

# Design of Internet of Things Analysis and Management System for Quality Data

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## ABSTRACT

Through the application of data mining technology and database technology, this paper designs and develops a three-tier framework of B / s technology for college students' quality analysis and management system. System development software environment is as follows: SQL Server 2005 database, C language and ASP.NET The overall function of the technical department is divided into four modules, namely, physical examination management, sports performance management, statistical analysis and basic file data management. The construction of these four modules makes the analysis of sports quality information. Using data mining technology and decision tree algorithm to complete the collection of students' physical education results, and provide data for the next step to improve students' physical fitness. This paper involves the development of system analysis, system design, system coding and testing and the application of related knowledge.

**Keywords:** Analysis of sports quality ASP.NET Technology SQL Server2005

## 1 INTRODUCTION

From its birth to its wide application, Internet of things technology has made rapid progress and considerable development, creating a new pattern of human survival and development. The application of new Internet of things technology not only accelerates the development process of human society modernization, but also has a broad and profound impact on human development. The problem of human development is the core issue in Marxist theory. Marx and Engels integrated the thinking of human development into his philosophical system, explored the root causes from the field of political economy, and regarded the realization of human free and all-round development as the fundamental value orientation of Communist society. Starting from the standpoint of Marxist humanism, combined with Marxist philosophy of technology and taking modern Internet of things technology as the research starting point, this paper studies the design of Internet of things analysis and management system for quality data of contemporary Internet of things technology, and then deeply analyzes a series of complex and profound effects it brings to human development.

Net framework technology is undoubtedly the core part of the general language runtime, this technology in the process of specific work is mainly selected the virtual machine technology, in addition, many common market development languages can be used under the net frame

work technology; the benefits of net framework technology are far more than that, Net framework technology can also be tailored for the EXE program, targeted development technology and a series of functions; many aspects of the update and improvement for the majority of software development company programmers is a very obvious help, to help them improve work efficiency is a very good tool Si. Net framework technology can be used to help create windows applications.

Net framework technology is the base of net application development[1]. Specific to the whole framework, the bottom layer of the whole framework is the common runtime language environment, which is the most basic and important part of the whole technical framework. Net framework technology unique component concept (assembly) is also a concept that needs to be emphasized here. Any net application on the market in the final release process is through the form of components.

## 2 RELATED WORK

### 2.1 Overview of Internet of things

The intelligent service based on a runs through the whole "cloud edge end" architecture. At the sensing terminal, technology a aims to improve the sensitivity and accu-

racy of comprehensive perception, the real-time performance of machine interaction and object interaction, and can also carry out simple logical reasoning through the chip. At the edge, technology is mainly responsible for collecting local data and relevant business data in the domain, Complete the analysis and reasoning of perceptual data, and be able to transmit relevant analysis results or models to the perceptual terminal to achieve the collaboration between the perceptual terminal and the edge cloud. At the same time, the edge cloud and the edge cloud can also share data, resources, algorithms, etc. through networking to complete the mutual collaboration between the edge clouds. In the cloud, it is not only necessary to provide cloud computing related storage similar to the edge cloud Computing, network and security resources also need to collect and integrate all data and provide intelligent services based on global data, including intelligent scheduling, operation and maintenance, macro decision-making, etc. cloud center is good at global, non real-time and long-term big data processing and analysis, and can give full play to its advantages in the fields of long-term maintenance, business decision support, etc. Edge computing is more suitable for local, real-time and short cycle data processing and analysis, and can better support the real-time intelligent decision-making and execution of local business. Edge green computing and cloud center are complementary and collaborative. Edge cloud collaboration will amplify the application value of edge green computing and cloud computing: edge computing is not only close to the implementation, but also the collection and preliminary processing unit of high-value data required by the cloud, so as to better support cloud applications; On the contrary, the business rules or models optimized and output by cloud computing through big data analysis and processing can be distributed to the edge side. Edge computing is based on new business rules or models. In addition to edge cloud collaboration, cloud interconnection and cloud network integration have also become an important trend, which refers to the interconnection and sharing between cloud centers, including dynamic adjustment of service resources, rational allocation of computing resources, institutionalized business interoperability, etc.

