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DESIGN OF COMPUTER INFORMATION MANAGEMENT SYSTEM BASED ON MACHINE LEARNING ALGORITHMS

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Abstract. In order to improve the efficiency of office automation, regulate work frequency, and improve office efficiency, this paper presents a computer information management system design based on machine learning technology. Firstly, the basic design principles of computer information management systems are analyzed, and secondly, risk prediction is studied. The risk of computer information management systems is caused by the cross influence of different risk factor indicators, and has linear and nonlinear characteristics. Using a single prediction model cannot obtain accurate prediction results. Therefore, the risk prediction method for computer information management based on machine learning technology. The risk prediction method is established by using Analytic Hierarchy Method in machine learning algorithms, and the historical data is collected according to the index system. The weight of the initial prediction is determined by the combination of subjective and objective weight; In machine learning algorithms, risk prediction and benefit prediction are used as input and output methods for cloud machine learning. Through training and training, a risk prediction model is established to obtain higher prediction efficiency. The simulation results show that the prediction accuracy of this method is 95.5%, which can estimate the hazard existing in computer information management and improve the method.

Key words: Machine learning algorithms, Computers, Information management system, Analytic hierarchy process

1. Introduction. Against the background of the rapid development in science and technology, computer information technology has introduced a rapid transformation. The reform of information management and information retrieval technologies has been greatly strengthened. In the process of office automation, the application of information technology management system has greatly improved the efficiency of office automation systems and effectively controlled the frequency of repetitive work, this can greatly improve office efficiency [16, 4, 8, 12, 7]. Computer software systems value universality and flexibility. How can we significantly improve the level of information technology and ensure the market competitiveness of our enterprise? We should analyze the development strategy of management information systems in detail. The security of computer information management systems and their business information is crucial. When there are risks to information security, some important information may be leaked. Therefore, risk prediction of computer information management systems has become a focus of current research in the field of information security. Machine learning combines knowledge of neurophysiology, computer science, and applied psychology, and there are discrepancies in analyzing large-scale data. It can be used for risk prediction in computer information management. Neffati, S. et al. The development of computer-aided design (CAD) and computer-aided manufacturing (CAM) systems in the past decade has made significant progress in biomedical and material applications. In particular, CAM and CAD systems have been applied in biomedical fields such as medical engineering, robotic surgery, medicine, and dentistry. Therefore, the accuracy and precision of CAD and CAM systems are very important for precision machining. A new brain classification CAD system is proposed based on the analysis of magnetic resonance imaging (MRI). First, the proposed reduced kernel partial least squares algorithm (DR-KPLS) is used as the feature extraction method.Then, support vector machine (SVM) is used for classification and k-fold cross validation method is used for validation. In addition, taboo search meta heuristic method is also used to determine the optimal kernel function. The algorithm named DR-KPLSVM [13]. Sun, Z, Others I believe there are still some deficiencies in the management of horse racing. The main problem is the lack of information management in the horse competition industry. Introducing information technology to the management of horse competition enterprise can achieve the management of enterprise information, make horse competition more professional and practical [17]. In order to improve the accuracy of prediction in computer information management, the author

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proposes a risk prediction method based on machine learning. This method combines the Analytical Process (AHP) of machine learning and neural network to ascertain the risk of computer information management, to ensure the stability and reliability of its operation.

