

Rank Algorithm of Web Education Resources Based on Fuzzy Set and RSS

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Abstract

The level of education determines the technology introduction level of industrial interconnection and intelligent manufacturing. Starting from web structure mining, this paper makes an in-depth study on the typical algorithm PageRank in Web Education resource structure mining. To solve the problem that PageRank algorithm only considers the link relationship between web pages and ignores the text content of web pages, which leads to "topic drift" of search results, an improved algorithm based on the distance between hyperlinked pages and reinforcement learning, disrank, is proposed. In this algorithm, the distance between education resource pages is regarded as a "penalty" factor to calculate the grade value of Web Education resource pages and sort them. Firstly, we use the web crawling algorithm of education resources to grab a certain number of web pages based on a certain topic as training samples, and then store them in the education resources database. Finally, PageRank algorithm and improved algorithm disrank are used to test the effectiveness of the improved algorithm..

Keywords: Rank Algorithm, Web Education Resources, Fuzzy Set, RSS, industrial interconnection

I. Introduction

With the rapid development of information technology and the wide spread of computer, more and more fields have realized informatization and automation [1-2]. The advantage of computer is more and more obvious, it can not only provide more, more comprehensive, more cutting-edge information, but also better manage information, make information access, update more convenient [3]. On the other hand, people gradually realize the importance of information in today's society. How to collect more information, how to manage and use the information correctly and reasonably, and how to make the computer serve the industry to the maximum have become the focus of many people [4-5]. This paper discusses an information-based process in the field of teaching. Taking web teaching as the starting point, it discusses some new ideas and models in the process of realizing network teaching. The focus of this paper is how to reasonably organize the abundant available teaching materials in web teaching, and how to help students learn education more humanely.

Our era is an era of rapid development of information technology, which puts forward higher requirements for college students' education ability, especially the communicative ability of language application, and puts forward new challenges to the traditional college web teaching mode [6]. At the same time, with the rapid development of network technology, especially the development of multimedia technology, it is possible to apply the network in the field of foreign language education and improve teaching methods and improve teaching quality. The requirements for College education curriculum issued by the Ministry of education in 2004 have clearly pointed out that "advanced information technology should be used in a large number to promote the teaching of education based on computer and network, so as to provide students with a good language learning environment and conditions." Therefore, the direction of College education reform is "the reform of teaching mode should make web teaching develop in the direction of personalized learning, learning without time and place restrictions, and active learning", and "the main development direction should be the combination of classroom teaching and web teaching software running on campus network". In this context, the research and development of network teaching system is imperative.

II. J2EE technology

Choosing J2EE as the development framework of the system mainly considers the development cost and the usability, scalability and reliability of the development process.

J2EE is an architecture that makes use of Java2 platform to simplify the development, deployment and management of enterprise solutions [7-9]. The foundation of J2EE technology is the core Java platform or the standard version of Java2 platform. J2EE not only consolidates many advantages of the standard version. For example, the feature of "write once, run anywhere", JDBC API which is convenient to access database, CORBA technology and security mode which can protect data in Internet application, etc. at the same time, it also provides comprehensive support for EJB (Enterprise JavaBeans), java servlet API, JSP (Java Server Pages) and XML technology. Its ultimate goal is to become an architecture that can greatly shorten the time to market for enterprise developers.

J2EE technology not only has an architecture, but also provides a middle tier integration framework to meet the needs of applications that need high availability, high reliability and scalability without too much cost. By providing a unified development platform, J2EE reduces the cost and complexity of developing multi-layer applications, and provides strong support for the integration of existing applications. It fully supports Enterprise JavaBeans, has a good wizard to support the packaging and deployment of applications, and adds directory support to enhance the security mechanism and improve the performance.

2.1 Advantages of J2EE

J2EE provides a good mechanism for building a scalable, flexible and maintainable business system.

1. Efficient development: J2EE allows companies to hand over some common and tedious server tasks to middleware suppliers. In this way, developers can focus on how to create business logic and shorten the development time accordingly. Advanced middleware providers provide the following complex middleware services: state management service 2. Developers can write less code and don't care how to manage state, so that they can complete program development faster. Continuous service ~ allows developers to write applications without coding data access logic, and can generate lighter, database independent applications, which are easier to develop and maintain. Distributed shared data object cache service allows developers to develop high-performance systems, which greatly improves the scalability of the overall deployment [10].

