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System Research of Computer Artificial Intelligence Information Technology in Teaching and Research Learning Terminal

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Abstract: With the application of mobile teaching and research learning as the research background, this paper attempts to explore a new conversion method for Web content application to mobile teaching and research learning. The non-standard HTML documents are clipped and formatted based on proxy server. Make it a document that strictly follows the format definition required by XHTMLMP. Then this paper proposes an instant message push method based on user demand priority. The similarity measurement method is introduced to construct the prediction model of instant message score of mobile learning terminal, obtain the priority set of instant message push, and complete the push according to the priority. Finally, the main functions of the system are implemented, and it is found that the landing page design can improve the system security by 30%, and the course Q&A page design can increase the participation of teaching and research learners by 50%.

Keywords: Artificial Intelligence, Computer Technology, Teaching and Research Learning Terminal System, Network Teaching.

1. Introduction

Mobile teaching and research learning enables teaching researchers to carry out teaching research and learning anytime, anywhere and in any way. Mobile teaching, research and learning breaks the limitations of traditional print media, but also enables teachers to use video/audio and other media resources to help teaching, mainly through the use of wireless networks and various mobile terminal devices to achieve. At present, there are two problems in mobile teaching and research: one is to reorganize web pages according to specific mobile terminals, which is suitable for new web pages, but it will consume time and energy for massive existing web pages; At present, most of the relevant research on the transformation of website content focuses on how to transform, and the content on the website that is suitable for mobile phone display is rarely related to the content on the website [1]. There is also little mention of efficient transformation suitable for mobile phone teaching and research. Therefore, this paper explores the design and development of mobile teaching and research learning system based on Web platform.

2. Design of Teaching, Research and Learning Terminal System Based on Artificial Intelligence

2.1. System Architecture

Moodle is a software based on B/S model. It can combine mobile communication technology with Internet through WAP wireless application communication protocol, so that mobile devices can access Internet network resources at any time. This model integrates network technology and Wap technology organically. In this system, students can study selectively [2]. At the same time, the mobile teaching architecture in this way is also technically easier to operate. Switch between different types of teaching methods on the page. The Moodle mobile education platform only needs to interact with a wireless network. The goal is to make the system meet the needs of teachers and students, realize the organic combination of multiple learning modes, and make the system interface simple and easy to use. From the current mobile learning technology environment, there are many ways for people to acquire knowledge. It has mobile phone SMS transmission, mobile Internet transmission, campus network assisted transmission, etc. Students can use mobile terminals and wireless networks to study. Moodle mobile learning system can be divided into two parts according to the object used by the mobile learning system, namely the student system module and the teacher system module. In order to complete the conversion of mobile device interface, a dedicated page processing system module can be established [3]. Among them, student-centered provides support for students. The teacher system module takes the teacher as the main body and supports the main body of the teacher. The web page processing system mainly uses HTML to complete the conversion of web pages to WML, and presents the converted effect in front of teachers and students. Both the student system module and the teacher system module interact with the learning resources of the system to realize the retrieval, storage and updating of resources. The Mlearning system should have two sites, a Web site for Internet access and a Wap site for mobile device access. Users use their own mobile terminal equipment to access and learn the course, and carry out a series of operations related to it. Figure 1 shows the architecture of the mobile Learning system for teaching and research (the picture is quoted in C-POS: A Context-Aware Adaptive Part-of-Speech Language Learning Framework).