2. Methods.

2.1. Objectives of professional teaching reform. Since the second half of the 20th century, information industry has become the most promising new industry in the world. At present, the average growth rate of international informationization is between 15%-20%, far exceeding the growth rate of international trade [20]. In the past decade, China's information industry has developed rapidly at an average annual growth rate of 30% and has become the biggest pillar of the national economy. In the meantime, the teaching of computer major information management system must be reformed to adapt to the development of information industry, which will be of great significance. Reforming the traditional concept of vocational education, clarifying the objectives of vocational education, and positioning the training objectives of vocational education as "cultivating technical applied talents, with sufficient theoretical knowledge, focusing on skill cultivation, and quality education as the core", emphasizing characteristic education, innovative education, and lifelong education. It is necessary for students to have strong practical skills in professional and technical aspects, love their job, be diligent, and work at the forefront with peace of mind. Reforming a single talent training model, adopting a combination of academic education and certification education. The plan is to add courses related to qualification certification in the curriculum system, help students pass relevant qualification certification exams, implement a "dual certification system", and embark on a path of combining academic education and certification education. Reforming the curriculum system and updating teaching content. The new teaching plan has made two major adjustments to the curriculum system. Firstly, theoretical courses have been appropriately compressed and more practical training courses have been arranged to meet the requirements; The second is to add practical, innovative, and characteristic courses that can meet the needs of the insurance industry and employers. The outdated teaching methods and means of reform will extensively adopt modern teaching methods in professional teaching to improve classroom information capacity; By relying on laboratories and training bases, students can deepen their understanding and mastery of knowledge through experiments, and improve their skills through practical training [18, 19]. At the same time, reform the examination system, increase skill assessment, and use skill level as the main assessment indicator and evaluation criteria for students. Optimize the structure of the teaching staff, establish a "double qualified" teaching staff, reform the situation where the theoretical knowledge of the teaching staff is relatively strong and the practical knowledge is relatively weak, strengthen the training and introduction of the teaching staff, and establish a high-quality and high-level double qualified teaching staff that adapts to the characteristics of higher vocational education and has the characteristics of the times, levels, and combination of full-time and part-time, and implement goal management, project management mechanism, and incentive mechanism for teachers. Strengthen the integration of theory with practice, adopt the path of industry, academia, and research integration, reform the traditional habits of closed teaching and weak connection between theory and practice, vigorously strengthen the connection between schools and enterprises, combine learning with employment and entrepreneurship, and combine teaching, research, and industry, so that students can participate in the entire process of the real software industry to exercise during their school years.

2.2. Analysis of basic design principles of computer information management system.

(1) Programming languages applied in the programming process. The programming language commonly used by designers in computer programming is C++ [2]. However, in the actual work process of designers with high professional and technical levels, they actually do not use the C++language. This is because the difficulty of C++programming language is very high, so it is quite difficult for technical personnel to fully master this programming language. Moreover, it is actually quite difficult for C++programming language to be flexibly applied, in addition, the update speed of this programming language is very slow, making it difficult to meet the actual design requirements of computer information management systems. In the actual operation of computer information management systems, it is necessary to ensure the system's running speed through the level of computer language programming. If an application wants to find highly targeted information from a database, it needs to use a data engine.

(2) Module Design Principles. When designing a computer information system, the most important issue involved is module design work. In the process of module design, it actually involves connecting the functional modules and hardware of the computer information management system together. Therefore, during the actual operation of the computer information management system, it can make certain guarantees for its own performance [10, 3]. Analyze this issue from a design perspective. During the process of module design work, it is generally done vertically to ensure that the system has all the functions. However, from a holistic perspective, the design of computer information management system modules is actually a horizontal design process. During the design process, the interconnectivity of each subsystem in the system should be considered, and a lot of data needs to be used, after completing the analysis and processing of data information, a detailed analysis of the actual requirements of the system can be conducted to ensure the design level. In fact, a computer information management system can be regarded as an advanced servo system, only in this way can various subsystems within the computer operate independently of each other [5]. In the process of dividing each system module, it is necessary to use a highly specialized division method. In general, all functions in a computer information system will be constructed with corresponding systems, therefore, it is possible to ensure the functionality of each system, greatly improving the operational security and stability of computer information management systems. Against the backdrop of the increasing development speed of computer information management system related technologies, the problems existing in traditional computer information management systems are gradually emerging in front of people, in order to effectively solve the problems existing in computer information management systems, the design principles of computer information management systems should be given sufficient attention, so that the probability of problem occurrence can be effectively controlled from an essential perspective.

