Implementation of Semantic Technology Based on Android Smart Phone

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Abstract

The over service stage of computer service to the Internet has played a major role in promoting the development of educational technology. The computer is combined with the Internet in the future, which will be an effective tool for thinking, and it will be an extension of the human brain. Global wisdom will cover and enter the complex Internet, creating an externalized and ever-changinghuman brain. Teaching and learning through the Internet have become a more mature learning mode at this stage, and the way of learning English in Internet is gradually developing. The personalized English learning through the Internet can fully reflect the convenience provided by information technology, especially the integration of semantic technology in the English learning system. The semantic technology of this new teaching can change the relationship between teachers and students in traditional teaching and improve the efficiency of students' English learning, thus changing the nature of cramming teaching of traditional English learning. The semantic technology can understand the human communication language through the computer, and through the support of semantic technology, it has gained effective communications between the PCS. It enables English learners to achieve the dynamic and personalized services, meanwhile, the semantic learning method is stored in the semantic network learning system, which is only a database to facilitate the future efficient learning.

Keywords: Personalized learning, semantic technology, network learning, Android, interactive learning.

1. Introduction

Personalized service will be the new direction of Internet information service in the future, and personalized web service is the process of providing accurate information services for customers. Through the specialized characteristic information data collection, it provides the most specialized and accurate information for the user [1]. But it's not easy to do this, because the communication of network resources has the interlinking problem of semantics. Many network designs are based on the use of the human body and the thinking pattern; therefore, the expression forms are mostly the natural languages and sound pictures [2]. Although it is convenient for humans to understand, there is no basic emotion in machines, and the intelligent machine follows the instructions, which can't automatically handle the problems encountered.

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The online English learning is the same. According to the organizational form of some kinds of network resources, sometimes English resources can't understand the resource connotation that is embodied in other systems for the system where English resources exist [3]. The emergence of semantic technology can solve the problem well, for example, in the process of personalized English learning, semantic technology can achieve relevant events of English expressions or certain correlation characteristics of objects. Such a structure can handle the large amount of data of the machine, which will be more natural, and machine understanding will not be ambiguous [4]. Therefore, the personalized learning of English must rely on the development state of semantic technology, which makes the searching and processing of information in English learning process more convenient. English teaching is in full swing, but there are still some problems: (1) there is a lack of teachers, and the fear of technology is common among teachers. According to statistics, College Englishteaching is still in the big class stage, and in the absence of teachers, teachers often do not use advanced technology in the teaching process, and there even are obvious technical resistances; (2) teaching materials and courseware pursue classics, and they all ignore the practicability; (3) in a single language environment, students can reveal that the language environment is unitary, and textbooks of the vocabulary and sentence are limited, and even foreign language dialogues take place in the classroom. Teaching materials and interactions between teachers and students should establish a high- quality learning environment, so the multidimensional teaching environment should be promoted rather than the existing one-dimensional environment.

The application of mobile communication technology in campus environment firstly appeared in the United States. In 1993, researchers at the school of information technology at the Carnegie Mellon University launched a research project called "Wireless Andrew" [5]. The project aims to build students' campus communities through wireless networks. Since then, research on this issue has become unmanageable. Education and telecom operators have been working together, and related work has been widely expanded. (1) Research initiated by the Institute of Education is to improve the link between learning and teaching [6]. New technological advantages are introduced, and researchers are usually based on education (the traditional teaching process), and they also pay more attention to the academic nature of the research, so they usually determine the pros and cons of the project from the learner's point of view [7]. This is generally acceptable, and academics at the Stanford University can provide information about the level of interactivity that you already have through the mobile terminal [8]. In this consensus, foreign language teaching is taken as the terminal teaching content [9]. Through the research, the conclusion can be drawn: mobile learning brings the high learning experience of learning fragments, and if you need to meet the needs of the learning process, the teaching content should also pay attention to this function, so the use of mobile devices on learning effect is necessary.

2. Literature Survey

In practice, the model is to replicate the target object in a simplified form, which is the way to solve a class of problems [10]. At present, the mobile learning model mainly includes the following aspects: (1) mobile learning based on SMS, for example, query transcripts, or accesses to conceptual knowledge fragments; (2) mobile learning based on online access. The model itself is similar to the desktop of the internet; (3) mobile learning based on offline browsing [11].

