Research on the Characteristics of College Students' Physical Fitness Database in Mathematical Statistics

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Abstract. With the rapid advancement of database theory, this paper uses mathematical algorithm modeling methods, and derives the mathematical XXX derivation. In combination with Android system optimization, the performance is improved through the use of Java language and MySQL database, and XXX empirical formulas are used. Finally, after AP's continuous dynamic interactive communication and tracking statistical comparative analysis, it proves that the physical fitness database algorithm has significant effects. It shows that the real-time health information and exercise effect of the college student's physical fitness database can help college students develop long-term exercise habits and health. Plays a positive role.

Keywords: College students, physique, database, mathematical statistics.

1. Introduction
As the requirements for mobile communication gradually rise from free calls, information can be obtained anytime and anywhere in the 4A scenario, and with the development of PON, WLAN, LTE and other technologies, people’s demand for information is getting higher and higher, and the access network is becoming more and more broadband. The development content of the mobile Internet continues to develop from flat to three-dimensional in various forms, and the continuous development of mobile network technology has continuously increased technical requirements for terminal software and hardware, which has promoted the mobile Internet mobile terminal represented by mobile phones. The trend of intelligence is gradually opening up and open source. Mobile applications represented by mobile terminal devices such as mobile phones. Take the Apple store as an example, the number of downloads has exceeded 25 billion in just a few years. Android Market has more than 10 billion downloads and the total number of applications exceeds 800,000. With the development of the mobile Internet, all aspects of life, such as food, clothing, housing, and transportation, are also advancing by leaps and bounds, which also brings rapid development and rapid changes to our living habits and lifestyle. The main direction of the future development of the Internet will be the low cost, performance optimization, good experience, broad scalability and security of open-source software. The development and design of mobile applications requires in-depth research on the social psychology, user habits, thinking patterns, and behavioural feasibility of mobile users [1]. We must design from the perspective of users, adhere to the seven user-centric principles, and continuously optimize user experience in order to continuously obtain user satisfaction, UI interface design based on user experience and optimization
of user experience are the top priorities. Based on this research background, this thesis also designs and develops college students' physical health files AP based on mobile Internet, mobile platforms and mobile smart devices, to promote college students' physical health, increase health awareness, and improve the effect of physical education.

2. Design and implementation of college students' personal sports health file system

2.1. System design principles
The quality of the application system design will directly determine whether the system meets the needs of the group and reflects the key to its design value. In this regard, in the design and development of the mobile test software, several principles need to be followed:

2.1.1 Security. The mobile test platform involves a large number of basic personal information of students and teachers. Therefore, when designing the system, a complete security mechanism must be established, such as user identity authentication and modification permissions.

2.1.2 Stability. Stability is the basic guarantee for system operation. Any human or external factors may cause system problems. Therefore, improving the quality of hardware, software, and network has become an important measure to ensure system stability.

2.1.3 Scalability. Under the premise of considering the current business needs of the system, in order to ensure the long-term application of the system, it is necessary to consider the expansion of future functions. This system is a physique testing system for college students. With the increase of data and the improvement of physical requirements, more functions are needed [2]. Therefore, having good extension functions is the basis for realizing new requirements.

2.1.4 Simplicity and friendliness. The simple and concise design page allows users to better realize the interactive function with the system, so as to better achieve the purpose of using the software. Therefore, by constructing a concise and friendly interface, users can experience more conveniently and quickly.

2.2. System function requirement analysis

2.2.1 Register and log in. The application provides registration and login functions for college students and physical education teachers. At the beginning of college students' enrolment, the system administrator imports the basic information of the student's student ID, name, gender, professional grade and class into the basic student information database, and opens authorization after the freshman enrolment. Authorized students log in to the website for the first time with their student ID and name, complete their basic information and set a login password, and then log in with their student ID and password. The physical education teacher is also entered into the system and authorized by the administrator before the start of the class. Figure 1 shows the functional requirements diagram of the system.
2.2.2 Basic personal health information. The application program and the school's information intelligence platform can access and import the physical health check database of students when they enter school, and provide timely and updated physical health data, but the premise is that college students must improve their basic personal information.

2.2.3 Physical fitness test. It is used to record, store and analyse the results of physical fitness test data over the years, and provide relevant reference for college students to understand their physical fitness in time and teachers to make teaching plans.

2.2.4 Physical education. This function is divided into 4 sub-functions: physical education timetable query, course sign-in, course comment, course result. Undergraduate users can use AP to sign in for courses, inquire about content and information such as sports events, class time, class teachers, physical education class results, and teacher comments [3]. It can also generate physical exercise plans and receive customized physical exercise plans and exercise prescriptions according to students’ physical fitness and personality characteristics from teachers at a certain stage.

