An Empirical Study on the Application of Machine Learning for Higher Education and Social Service

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ABSTRACT

The work used the current mature computer technology, machine learning technology, and other higher technologies to explore the comprehensive application of educational information management under the internet to provide educational scientific researchers with a retrieval platform for educational statistical information. Deep learning was used to extract useful network features more effectively and make the machine learning model fully consider the constraints of satisfying the constraints and optimization objectives in the problem. Based on the classification of the restricted Boltzmann machine, the Gauss-binary conditional classification of the restricted Boltzmann machine model was proposed as the routing decision unit with the given specific training algorithm of the model.

KEYWORDS

Educational Information Management in Colleges and Universities, Machine Learning, Multiple Intelligences, Restricted Boltzmann Machines

1. INTRODUCTION

In colleges and universities, educational administration is the basic platform for teaching. It serves the education and teaching work of the school and provides a strong guarantee for the teaching work of teachers and the learning of students. Educational affairs need to organize and arrange all major education and teaching activities of the school to ensure the high-quality and efficient completion of the school’s teaching work (Costa-Mendes et al., 2021; Luan & Tsai, 2021; Xu et al., 2019). Therefore, as an educational administrator, it is expected to strengthen the development of online educational administration and online teaching through continuous improvement of rules and regulations and take practical measures to provide positive impetus and promotion for colleges and universities to improve the quality of teaching. Based on the current Internet+education hot market and the background of continuous attempts and advancement of national education reform and innovation, the school has tried to study the university’s educational administration management system (Albahri et al., 2020). Faced with various data research reports and the status quo of social development, they discovered and affirmed the significance of the development of the Internet and education. Internet teaching can provide more learning resources and learning methods, break through the limitations of time and space, and realize long-distance teaching exchanges and sharing, which is conducive to mobile learning and personalized learning (Shankar, 2018). It is a new attempt and active exploration for
the country’s education, the school’s educational work, the teaching process of teachers, and the learning methods of students.

While machine learning has a huge impact on people’s lives and work, it is also accelerating its integration into education (Gayathri Edamadaka et al., 2020). A new era of disruptive smart technology transformation education is coming. A new round of technological transformation education will be led by smart education for education. Teaching injects new ideas, provides new methods and tools, drives the fundamental transformation of education and teaching mode, and promotes the quality of teaching effects. At present, machine learning can improve teaching and learning in all aspects such as learning guidance, teaching evaluation, and teaching space optimization, enhance the learning experience and make personalized learning a reality (Shah et al., 2021). Machine learning is leading the innovation of education and teaching and has become an important factor in the development of educational information. The “New Generation of Machine Learning Development Plan” proposes, “Using intelligent technology to accelerate the reform of talent training models and teaching methods, and build a new education system that includes intelligent learning and interactive learning.” In this era, the field of education should be followed closely. The development of machine learning promotes its teaching reform and innovation, builds an education system that realizes personalized learning and lifelong development, and promotes the transformation of education from a low-level, extensive type to a high-level, precise type (Raja Suganya, 2021).

The work has studied the following aspects, e.g., developing the system based on the mature incremental method of software engineering, proposing the design ideas, principles, and requirements of the basic platform of the system, analyzing the functional structure of the system in detail, and selecting J2EE as the main development environment of the system. We analyzed a very important and widely concerned learning model in deep learning—restricted Boltzmann machine and discussed its network structure, mathematical model, and training algorithm in depth. It is proved that the conditional classification restriction Boltzmann machine model can fully consider the restriction conditions in the training and prediction process. At the same time, we have expanded the input layer node unit that can only represent the binary state in the original model and introduced Gaussian noise for it to more accurately represent the characteristics of continuous real number input data, thereby constructing a Gaussian-binary conditional classification restricted Boltzmann machine. The specific training algorithm and parameter update rules of the model were given through reasonable mathematical derivation. Based on the analysis of needs in the management field of basic education units, the work used the theory of education for all and the socialization of education under the holistic view of education and the theory of educational philosophy and put forward a new concept of comprehensive education in the basic education stage—community education development community. According to the theory of holistic education and the big curriculum view, it was assigned to participate in the discussion and formulation of the medium and long-term development plan of the region and the school, participate in the school curriculum setting, coordinate the educational resources of the school and the surrounding communities to achieve resource sharing, and promote the school logistics and teaching supplementary socialization.

