



Intelligent College Management (ICM) and Evaluation Information System (IS) Based on ANN Algorithm

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Abstract. With the continuous development of higher education and the popularization of modern information technology and Internet, a large number of traditional affairs have also been transferred to the information platform. The application of evaluation IS in higher vocational colleges is becoming more and more extensive. This paper presents the application of ANN algorithm in the construction of ICM and evaluation IS. This paper discusses and analyzes the ANN algorithm, the necessity of the design of ICM evaluation system and the design process design. Through the ANN algorithm, the experimental test and analysis of ICM evaluation are carried out, and the times of maximum evaluation, minimum evaluation and effective evaluation given by each expert are counted. Combined with the basic information reported by each college and department in the system, a simulation test data set is generated for the training of ANN model. There are three college / department tests for the school; The test results show that the ANN model is helpful to design a more reasonable evaluation index system, and can also be used as a useful supplement to the existing index system, which verifies the effectiveness of the application of ANN algorithm in the construction of ICM and evaluation IS.

Keywords: ANN Algorithm · Intellectualization · Evaluation · Information System Construction

1 Introduction

College evaluation is an evaluation behavior with strong subjectivity and uncertainty, and its results largely depend on the experience and subjective understanding of experts. Therefore, this paper attempts to use ANN algorithm to find out the laws and knowledge hidden in expert experience from historical data, and solidify these experiences in the mathematical model of data mining, so as to make the evaluation results have a certain stability, The ANN algorithm is applied to the ICM and evaluation IS.

Many scholars at home and abroad have studied the application of ANN algorithm in the construction of ICM and evaluation IS. Oguguo B adopts a non equivalent quasi experimental research design and uses an instrument called “measuring and evaluating achievement test” for data collection. The data collected were analyzed by means and

standard deviation to answer the research questions, and the null hypothesis was tested by analysis of covariance. The results show that students who use LMS teaching perform better than those who use cai4me software package. Determine the impact of learning management system on students' performance in educational measurement and evaluation courses [1]. Ekstedt m compared nursing students' perceptions of clinical learning environment and supervision under two different supervision modes: peer learning in student specific units, students working in pairs, supervised by "day tutors" (mode a) and traditional supervision, in which each student was assigned to an individual Tutor (mode B). In the two supervision modes, students have a positive experience of clinical learning environment and supervision. This study also shows that peer learning based supervision is more satisfactory for students in a student specific classroom with many tutors than the model in which each student is assigned to one tutor [2].

Based on the traditional college management and evaluation IS, this paper puts forward a data mining model suitable for college management and evaluation. The model is based on ANN learner, puts forward two modeling strategies of single ANN and integrated ANN, and tests the model on the simulated data set. At the same time, an expansion interface is reserved for the intelligent analysis module on the college management evaluation platform. When the amount of system data reaches a certain scale and there is a training data set required by the model in the future, the module can be applied in the system [3, 4].

2 Application of ANN Algorithm in the Construction of ICM and Evaluation IS

The effectiveness evaluation of college management is a highly subjective work, which depends on the scores of experts for a long time. To do a good job of the evaluation, we need a perfect evaluation standard and an objective evaluation model. The evaluation standard specifies various factors to be considered in the evaluation and their weights. The evaluation model is a reflection of the regularity of the impact of various factors on the final evaluation results. Most of the previous evaluations focused on the evaluation standards, spent a lot of time and energy designing the evaluation standards, and established the corresponding information management system according to the established evaluation standards. The function of the evaluation model is undertaken by the expert group, which will inevitably produce unstable, subjective and biased evaluation results [5]. Therefore, try to analyze and mine the historical evaluation record data, establish a machine learning model based on the experience of expert evaluation, provide an intelligent evaluation model to assist experts in the evaluation work, which will greatly increase the reliability and stability of the evaluation results and greatly reduce the workload of expert evaluation, which is also an important practical significance of this paper.