Static data and dynamic data sheet in terms of data changes, Internet of things data can be divided into static data and dynamic data. Most of the static data are label data and address data. Most of the data generated by rfid are stored in structural and relational databases; Dynamic data is based on sequence data. Each data of dynamic data of the Internet of things has a corresponding relationship with time, and this relationship is particularly important in data processing. This kind of data storage usually adopts the mode of time series database, and the data will increase with the increase of sensors and the number of

devices; Dynamic data not only increases with the number of devices and sensors, but also increases with time. In IOT 1.0, the growth of data is linear, not exponential, because the dynamic data of IOT is continuous, so the data is massive. Therefore, the pressure of IOT stage 10 data is controlled and not as uncountable as it is transmitted. Uncontrollable source type / diagnostic type. In terms of the original characteristics of data, we can divide IOT data into energy type data, asset attribute type data and diagnostic type data. Source type data refers to the relevant data that can be related to energy consumption or required to calculate energy consumption, such as current, rate factor, frequency Harmonics, etc. Energy data is the most critical data class of the Internet of things. One of the ultimate purposes of the Internet of things is to save energy, obtain energy data, understand energy data and analyze energy data. It is a necessary function in the implementation of the Internet of things[2].

The correlation between data is the relationship between different data. The relationship between data has the most direct impact on understanding the operation of the whole system. Combing the correct relationship between data is the cornerstone of the effective operation of the system and generating value. The correlation between data can be analyzed from the following aspects: the data at the same time is photographed, and the data is generated by the system at the same time. It reflects the state of the system at this time. From the perspective of the data world, the system is the data set at this time. Data photography reflects the static display of the system; Time division stamp is the key factor of this kind of data, so it is required that the time stamps obtained by each data must be the same. Time stamp is missing in many data at present, and it is also the process relevance of the problem that needs to be paid attention to and solved in the implementation of the Internet of things: that is, the data of one point affects the generation of the data of the second point after a certain time, which reflects the dynamic process display of the system. The process relationship between data needs to be provided by the model and corrected in implementation. Timeliness of data timeliness of data refers to the time from the generation of data to its elimination. Data timeliness is determined by the implementation unit of the system. Data can be used many times, or it can be eliminated after being used once. Generally speaking, whether the process data or the edge data affects the timeliness of the data. Generally, the timeliness of the edge data is short and the timeliness of the remote data is long. The data required by the edge part is usually timely, but the edge storage space and computing power are weak, so it can not be saved for a long time; Remote data is usually historical data display, calculation and analysis. At the same time, cloud space and computing are highly scalable. Therefore, data timeliness is long,

and the real-time performance of data is also a part of data timeliness. Real time performance is related to the deployment location, importance and transmission mode of data.

## 2.2 B / S architecture

In the past common architecture, the client will be subject to some constraints of the system. However, B / S architecture is no longer subject to this constraint, you can directly enter the browser through the network protocol software to get the information you want. B / S architecture completes the transaction mainly on the server side. By exchanging the user's corresponding requirements with the server, the server will understand what the customer needs, and then proceed to the next step of operation. The features of B / S architecture are as follows:

1. When the customers have the network, they will send the information they want to get to the server, so the system will automatically arrange the web program at the server terminal, and then the operation is completed.
2. Web application upgrade and other follow-up work needs to be done, customers can operate on the server by themselves, without the administrator to deploy and other operations.
3. There are many users that need not be equipped with a system administrator to deal with different needs of different customers.
4. Due to different types of customers, seat customers are vulnerable to virus intrusion when using internet access, which is also the biggest drawback of B / S architecture.
5. There must be professionals to monitor and maintain the server terminal for a long time to ensure that customers can access the Internet normally
6. On the Internet environment requirements are higher, must be a good signal, the environment security of the Internet.

