Hindawi
Wireless Communications and Mobile Computing
Volume 2023, Article ID 9835293, 1 page
https://doi.org/10.1155/2023/9835293

Retraction

Retracted: The Application of Successful Physical Education Teaching Mode Integrating Deep Learning in Basketball Teaching

Wireless Communications and Mobile Computing

Received 26 September 2023; Accepted 26 September 2023; Published 27 September 2023

This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

(1) Discrepancies in scope
(2) Discrepancies in the description of the research reported
(3) Discrepancies between the availability of data and the research described
(4) Inappropriate citations
(5) Incoherent, meaningless and/or irrelevant content included in the article
(6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

References

[1] Z. Guo and K. Zhu, "The Application of Successful Physical Education Teaching Mode Integrating Deep Learning in Basketball Teaching," *Wireless Communications and Mobile Computing*, vol. 2022, Article ID 3112782, 12 pages, 2022.

Hindawi
Wireless Communications and Mobile Computing
Volume 2022, Article ID 3112782, 12 pages
https://doi.org/10.1155/2022/3112782

Research Article

The Application of Successful Physical Education Teaching Mode Integrating Deep Learning in Basketball Teaching

Zhen Guo[1] **and Kunrong Zhu**[2]

[1]*School of Physical Education, Shaoyang University, Shaoyang 422000, China*
[2]*Department of Military Sports, Jiangxi Agricultural University, Nanchang 330045, China*

Correspondence should be addressed to Kunrong Zhu; zhkr@jxau.edu.cn

Received 10 April 2022; Revised 14 May 2022; Accepted 19 May 2022; Published 9 June 2022

Academic Editor: Kuruva Lakshmanna

The successful physical education teaching mode is a new teaching mode used in physical under the traditional physical education teaching mode, which is formed and developed from the teaching reform of physical education in recent years. Under the background of The Times, the new educational mode conforms to the trend of The Times and is conducive to the benign development of education. Compared with the traditional physical education teaching mode, the students of the successful physical education teaching mode have a stronger sense of experience. This strong sense of participation and experience can not only improve students' love for sports but also have a positive impact on the development of students' mental health and also free the cultivation of students' personality. Deep learning (DL) is a type of pattern analysis method in machine learning algorithms, which solves many complex pattern recognition problems, and has achieved many results in the fields of search technology. In this paper, by constructing a deep learning model, the model is applied to the application research of the successful physical education teaching mode in basketball teaching, and the effect of the successful physical education teaching mode in actual teaching is obtained through comparative experiments. According to the experimental results, the successful physical education teaching mode has a more significant effect on the teaching of students' basketball skills, and according to the experiment, when the number of fine-tuning is 180, the correct rate is the highest at this time, which is 85%. When the number of hidden layer nodes is 180, the highest accuracy rate is 85.6%, and according to the experiments on the classification results, it is concluded that the model has a high degree of matching with the application research of the successful physical education model in basketball teaching.

1. Introduction

With the enrichment of theoretical knowledge and frameworks in multidisciplinary fields, the connection between disciplines has been strengthened, and the scientific research on human social education and educational derivatives in the multidisciplinary field has also led education researchers to thinking about the reform of educational models. Physical education, as an educational activity, is aimed at enhancing students' physique, promoting their physical and mental development, improving students' cognition of scientific exercise theories and methods, and promoting the development of good habits in students; it is more characteristic of the times. In the traditional physical education teaching mode, it is difficult to arouse students' interest in physical education by injecting and cramming teaching methods, which makes it difficult for students to achieve the goal of physical health development. Therefore, the development of a new physical education teaching model has become the demand of the times. Successful physical education adopts layered teaching for students of different levels in teaching, instills the idea of success in each student, and uses an encouraging evaluation system to evaluate students, to create a relaxed and pleasant sports learning atmosphere for students, so that every student can have a successful experience. Basketball is one of the more popular sports, and it is also used as a basic sports in schools to provide practice venues for students. At the same time, basketball as a team sports, which helps to improve students' sense of teamwork and competition. Through basketball activities, not only can students achieve the purpose of physical exercise but also can they expand students' interpersonal communication circle and promote students' interpersonal communication.

To study the new educational model of basketball teaching, on the one hand, can provide theoretical basis for scientific and rational arrangement of basketball teaching. On the other hand, it can reflect the characteristics of successful physical education teaching mode and provide reference for the reform of teaching mode in other teaching fields, which has certain practical significance. It is of certain theoretical significance to integrate deep learning methods for research to provide research reference for text information processing based on deep learning.