2.1 ANN Algorithm

Because the subjective degree and reliability of the index data sources contained in the whole index system are different, it provides a more accurate and robust evaluation model. Ann is a widely studied learner model. It was originally derived from the

simulation of human brain structure. At present, the commonly used algorithm is back propagation learning algorithm (BP algorithm). At present, mature artificial neural networks are generally designed into three layers, which need to be designed according to experience to make the model obtain the best accuracy and generalization ability [6, 7].

2.2 Necessity of Designing ICM Evaluation System

The need of information resource management: at present, there are a large number of college students, and the work of each department is inseparable from the management IS, especially for some aspects that need data processing, such as data statistics, classification, calculation and management. If they are completely completed by hand, it will be time-consuming, laborious, inefficient and difficult to ensure the accuracy. ANN algorithm in ICM and evaluation information can effectively help school departments, teachers and students to realize information sharing, and provide a platform for seamless communication among units. The need of information statistics and access: as for the teaching achievements of the college, the teaching achievements of each college are generally subject to the evaluation of experts. With the help of the IS, the whole process information of the college's teaching centered teaching activities can be vividly, intuitively and quickly displayed to the expert group, and the dynamic query and statistics of information can be realized. The needs of colleges and universities for their own development: through the platform of teaching evaluation management IS, we can clearly allocate the responsibilities of various departments of the school, and timely listen to the opinions of students and departments. Personnel inside and outside the school can also evaluate the school resources according to the feedback results, so as to continuously improve the teaching management mode and improve the teaching quality [8, 9].

2.3 Design of ICM and Evaluation IS

(1) User login management module

The browser page provides a login interface for users. After selecting their own user type, users can log in to the system by entering the correct user name and password assigned by the system. Among them, the user type, user name and password must match, otherwise they cannot enter the system. In case of login failure, the system will prompt users for login error and check their own type, user name or password.

(2) Basic information management module

This module actually integrates the user's personal information and related information, including the basic information of teachers and students' status. In this module, the administrator can manage the personal information of teachers or students, of course, including the information of evaluators. They can add, delete or modify the information of these types of personnel, provide them with corresponding login permissions, view and modify their system login password. Students can log in to the system through their student ID and initial password to view their own information, teachers can log in to the system through their job ID and initial password to view their own and teaching students' information, and the evaluator carries out the evaluation operation according to the evaluation expert code and initial password provided by the administrator [10].

(3) Score management module

The score management module is an important link of the teaching evaluation management IS. In this link, the teaching level of teachers can be measured according to the students' scores. After logging in to the system and calculating the students' final scores according to a specific way at a specific time, the teachers will upload them. Then the academic administrators will make statistical verification on the scores and count out the students whose scores are unqualified and who need to retake and make-up exams. When uploading grades, teachers can freely choose the generation method of final scores. For example, they can score according to the comprehensive scores of usual classroom performance scores and final examination scores, and select an appropriate percentage to achieve scientific scoring. At the same time, teachers can modify and delete grades when uploading grades. After a specific time, the system will fail, and the modified grades need to be modified at the Academic Affairs Office [11].

(4) Teaching evaluation management module

The teaching evaluation management module is a characteristic function of the teaching evaluation management IS. Firstly, it can integrate the evaluation information of other modules. The personal information interface where students log in will have evaluation functions, such as scoring the teaching quality and popularity of teachers, and teachers can evaluate the school's teaching resources and give some suggestions. Then the system will integrate and analyze all the evaluation information, after logging in, the evaluation expert will view this information and make corresponding evaluation.

(5) College management module

The main goal of students in school is learning, including learning theoretical knowledge and practical knowledge, as well as the cultivation of ideology and morality, and learning the basic truth of being a man. The most important is the learning of basic theoretical knowledge. Therefore, the system focuses on providing students with rich learning resources to facilitate students' browsing and downloading. The management and operation of students can facilitate the school to grasp the learning dynamics and comprehensive quality level of students on the whole. At the same time, it is also convenient for students to understand their own basic information and academic completion. During the implementation process, the functions of sub modules will be given specific permissions for the operation of each sub module, and finally the specific operation of each module will be connected with the corresponding users [12].