UKF algorithm is based on the filtering value  $X_1$  of state variable  $X$  at  $k-1$  time and its error covariance estimation  $P_{k-1}$  to generate sigma point set and then obtain  $X_k$ . However, if we add backward smoothing on the basis of standard prediction after the observed value  $x$  at time  $k$  has been obtained, its estimated value and  $P_{k-1}$  are better than those of and  $P_{k-1}$ . Therefore, the accuracy of filtering approximation can be further improved by generating sigma points based on star and  $P_1$ .

The detailed process of BS algorithm is as follows:

$$\hat{X}_{0/0} = E[X_0] \quad (1)$$

$$P_{0/0} = E[(X_0 - \hat{X}_0)(X_0 - \hat{X}_0)^T] \quad (2)$$

## 3 DATA ANALYSIS

### 3.1 System structure

The system structure mainly has the following two forms: client / server structure, abbreviated as C / S structure, which is a commonly used double-layer structure, as shown in Figure 1. This structure gives full play to the processing capacity of the client PC. after the client completes a lot of work, it will be submitted to the server. This has the advantage of fast response speed of the client; By taking advantage of the hardware advantages of the client side and the server side to deal with their assigned tasks respectively, the communication expenditure of the system is effectively reduced: the application program of the system is separated from the server side, which improves the stability and flexibility; the database application program and data of the two-tier structure are separated, so they can be developed and maintained respectively: it is mainly suitable for LAN, It reduces the workload of database server, reduces the traffic on the network, and has high security. Browser / server structure, abbreviated as B / S structure, is an improved structure based on C / s rising with the development of Internet technology. B / S is a web based on the application layer HTTP protocol and is built on the wide area network. This structure does not need customer specific software[3]. It can realize the required functions of the system only through the browser combined with script language (VBScript, java script, etc.) and active X technology. The biggest advantage of B / S structure is that it is relatively simple to operate and maintain, and can enable different personnel to access and operate common data in different places and in different access modes. Its disadvantage is that its security is weak; The response speed is affected by many factors, and the user experience is not particularly good. Descriptive analysis: Statistics and display the collected Internet of things data. This part focuses on statistical analysis, diagnostic analysis of industrial mechanism and diagnostic analysis of the causes of abnormalities. This part requires a lot of data mining technologies, including correlation analysis, sequence event analysis and other predictive analysis: through the development law of long-term historical data, To predict the change of trend, this part needs to introduce technologies such as machine learning and neural network to predict the trend: through the results of multi-dimensional data analysis, combined with knowledge base and machine learning, give the possibility of a variety of decision-making basis, and provide intelligent decision support[4].

It can be seen that the basic mechanism of Internet of things data analysis is the understanding of professional knowledge, rather than the methods and capabilities of

data analysis. Without sufficient physical mechanism and special purpose, it will be counterproductive to analyze industrial data with some big data and artificial intelligence tools.

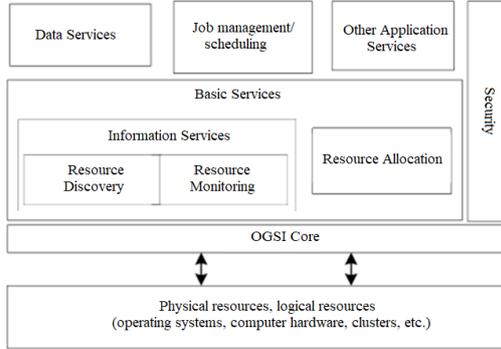


Fig. 1. Basic functional division of the Grid

From the following aspects, in terms of hardware environment, C / s establishes a private network and provides connection between LANs through special servers; B / S is built on the wide area network, so there is no need to consider the special network hardware environment, as long as there is a browser and operating system. In terms of program architecture, C / s program pays more attention to process, can verify permissions at multiple levels, ensure information security, and less consideration is given to the running speed of the system: B / s has multiple considerations about security and access speed, which is established on the basis of more optimization. In terms of software reuse, the overall consideration of C / s program is inevitable[5]. The reconfigurability is not as good as that of B / s: B / s has multiple structures and requires components to have relatively independent functions. In terms of user interface, C / S is mostly based on Windows platform; B / S is built on the browser. In terms of information flow, C / S is a typical centralized processing method, and the interactivity is not high, while B / S is the change of information flow, and the change of information flow such as B-B and b-c.