2. RELATED WORK

Machine learning occupies an important position in the field of machine learning (Shannaq, 2020). In the current market, more and more researchers are conducting in-depth research, so it is in a stage of rapid development in the technical field. Relevant scholars pointed out: “machine learning mainly uses computers to learn the laws and characteristics of data so that it can gain new knowledge and new experience. The intelligence of the computer is improved so that the computer can have the same decision-making ability as humans (Le et al., 2017).” At present, the most popular algorithms in machine learning are coming into people’s eyes: random forest algorithm, association rule algorithm, SVM algorithm, decision tree algorithm, Boosting, Bagging, etc. This provides a technical means for
the development of intelligent life (Vaishnavi & Ravichandran, 2021). At present, machine learning is widely used and can be seen everywhere in life, such as the intelligent recommendation system on shopping websites, the speech recognition system of Baidu and Xiaomi, the natural language processing technology of search engines, and people. For better applying the algorithms in machine learning to the management of colleges and universities, the SVM algorithm in machine learning, Bagging, XGboost, logistic regression, and other technologies can be used to manage the information of college students, hoping to use machine learning technology to help colleges and universities development (Gill-Cox, 2018).

Related scholars pointed out that educational machine learning is a new research field formed by the combination of machine learning and learning science (Salamatov et al., 2021). Educational machine learning aims to create conditions for students’ learning through observation and understanding of the process of learning. Relevant scholars pointed out that educational machine learning mainly uses computers and teaching platforms to allow students to better participate in teaching, helps teachers to teach more effectively, and emphasizes that the power of artificial intelligence should be combined with advances in the robotics field in the future (Wang et al., 2020). More sensor devices are used to monitor the learning environment and learning behaviors. Some researchers have conducted research on the model Knewton project of the adaptive teaching platform and proposed that it can collect data from students’ online learning and accurately analyze and predict students’ knowledge mastery, hobbies, and practice levels (Krishnamoorthy & Lokesh, 2020).

Other researchers analyzed the “Curriculum Signal” project of Purdue University in the United States and pointed out that the project provides an intervention system that supports teacher teaching and student learning (Rogers et al., 2021). Various technical methods such as learning analysis can be used to help teachers understand learners’ learning. Researchers pointed out that intelligent personal assistants are machine learning to build natural human-computer interaction between humans and machines and pointed out some scenarios in which intelligent assistants are used in education, such as accompanying learning and language learning; related scholars have designed and developed services for admirers (Arroyo et al., 2019; Chen & Siau, 2020; Usharani et al., 2020). The MOOC Buddy, the teaching robot on the lesson platform, can recommend adaptive learning resources for learners based on their characteristics. Related scholars have developed the intelligent teaching assistant Botty based on MOOC learning and applied it to teaching practice (Yousefi et al., 2020). An intelligent teaching assistant can make the relationship between teachers and students more harmonious and improve the teaching effect, but teaching assistants do not replace teachers.

Relevant scholars pointed out that artificial intelligence, virtual reality, 3D printing, and other technologies affect education and discussed the changes caused by technology in the teaching methods of teachers and the learning methods of students; researchers have discussed the teaching model of big data in education (Slanetz et al., 2020). Starting from the key characteristics of the big data era, relevant scholars analyzed the development trend of big data reform teaching, as well as the changes in the resource environment view, teaching view, and teacher development view caused by the teaching reform and analyzed specific teaching cases (Fallucchi et al., 2020). Relevant scholars have studied the teaching reform induced by big data from the perspective of big data, pointing out that big data strongly impacts teaching activities, specifically discussing the reform of teaching thinking, teaching structure, and teaching methods induced by big data and analyzing and using big data (Peng et al., 2019). The supporting conditions for inducing in-depth teaching reforms put forward teaching reform strategies from teaching content, teaching methods, and teaching organization; experts studied the teaching reforms in the information technology environment and specifically analyzed the teaching content, teaching goals, and teaching objectives in the information technology environment (Huang, 2020; Mutalib, 2021).
3. DESIGN OF EDUCATIONAL INFORMATION MANAGEMENT SYSTEM IN COLLEGES AND UNIVERSITIES

3.1 System Model

The educational information management system of colleges and universities follows the design of J2EE specification and adopts the three-tier structure design of J2EE, consisting of a presentation layer, a business logic layer, and a data providing layer (see Fig. 1).