Generally, digital learning resources come from other media. They consider not only the mobility of the resources themselves and the adaptability of the platform, but also the learner and their interaction [12]. At least some of these problems are like this: (1) short messages are presented in a single way. The extents of interaction and interaction forms are still limited by data communication; (2) There are network problems. The corresponding improvement in capital charging standards poses an economic burden to the vast majority of learners. On the other hand, the instability of mobile network greatly reduces not only the learning effect of network accesses, but also the enthusiasm of learners

Interaction is a very common phenomenon [13]. Broadly speaking, it is a cyclic process of input and feedback, and its subject, object, and state change with the time and scene. Teaching interaction is the learning process that learners have an appropriate meaning to the content of the study, and learners can interact with the learning environment [14]. It can be divided into "individual interaction" and "social interaction".

The hierarchical structure of teaching interaction is similar to DELL's "experience tower", while the bottom of "experience tower" represents a specific experience, and the higher the bottom, the more abstract the experience. As a result, learning is a step-by-step process

2.1 Smart Phone Platform Selection

By comparing a variety of smart phone platform analysis, it is easy to find that Android platform has a great attraction for developers and users [15]. The system architecture diagram of the Android platformis shown in figure 1.

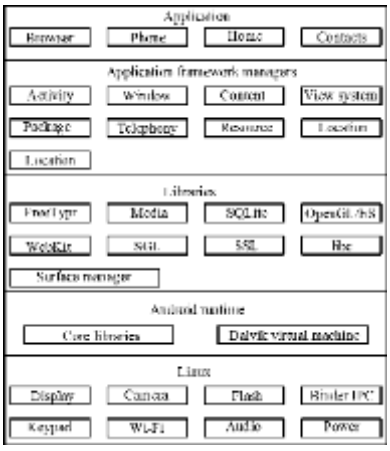

Fig. 1 Android architecture

The interactive design based on the mobile assistant is shown in figure 2. In addition to the advantages of the above analysis, there are several reasons for the development of the Android

platform:

(1) More free program permissions. On the Android platform, more free program authorities mean that you only need to access to configuration files [16]. The definition of privilege not only provides developers with freedom, but also allows users to use more transparent programs.

(2) No communication barrier between applications. From the experience of previous development, mutual programming between programs has many problems, and in the design phase, the "persistent disease" on the Android platform has been cleaned up. There are at least four ways of communication with each other at the Android platform [17]

3. Methodology

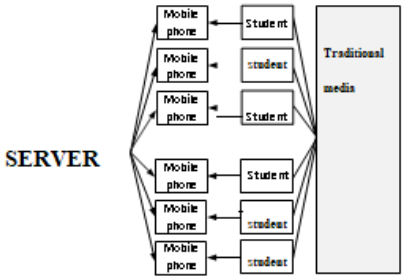

Fig. 2 Based on the interaction design of mobile assistant

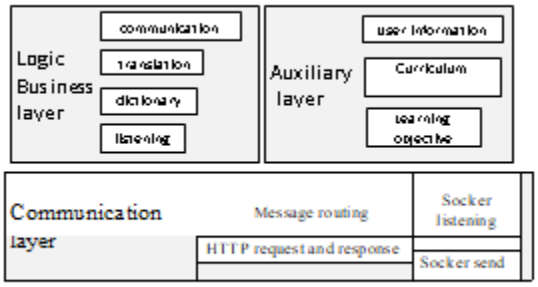

Fig. 3 The system block diagram on English classroom assistant service

Each function layer is responsible for each function. The communication layer uses the UDP protocol to send and receive data in the WIFI network environment and forwards the information to different requests: (1) an interactive assistant on the blackboard. It converts the keyboard input to server-side response; (2) assistant/interpreter dictionary. It translates English and Chinese, while dictionary assistants are specific for specific explanations, and related phrases and examples; (3) hearing and speaking assistant. Its mobile terminal becomes a replay, recording and repeating instances; (4)

exchange/discussion assistant. It seeks help from its surrounding partners through a communication assistant. A discussion assistant is useful in class discussions.

Socket design is used for C/S mode, and it usually applies a socket request or response to the Internet. When the data exchange is completed, the connection and the loop can be turned off. The difference is that the server has a globally recognized socket.

