Design and Research of Minority Chinese Teaching System in Southern Xinjiang Based on Cloud Computing

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Abstract — Chinese teaching in Xinjiang has more than 30 years, Xinjiang minority students’ Chinese level has been greatly improved, but the southern Xinjiang ethnic minorities, education is lagging behind the development of the school teaching quality needs to be improved. In order to improve the quality of teaching, to construct a set of minority language teaching system based on cross frame cloud models using various emerging technologies. In the process of building the system, design and system architecture, is put forward with the design model based on cloud model, so as to realize the data processing mainly are placed on the server. Add the function on the client, which can not only rely on the powerful cloud computing system to help data processing, but also can reduce the client hardware requirements and simplify the design of the client, so as to realize the goal of cross platform client. At the end, a middle school in Xinjiang in Kashi carried out a teaching experiment evaluation, the cloud computing in ethnic Chinese listening and speaking teaching system based on really improved student achievement. This design provides a new idea for the southern minority Chinese teaching, promote the development of Chinese in southern Xinjiang, also have reference meaning to other cloud platforms and mobile Internet learning system development.

Keywords - cloud computing; southern Xinjiang minority; Chinese teaching system

I. INTRODUCTION

The southern region is the minority areas, the ethnic minorities in patchy distribution, southern Akesu, Kashi Oblast, and Hotan minority population accounted for 88% of the total population, is the key to the Xinjiang economic and social development[1]. But because of the lower level of education in the areas, the social and economic development is relatively backward. On the south of Xinjiang University overall, minority students mostly from rural areas and pastoral areas, when the basic knowledge and basic Chinese are relatively weak, coupled with the impact of the local ethnic minority teachers’ teaching ability in Chinese is not high and the special language environment, the teaching of Chinese in southern Xinjiang and other Xinjiang Universities are facing more than special difficulties. With the popularization of information society, requires us to develop the minority students have good Chinese language literacy and strong oral communication ability, the traditional teaching mode in teaching speaker, full of grammar and language points of logic is difficult to achieve the teaching effect of this[2]. The main characteristics of Chinese are a tone, and no morphological signs of Chinese characters. The same sentence, it will change due to different tone or context and meaning[3]. Although the minority students have received nearly ten years of formal learning, mastering a certain amount of vocabulary, but a part of them in Chinese to communicate with others, but can't express personal views and opinions[4]. The lack of the application of multimedia technology can make up for the traditional classroom teaching. The combination of artificial intelligence in a national teaching Chinese listening and speaking teaching system can offer a real language context, shared resources, convenient access to information rich for Chinese listening and speaking, fully mobilize the enthusiasm of the students, the construction of the true sense of the new teaching model to the students as the main body of the possible[5]. When the combination of network classroom, teachers and students, the four, in order to fundamentally reform the teaching mode of listening and speaking. So it is necessary to carry out the design of ethnic Chinese listening and speaking teaching system.

II. STATE OF THE ART

A. Chinese Teaching for Minority Nationality

Looking at the current Xinjiang Chinese teaching, Chinese teaching in Xinjiang can be divided into two types: one is that students only understand the language and do not understand[6]. Chinese, is just a course of student learning, teaching mode with single teaching Chinese, other courses in minority language teaching in primary and secondary schools, which lasted for many years the traditional Chinese teaching mode is now showing decreasing trend; another is the students can understand the language and understand some Chinese, Chinese as the learning of other subjects is medium, tool or method of teaching, the use of two or more than two

DOI 10.5013/IJSSST.a.16.5A.15 15.1 ISSN: 1473-804x online, 1473-8031 print
languages to organize non language teaching activities, often referred to as "bilingual teaching". At present, there are three main types of Bilingual Teaching: first, mathematics courses in Chinese teaching and other courses in the ethnic language teaching; second, the science curriculum in Chinese teaching; the liberal arts curriculum with the ethnic language teaching; third, in addition to the mother language, the course of all the Chinese teaching; third the student is both the base of mother tongue, there are Chinese, but the Chinese degree level is uneven. Chinese teaching is not only the goal is to learn other subjects and teaching tools[7].