The novelty of the article is as follows: (1) This paper processes textual information through deep learning methods, which is not only a major innovation in textual information research methods but also a major expansion of the research field of deep learning methods. (2) The experimental part of this paper uses the method of comparative analysis, compares, and analyzes the basketball teaching effects under different teaching modes, and the experimental results are more convincing.

2. Related Work

Because the traditional physical education teaching mode is not suitable for today's social environment, researchers approach the field in a variety of ways. Juhe and Zhibin believe that the application of computer knowledge in physical education is conducive to students' continuous learning [1]. Dania and Zounhia found through relevant experiments that the game-based physical education method can effectively improve students' classroom physical activity [2]. Based on the theory of self-efficacy, Li et al. constructed a conceptual model that uses successful practical experience as a behavioral mediator, providing theoretical guidance for the development of physical education teaching methods [3]. Deep learning, as a widely used analysis method in recent years, has demonstrated its strong data processing capabilities in many fields. Chen et al. classify hyperspectral data through a deep learning framework. His research shows that deep learning-based methods can extract deep features hierarchically when processing hyperspectral data classification [4]. Shen et al. believe that deep learning can be applied to medical images [5]. Dong and Li summed up the application of deep learning in acoustic models, indicating that deep learning has a nonnegligible role in the modeling technology of decoding [6]. Ravi et al. reviewed the related research of deep learning in health informatics and made a critical analysis of the advantages and disadvantages of deep learning [7]. Schirrmeister et al. use neural networks for the task of discriminating between pathological and normal EEG recordings in a hospital's expected library of EEG abnormalities. Experiments show that the data processed by the neural network is consistent with the spectral analysis results of EEG data [8]. Hou et al. proposed a blind IQA model based on deep learning to qualitatively evaluate and output numerical scores for quality assessment of objects [9]. Zhu et al. made an evaluation and analysis of the application of deep learning in the field of remote sensing through relevant theoretical research [10]. However, the above studies are all introductions to deep learning and do not highlight the theme of the article.

3. An Overview of Deep Learning and the Construction of a Model for the Application of Successful Physical Education Teaching Models in Basketball Teaching

3.1. Deep Learning. Deep learning (DL) is a new development direction in the field of machine learning, also known as artificial neural network. It is a data processing model that is inspired by the structure of the human brain and constructed to learn samples with multilevel feature structures [11, 12]. As a type of neural network, deep learning is different from traditional neural networks. Optimizing on the basis of traditional neural network, that is, adding multilayer feature calculation, is deep learning [13], as shown in Figure 1.

As can be seen from Figure 1, the development of artificial intelligence (AI) has derived machine learning models to analyze data [14]. With the development of society making the calculated data gradually increase, multidimensional and multidomain data analysis has promoted the development of machine learning (ML). In this context, feature learning has emerged. Deep learning combines these three learning modes, and on the basis of feature learning, multilayer feature training is carried out.

Figure 2 is a flow chart of the artificial neural network model and autoencoder. As can be seen from Figure 2, the artificial neural network model is input by the first layer, and the output of the first layer is the input of the second layer. The equivalent of the second layer of processing is the result of the first layer of processing, and so on, until the output. The role of the autoencoder is to minimize the difference between the original input data and the final output data by continuously updating the weights of the encoder and decoder.

Figure 3 is a simple training flow chart of deep learning. In the DL training model, after each layer of network is trained, advanced features will be generated based on the features of this layer and move upward. That is, in a DL training model, the data is abstracted from low-level features to high-level features [15]. When the input data is processed by each layer of the system without any data loss, which is equivalent to no change after the input data is processed by the system, the output data of each layer can be regarded as the feature representation of the input data. Building a multilayer network structure, make the input of each layer as the output of each layer, adjust the parameters continuously, and finally obtain a series of features of the input data [16]. In this process, the number of layers and the number of units in each layer will affect the ability of DL to abstract the input data and the results. Although it is said that the