3 ANN Algorithm

This paper designs two groups of analysis models respectively. The first group is a single ANN analysis model, and the second group is an ANN network, that is, each project (such as organization leaders, etc.) is scored manually by experts, and then several ANN are trained respectively. For different projects, the output of these Ann is used as the input of a summary Ann; Let $d = \{W_1, W_2, \dots, W_N\}$ be the evaluation project set, where $w_k = \{WK_1, WK_2, \dots, w_{k_n}\}$ is the index set contained in the project w_k , K_N is the number of indicators contained in w_k , $k = \{1, 2, \dots, n\}$. Such as formula (1)

$$Model_I = ANN(W_1, W_2, \dots, W_n, Score_{all}) \quad (1)$$

where scoreall is the score of the final output of the model, and formula (2) formally describes the second group of models. $H_1 = ANN(W_1, Score_1)$

$$\begin{aligned}
 H_1 &= ANN(W_1, Score_1) \\
 H_2 &= ANN(H_2, Score_2) \\
 &\dots \\
 H_n &= ANN(W_n, Score_n) \\
 Model_I &= ANN(H_1, H_2, \dots, H_n, Score_{all})
 \end{aligned}
 \tag{2}$$

The second group requires experts to give manual evaluation results after examining the actual situation of each item manually, while the first group only requires experts to give overall evaluation results after examining the overall situation.

4 Experimental Test and Analysis

Due to the subjective and trust attributes of the index data in the system, this paper selects six experts with rich teaching experience and college management experience in a school to estimate the subjective and trust attributes of the index data. Each expert needs to estimate the subjective and trust of 101 indicators. For the evaluation of the subjective degree and trust degree of each index, remove the expert with the highest and the lowest valuation, and take the average of the other expert valuations as the final result. Experts are represented by all initials of their names and Pinyin, and count the number of times each expert gives the highest assessment, lowest assessment and effective assessment. The statistical results are shown in Table 1 and Fig. 1.

The above statistical chart shows that in the implementation of the IS in this paper, the score does not consider the subjective degree and trust degree of the index, but is weighted according to the weight of the index system. After the system outputs the evaluation results, the person in charge of college management of each department can log in to the system with his own account to view the scores. The evaluation score can be calculated through the weights of the evaluation index system that has been entered into the system. Through this test, we can get more accurate and flexible results than the evaluation score calculated only by the weight of the index system.

Next, the ANN model is trained, and the ANN’s predicted value of the current state and the evaluation score calculated according to the weight of the index system are averaged as the final evaluation score. There are three college / department tests for the school. Figure 2 records the absolute value of the difference between the evaluation

Table 1. Expert evaluation information form

expert	XSV	SFR	HHM	WXW	LLY	LY
Highest evaluation	32	23	15	28	22	18
Minimum assessment	25	20	11	9	10	16
Effective evaluation	143	158	177	166	169	168