B. Study on the Southern Students' Chinese Teaching for Ethnic Minorities

In 1990s, scientific research consciousness of subject consciousness, the southermost engaged in teaching Chinese teachers are relatively weak. But since twenty-first Century, along with the development of the southern minority Chinese teaching career, the consciousness of scientific research has been greatly improved, the research work showed an increasing trend, of course, the State Council and the government of the autonomous region of minority Chinese teaching career concern and policy orientation are closely related. Since the beginning of the Autonomous Region People's Government in 1996 in Xinjiang University to promote HSK and HSK and the first Xinjiang financial center in Xinjiang held a national seminar, reform of the Chinese teaching has discussed is the hotspot of Chinese teaching of ethnic minorities. The reform which mainly focuses on: how to build suitable teaching materials; how to solve the single teaching mode, students' practical ability difference; how to change the expansion led to a decline in the overall quality of students, students' learning concepts backward, poor learning culture situation of the area. Although we put forward many suggestions and measures, but as of now, this is still the emphasis and difficulty of Xinjiang University Chinese teaching reform, but also need to make great efforts to study. At the same time, the promotion of HSK made in this period the development of the study of Chinese test is relatively rapid, but mainly reflected in the research on Chinese proficiency test[8]. Study on the test should be much weaker compared with the practical requirements, from teaching practice, research needs to vigorously strengthen the test. In addition, in early twenty-first Century, the multimedia technology used for language teaching in Xinjiang began to rise, promotion effects and experience of some teachers engaged in teaching Chinese in Colleges and universities have enthusiastically on the way of teaching is discussed. 90 of the last century in Chinese teaching circles the rise of "culture fever" has caused the southern universities engaged in the teaching of Chinese teachers, as an indispensable part of culture teaching is also a minority of Chinese teaching[9].

III. MATERIALS AND METHODS

A. System Architecture

In order to satisfy the user's learning needs, the project group with a cloud model based on MVC architecture. Also called the cloud server, the main is to provide a variety of Chinese learning resources for the client; the client is a user interface of the system, mainly responsible for a variety of interactive and user, but the main business logic are executed on the server.

The main function of the cloud are as follows: to achieve a variety of operations on the database; to provide a variety of rich knowledge base for the client; speech recognition service; providing text recognition service; provide the
upgrade script for the client; all kinds of business logic processing system[12].

The main functions are as follows: it is responsible for client and direct user interaction, provides a graphical interface for the user. It implements the cloud service proxy module provides a cloud service interface for the client.

B. The Design and Implementation of the Server

Server architecture: server architecture is the overall design of the server architecture, directly determines the performance of the server. The server's main task is to meet the needs of the client, in this system, the main server is to provide a variety of services to support the client, these services include speech recognition, speech synthesis technology support and technical support, character recognition technology, the knowledge base to support the foot support, upgrade intelligent translation support, user authentication[13]. Architecture design: for a demand model, you can use a variety of architecture to achieve; each architecture has a corresponding system implementation. Therefore, schema directly determines the quality of the whole system, and the system will have a direct impact on the user experience.

