Design of an Online Education Platform for High-Tech Agricultural Talents Based on ASP. NET Technology

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Abstract. Agricultural talent education is a characteristic of the current development of agricultural modernization in China, and it is the core mode of agricultural economy that combines emerging digital technology with the agricultural production. Modern agricultural talents are the key to supporting the development of agriculture. The lack of talent has become a major problem affecting the rapid development of agricultural education. This paper studies the training mode of agricultural talents, analyzes the current mode, finds out the problems and puts forward suggestions for the optimization of the mode. The online education platform for agricultural talents is designed based on ASP. NET. The development environment database system can meet the needs of teachers and students, using the VS2019 development environment and SQL Server2019 database system. To meet the basic information, distance education, forum exchanges, online examinations, online homework, and online Q & functions. This study fills the gaps in the relevant aspects of agricultural talent online education and is of great significance to the design of the agricultural talent online education system.

Keywords: Agricultural education · Online platform · Management module · ASP. NET

1 Introduction

The mode of modern distance education is developing towards the trend of popularization, internationalization, networking, and collectivization. With the increase in social pressure and the demand for career planning, people pay more attention to education and are more eager to learn. Modern distance education system changes teaching into learning and teaching, and emphasizes the cultivation of students' autonomous learning abilities. Teachers are no longer bored to pass on knowledge. Teachers are now more acting as a link of knowledge, presenting the knowledge to students one by one. This not only enhances the interest in learning, but also improves students' enthusiasm for learning. Various forms of interaction between students and teachers make online courses rich and colorful. Teachers and students learn together. Teachers help students learn. In the distance education classroom, students speak and communicate more boldly. A

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classroom even has students from many countries to exchange learning with each other, so that competition is replaced by cooperation and learning towards collectivization.

Online platform matrix factorization is to find a linear mapping function to map the original nodes to a low-dimensional space. When dealing with a highly complex nonlinear space such as a large network, the deep neural network is undoubtedly a better choice, because the neural network can superimpose multiple activation functions to form a nonlinear function learning model. Reference [3] proposes that the SDNE model is applied for network data embedding, so that the depth model can fit the network data. The network structure and properties can be adapted to the depth model. The deep neural network model has an excellent performance in dealing with end-to-end problems, such as the method used to predict information concatenation, the application of graph convolution neural network for link prediction, entity classification and so on. The above methods mainly learn a single vector representation for the nodes in the network, so they can be called single-aspect embedding methods. However, in the heterogeneous information network, the types of nodes are complex. A single vector may not fully reflect the semantic information of the nodes. The ideal solution should assign multi-aspect embedding representations to the nodes according to their different meta-paths [4]. Literature [5] chooses a clustering method based on matrix decomposition to obtain the multi-aspect distribution of each node, and literature [6] adopts a local clustering method to assign a multi-aspect vector representation to each node. However, this method trains each aspect representation to be similar to the initial node representation.

There is a big difference between ASP. NET and traditional ASP technology. For ASP, it is only a kind of analytic language. In the past, the early ASP needs to use the analytic method to run the program. In the ASP. NET Web Site, *.DLL files are compiled separately by each page. In the ASP. NETWeb Project, a *.DLL file is compiled by the entire Web Project. Finally, the local machine code is delivered to the CLR for transformation [8].

In this paper, the functional modules of the online education platform for agricultural talents are enhanced to better serve the teachers and students of the whole school. It realizes the development of personalized training programs for different agricultural disciplines, which greatly reduces the management of colleges and universities. This paper adopts the three web front-end technologies of HTML, CSS, and JS and the unique front-end technology of the WeChat applet. The back-end applies ASP. NET. Many frameworks and technologies of web, as well as cache technology and SQL Server database technology, choose different technologies according to the characteristics of the system to achieve efficient development and stable operation of the system.