Client implementation uses the Android platform, and Java is used for code reuse in development languages of the server and client. As shown in figure 4, the entire communication layer uses java. net. datagramsocket to send and receive packets. In addition, the system also defines two different message types: ServerMessage and ServerComplexMessage.

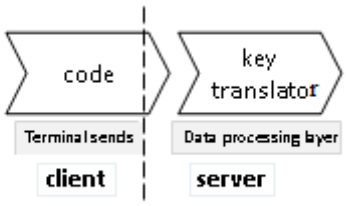

Fig. 4 The implementation process

The future personalized service can realize the technological integration development in the Internet, and it provides accurate information services for customers in the case of clarifying the professional needs of customers. The development and emergence of semantic technologies provide a new opportunity for personalized web services, and semantic technologies can revolutionize personalized services [18]. Metadata can provide descriptive resource information, and the accuracy of information retrieval in the system is greatly improved, which makes up for the weakness of this matching personalized service mechanism. Although the basic information in the Internet can be returned to a large number of basic information, it can't be delivered to the customer accurately, and the customer can't accurately filter the information. The construction of individualized English learning system needs to make use of the ontology technology to develop the meta technology and effective development system, and it can effectively promote the inter-combination and utilization of interdisciplinary subjects [19]. Data mining, as a specialized network information communication technology, can promote the development of semantic technology, and RDF data and ontology can automatically generate the data mining technology.

In order to give full play to the technical features of the semantic and implant them to the personalized English learning system will be the new development mode of the future English learning information system service. In order to realize the individualized service of English learning system, it is necessary to model customer's memory firstly, so as to realize the combination of semantics and English learning systems. This method can solve the defect of users in understanding the original meaning by using the keywords. Therefore, on the basis of understanding the semantic concept, it is necessary to analyze the common access and expression of customers, then, the natural and appropriate semantic network technology is used to construct the semantic network structure

that is required by customers, thus further implementing of the accurate personalized service [20]. According to different requirements, the user's template gives certain role definition modes, and the user populates them according to the frame of the analogy. In this study, the expression content of the research itself was filled into the corresponding template framework, and the analogical calculation was implemented in a specific way. The data filtering process used in this study is the dynamic framework.

The foreword describes the modeling of semantic technology and the way to build resources, thus completing the module setting of personalized users and resources. The latter task is to link users and resources effectively. Users need to understand their own needs and get resources, which is the dynamic factor of personalized services [21]. The user model based on semantic technology and the resource library are all realized through information filtering technology, therefore, the use of the Ontology resources and the combination of the information filtering method can realize the individualized service system of English learning system, as shown in figure 5. In this paper, the other factors were excluded, and only the data was filtered and the selective statement was used for the language writing. Therefore, the additional statements need to be further studied.

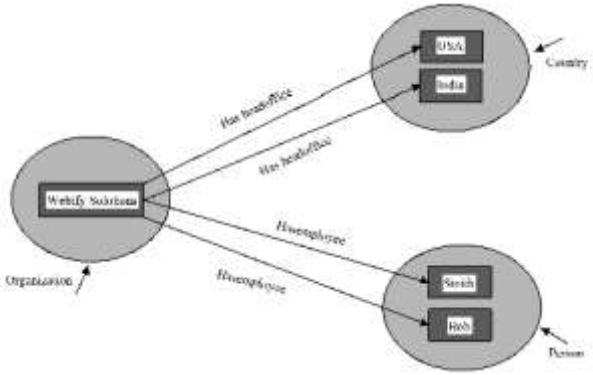

Fig. 5 OWL ontology of Webify Solutions

Establishing user model can obtain the personalized service of demand information, and if the English learning system achieves a personalized service level, the user's model is the basis of the personalized service of the English learning system. The model can build the underlying data and is an effective measure to achieve the basic goal. The personalized service system can push the customer's most interesting information to the relevant customers [22]. The system model of English learning has actually collected the customer's favorite data and established the model of information service for the user. According to the user's work in different areas, the personalized service system for English learning is also different. In general, the establishment of the model requires the interactive implementation of the acquired user information [23]. In addition, through the use of intelligent data collection methods (such as the bookmark files in collecting user's browsers), the user's basic interests and behaviors are authenticates and the data is recorded, and based on the data mining method, a model of user's interests can be established. Based on this model, the personalized service

system of English learners will be more user-friendly.