$$(E(t) - M_2C)\Delta\dot{x}_{k+1}(t) = f(t, x_d(t)) - f(t, x_{k+1}(t)) + B\Delta u_k(t) - (\Gamma_{p1}C + M_1C + M_2C)\dot{x}_d(t) + \Gamma_{p1}C\dot{x}_{k-1}(t) \quad (3)$$

Today's software application systems are developing towards distributed web applications. At present, most application software systems are still a two-tier structure in the form of client / Server: Web and client / server applications can carry out the same business processing, and internal and external users can access new and existing application systems; Each application module shares logic components; Through the logic in the existing application system, we can expand a new application system and realize the integration of information time and

space, which is the development direction of the current application system.

$$\Delta x_{k+1}(t) = \int_0^t Q^{-1}(f(t, x_d(\tau)) - Q^{-1}f(t, x_{k+1}(\tau)))d\tau + \int_0^t Q^{-1}B\Delta u_k(\tau) d\tau - \int_0^t Q^{-1}Z\dot{x}_d(\tau) d\tau + \int_0^t Q^{-1}F\dot{x}_{k-1}(\tau)d\tau \quad (4)$$

Considering the current environment, because the system needs internal network operation, has high requirements for security and accuracy, and requires docking with the Internet, it is more reasonable for the paper system to adopt the mixed mode of C / s and B / S structure[6].

### 3.2 System architecture design

The student sports score analysis and management system is based on net framework and adopts n-layer architecture, integrating data access layer, database, business logic layer, data model layer and presentation layer, as shown in Figure 2.

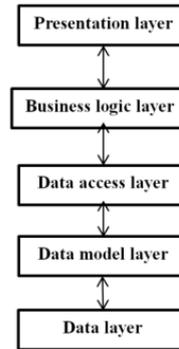


Fig. 2. Data layer system architecture

Database mainly refers to the database management system, which stores and manages all the data. This management system can fully realize the combination of net and SQL Server 2008 background data layer management system, which can ensure the security and concurrency of data. The so-called software model must be transformed into thousands of data tables in the database, and the name of each model should be transformed into a database[7]. In order to facilitate the effective operation of the data between the database and the application program, we will make a conversion between the class properties and the table fields.

The function construction diagram of the system should be designed before entering the system implementation stage. According to the various functions of the system, the system is designed. In the function building diagram, there are many different templates and subordinate sub templates. Through the relationship between different templates, we can see the function of each template. In

order to improve the security of the system, users will be given different permissions when logging in, and at the same time, it can also avoid illegal elements or users to carry out operations that are not commensurate with themselves.

### 3.3 database

In the early days, there were three popular database models: network database, hierarchical database and relational database. Nowadays, the most commonly used classification is relational database and non relational database. The relational database model is to reduce the complex data structure to a simple binary relationship. The specific relational data is composed of tables, records and fields. The table is a two-dimensional table form[8]. Each row is a record and each column is a field. A database consists of several such tables, and then the tables are linked through relationships. Network database and hierarchical database solve the problem of data centralization and sharing, but there are still great deficiencies in data independence and abstraction level. When users access these two databases, they still need to clarify the data storage structure and expenditure storage path. Relational database can better solve these problems. Oracle is a popular relational database nowadays. Oracle database has provided distributed processing capability since version 5, and has relatively perfect distributed database function by version 7. An Oracle distributed database is composed of oraclerdbms, SQL \* net, SQL \* connect and other non Oracle relational products. Oracle has the following characteristics:

- 1) Shared SQL and multi thread server architecture have been introduced since Oracle 7. X. This enhances Oracle's capabilities and reduces its resource footprint, enabling it to support hundreds of users on high platforms and more users on lower platforms with fewer resources.
- 2) It provides security management based on role division. Good performance in database management function, integrity check, consistency and security.
- 3) Support a large number of multimedia data, such as sound, animation, binary graphics and multi-dimensional data structure.
- 4) It has many excellent foreground development tools, such as SQL \* forms. VB and PowerBuilder, which can quickly develop and generate application programs based on client PC platform. In addition, it provides Pro series of interface software with the third generation of high-level language, so that it can embed SQL statements and procedural statements in main languages such as C, C + +, Java and operate the data in the database, It has good portability.
- 5) It provides new distributed database capabilities and symmetric replication technology. The data in the remote

database can be easily read and written through the network[9].

In addition, compared with another common database SQL, Oracle database also has some advantages, such as strong stability, better security mechanism and more reliable processing of big data. In contrast, SQL server is better in ease of use and friendliness than Oracle, and SQL server is stronger in data export. The above is a summary of the characteristics of Oracle database.

## 4 REALIZATION AND TEST OF THE SYSTEM

### 4.1 System development environment

The development environment of College Students' sports quality analysis management system is as follows: SQL2005 database, C language and visio2010 for UML use case drawing. Hardware environment: one intercr300 processor or higher; 4gmb and above memory, 1TB hard disk space. Development environment: win7 or win8 or Windows2000 operating system; SQL Server 2005 database; MyEclipse 85 as the system development tool; C well program development language. Running environment: the operating platform of the system is Windows 7: the browser and its version are JDK1.6 and e11.0.

### 4.2 The realization of each function module of the system

Sports test category information mainly manages the classification of physical education subjects, which will deal with other sports subjects. There is no doubt that each test subject has a unique connection with one of the test types. There are many contents of system test type maintenance, mainly related to the basic information of body side type and weight information. This article only introduces the deletion function in detail. The implementation process of this function is as follows: select the information of the object to be deleted, and then click the corresponding control to delete the object. However, the deletion operation will not be executed immediately by the system, but will be executed after certain judgment on the driver of the delete button[10]. The main content of the judgment is whether the test information has subordinate account information, and then select whether to execute the deletion operation according to the query results. If not, you will be prompted that the deletion is successful; if there is a subordinate account, the system will not be able to delete it successfully, and the user will be prompted by the information pop-up.

Firstly, `getpnicontrolvalue` is defined as `dabtyelInfo beam`, and the test type is obtained, and then the information is filled in the entity class: `CMM constants. Flg_ Add. Equals` operation is judged[11]. If the operation is added, then judge whether the test type is repeated. If it is repeated, call `throw new cmmexception` to operate. If not, add the operation to the corresponding entity and create a new information to record it. Finally, by calling `beam. Create date = date time. Now and blltypeInfo. Insert` (`beam` will save the reference type added).

## 5 CONCLUSION

Based on the modern society and national education for talent training more and more attention to the overall development, coupled with moral education in Colleges and universities every year in the comprehensive evaluation occupies a very important proportion, undeniable, physical education teaching has become an important teaching goal that colleges and universities need to form a considerable scale in a short period of time. With the advent of the era of big data, the full implementation of the information-based teaching management system has been put on the agenda and is gradually improved, and the physical education teaching is also in urgent need of information management. Based on the field research of colleges and universities as a benchmark, this paper has a detailed understanding of the relevant knowledge of college physical education, and found that there are still many problems in the University's physical education teaching, mainly reflected in the teaching can not be combined with the requirements of modernization. Therefore, this paper puts forward the design concept of college sports quality analysis management system. Through the demand analysis and function improvement of the target system, the system can complete the information management of physical education teaching, so as to improve the teaching efficiency and standardize the teaching system.

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