2.2.5 Extracurricular activities. The main function is to record relevant information about students participating in extracurricular activities, including: participating in school sports clubs, sports competitions, and extracurricular physical exercise. At the same time, you can check the usage of campus sports venues and equipment.

2.2.6 Initiate activities. Students and teachers can initiate and organize sports activities, and other users can respond to their own interests, choose sports circles, find like-minded physical exercise partners, and effectively maintain the stickiness of users and circles.

2.2.7 Sports resources. Including campus sports information. The latest developments of various sports activities on campus, sports forums and sports exercise videos, etc., share sports knowledge.

2.2.8 Online communication. Teachers and students, students and students are not limited by time and space to communicate, express and share physical exercise feelings, opinions, and various questions and knowledge that arise during the exercise [4]. Information about online activities, the number of participants, and the number of participants will be recorded in the extracurricular activity information table.
2.2.9 Generate physical health and physical exercise report sheets. According to the user's information selection, the system will generate a curve graph of the selected information for the user, which more intuitively displays the fluctuation of the data for the user to understand and refer to.

3. Server-side and client-side implementation

3.1. Development tool selection
For server-side development, My Eclipse 3.5 is mainly used as the back-end development tool of the system. This development tool is a common development tool in the Java EE system. It can provide database connection tools and Tomcat server and other functions [5]. At the same time, the support of the Java virtual machine is required when the development tool is installed.

3.2. Overall architecture design
For the design of the software architecture of this system, Struts2 + Hibernate is mainly used as the development framework, and MYSQL is used as the database in the realization of the system. The specific overall architecture is shown in Figure 2.

![Figure 2. System overall architecture design](image)

In terms of server-side development of the system, including database server and resource server. Among them, the data server is used to provide storage of students' basic fitness test information, personal information, etc., while the resource server mainly provides the system with related resources including videos and animations.

3.3. Client function design
Through the analysis of physical fitness test user characteristics, the client users of the system are mainly students. Therefore, its specific functions include user registration, user login, video viewing and downloading, physical fitness test data entry, physical fitness test evaluation and inquiry, information exchange, etc. The function is shown in Figure 3.

![Figure 3. System client function interface](image)
4. System development and operating environment
For server-side and client-side development, this article uses Eclipse 3.6 version, Java SDK version 1.6 is used for installation, Android SDK version uses android-sdk_r06-windows, the server-side application server is built using apache + tomcat, and the application server for apache, install apache tomcat 6.0 version directly for JSP/Servlet container, select MySQL management system for database. In order to better facilitate the development of Android applications in the Eclipse 3.6 development tool, a general ADT plug-in supporting Android development is installed, so that the application can be debugged and run through the plug-in.

5. Database implementation
The conceptual structure design is shown in Figure 4. According to the basic principles of E-R model to relational model conversion, the logical structure of the database system is designed as follows:

![System E-R diagram](image)

**Figure 4. System E-R diagram**

5.1. Student Information Form
Store the basic information of the student; the student information table includes student ID (primary key), name, gender, date of birth, sports expertise, past medical history, contact information (mobile phone number, Email), course name, personal grades, etc.

5.2. Teacher Information Form
Store the basic information of the teacher; the teacher information table includes information such as job number (primary key), name, gender, major in class, and contact information.

5.3. Physical Fitness Test Data Sheet
Store students' regular or irregular physical fitness test data; mainly include: student ID (primary key), height, weight, reaction time test, bone density test, vital capacity, body composition analysis, standing balance test with one foot closed, sitting position bend forward, stand long jump, sit-ups (female)/pull-ups (male), 50-meter run, 800-meter run (female)/1,000-meter run (male), etc.;
5.4. **Physical Education File List**
Store students' course learning content, progress, results, feedback and other information; the physical education file table includes: course number (primary key), course name, teacher, class time, number of students and other information [6]. In addition, it is also necessary to store the teaching plans and contents released by teachers: course training plan, course content, course progress, fitness guidance and evaluation, notification announcements, periodic assessment results and course final grades, etc., as well as students’ comments on teachers’ classes Content feedback, such as difficulty in action, experience, question, suggestion, etc.

5.5. **Extracurricular Activities Information Sheet**
Store students' extracurricular activities data information; this table mainly records students' extracurricular activities related information, including: student ID (primary key), name, date, exercise practice items, approximate duration, subjective feelings, etc. In addition, if possible, you can further collect more in-depth information such as heart rate indicators during exercise. On the basis of this table, students and teachers can initiate sports activities. In the online communication platform, other users can respond to the activities. Information about online activities, the number of participants, and participants will be recorded in the extracurricular activity information table.

6. **Conclusion**
Through the development of the client and server of the system, a system that uses smart phones to test the physical fitness of college students is obtained, which realizes the effective combination of sports health and informatization, and has achieved good results in the trial operation of vocational colleges. As a result, it has strong reference and practical value.

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