Design and implementation of high concurrency: in order to achieve high concurrency server, the system uses the Reactor design pattern. Reactor design pattern is one of the main mode of high concurrency server design. The Reactor framework consists of 4 parts, namely: Reactor manager, synchronous event handler, the handler function separator. Reactor provides 3 interfaces, which are responsible for registration: event handling function, delete function of event, event distribution function; synchronous event multiplexer responsible for event monitoring on the handle, the handle mainly refers to the socket handler, the handler function written by the user, responsible for handling the specific events, by the Reactor manager calls. In the server, the Reactor design pattern is used to achieve asynchronous selection model. In the asynchronous selection model, using socket to create a handle, using asynchronous selection function to bind to the window, using the message processing function to handle socket events, using the message mechanism and millet to simulate Reactor manager. So, focus on the realization of reactor manager. In this method, mainly rely on the message mechanism and the system operating system of food. After the first create a window class, after setting the window function for the window class, create a window and hide; after creating a socket for connection, monitoring the client, the socket and the accept event is bound to the newly created window, then enter the thread function messages dish, chestnut to extract the message queue message in the news, if there is a message to the judge, whether the exit message, if not, is blocked waiting for news of the arrival[14]. If the exit message, the thread function exit message, a variety of resources, create the front end of the thread release; otherwise, call the corresponding message processing function, processing the corresponding message; after continue to extract the message the message in the queue until the thread exits.

Design and implementation of the thread pool: usually in the development of the server, the network thread using the Reactor model to deal with the high concurrent socket requests, but in order to achieve rapid response of socket requests to the socket business, not on the network thread, but in a separate business logic processing thread. In order to make the business processing efficiency reached the highest, give full play to the advantages of multi-core, the number of threads is equal to the number of the best business nuclear CPU. The difficulty is the realization of the design of the thread pool thread pool threads. Because, if not handled properly, will cause the thread pool thread paralyzed. The operation process of the thread pool manager thread, first create a ThreadPoolMainThread object, and then call the InitThreadPool member function of the initialization of the thread pool initialization, then call the run member function into the task queue. When run returns, the end of the thread to run[15].

Design and implementation of a priority queue: when the server network thread receives the client's request, and not immediately, but is put in the task queue, the waiting thread pool thread processing. For the concurrent server for a short period of time can accumulate a large number of tasks to the queue. Therefore, how to effectively deal with tasks in the job queue for the client user experience, will be a very important thing. Based on previous experience and a large number of facts prove that priority based processing is reasonable, when there are many tasks in the queue, with the highest priority task first, then processing the lower priority task. When the two tasks of equal priority, in accordance with the FIFO principle to deal with, this requires the task queue model is not simple. Because of the simple model does not support the priority queue, but can not because when the priority queue, equal to the task, to deal with. In summary, the priority queue model of task queue is the best choice, because it can not only meet the priority needs, but also to ensure that when the priority is equal, first to the task, so the priority queue mode choice is in line with the needs of users.

The design and implementation of SlopeOne: in this project, course recommendation module is implemented by SlopeOne algorithm. Because the calculation of Slope One algorithm on the users of the database table, the product table and the user of the product scoring table, and the three tables of data is very large, so the project team decided to SlopeOne to achieve SQL storage process, and stored in the database server, to speed up the computing speed of SlopeOne.

C. Design and Implementation of Client
Speech recognition: in this model, the user provided by the module API voice information to Windows Speech, Windows Speech received voice information and outputs the results to individual speech feature matching module library. The matching module by searching the personal voice feature library, matching the correct results, and the correct text output to the output parameters of API.

The remote interface of the system call mechanism: the server interface provides a number of calls for the user, one is to provide large data query for the client, on the other hand, in order to reduce the client configuration requirements, design and implementation of target cross platform. The client call module will first input information to the cloud service proxy module, the receiving module provides information, it is packaged into a Http message. The message describes the need to call the class name, method name, input parameters. After that, the encrypted information sent to the server. The server receives the information, first analyzes the Http message, and then decrypts the contents of the POST. According to the local service requirements of the client, and then the results are encapsulated in the XML is sent to the client (including the contents of the XML user ID, request the class name, the request method, input parameters, request number and processed results). When the client cloud agent module receives the information, analyze its. Then send back to the upper call module, complete the remote call.

The client software upgrade: first upgrade thread thread exit sign detection, to determine whether to quit, if do not need to exit, then connect to the server. After the latest Lua number to get the script from the server, through the comparison of the Lua number and Lua number server script script to determine whether you need to upgrade the local. If the number is higher than that of local Lua server Lua script number is to download the latest Lua script from the server. Download the script after successful execution. If the number is not higher than the local server script script number, you do not need to upgrade. Finally, disconnect the connection to the server, enter a dormant state, after the end of dormancy, again in the last cycle, until the thread exits.