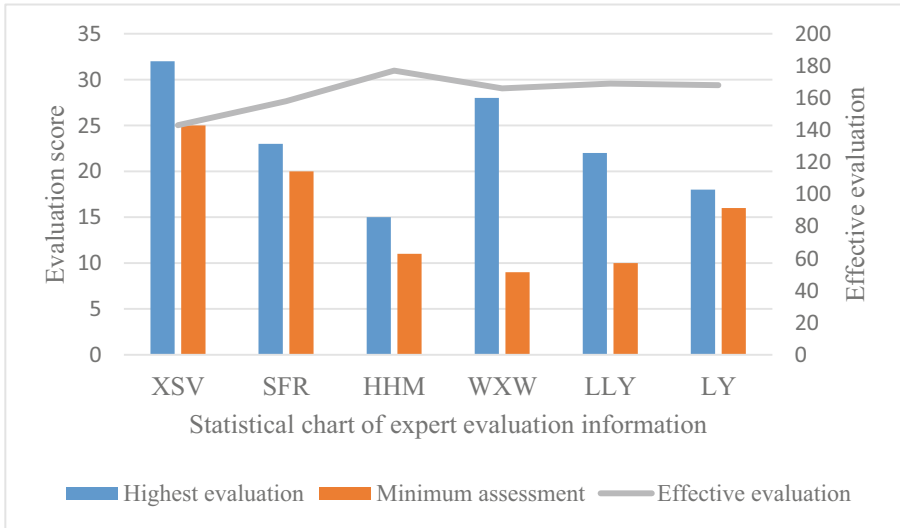


Fig. 1. Statistical chart of expert evaluation information

score of the two groups of models under the test and the weighted score of the index system in Sect. 3.

It can be seen that since the model is considered to capture the experience and subjective will of experts, this deviation also reflects the tendency of experts in different aspects of college management evaluation and the weight in the index system. This tendency is obtained through ANN model, which is helpful to design a more reasonable evaluation index system, and can also be used as a useful supplement to the existing index system.

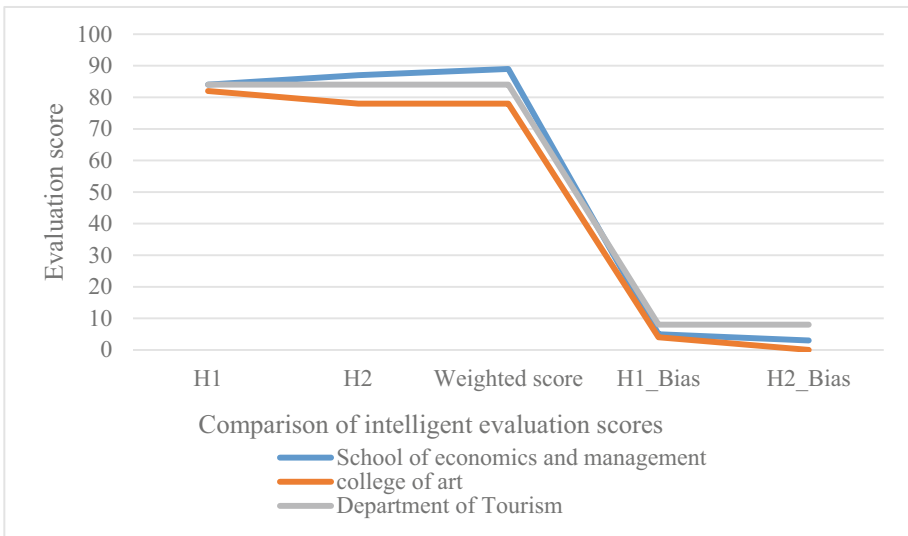


Fig. 2. Comparison of intelligent evaluation scores

5 Conclusions

At present, intelligent analysis technology is being combined with college information management platform, and the intelligent analysis of college management data has become a hot research field. The method of machine learning is used to evaluate the college management intelligently. In the unified model, the objective indicators and subjective indicators are combined, and the model is trained with the scores of previous experts. Finally, the expert experience is solidified in the model. The work of this paper is similar to these works. On the basis of index data collection, using data mining modeling technology, combined with historical data to establish evaluation model, and then apply the model to information management system. The existing student evaluation management IS must be constantly upgraded and improved according to the needs of school construction and development. Therefore, it needs to be constantly updated and improved. In the future research, we can mainly from the following directions: improve the data analysis of student evaluation, rather than collecting the evaluation results alone; Continue to improve the system to make it more convenient for users to operate; Encrypt and transmit important and sensitive data to ensure security; Put all the functional modules of the existing system into use to find and solve problems; Further optimize the network and database.

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