

DESIGN AND IMPLEMENTATION OF AN ANDROID-BASED PHYSICAL TEST PRACTICE APP

* Liqi Lai, Jian Shu

Zhuhai Campus of Jinan University, China.

ABSTRACT: *In view of the current situation that it is difficult for students to fully understand the spirit of the constitution testing policy documents, the training and guidance methods are not complete, and the physical test scoring means are extremely complicated, the author designed and developed the physical test practice software based on the Android platform, the server side uses PHP language programming, and the database uses MySQL. This APP is mainly used for training and guidance of college students' physical test practice. Practical application shows that the developed system runs well with simple and convenient operation, and can better meet the basic requirements of physical test practice.*

KEYWORDS: Physical Test, Android, System Design, PHP, MySQL.

INTRODUCTION

Physical test is related to physical performance, exercise and good exercise habits. However, there are many problems in the current physical test. For example, students do not have a clear understanding of the purpose of physical test. In the current wave of Internet of everything and mobile learning, it is a trend to use mobile Internet technology for learning support. From the strategic level of vigorously advocating students' physical testing, it is necessary to combine the related work of college students' physical testing with mobile Internet technology to build a new learning platform.

With the development of mobile communication technology and intelligent equipment, mobile terminal application technology based on intelligent system develops rapidly, providing college students with new learning tools featuring real-time and convenience. The use of smartphone APP for body-side training has many benefits: 1) It can help students timely understand relevant information about physical examination and exercise knowledge, so as to stimulate students' learning enthusiasm and promote their physical examination results; 2) It can help guide students to train, assist teaching, and can promote learning by testing, cultivate students good habits of sports and exercise.

In CNKI, "sports mobile application", "sports APP" and so on were used as key words to search, and it was found that there were more than 150 relevant papers from 2006 to 2018 focusing on relevant research topics, which mainly involved mobile application prospect,

practice development introduction, system analysis and other aspects[1,2].It includes the design and development of apps for fitness test and exercise assistance based on mobile Internet and mobile intelligent devices.They play a different role in promoting college students to improve their physical test scores, better prepare for physical tests, enhance physical exercise, maintain the awareness of healthy exercise habits and assist physical education teaching.

By checking the mobile APP store, we can find that there are many sports apps, such as "Gu Dong" and "Yue Run Circle" for running.[3]Yoga, "Daily Yoga" and "a Basketball trick.[4].Apps for students' physical examination mainly include :(1) apps for internal use of the school[5]: it is basically developed by the physical testing company or the school's internal development, the openness is not high, and because the physical testing company is usually a service fee project, and the school's internal is mainly used for the physical testing notice, score checking and other functions, so there is a lack of professionalism and openness.(2) simple physical test scoring APP[6]: this kind of APP is small in size, providing the introduction of physical test content and scoring and other functions. Its advantage is convenient to use, but the number of content is limited, the lack of timely update of the server, often lack of personal information login system, unable to achieve personalized development.

In this paper, an android-based physical test practice APP is designed to transfer the policy documents of physical test, provide the guidance and Suggestions for physical test exercises, and calculate the comprehensive scores of physical test according to the scores of physical test.

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System Architecture

The software designed uses Android to develop and adopts the classic server-side and client-side (C/S) architecture[7].Among them, the interpretation of policy documents and relevant information of physical fitness test are stored on the server, and users can log in to obtain relevant content through the client program installed on the mobile device.

In order to improve the scalability and maintainability of the system, MVC is adopted as the design pattern[8]. The server is built on the alibaba cloud web host platform, using PHP language for programming development, and the client uses JSON (a lightweight data format for data exchange) for data interaction.The program development of the client is based on the Android operating system and makes comprehensive use of core components such as Activity and Intent.The Activity technology is responsible for implementing the user interface, and the Intent is responsible for page jumping and data transmission[5], the main business logic is implemented through interfaces.The architecture of the system is shown in figure1.