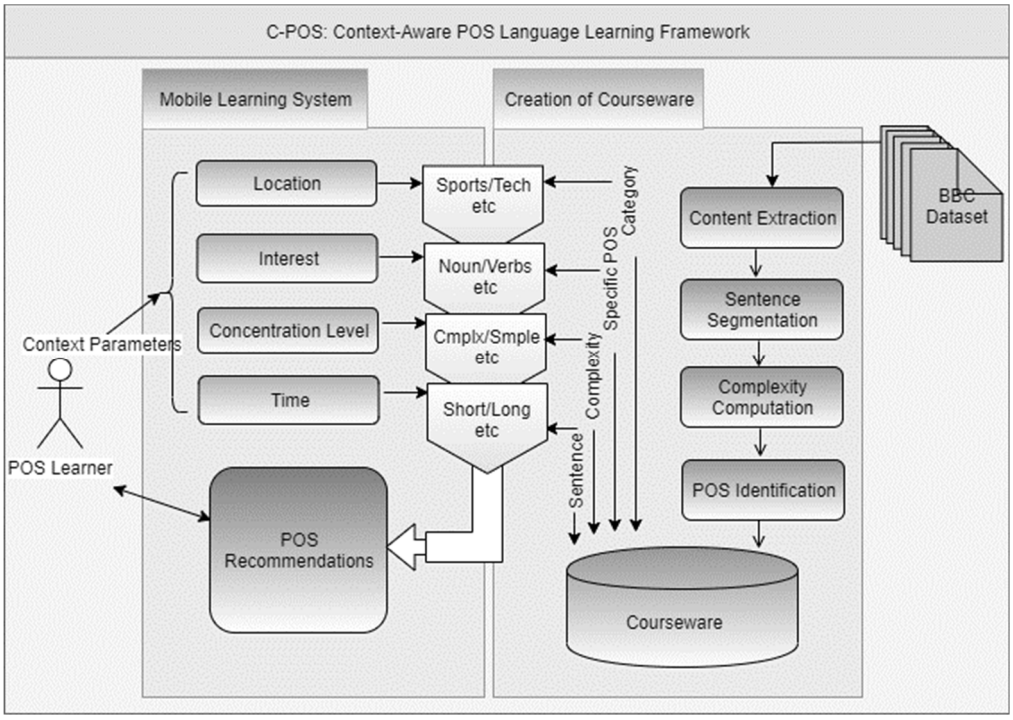

Figure 1. Architecture of mobile learning system for teaching and research

2.2. Proxy Server Component Design

The function of the proxy server is to complete the web page conversion, which is based on the HTTP protocol. HTTP is an application-layer protocol developed for distributed, collaborative, hypermedia information systems [4]. It defines a fast, easy to operate, demand-oriented distributed, interactive multimedia system. It is an object-oriented protocol. We designed the Agent server to have a service port that is always listening on the port (Figure 2 refers to Deployment of reverse proxies for Web server integration).