2. Support heterogeneous environment: J2EE can develop portable programs deployed in heterogeneous environment. J2EE based applications do not rely on any specific operating system, middleware, hardware. Therefore, a well-designed program based on J2EE can be deployed to various platforms only once. This is critical in a typical heterogeneous enterprise computing environment. J2EE standard also allows customers to order ready-made components of the third party compatible with J2EE and deploy them to heterogeneous environment, saving the cost of making the whole scheme by themselves.

3. Scalability: enterprises must choose a server-side platform, which should provide excellent scalability to meet a large number of new customers who are doing business on their systems. Applications based on J2EE platform can be deployed to various operating systems. For example, it can be deployed to high-end UNIX and mainframe systems, which can support 64 to 256 processors (This is beyond NT server's expectation. J2EE vendors provide more extensive load balancing strategies. It can eliminate the bottleneck in the system and allow the integrated deployment of multiple servers. This kind of deployment can reach thousands of processors, realize highly scalable system, and meet the needs of future commercial applications.

4. Stable availability: a server-side platform must be able to operate 24 hours a day to meet the needs of the company's customers and partners. Because Internet is global and ubiquitous, even if it is shut down on schedule at night, it may cause serious losses. If it stops unexpectedly, it will have disastrous consequences. J2EE is deployed

in a reliable operating environment. They support long-term availability. Some J2EE is deployed in Windows environment, and customers can choose more robust operating systems, such as SunSolaris, IBMOS/390. The most robust operating system can achieve 99.999% availability or only 5 minutes of downtime per year. It is an ideal choice for real-time business systems.

2.2 Four tier model of J2EE

J2EE uses a multi-layer distributed application model. The application logic is divided into components according to their functions. Each application component is distributed on different machines according to their layers. In fact, sun's original intention of designing J2EE is to solve the disadvantages of the two-tier mode (client / server). In the traditional mode, the client plays too many roles and appears bloated. In this mode, it is easy to deploy for the first time, but it is difficult to upgrade or improve, and its scalability is not ideal. Moreover, it is often based on a proprietary protocol, usually a database protocol. It makes it very difficult to reuse business logic and interface logic. Now the multi tier enterprise application model of J2EE divides the different layers of the two tier model into many layers. A multi tier application can provide an independent layer for different services. The following is a typical four tier structure of J2EE:

Client tier components running on client machines
Web layer components running on J2EE server
Business logic layer component running on J2EE server
Enterprise information system layer software running on EIS server

III. Requirement analysis of key modules in web teaching system

3.1 Introduction to general requirements

In traditional web teaching, the teacher usually adopts the way from vocabulary to phrase, then to sentence, and then to discourse analysis. Therefore, vocabulary, phrases and sentences are the basis of education learning. The Internet-based web teaching system should also follow this rule, providing teachers and students with such a step-by-step, hierarchical learning platform as vocabulary phrase sentence. The related modules discussed in this paper are under the function of vocabulary analysis in the reading, writing and translation part of education online teaching system. This part provides a platform for teachers and students to teach and learn education words, phrases, sentences and texts. The platform consists of four parts, namely, vocabulary learning platform, phrase learning platform, sentence learning platform and text learning platform, corresponding to the vocabulary database management module, phrase database management module, sentence database management module and text analysis module. For different user identities, each module also adds the control of permission management, so that different users have different permissions and different function entries. For example, for teacher users, their permissions include add, modify, delete, view, search and so on. For student users, their permissions only include view and search. The reason for this design is that due to the large number of student users, if given the right to modify and delete, it is not easy to manage, and will produce a lot of data, which will bring greater pressure to the server.

3.2 Key module requirement description

(1) Requirement description of phrase module

Phrase module provides users with the realization of related functions that may be involved in phrase teaching. Teachers can use this module to manage phrase resources in the teaching process, including input, modify, delete resources, etc. students can use this module to obtain phrase resources in the system, including viewing and retrieving resources, etc. On the whole, the functions of phrase module mainly include: phrase addition, phrase retrieval, editing (including modification, deletion, etc.), phrase version management (including version addition, retrieval, editing, publishing).