The system follows the J2EE specification design and adopts the three-tier structure design of J2EE, which consists of a presentation layer, a business logic layer, and a data providing layer. The presentation layer is the Web Server composed of JSP pages and Servlets, which are used to process page interaction logic, receive requests from the client browser, and feedback the processing results of the business logic layer to the client browser. The business logic layer provides logic processing to solve or meet a specific business requirement. The system provides processing of business logic in the form of software components.

In the system, a component contains one or more services (functional interfaces), and each service is responsible for processing front-end business requests. For example, the process management component includes services (functional interfaces) such as starting a new process and executing tasks on the current node. System basic components and business components are built on the J2EE component framework. A framework is a set of prefabricated software building blocks that programmers can use, extend, or customize for specific computing solutions. The framework provides unified management and deployment of components in the system as well as the logical control of calls between components.
3.2 System Workflow

The calling relationship of the subsystem shows the call relationship between the various subsystems of the system. The system is composed of six main subsystems: interface driver, framework service manager, business service, workflow service, workflow service agent, and workflow engine. The page drives the requested XML message through the interface and dispatches the workflow service through the framework’s service manager to complete the message interaction with the workflow engine.

The workflow engine is responsible for the process control and role assignment of the business process. We call each link of workflow processing a task, and the tasks of a workflow can be divided into ones dealing with user interface interaction and a specific business. The tasks of handling the user interface interaction and the user interface to complete the interaction through workflow-driven services; while the task of processing a specific business sends a service request to the framework service manager, and the workflow task processed by the framework service needs to be processed.

The framework uses the service manager to uniformly manage and schedule business services and basic services in the system. Services are transparent to other subsystems. The various subsystems of the system maintain close “connection” through the J2EE framework and XML messages, but they are relatively independent of each other. Fig. 2 shows the educational information management system in colleges and universities.

4. IMPROVED MACHINE LEARNING MODEL FOR COLLEGE-EDUCATION INFORMATION MANAGEMENT

4.1 Restricted Boltzmann Machine

Restricted Boltzmann Machine (RBM) is a generative stochastic neural network model that can learn the probability distribution of input features. Fig. 3 shows the original RBM model, consisting of a two-layer network structure, namely the visible layer and the hidden layer. Each layer contains a
certain number of node elements, which are called visible node elements and hidden node elements, and their values are binary in the original RBM, which is 0 or 1. The visible node unit is used to represent the input data, and the hidden node unit is the main feature extracted from the input data. Between the visible layer and the hidden layer, the RBM model connects each visible node unit to all hidden node units through a bidirectional connected matrix. Similarly, each hidden node unit is connected to all visible node units.

The restricted Boltzmann machine is a variant of the Boltzmann machine. Compared with the Boltzmann machine, it cancels the connection between the internal units on the same floor. This limitation enables some more efficient training algorithms. Therefore, in the mathematical model of RBM, a weight matrix $W = \{w_{ij}\}$ is included (with the size of $m \times n$, where $m$ is the number of nodes in the visible layer and $n$ is the number of nodes in the hidden layer), $w_{ij}$ is the visible node unit ($v_i$) and the connection weights between node elements ($h_j$). In addition, each node element has corresponding bias weights, $a_i$ and $b_j$.

At the same time, RBM is an energy-based model, which is rooted in statistical mechanics. Inspired by the energy function, the model introduces an energy function. The energy function is a measure that describes the state of the entire system, and each system has a corresponding stable state. For example, if we put a small ball into a flat bowl, no matter how disturbed it deviates from the bottom of the bowl at the beginning or in the process, it will eventually stop at the bottom of the bowl when the disturbance disappears because that is its stable state. The more orderly or concentrated the probability distribution of a system, the less energy the system has. Conversely, the more disordered the system or the more uniform the probability distribution, the greater the energy of the system. All in all, the minimum value of the energy function corresponds to the most stable state of the system.
The RBM model introduces the concept of the energy function, turning the problem of seeking extreme values and optimization into a problem of seeking a steady state. Therefore, for the RBM model containing the visible layer vector and the hidden layer vector \((v, h)\), the energy function is defined as follows.

\[
E(v, h) = a_i h_j + b_j v_i - w_{ij} v_i h_j
\]  

(1)

Since the value state of each node in the model is random, from the point of view of Bayesian networks, three different probability distributions are needed, namely joint probability distribution, marginal probability distribution, and Conditional probability distribution to describe the entire system. Since the probability distribution is a function of the energy function, based on the above energy function, the model gives the joint probability distribution of all possible visible layer and hidden layer vectors, which is defined as follows:

\[
p(v, h) = Z^{-1} \cdot e^{-E(v, h)}
\]  