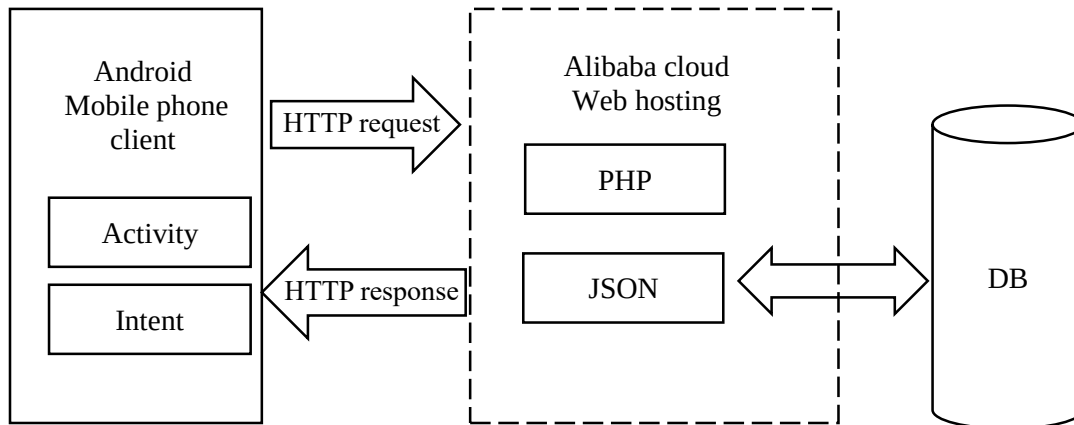


Figure 1: System Architecture of the Software

System Function Module

According to the goal and actual needs of the system design, the functional modules of the software system are drawn, as shown in figure2. As can be seen figure2, the main functions of the system include six basic function modules : (1) registration and login module; (2) physical training knowledge module; (3) special guidance module for physique testing; (4) score module of physique test; (5) background login function module; (6) information content management module. Of these, the first four are client functions and the last two are server functions.

(1) Register the login module

In order to ensure the integrity of users' learning and the validity of records, the software sets up the user registration and login module. The user name, age, name, user password and email address need to be entered during the registration. If the registration is successful, the user needs to go to the email address for verification. After logging in, you can conduct personal information management, including maintenance of physical fitness test related comments or sports records.

(2) Sports training knowledge module

The design of this module is mainly to popularize the policy documents related to physical fitness testing to users, and at the same time, it also pushes sports training, health management, news and other information related to physical fitness testing to users, among which, the information is displayed in a drop-down list. This information is transmitted to the client through the back-end server to update the information in a timely manner.

(3) Special guidance module for physique testing

According to the requirements of the physical test project, pictures and text courses are provided, and the physical test content is graded, step-by-step and targeted to guide the training, so as to help users carry out the physical test training scientifically and effectively. In

addition to the regular physical exercises, there are also auxiliary instruction programs such as tai chi, fitness, walking and running.

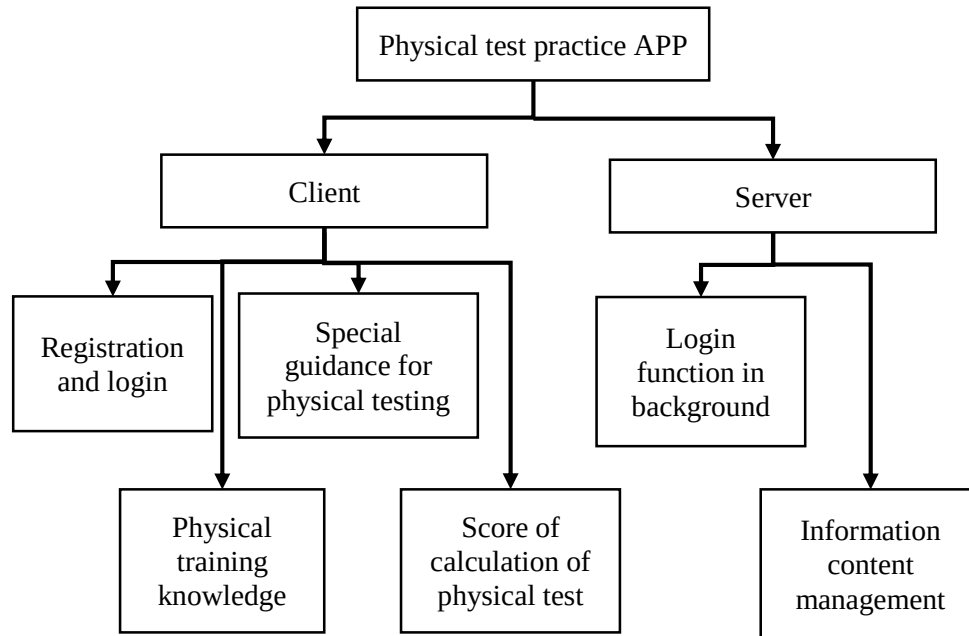


Figure 2: Functional Structure of the System for Physical Test

(4) Score module of physique test

When calculating the score of physical test, the total score of each test entered by users shall be calculated according to various scoring standards. The main indicators include height, weight, lung capacity, 50m and standing long jump, which are shared by both boys and girls. There are also 1,000m and pull-up events for boys and 800m and sit-ups for girls.