2 Workflow of Online Education Platform for the Agricultural Talents

Define the attributes according to the characteristics of the resource types specified in the construction of educational resources. Study the metadata database structure of system resources, so that it can store the metadata of system resources and the semantic relationship between resources. Set the recommendation level of learning resources from

Table 1. Classification of quantification levels of platform work

Degree of project focus	Quantization parameters
Focus level	$S_g = x$
Secondary focus level	$S_g = y$
Ordinary level	$S_g = z$

Table 2. System management rules

Index	Management layer	Teacher layer	Student layer
Management class	x^3, x^2	x^3, x^2, x^1	x^2, x^1
Education class	y^2, y^1	y^3, y^2, y^1	y^3, y^2, y
Transaction class	z^3, z^2, z^1	z^3, z^2, z^1	z^2, z^1

shallow to deep. By integrating the concept of "fit" of ecology, accurately analyze the cognitive map of learners and recommend resources. Realize hierarchical recommendation of system resources [9].

System calculation is an important part of the online education platform for agricultural talents. The workload of the system is represented by S_g, and the initial value is set to 0. The system automatically judges the important level according to the information, and the level classification is displayed in Table 1.

After the system level is determined, the system type shall be determined. If it is a project type, it shall be multiplied by the proportional coefficient α[10].

The system user management rules are shown in Table 2.

The management category needs to be multiplied by the proportional coefficient. Finally, the importance of the system project is judged. The final workload calculation is displayed in flow chart of Fig. 1.

3 System Data Decision Algorithm

The index decision matrix is presented in Eq. 1.

$$\lambda = \begin{Bmatrix} x_1 & \cdots \\ x_2 & \cdots \\ \cdots & \cdots \\ x_n & \cdots \end{Bmatrix} = \begin{Bmatrix} \alpha_1 & \alpha_2 & \cdots & \alpha_n \\ \alpha_{21} & \alpha_{22} & \cdots & \alpha_{2n} \\ \cdots & \cdots & \cdots & \cdots \\ \alpha_{m1} & \alpha_{m2} & \cdots & \alpha_{mn} \end{Bmatrix} \tag{1}$$

The ratio of output to inpu is expressed in Eq. 2.

$$T_i = \sum_{i \neq 0}^{n} \frac{\lambda_{nm} \eta_i{}^2}{\theta_{nm}} \tag{2}$$

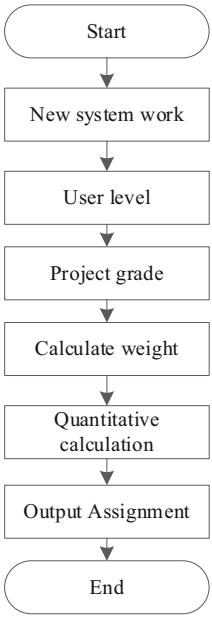

Fig. 1. Quantification process of system calculation

where, T_i is the output-to-input ratio of decision making unit *i*. θ_{nm} is the input weight. λ_{nm} is the output weight, and η_i is the efficiency value.

After choosing the appropriate weight coefficient, T_i will be limited in the interval [0,1]. The *ith* decision making unit is evaluated.

Finally, T_i^z will be obtained. The larger T_i^z is, the higher the η_{DMU} efficiency value is, and the smaller T_i^z is, the lower the η_{DMU} efficiency value is. Then, the CCR model is expressed as:

$$s.t.\frac{\sum\limits_{i\neq 0}\theta_{nm}\lambda_{nm}}{T_i^z} \leq 1 \tag{3}$$

As a nonlinear programming model, it has infinitely many optimal solutions. With the Charnes-Cooper transformation, let:

$$|\phi| = s.t.\eta_{ij} \times \sum_{i\neq 0}^{n} \eta_{DMU} \geq 0 \tag{4}$$

The dual model D of CCR indicates that the efficiency can be adjusted by changing the input when the output is fixed. On this basis, the slack variables ϖ^+ and ϖ^- can also be introduced. Decision-making units need to increase or decrease the number of inputs to achieve optimal efficiency.

4 System Performance Test

1) System response time test

The system response time is mainly applied to test the web page opening speed and login time when the system applies different browsers. The system adopts Edge, Chrome and Firefox three common browsers to test on the client, and the test results are displayed in Table 3.