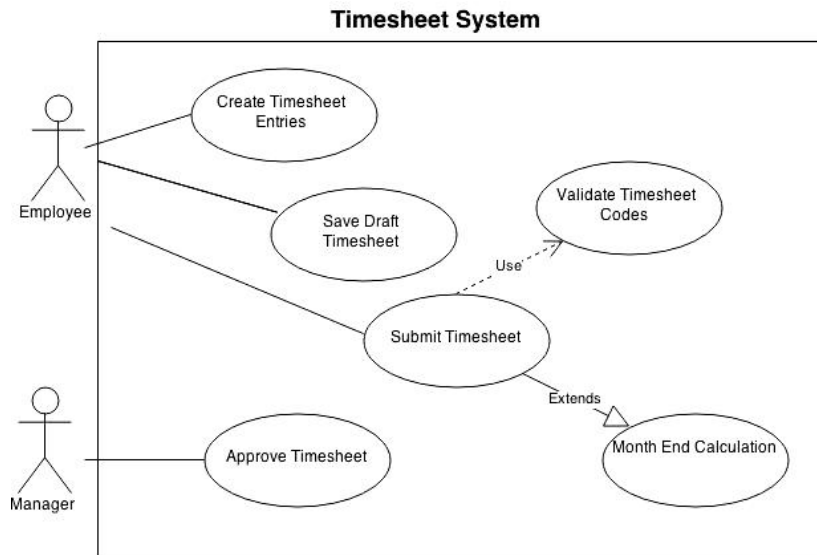


Fig 1: Phrase module use case diagram

(2) Requirement description of sentence module

Sentence module provides users with the realization of related functions that may be involved in sentence teaching. Teachers can use this module to manage the sentence resources in the teaching process, including input, modification, deletion of resources, and students can use this module to obtain the sentence resources in the system for learning, including viewing and retrieving resources. On the whole, the function of sentence module mainly includes: sentence adding, the emphasis of adding is to use the compiler to annotate sentence components, sentence retrieval, editing (including modification and deletion), sentence version management (including version addition, retrieval, editing, publishing).

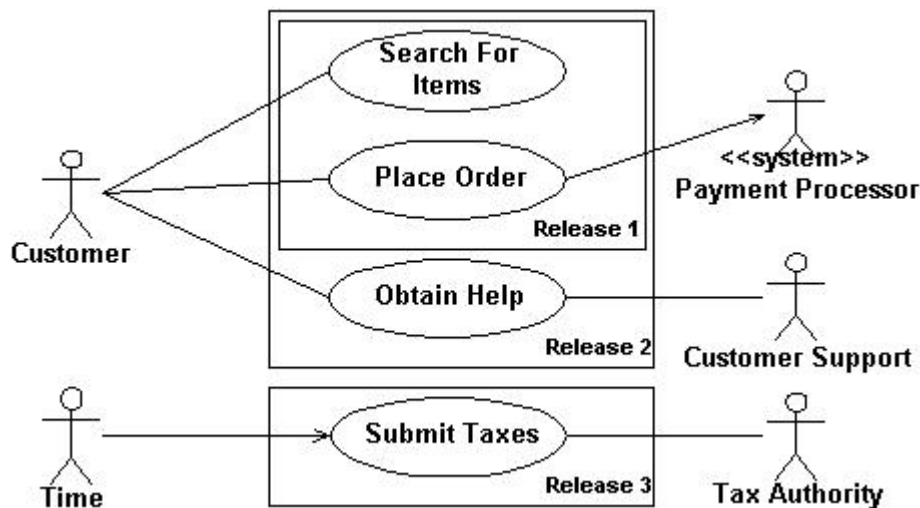


Fig 2: Sentence module use case diagram

3.3 Development environment and running environment

The development environment of this system is eclipse, and it is tested in different browsers. The current popular browsers can be divided into two categories, those using IE kernel and those not using IE kernel. Although a large number of Internet users are still using ie, the market share of other browsers is constantly expanding, including Mozilla Firefox, which can customize personalized plug-ins, Sogou browser, which supports multi task

asynchronous browsing and contains many convenient functions, safe and fast kissing era browser, etc. Browsers with different cores have different support for people's "bad habits" in making web pages. Even IL? Browser itself, different versions of HTML support features also have great differences. In order to enable users to use the web teaching system normally, we must make the website display normally in all kinds of browsers as far as possible. In this way, we must make the web page conform to W3C specification.