(2)

where \(Z\) is the normalization factor, also known as the partition function. For the solution of a generative model in a practical problem, the probability distribution of node vector \(V\) of the visible layer should be considered. Given all possible hidden layer node vectors, the probability of the input sample is

\[
p(v) = Z^{-1} \cdot e^{-E(2v, h)}
\]  

(3)

Since there is no connection between layers in the RBM model, when the visible layer input is given, the activation of the state of each node in the hidden layer has nothing to do with other nodes in the hidden layer. On the contrary, the activation of the state of each node in the visible layer is only related to the state of the hidden layer, completely independent of other nodes in the same layer. So when a training sample is given to make visible layer state \(V\), the conditional probability of the hidden layer node being activated is

\[
p(h_j, v) = \sigma(\prod_i w_{ij} v_i - b_j)
\]  

(4)

where \(\sigma(x)\) represents the logic equation \(1/(1+\exp(-2x))\). When the value of the hidden layer node element is given, the conditional probability of the visible layer node element being activated can be calculated by

\[
p(v, h) = \sigma(\prod_j w_{ij} \cdot h_j - a_j)
\]  

(5)

The training goal of RBM is to adjust the unknown parameters \(\theta\) in the model under the precondition of given some training samples to make it fit the given training samples to the maximum. It is assumed that the set of training samples is

\[
X = \begin{bmatrix} v_0 & v_1 & \ldots & v_{n-1} \end{bmatrix}
\]  

(6)
The number of samples is $n$, and the number of features contained in each sample (the number of nodes in the input layer corresponding to the model) is $n_v$. Since the samples are independent and identically distributed, and $\ln x$ is strictly monotonic, the goal of training RBM is to maximize the likelihood as follows:

$$\ln L = \ln \prod_{i=0}^{n-1} p(v_i) = \sum_{i=0}^{n-1} \ln p(v_i)$$  \hspace{1cm} (7)

By solving the gradient rise of the above formula, it is necessary to calculate the mathematical expectation of all possible input samples of the model in the process of solving. Compared with the mathematical expectation of a given sample, it is difficult to calculate this value. As previously analyzed, RBM has the following structural characteristics, that is, when the visible layer unit state (input data) is given, the activation conditions of each hidden layer node unit are independent. Conversely, when the state of the hidden layer node element is given, the activation condition of the visible layer node element is also independent. In this way, even if the distribution of all possible inputs represented by RBM cannot be calculated efficiently, Gibbs sampling can be used to obtain random samples that obey the distribution represented by RBM. Theoretically, as long as the number of hidden layer units is large enough, RBM can fit any discrete distribution.

In the process of mathematical modeling, many problems cannot be solved analytically, just like the mathematical expectation of all possible input samples. In this case, people often use some approximate methods to estimate the value and get its approximate solution. Gibbs sampling is one of the approximate solution algorithms, one of the well-known Monte Carlo methods. The Monte Carlo method is first invented by physicists, and its purpose is to calculate integrals through randomization.

Suppose we cannot use the analytical method to accurately obtain the numerical solution. $h(x)$ can be decomposed into a certain function $f(x)$ and a function defined in $(a, b)$ to avoid enumerating all the values of $x$ in this interval (at the same time it is impossible in most cases). The product of the probability distribution function $p(x)$ in the interval is as follows.

$$E_{p(x)} \cdot f(x) = \int_a^b h(x)dx = \int_a^b p(x) \cdot f(x)dx$$  \hspace{1cm} (8)

In the above state transition process, the state may be rejected, resulting in low efficiency and slow convergence speed, so the Gibbs sampling algorithm appears. Simply put, Gibbs sampling uses conditional distribution sampling instead of full probability distribution sampling. Compared with the Metropolis-Hasting algorithm, it no longer considers the acceptance probability $\alpha(i,j)$ so that the state transition can always be carried out. Since there is no possibility of state rejection, the convergence rate of Gibbs sampling is faster. Fig. 4 shows the Gibbs sampling process.