It can be seen from the login time when each browser opens the web page that the support of the system for each browser can reach the ideal state, among which the optimization of the mainstream Edge and Chrome browsers is better. The compatibility with Firefox is also good.

2) User concurrency

First, set up an environment for the system, and use LoadRunner software to simulate a large number of user visits. The test results are displayed in Fig. 2.

When the number of users is small, the processing capacity of the server is very high. With the increase of the number of users, the possibility that the server fails to

Table 3. Response time test

Time/ms	Edge	Chrome	Firefox
Enter the interface	45	38	77
Login	62	57	104
Open more accounts/10	105	112	149

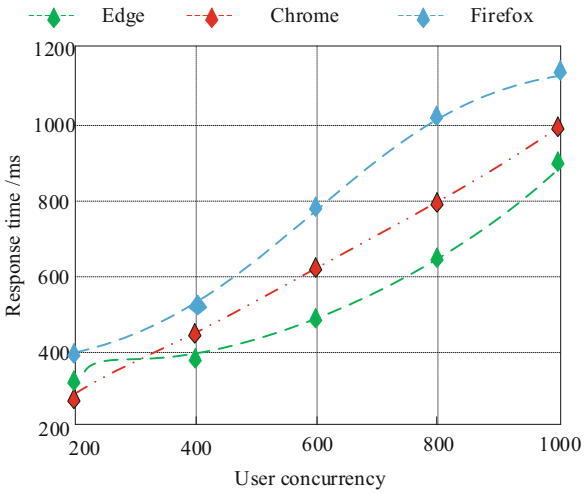

Fig. 2. User concurrency test

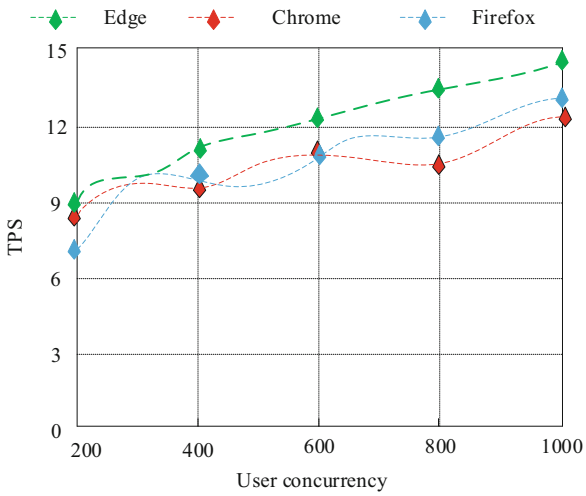

Fig. 3. Throughput Test

respond to requests increases. Finally, simulate the concurrent operation of 1000 users. The response time is about 1000 ms.

3) Throughput

System throughput refers to the number of system transactions per second. TPS equals to the concurrency/average response time. The test results are presented in Fig. 3.

The throughput test can verify the performance of the platform on the network capacity, improve the reliability of the system, and meet the requirements of online teaching in agricultural colleges and universities.

5 Conclusion

This paper studies the application of the system to Microsoft SQL Server, C # basic language programming learning, and ASP. NET technology. Based on the web, design a set of workload reporting, approval, calculation and statistics, query as one of the distance education management system, which is to test the performance of the system. It verifies the accuracy and average response time of the system under high concurrency. By simulating multiple clients to send access requests to the server, the concurrent requests to the server are realized by setting the number of threads and the number of cycles. It realizes the online office ability of university teachers' workload data and the automation of information management. The work efficiency of the management department is greatly improved. The teaching staff can organize the teaching work scientifically and reasonably according to the statistical information of teachers' workload so as to improve the quality of work.

This system still has a lot of content to be perfected. For example, data collection, at present, the system is only for internal data analysis, which may lead to incomplete data. The system may not be updated in time, requiring special personnel to maintain

data frequently. Users may not have time to register the system. These problems will be solved in the follow-up system development process. At the same time, in the future, the system will analyze more needs, expand more business functions, and promote a large number of applications to provide services for the vast number of agricultural talent users.

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