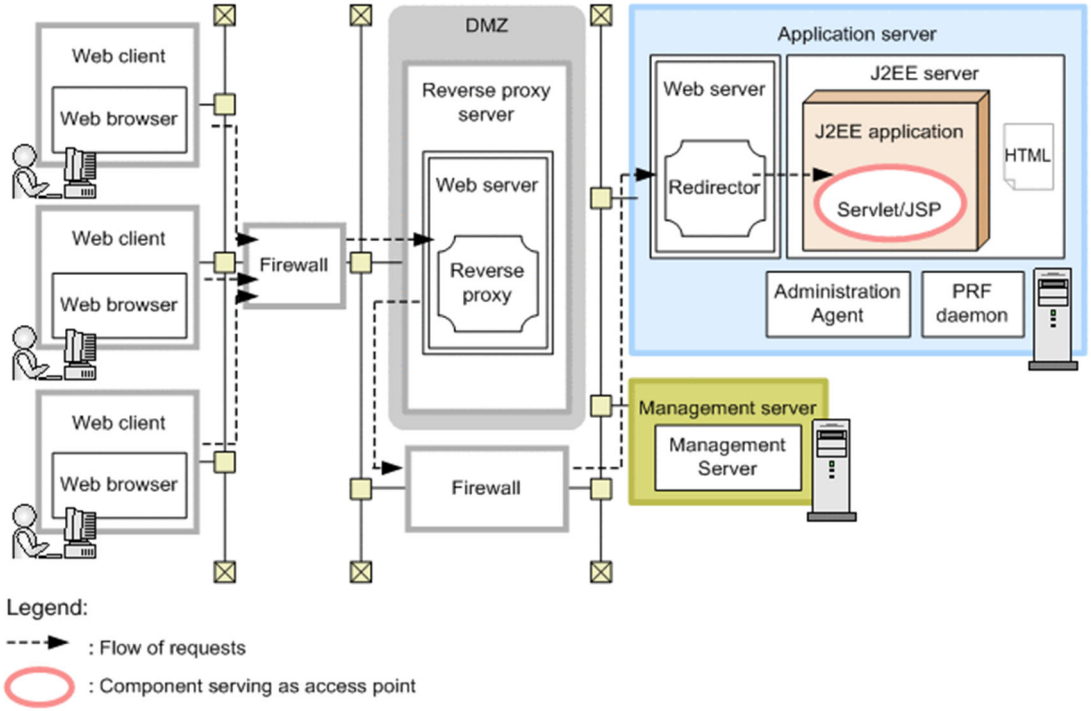

Figure 2. Proxy server design

2.3. Rule base component design

There are two types of tags in HTML: one is formatted tags. This label only has an effect on the presentation of the text and is closely related to the presentation of the text, so this label should be placed in the text fragment. Another sign is the control sign. Such labels are quite independent. This logo has a structure inside it. In addition to the front and back boundaries, a tag can be divided into two areas: the tag name and a list of attributes with an unspecified number of entries [5]. On this list, each project has a "name = value" structure. Tag names and attribute names are not case sensitive. The clipping module is designed in detail according to the structure characteristics of the original file based on the law

of HTML file clipping.

2.4. Design of format cleaning module

The format cleaning function is to send the HTML file format to the client for viewing after strict preprocessing. HTML Tidy, developed by Dave Raggett, will find and correct common problems with HTML markup, and will be able to change the formatting of markup, look up code, and find differences from W3C publishing. A tag-based HTML tag standardization algorithm is proposed. Place the end tag of an embedded unit in the end tag of a closed unit.

3. Users Need to Learn the Priority Data Push Method

In order to provide user a with better results of mobile terminal learning data push, it is necessary to make score prediction in user a learning data push candidate set E_a, and generate a digital learning data push list in Top-N. User a prediction of the score of the learning materials i on the mobile learning terminal is

$$s'_{ai} = \lambda_i + u_i v_a^T \tag{1}$$

According to the score prediction results in equation (1), it can be concluded that the difference is the smallest when the predicted value is closer to the actual score value. The minimum difference objective function is

$$F = \sum_{a,i} (s_{ai} - \lambda_i - u_i v_a^T)^2 \tag{2}$$

$s_{ai} - \lambda_i - u_i v_a^T$ is the square error between the actual score and the predicted score of the learning material. v_a is the user score learning data set, λ_i is the construction of mobile learning terminal learning data attribute vector [6]. The expression of its squared error is

$$S = \min_{\lambda,v} (s_{ai} - \lambda_i - u_i v_a^T)^2 + \mu(\lambda_i^2 + \| u_i \|^2 + \| v_a \|^2) \tag{3}$$

$\mu(\lambda_i^2 + \| u_i \|^2 + \| v_a \|^2)$ is a regularization factor added based on the objective function of equation (2), which is mainly used to prevent the training fitting phenomenon of learning materials in mobile learning terminals. The similarity measure method is introduced to optimize formula (3), and formula (4) and formula (5) are used to guide λ_i and v_a respectively

$$\frac{\partial S}{\partial \lambda_i} = -2 y_{ai} + 2\mu\lambda_i \tag{4}$$

$$\frac{\partial S}{\partial v_a} = -2 y_{ai} u_i + 2\mu v_a \tag{5}$$

Where, y_{ai} is the prediction error of learning data. The iterations for λ_i and v_a are updated to

$$\begin{cases} \lambda_i \leftarrow \lambda_i + \sigma(y_{ai} - \mu\lambda_i) \\ v_a \leftarrow v_a + \sigma(y_{ai} u_i - \mu v_i) \end{cases} \tag{6}$$

σ is the learning rate of learning materials, and the prediction model of learning materials score of mobile learning terminals is given as

$$s'_{ah_v} = \overline{s}_a + \frac{\sum_{h_j \in G_{neih_v}} sim(\mu) \backslash (t_i)}{\sum_{h_j \in G_{neih_v}} | sim(\mu) |} \tag{7}$$

G_{neih_v} is the nearest neighbor of the learning data, μ is the loss factor of the learning data, and t_i is the difference between the learning data and the learning data of the mobile learning terminal [7]. The priority of mobile learning terminal learning data push is given as

$$E = G_{neih_v} + \overline{s}_a \backslash y_{ai} \tag{8}$$

The priority of learning material push given in formula (8) is used to complete the push

$$R = y_{ai}\lambda_i + v_a t_i + \mu \tag{9}$$

Push the information according to the priority of the mobile learning terminal.