The basic way of acquiring English learners' basic information comes from the analysis of learners' basic behaviors, and in the e-learning system, a lot of learning behavior of users will leave footprints on the internet, for example, English learners like to look at what kinds of English websites, what kinds of problems they are accustomed to ask in online learning, etc. All these need to be recorded and saved by the personalized English learning systems [24]. Then, the collected information is pretreated to complete the input of the data algorithm, and the basic information is processed as follows: data filtering -- user identification -- session recognition -- path supplement -- event identification.

The architecture of the personalized English learning system is described in detail, and the semantic technology and personalized service system are combined. On the basis of this research, the core module of personalized services based on semantic technology is proposed, which includes the knowledge database of the semantic technology and the English personalized service module, in addition, modules for online learning and answering in the system need to be set up [25]. English learners register new users through dedicated channels, and after successful registration, they can use various functions after entering the system. The system has a courseware learning module, and learners can enter the corresponding learning area through the on-demand mode. The system also has the answering center module, and the assistant will receive the message for the next process. There also are operation centers, interactive forums and courseware generation module, as shown in figure 6.

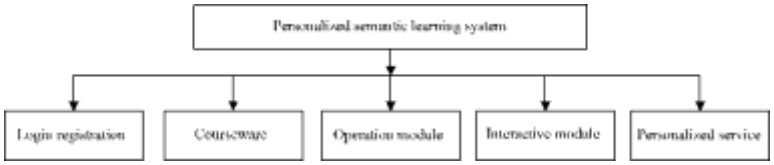

Fig. 6 Module for personalized English learning system

The user side of the system sums up the requirements of the user system resources, and the user's model updates the data dynamically with the user, which can reflect the resource requirements of the user in the natural state. The English personalized learning system based on semantic technology has set up modules such as courseware learning, homework answering and interactive discussion, as shown in figure 7. The system records the learning data of English learners and uses the data filtering module to correct them, and the system also provides information for the user according to the content stored in the semantic knowledge database of the user.

Fig. 7 Personalized English learning system architecture

At present, the form of courseware is usually in the form of real-time recording by teachers, but it is not easy to retrieve English knowledge, and this is because the knowledge points in the class are explained by each teacher in each class, and they are in a more dispersed state. If there is a need to understand explanations of the English-related knowledge, the location of the specific knowledge needs to be guided. Therefore, the method of adding indexes in the system can be adopted. In the process of recording the lecture video, it can simultaneously capture the page information of the teacher and record the time, starting point and the end point of all the pages. The class teacher can delete and modify the basic content according to the recording, and form an index catalogue of the basic knowledge points, which is convenient for English learners to look up and find English grammars and related knowledge points [26]. All data is accessedin the order of the object hierarchy, and each access determines the object that is to be accessed, so as to filter out the useless information and form the required text content.

When users log on the platform, it will distinguish the learning information of different users according to the user's ID, and build a certain user model by collecting the learning information of different users and related learning habits. The user model is updated by intelligent information access, which ensures that the user has kept the latest application status. Users learn on theplatform of the system and access the information of teaching resources directly, at the same time, the semantic knowledge base is searched in the search engine according to the rule of semantic inferences, and the resource information which the user is interested in is usually given in the knowledge base.

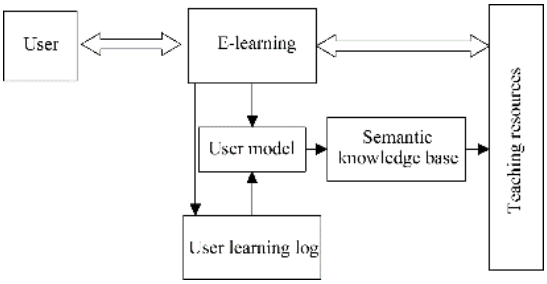

Fig. 8 Detailed design of the system

4. Result Analysis and Discussion

For keywords, they are given sequential decrement weights, and the defined knowledge points belong to Pi. The importance of the knowledge points in the knowledge database is Import (Kj), and the knowledge tree will give the data specific values, and the parent nodes need to be higher than the child nodes. Knowledge points can be matched many times, and each matching can increase the weight of knowledge points, and the product of the key weight of English words and the importance of knowledge points are the increment of knowledge points.