IV. Detailed design and implementation of key modules of web teaching system

4.1 System overall design

The entry of phrase module and sentence module are the same, both belong to the category of vocabulary analysis, and the operation process is shown in the figure 3:

4.2 Design and implementation of phrase module

(1) Class design of presentation layer

Phraseaction class provides the functions of adding, deleting, listing, saving, updating, viewing and querying phrase modules in the presentation layer.

The main methods are as follows

Add: control the system to jump to the page where the phrase is added;

Deleted provides a function entry for users to delete phrases in the system, and calls the manager's deletephrasebyid method;

Listphrase}: list all the phrases in the system and call the getallphases method of the manager;

Save: provides users with a function entry to save the added data, and calls the save method of the manager;

Search: find the corresponding phrase according to the query method selected by the user and the information provided, and call the getsearchedphases method of the manager. This is just an entry for phrase query, because there are many kinds of phrase query methods, and the judgment of query methods will be carried out in the manager;

Update: provides users with a function entry to modify phrases, and calls the save method of the manager to save the modified data;

View: provides users with a function entry to view the detailed information of the phrase. Call the getphrasebyid method of the manager to find the detailed information of the specified phrase.

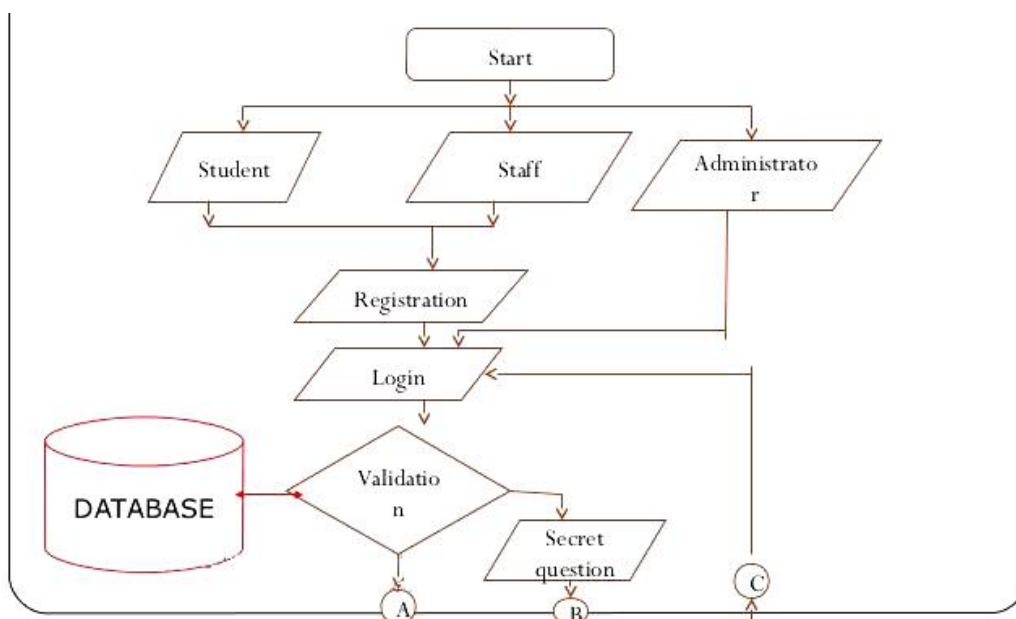


Fig 3: System operation flow chart

(2) Business logic layer class design

Wordmanager defines various ways to process the business logic of the vocabulary analysis module. It is the common business logic layer interface of word module, phrase module, sentence module and text module. The corresponding class is wordmanagerimpl, which is also common to the above mentioned modules.