4.2 Boltzmann Machine for Gaussian-binary Conditional Classification

The nodes of the visible layer, hidden layer, and conditional layer of Conditional ClassRBM are all binary units, that is, their values can only be 0 or 1. However, since the data collected in the network and the boundary data representing the constraint conditions come from the continuous real number domain, not the binary representation, we should improve the corresponding model to achieve a satisfactory prediction effect. At present, there is a simple method of using binary units to process continuous data, that is, first scale the data to the closed interval of $[0,1]$, and then use these scaled values as the probability of the corresponding unit being activated. However, in essence, the model is still a way of expressing binary data, and through simulation experiments, we found that its effect...
is not ideal. Therefore, the work extends the model to fundamentally solve the representation of continuous data.

In the improved model, since the data of the conditional layer and the input layer conform to the same distribution, we set the node units of the two layers as Gaussian. For naming convenience, according to a convention, since the visible layer unit is Gaussian and the hidden layer unit is binary, the improved model is called Gaussian-binary (GB) conditional ClassRBM model, and its energy equation is defined as follows.

$$E(y, v, h, r) = \sigma_i^2 \cdot |u_i - v_i| + h_j \cdot b_i - w_{ij} \cdot h_j \cdot v_i \cdot \sigma_i^2 + e_y$$ (9)

where $\sigma_i$ represents the standard deviation of the node data; $\sigma_i$ the standard deviation of the Gaussian noise introduced by node unit $i$ in the visible layer; $\sigma_k$ the standard deviation of the Gaussian noise introduced by node unit $k$ in the conditional layer.

Since the model can learn the standard deviation of the noise of different units of the visible layer and the conditional layer, compared with the previous standard form where the nodes are all binary, it becomes more cumbersome in terms of mathematical expressions. The CD algorithm is also used to solve the parameters. In the process, the calculation of each step will become more complicated to adjust. Therefore, in many applications of Gaussian-binary RBM models, a simpler alternative method is to normalize the original input data before bringing it into the CD algorithm training, that is, the data to be processed by each node unit is normalized to 0 mean and unit variance so that $\sigma$ in the above formula takes the value of 1. Then the CD algorithm is used to perform Gibbs sampling. Meanwhile, in the process of reconstructing the visible layer, the value of the node unit of the Gaussian visible layer is calculated by the binary hidden layer unit and the weight matrix. After that, the sum of its bias is obtained. This approximate solution method can reduce the computational complexity; however, in the theoretical discussion and experimental stage of the work, the following accurate CD solution algorithm will be used to strive for the completeness of the process and the accuracy of the results.
We can obtain the joint probability density of $y$, $v$, $h$, and $r$, and this form is the same as the binary-binary model:

$$p_{GB}(y, v, h, r) = Z_{GB}^{-1} \cdot e^{-E_{GB}(y, v, h, r)}$$ \hspace{1cm} (10)$$

where $Z_{GB}$ represents the partition equation in the Gaussian-binary model, ensuring that the above equation conforms to the probability density distribution.

5. EXPERIMENTAL RESULTS AND ANALYSIS

According to the theory of multiple intelligences, individuals have 8 types: speech-language intelligence, music-rhythm intelligence, logic-mathematical intelligence, visual-spatial intelligence, body-kinesthetic intelligence, communication-communication intelligence, self-knowledge-introspective intelligence, and natural intelligence. In different areas of intelligence, each individual has 8 types of intelligence independently, but each individual’s performance and abilities in each intelligence field are different. When dealing with specific problems, the combination of different intelligence fields is also presented. From a learning perspective, this requires our education management department to design and set up more comprehensive courses for students as much as possible to meet the needs of different students for learning and improving in different areas of intelligence.

In the current national curriculum, a three-tier structure of learning fields, subjects, and modules was adopted. There were a total of 8 learning fields. Each field contained several subjects with similar curriculum values, and each subject included a large number of subjects. In this way, a complete curriculum system was formed. Simultaneously, these various courses were divided into compulsory, elective I, and elective II, allowing schools to set up school-based courses based on local characteristics, their characteristics, and student needs and incorporate them into student credit construction. Besides, it allowed the sharing of resources between schools and even between schools and society and enterprises, sharing or co-opening school-based courses.