According to the computational requirements of the formula, the input values related to the filtered knowledge points need to be dealt with firstly; and then referring to the importance of English knowledge, the weighted calculation of weights is carried out. If an English knowledge point is weighted for several times, it is proved that this knowledge point is more important, and the relevance of this knowledge is relatively large. Therefore, the weight admission can be used to increase the weight of knowledge points in facing the page, thus improving the accuracy of the query. In the page retrieval weighting process, if the title of the English knowledge point appears in the retrieval process, this page is most likely to tell about knowledge, and compared with other pages, the correlation is also the biggest. Finally, the searched knowledge points are always able to calculate the correlation between the page and the input when it is matched for many times. If this exceeds the minimum value of the match, it is thought that the page is not related to the English knowledge points of the search [27].

Through the actual test of the personalized English learning system proposed by this research, good results have been achieved. Firstly, the system improves the teaching efficiency of teachers. The teacher makes a courseware for the lecture and uploads it to the server of the system, and the indexes of the knowledge points will be formed too [28]. After class, students do not need to synchronize the knowledge of the content of the course, and they only need to realize the personalized English learningaccording to the retrieved knowledge. The students' learning efficiency has been greatly improved, and the personalized English learning system based on semantic technology can help students find the content of knowledge they want, and students only need to click on the link to enter the knowledge point to get into the learning state quickly.

In order to alleviate the daily running pressure on the server of the system, the class teacher will convert the files he make into HTML format, and after uploading to the server, students can download the document for only tens of Kb, and the pressure of the system server can be reduced by an order of magnitude, and the amount of access to the server can be greatly improved [29-31]. Table 1 shows the result of test data for personalized English learning system based on semantic technology. Data results show that when the number of test servers used is 50, the server consumption of the system is 1678MB; when the number of servers used is 100, the server consumption of the system is 1300MB; and when the number of servers used is 200, the server consumption of the system is 1810MB. When the numberof test servers is 50, the CPU utilization rate of the system server is 62%; when the number of test servers is 100, the CPU utilization rate of the system server is 68%; and when the number of test servers is 200, the CPU utilization rate of the system server is 77%. When the number of test servers is50, the average response time of the system server is 7.42s; when the number of test servers is 100, the average response time of the system server is 15.52s, and when the number of test servers is 100, the average response time of the system server is33.38s.

Table 1 Results of a personalized English learning system test

Number of users	Memory consumption	Server utilization	Response time

50	1678MB	62%	7.42
100	1300MB	68%	15.52
200	1810MB	77%	33.38

5. Conclusion

In this paper, in view of the current development and application of network learning, the basic problems of network learning itself were put forward; and by analyzing the characteristics of semantic technology, it was considered that the construction of personalized English learning systems could be realized by combining the semantic technology; in addition, by analyzing the characteristics of the semantic technology and the personalized web service, an effective fusion scheme of personalized network services and semantic network technologies was proposed. In order to achieve the systematic personalized English learning, it requires a certain level of understanding of customer needs. The purpose of semantic web technology is to design an intelligent network that can understand human language features, so that communications between computers are more fluent. In this paper, the user's semantic knowledge base and model were firstly established, and the semantic knowledge chain was connected by semantic reasoning, so as to better realize the needs of personalized English learning. Each course forms the semantic knowledge base of the knowledge point, which takes the course as the object. The content that English learners want is extracted by weighted computing methods, and the semantic knowledge base of automatic search is formed to realize the function of personalized English learning. In view of the current situation of traditional English classroom, an English classroom assistant based on smart phones in this paper was designed and implemented from the level of operation interaction and information interaction. By providing a whole set of solutions, it improves the initiative and creativity of learners in traditional English classroom, and helps to guide the role of teachers in full play. The blackboard interactive assistant module in the English classroom assistant enables learners to interact with classroom teachers, the translation and dictionary modules provide instructional guidance more timely, and the communication / discussion assistants play a positive role in promoting collaborations and achieving learning goals. The current English class assistants are concerned with the course of the class, and do not have time to make a study before and after class. For the information pushing before class and after-class training, it is worth studying seriously in the future.

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