(5) Background login function module

This module is used for the administrator to browse the list of users, delete, add, modify and permissions and other operations, as well as the management of various background information and status.

(6) Information content management module

The client side sports training knowledge module relies on the server side information content management module to update, the administrator will collect the information for processing, but also for the information classification and sorting, addition and subtraction and other operations.

Database Design

Database design is an important part of system development[6], mainly for the logical

analysis between entity object attributes. The database design needs to integrate the user information, query the motion information and design the table structure of the physical database.

(1) E-r diagram of system relation

The e-r (entity-relationship) diagram provides a way to represent entity types, attributes, and relationships[9]. By analyzing the structure of the application, it can be known that there are three entities: "user", "information" and "physical measurement". The e-r diagram of the application structure is shown in Fig.3. As can be seen from Fig.3, one user can view multiple information, and one information can be viewed by multiple users, so the relationship between users and information is many-to-many. A user can have multiple scores (users can take multiple scores), and each score can only be one user, so the relationship between users and scores is one-to-many.

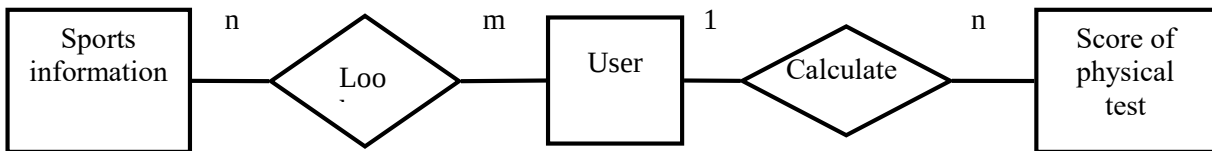


Figure 3: E-r diagram of system relations

(2) Database table structure design

The table structure of APP database for physical exercise is shown in figure 4. As can be seen from the figure, there are three tables involved, namely user information table, physical test table and sports information table.

Physical test table		User information table		Sports information table	
PK	<u>User nickname</u>	PK	<u>User nickname</u>	PK	<u>Information</u>
	Height weight Lung capacity Score of 50 meters Score of 800 meters Score of 1000 meters Sitting position forward Bend result Results of sit-ups Chin-up scores		Mobile phone no. WeChat Gender Medical history Sports hobby Contact		The title Describe Content Comments The thumbnail

Figure 4: Database table structure

User information table: it is used to store users' basic information, including field information such as "user nickname", "gender", "mobile phone number", "WeChat ID", "email", "previous medical history" and "sports hobby". The above information needs to be added manually when a user registers, where the "user nickname" is the primary key.

Physical test table: it is used to store the score information of physical test, including the user's nickname, height, weight, lung capacity, 50m, 800m, 1000m, sit-forward, sit-up, pull-up and long jump. Where a user nickname is both a primary key and a foreign key.

Sports information table: stores sports training information, including primary key id, title, description, content, comment, thumbnail and thumb up.

OPERATION AND APPLICATION OF THE SOFTWARE**Figure 5: Registration and Login Interface Figure 6: Physical Test Training Interface****Figure 7: Sports Information Interface Figure 8: Interface of Physical Test Calculation**

In order to promote the use of the software, the development team named "physical expert". Before the official launch, the development team conducted repeated tests on the software to find existing problems and make timely modifications. At present, the experts have been used in tencent app bao online, and has a certain amount of downloads. According to the feedback from test users and download users, the software functions run well and no other abnormal phenomena appear.

Figure 5 shows the user registration and login interface. The user name and password can be entered for login. Figure 6 is the homepage after entering the software, and it is also the module of users' self-measurement training. In addition to the physical exercise program, we also added four auxiliary instruction programs, such as tai chi, fitness, walking and running. Figure 7 is the interface of sports information. Through this module, users can view the interpretation of the policy documents of physical fitness testing, and at the same time, they can learn about sports and fitness information and obtain sports-related information. Figure 8 is the physical test calculation interface. The software can automatically calculate the comprehensive score of the physical test according to the scores entered by users.

CONCLUSION

As a part of college physical education informationization teaching, the APP of physical test experts, based on the Android system platform and the mobile Internet, focuses on the training and exercise guidance of college students' physical testing, providing free use for teachers and students, and also helping physical education teachers to assist in teaching. The initial online operation practice shows that the APP has stable operation status and good application effect, which is worthy of more extensive promotion.

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