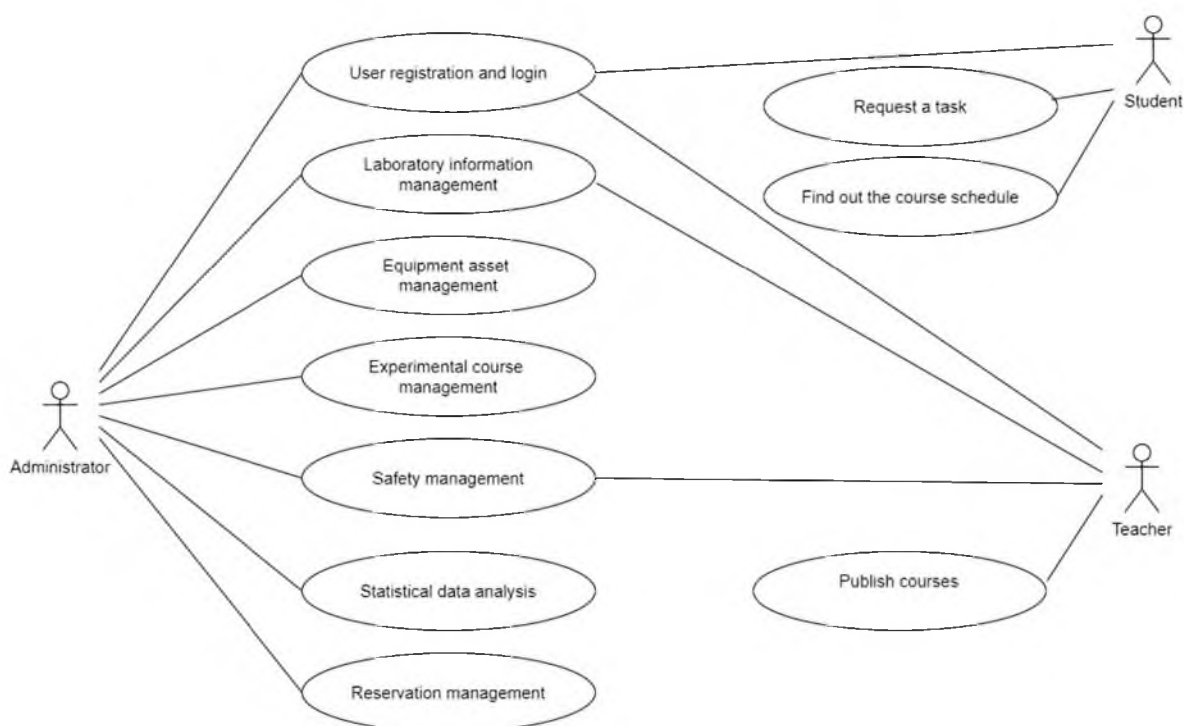


Figure 3 – System overall functional use case diagram

Design of the main class diagram of the system (Fig. 4), which shows the main components and interaction modes of a university laboratory management system, covering multiple modules such as user login, system user management, laboratory equipment, laboratory information, system log, laboratory courses and open laboratory.

In addition, the system has also built a perfect safety management system, including the release of safety rules, regulations, and safety inspection records, which effectively guarantee the safe operation environment of the laboratory.

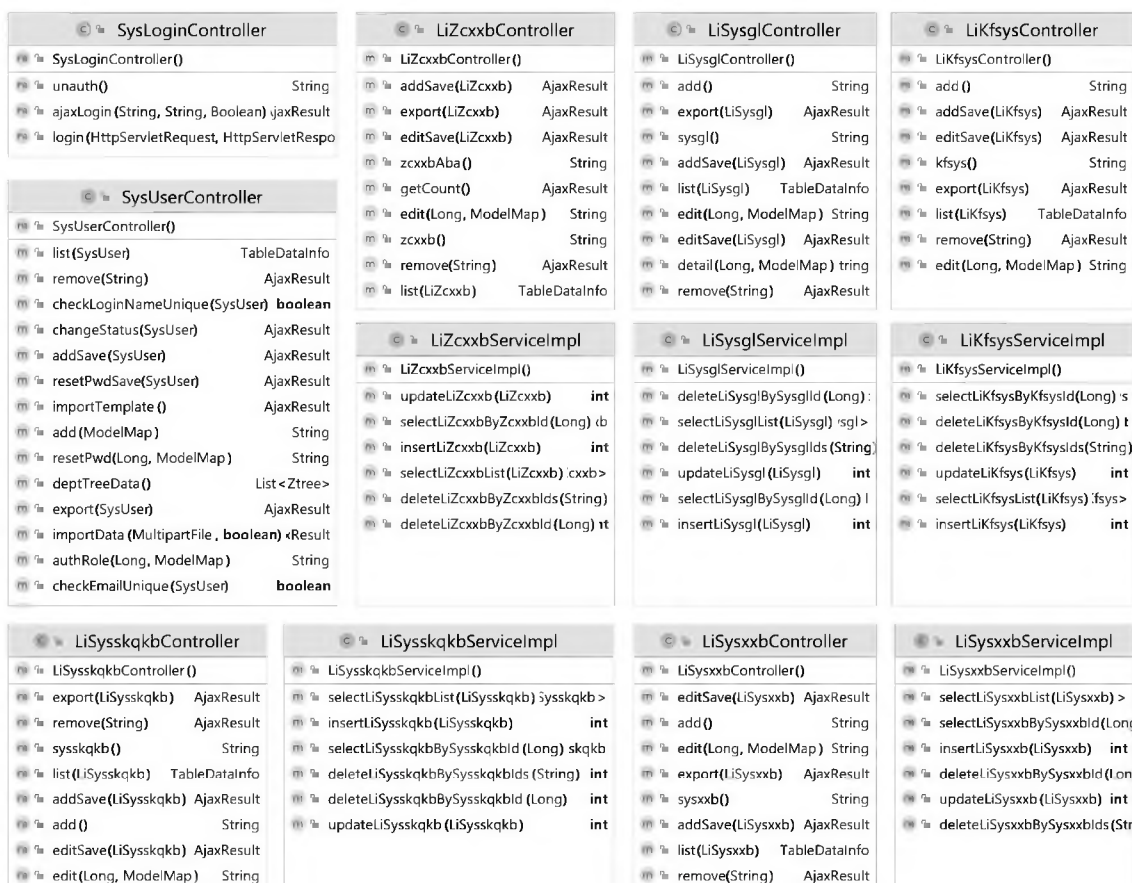


Figure 4 – Application class diagram

Reference

1. Website «Jiangxi University of Engineering» [Electronic resource]. – Access mode: <http://www.jxue.edu.cn/> – Access date: 08.02.2025.

UDC 004.415

DEVELOPMENT AND OPTIMIZATION OF THE VEHICLE PARKING MANAGEMENT SYSTEM

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Abstract. This paper discusses the key issues in the design of an intelligent parking lot management system. The system is developed to improve the management efficiency of parking lots and provide car owners with a convenient parking experience.

Keywords: smart parking lot, management system, vehicle management, parking space monitoring, user interaction.