2.3. Risk prediction of computer information management systems using machine learning algorithms.

(1) Construction of Risk Prediction Index System for Computer Information Management System. Analytic Hierarchy Process (AHP) is an information technology learning algorithm which combines the theories well and efficiently. It can monitor the initial data and make research decisions based on the analysis results. The process is very simple. Predicting the risks of the computer information management system is mainly to ensure the security of the information resources in the system.The security of information assets can be described through density preservation, integrity, reliability, authenticity, and availability [11]. Computer information management systems have openness and dynamic variability, and their risks mainly come from illegal external access to information computer information management systems, as well as illegal tampering, possession, destruction, and monitoring of information assets and application systems within the system. According to the relevant regulations on computer information management systems and information asset security protection,the risk factors of computer information management system can be divided into information assets risk, risk factor, risk factor, safety factor, and risk factor backlog. the risk factors are analyzed. Based on the five kinds of risks of computer information management, a pre-evaluation risk model for computer information management system was established using the Assessment Procedure System (AHP) (as shown in Table 2.1), which includes a total of 25 risk indicators.

(2) Construction of risk prediction model. Neural networks are nonlinear distributed consecutive data processing algorithms with characteristics such as self-learning preservation, transfer storage, and integration. Among them, feedforward neural networks have simple and high performance results. Among them, feedforward neural networks have good robustness and robustness. Compared with other feedforward neural networks, a hidden layer feedforward neural networks with advanced learning technology can achieve learning of neural networks under half parameter treatment, thus improving learning efficiency. x_p and y_p represents the risk indicators first and foremost risk estimates key components of the computer information management system, respectively. The data structure is described as follows:

$$J_s = \{(x_p, y_p)\}_{p-1}^{s} \tag{2.1}$$

In the formula, s represents the number of samples.

Table 2.1: Risk prediction index system of computer information management system

Target layer	code	Factor layer	code	Indicator layer	code
Risk prediction of computer information management system	A	Risk factors of information assets	B1	Confidentiality	B11
				Integrity	B12
				Reliability	BI3
				Authenticity	B14
				Availability	B15
		Threatening risk factors	B2	Information is stolen, tampered with, or deleted	B21
				Network resources are destroyed	B22
				Service suspension	B23
				Illegal access	B24
				Bypass control	B25
				Authorization violation	B26
		Vulnerability risk factors	B3	Manage Security	B31
				Hardware security	B32
				software security	B33
				Personnel safety	B34
				environmental safety	B35
				Communication security	B36
		Risk factors of safety measures	B4	Encryption measures	B41
				Anti hacker measures	B42
				Antivirus measures	B43
				Data backup and recovery measures	B44
		Recovery risk factors	B5	environmental deterioration	B51
				Service deterioration	B52
				Information recovery costs	B53
				Service recovery costs	B54

Equation (2.1) describes the regression constraint form of extreme learning machines:

$$\min\left(\frac{1}{2}\eta_L^Y\eta_L+\frac{\gamma}{2}\phi^Y\phi\right) \tag{2.2}$$

s.t.

$$y_p=\sum_{i=1}^{L}\eta_i f\left(\delta_i x_p+z_i\right)-\phi_p \tag{2.3}$$

In the formula, L and z are the number of hidden layer nodes and regression error, respectively; $f()$ and ϕ are the mapping function and output layer node regression errors, respectively; δ_i is the weight vector of x_p, η_i is the weight vector representing y_p, and Y is the expected output [14, 9].

$$L\left(v,\phi,\eta_L\right)=\frac{1}{2}\eta_L^Y\eta_L+\frac{\gamma}{2}\phi^Y\phi-v\left(G_L\eta_L-Y-\phi\right) \tag{2.4}$$

Build a risk prediction model for computer information management systems:

$$y=\sum_{i=1}^{L}\eta_i f\left(\delta_i x+z_i\right) \tag{2.5}$$

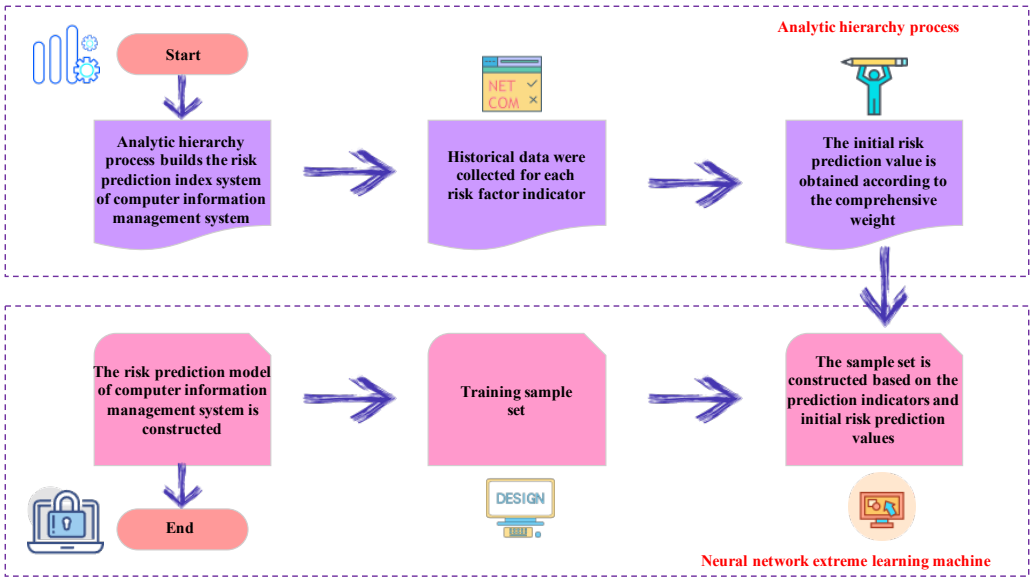

Fig. 2.1: Risk prediction workflow

The risk prediction method of the operation of computer information management system based on machine learning algorithms is illustrated in Figure 2.1. The final estimated risk value obtained by the method in Figure 2.1 can describe the risk of computer data management.

3. Simulation Experiments. The experiment aims to verify the effectiveness of the author's research on risk prediction of computer information management systems. VC++600 was used to implement this study, and computer information management systems in product development departments of 20 small and medium-sized enterprises in a certain province were selected as the research objects for example verification [15].

3.1. Risk prediction process. In the process of predicting the risk of research items, select all research items and use the risk prediction method developed by the author, as shown in Table 2.1. After collecting the relevant data, calculated weights, and results are shown in Table 3.1.

The factors and initial risk prediction results of the selected research subjects are shown in Table 3.2. According to Tables 2.1 and 3.2, a sample set was constructed, and after training and learning, the final risk prediction result for the selected research object was 0.5878. Table 3.3 shows the comparison between the risk prediction results of all research subjects and the actual risk values studied by the authors. From Tables 3.1-3.3, it can be seen that the author's research can effectively predict the risk of the research object [1].

3.2. Performance verification. By combining the author's research in Table 3.3 with the actual risk factors, the prediction results of the author's research results are verified. The results are shown in Figure 3.1. From Figure 3.1, it can be seen that the author studies the prediction results with high accuracy, and the prediction values are consistent with the actual risk values.

The author's high research on predicting the risk value of research products is due to the combination of the two prediction models. It not only has the function of linear theoretical prediction models (identifying hierarchical processes), but also has the function of nonlinear theoretical prediction model (neural network cloud systems), which uses nonlinear prediction capability to fit the relationship between the evaluation indexes and the prediction results, To improve prediction accuracy [6]. By using computational information management system risk prediction, the weak links of the computer information management system can be identified based on the prediction results. Targeted solutions can be developed for different weak links to reduce system risks and ensure information security. Combine the linear method of Analytic Hierarchy Process with the nonlinear method of neural network extremum training machine, analyze the research object, fit for the relationship

Table 3.1: Weight calculation results

Factor layer	comprehensive weight	Indicator layer	comprehensive weight
5*B1	5*0.2469	B11	0.054
		B12	0.0707
		BI3	0.0418
		B14	0.0582
		B15	0.0226
6*B2	6*0.2150	B21	0.0585
		B22	0.0227
		B23	0.0176
		B24	0.0528
		B25	0.0289
		B26	0.0350
6*B3	6*0.2363	B31	0.0618
		B32	0.0421
		B33	0.0464
		B34	0.0433
		B35	0.0255
		B36	0.0177
4*B4	4*0.1737	B41	0.0283
		B42	0.0348
		B43	0.0585
		B44	0.0524
4*B5	4*0.1286	B51	0.0252
		B52	0.0209
		B53	0.0395
		B54	0.0433