D. T Test Method

Based on the statistics used in the analysis of variance (F test). The total score of the students

\[ \sum X = x_1 + x_2 + \cdots + x_m \]  

(1)

Wherein, \( m \) is the number of students; \( x_i (i = 1, 2, \cdots, m) \) is the student achievement.

The average score of the students

\[ \bar{X} = \frac{1}{m} \left( \sum X \right) \]  

(2)

Deviation from the mean square and the variation between groups

\[ SS_a = \frac{\left( \sum X^2 \right)}{m_1} + \frac{\left( \sum Y^2 \right)}{m_2} - \left( \frac{\sum X + \sum Y}{m + m_2} \right)^2 \]  

(3)

Wherein, \( \sum X \) and \( \sum Y \) are the total score of two groups of students respectively.

Sum of square variation within groups

\[ SS_w = \left( \sum X^2 - \left( \sum X \right)^2 \right) + \left( \sum Y^2 - \left( \sum Y \right)^2 \right) \]  

(4)

F-measure

\[ F = \frac{SS_a}{df_a} / \left( \frac{SS_w}{df_w} \right) \]  

(5)
IV. RESULT ANALYSIS AND DISCUSSION

A. Experiment

In order to ethnic Chinese listening and speaking teaching system under the guidance of teaching effectiveness. The experiment lasted for four months in a middle school in Kashi City, the two high class the first grade 80 students participated in the experiment.

Pre test: the first grade of high school early, for students to thoroughly test, strictly control the examination discipline, the standard test using a unified whole, exclude the subjective factors of interference, to ensure objectivity of the examination results, results as a reference.

Post test: after one semester for students after the test. Select a middle school of Kashi city survey test, to ensure true and reliable performance. After measuring the main study contents: two reading test results before and after the experiment the experimental class and the control class difference is the same, namely, ethnic Chinese listening and speaking teaching system in senior high school English teaching role.

B. Test Results and Analysis

Pre test: The measured A class average score of 20.05 points, B class average score was 20.1. It can be seen that the two groups of students in accept

Before the teaching method of the same, no significant difference.

Post test results showed that the average A class 23, B class average score was 33 points, on the surface of B group difference.

As a result of the test is two A, the overall mean B is the problem, in order to further confirm the results of this experiment is not a coincidence, but an inevitable result.

The experimental data analysis the following conclusions: Minority Chinese teaching system significantly improved student achievement. In the process of teaching in the class, obviously we can see that the B class of Chinese conversation coherence is stronger than class A.

V. CONCLUSION

Minority education in Xinjiang has always been a priority among priorities of Xinjiang education. In order to make the minority people grasp the rich scientific and cultural knowledge, to get more opportunities to broaden their horizons, we need to strengthen Chinese learning. For this, this paper is based on the cloud model of the successful completion of the southern minority Chinese listening and speaking teaching system design and Realization of the. The first describes the overall system design, this design not only includes the server also includes the client. In the design of server, the high concurrent design, thread pool design, priority queue design and SlopeOne design. In the mobile client, to achieve the design of speech recognition, language feature matching design, remote call interface mechanism. In the teaching evaluation of cloud computing in Xinjiang Minority Chinese teaching system based on the system are of great help to improve the students' listening ability. The system will promote China's Xinjiang Minority Chinese teaching development, is conducive to national unity and stability.

ACKNOWLEDGMENT

Social science fund of Xinjiang production and Construction Corps “A survey study on the popularization and use of the national common language in Xinjiang” (Item Number: 13QN04); Xinjiang Education Science Program “Xinjiang Uygur Autonomous Region family language education and the present situation of the school of Mandarin promotion survey” (Item Number: 145030).

REFERENCE