5.1 Simulation of Representation of Educational Information Management in Higher Education

Under the guidance of the three-dimensional intelligence theory and the multiple intelligence theory, the school designs corresponding courses in each field according to the division of the multiple intelligence theory as much as possible to meet the needs of different students for learning and improving in different intelligence fields. However, in the actual implementation process, the school always over-concentrates the curriculum in a few areas due to work inertia, ignoring other areas of intelligence. Under the new curriculum, the entire curriculum system is divided into three levels: field, course, and module. Meanwhile, the number of school-based courses has been greatly increased, and the students’ autonomy and selectivity have also been improved. The work redesigned the course code and used the curriculum code system under the big curriculum view based on the theory of intelligence. To make it easier for students to understand the field of intelligence that each course belongs to and consider the unity of various courses such as research learning, community service, and social practice.

Since Tianjin middle and high schools have entered new courses, they have the same or similar fields and subjects. In particular, the code for junior and senior high schools was added to facilitate the distinction. The work added multi-intelligence codes in front of the first level of the new curriculum area. On the one hand, it is convenient for students to understand the intelligence fields involved in related subjects or modules at any time and for the teaching management of the school’s teaching management department. Fig. 5 shows the proportion of multiple intelligences in college-education.
information management. The field is the first layer of the three-tier curriculum structure of the new curriculum. Fig. 6 shows the number of students in each field of the four academic years in the database.

**Figure 5. Proportion of multiple intelligences in education information management in colleges and universities**

**Figure 6. Number of students in the database in each field in the four academic years**

5.2 Simulation of College-education Information Management Module

As the last level of the three-level code of the new course, the module has the highest utilization rate in the actual course. Since the new course includes the national, local, and school three-level curriculum system, in addition to the module coding of the local curriculum, a large number of school-based modules have been compiled according to the specific needs of the relevant schools. Meanwhile, users in the system can add, delete, or change modules at any time as needed. In this way, all courses of basic education are classified by coding, including language and literature, mathematics, humanities and social sciences, science, technology, art, sports and health, research learning, community service, and social practice. Each field is divided into national courses, local courses, and school-based courses. Fig. 7 shows the time required for the query of the information management module of college education under the improved machine-learning model.
Each course has a unique course name through this naming model, and it can be directly judged which intelligence field the course belongs to in multiple intelligences. We can input all the courses through the computer and classify them according to the intelligent codes of the courses. It is very intuitive to see the number of courses in each intelligent field, which is very convenient for school administrators to manage the curriculum design and setting.

According to statistics, the school-based curriculum is distributed in the eight intelligence fields of multiple intelligence theory. Fig. 8 shows the success rate of course distribution prediction under the improved machine learning model.

Figure 7. Time required for querying the information management module of college education under the improved machine-learning model

Figure 8. Success rate of course-distributed prediction under the improved machine-learning model
The field of communication-communication intelligence, self-knowledge-introspection intelligence, and natural intelligence lack curriculum support. On this basis, the education management department is adjusted to add additional courses in communication-communication intelligence, self-knowledge-introspection intelligence, and natural intelligence; appropriate adjustments are made to the courses in each field to achieve an appropriate balance, and the courses are carried out according to the results. The school-based curriculum of the school is relatively balanced and can meet the needs of students for learning and improving multiple intelligences. Fig. 9 shows the distribution of the satisfaction degree of university teachers with education information management under the improved machine-learning model.

6. CONCLUSIONS

The work constructed a system design model, using the J2EE standard design that the system follows. The three-tier structure design of J2EE was adopted, which is composed of a presentation layer, a business logic layer, and a data providing layer. The calling relationship between the systems clearly showed the system workflow. The proposed learning model, which we called the conditional classification restricted Boltzmann machine, was improved based on the standard classification restricted Boltzmann machine. Besides, it could independently solve the multi-label classification problem with multiple constraints in the way of a supervised machine learning model.

In the process of extracting useful network features from the model, the conditioning layer was introduced to fully consider the influencing factors of the constraint condition, which was crucial for solving the constraint satisfaction problem. Meanwhile, by extending the node units of the visible layer and the conditional layer to a Gaussian model, the model could more reasonably process the continuous values collected in the actual network. Through detailed mathematical analysis and simulation experiments, we confirmed that the conditional classification restricted Boltzmann machine could be applied to the education information management of colleges and universities. Using the holistic view of education and the theory of educational philosophy, the problems and puzzles of the basic education units in the education for all and the socialization of education were analyzed, with a new concept of comprehensive education in the basic education stage—the community education.
development community proposed. The concept was defined and analyzed. The theory of multiple intelligences was used to design a basic unit-curriculum-setting analysis model. Based on it, the icon method was used to analyze and apply the curriculum setting of a school.

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REFERENCES