The main methods of phrase module are as follows:

Getsearchedphrases(): according to the query method selected by the user, call the corresponding method in Dao to find the corresponding phrase;

Getalleducationteachers(): call the corresponding method in Dao to find all the users belonging to the education teacher category in the system;

Getallphrases(): call the corresponding method in Dao to find all the phrases entered in the system;

Deletephrasebyid(): according to the primary key of the phrase, call the corresponding method in Dao to delete the specified phrase;

Save (): save the data entered by the user. Here, make a judgment. If it is a new phrase, call the savephrase method in Dao. If it is an existing phrase, call the updatephrase method in Dao;

Getphrasebyid(): according to the primary key of the phrase, call the corresponding method in Dao to find the specified phrase.

4.3 Design and implementation of sentence module

(1) Presentation layer design:

The sentenceaction class provides sentence module adding, deleting, list displaying, saving, updating, viewing, querying and other functions in the presentation layer.

The main methods are as follows

Add (): control the system to jump to the page where the sentence is added;

Deleted (): provides users with a function entry to delete sentences in the system, and calls the manager's deletesensebyid method;

Listsense(): list all the sentences in the system and call the getallsense method of the manager;

Save (): provides users with a function entry to save the added data, and calls the save method of manager to save the newly added sentence;

Search (): find the corresponding phrase according to the query method selected by the user and the information provided, and call the getsearchedsense method of the manager;

Update (): provides users with a function entry to modify sentences, and calls the save method of the manager to save the modified data;

View (): provides users with a function entry to view the detailed information of the sentence, and calls the getsentencebyid method of the manager to find the detailed information of the specified sentence.

(2) Business logic layer class design

Wordmanager defines various methods of business logic processing in the module of vocabulary analysis. It is the common business logic layer interface of word module, phrase module, sentence module and text module. The corresponding class is wordmanagerimpl, which is also common to the above mentioned modules.

Getsearchedsense(): according to the query method selected by the user, call different methods in Dao to find the corresponding sentence;

Getallsense(): call the corresponding method in Dao to find all the sentences entered in the system;

Deletesensebyid(): according to the primary key of the sentence, call the corresponding method in Dao to delete the specified sentence;

Save (): save the data entered by the user. Here, you need to make a judgment. If it is a new sentence, call the savesense method in Dao. If it is an existing sentence, call the updatesentence method in Dao;

Getsentencebyid(): according to the primary key of the sentence, call the corresponding method in Dao to find the specified sentence.

4.4 Design of phrase processing scheme in text analysis

Generally speaking, education phrases can be divided into two categories, regular and irregular. The so-called regular phrase refers to the fixed way of composition, including the order of each part and the part of speech. This kind of phrase can be identified according to the inherent rules. For example, the structures of play football and play basketball are play plus words for ball games, while irregular phrases refer to the irregular way of formation, often a fixed collocation, indicating a fixed meaning, which often has no direct relationship with the literal itself. For example, the phrase cats and dogs is used to express heavy rain. It doesn't follow any rules. It's just a habitual usage.

According to the characteristics of education phrases, this scheme chooses a combination of multiple strategies. Among them, the rule-based method is mainly used to identify regular phrases, while the corpus based method is mainly used to identify irregular phrases. The specific analysis process can be divided into two stages.

The first stage is the establishment of rule base and corpus. The rule base sorts out the composition of common regular education phrases. The basic grammatical forms of these rules are: guide word (here is the first word in the phrase, generally preposition), conjunction (generally article or indefinite article), and subsequent part (may be noun or noun with modifier). The rule base adopts the syntax supported by Java rule engine drools. The corpus can be used as the phrase database in our system, including all the existing phrases in the system. The second stage is to use the corresponding algorithm to divide the phrases. The specific scheme is designed as follows: the first step is to use word analysis to preliminarily identify the phrase information. The second step is to identify regular phrases. The third step is to identify special phrases.

V. Conclusion

On the one hand, based on a large number of reading and referring to the relevant literature and materials at home and abroad, this paper summarizes the development process of network teaching system, as well as the related technologies in the design and implementation process of network teaching system. On the other hand, it analyzes the existing network teaching system for web teaching, points out its defects, and introduces a new network teaching system with multiple functions, and puts forward the research significance and innovation of this paper. According to the design requirements, the main part of this paper studies the related technology of education phrase automatic division and the related algorithm of sentence similarity, and proposes a scheme of automatic extraction of education phrases in text. According to the requirements of the Language Institute, the functions of phrase module and sentence module in education reading, writing and translation are designed and implemented.

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