4. System Inspection

In order to test the comprehensive performance of the proposed method, it is necessary to carry out a test, the test environment is: Windows7 operating system, and the hardware configuration is the configuration of the PC: CPUCorei 7-47903.60 GHz, RAM=16 GB,500 GB hard disk, test data from MovieLens, the data set contains 850 users to the mobile learning terminal real-time information push score [8]. Compared with the product recommendation algorithm based on user preference and the constructed social network model, the optimal social network model is obtained. A in Figure 3 is a message distribution method of a social network based on trust. B is the way to recommend products according to users' preferences. C represents the algorithm described in this article.

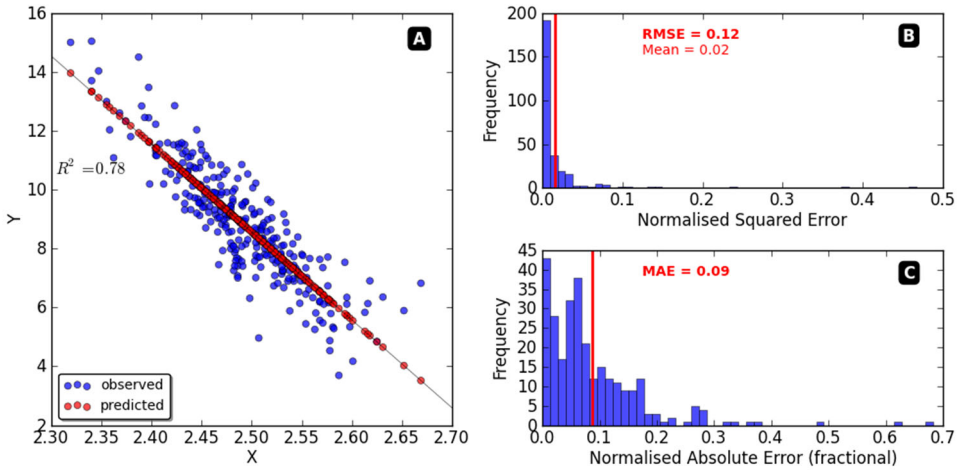

Figure 3. Comparison of average absolute error values of different methods

The average absolute deviation value of these three methods will increase with the continuous increase of the number of users [9]. When the number of users reaches 10, the average value of the proposed method is 0.22%, the average value of the information push method based on trust relationship is 0.45%, and the average value of the product information push method based on user preference is 0.45%. The average difference between the two is 0.23%, and the average difference between the social network information push mode based on trust relationship and the product information push mode based on user preference is 0.01% and 0.23%. The average absolute error of the proposed method is 0.16% when the number of users is 30. The average absolute error value of social network information push method based on trust relationship is 0.35%, the average absolute error value of product knowledge push method based on user preference is 0.22%, and the average absolute error value of the method proposed when the number of users is 50 is 0.22%. The average absolute deviation value of information push method based on trust relationship is 0.36%, and that of product knowledge push method based on user preference is 0.34%. Experiments show that the algorithm proposed in this project is superior to the trust-based social network information recommendation algorithm or the learning-resource recommendation algorithm based on user preference in terms of the number of users, and its mean and absolute value in terms of the number of users are smaller than that of the trust-based social network information recommendation algorithm.

5. Conclusion

The thesis mainly studies the architecture of Moodle mobile phone teaching system, the design of function modules and the implementation process. This paper presents an algorithm to push information according to the order of request. By calculating the information diffusion and similarity in the network, the information in the network is filtered. Although all aspects of this mobile learning system are not perfect, it can provide some references for the subsequent development of the moodle platform mobile learning system to a certain extent, and it also has great practical significance for the development of mobile device terminal access.

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