Table 3.2: Initial risk prediction results for each factor

Factor layer	Initial risk prediction value
B1	0.1433
B2	0.1359
B3	0.1074
B4	0.0942
B5	0.1154
Research object	0.5958

between the evaluation index and the prediction result, and make prediction risk more accurate. The changes in the two estimated estimates are shown in Table 3.4.In Table 3.4, the risk prediction results of the study subjects before and after using this method showed a significant downward trend, with a decrease in risk prediction results between 24% and 39% for each study subject. Compared with the data in the relevant statistical data of the comparative method, the risk reduction effect was more significant, indicating that the risk prediction effect of the author's study is good and can be widely promoted and used.

4. Conclusion. The author proposes the basic idea of educational reform, which is to design a reasonable theoretical and practical teaching system based on job knowledge requirements and centered on knowledge, ability, and quality structure. Then, a risk prediction method for computer data management based on machine learning algorithms is proposed, which combines Analytic Hierarchy Process (AHP) in machine learning algorithms with neural networks for prediction. The research results show that the author's research results

Table 3.3: Comparison of risk prediction results and actual risk values of the author's study

Research object	Author's research on risk prediction	Actual risk value	Research object	Author's research on risk prediction	Actual risk value
1	0.3642	0.3827	11	0.3956	0.4569
2	0.4228	0.4802	12	0.2941	0.2762
3	0.2896	0.2685	13	0.5878	0.6032
4	0.3545	0.3757	14	0.4145	0.3856
5	0.3127	0.3127	15	0.3061	0.4094
6	0.4701	0.4523	16	0.5830	0.5813
7	0.5114	0.4997	17	0.4171	0.4027
8	0.5927	0.6024	18	0.3603	0.3603
9	0.3716	0.3860	19	0.2994	0.2995
10	0.4009	0.6594	20	0.4162	0.5369

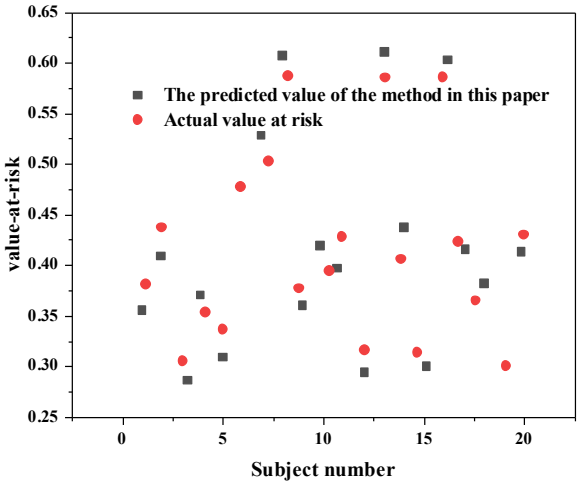

Fig. 3.1: Verification of risk prediction effect

Table 3.4: Changes in risk prediction values

number	Previous Result	Subsequent results	number	Previous Result	Subsequent results
1	0. 3642	0.2241	11	0.3956	0.2500
2	0.4228	0.3146	12	0.2941	0.1949
3	0.2896	0.1929	13	0.5878	0.3956
4	0.3545	0.2243	14	0.4145	0.3002
5	0.3127	0.2362	15	0.3061	0.2107
6	0.4701	0.3248	16	0.5830	0.3863
7	0.5114	0.3776	17	0.4171	0.2912
8	0.5927	0.4209	18	0.3603	0.2233
9	0.3716	0.2503	19	0.2994	0.2205
10	0.4009	0.2895	20	0.4162	0.2936

have better prediction accuracy than the comparison method. Due to the problems in computer management systems, as well as risk issues such as personnel management and financial management, the author only focuses on risk prediction in computer information management systems. Subsequent research will mainly focus on the scalability of the author's research and expand its application fields.

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