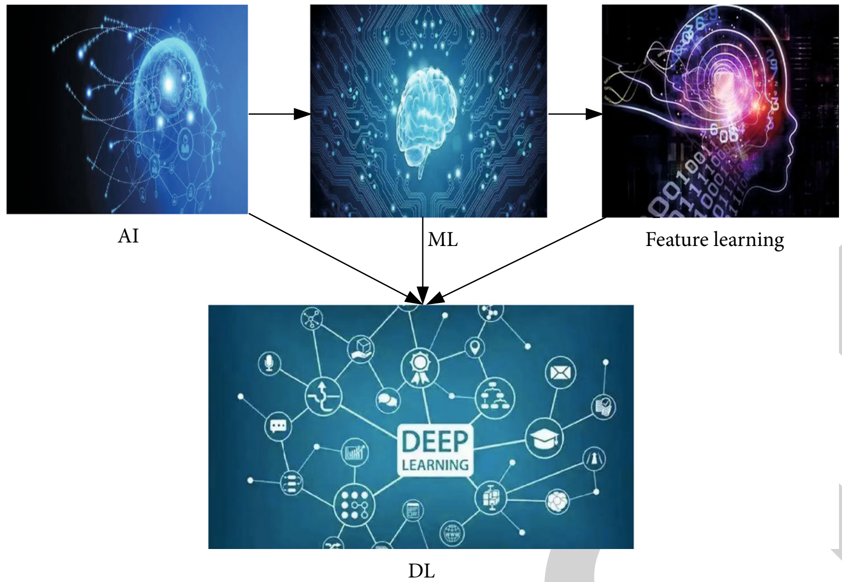

Figure 1: Neural network diagram.

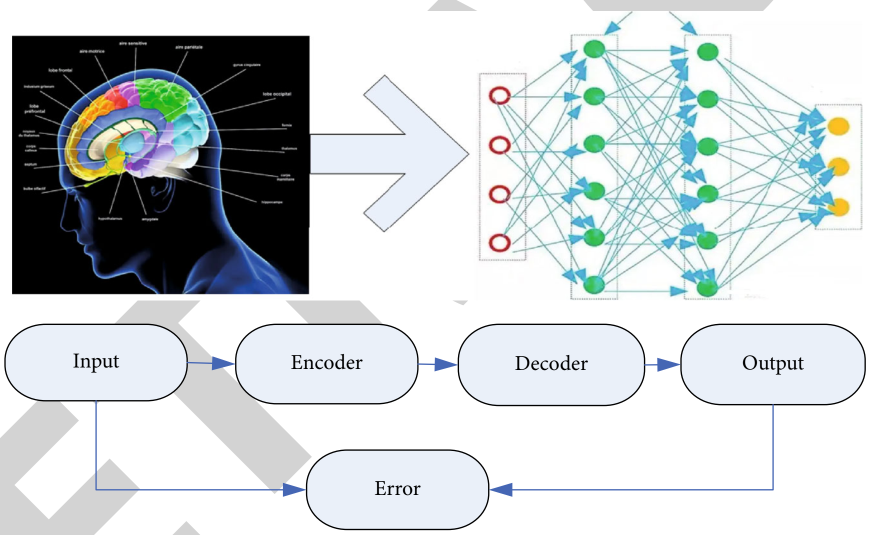

Figure 2: Artificial neural network.

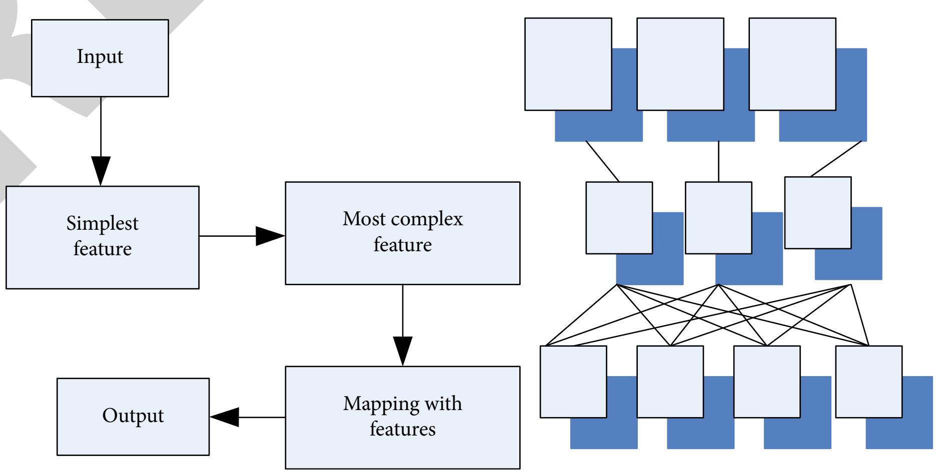

Figure 3: Deep learning training flowchart.

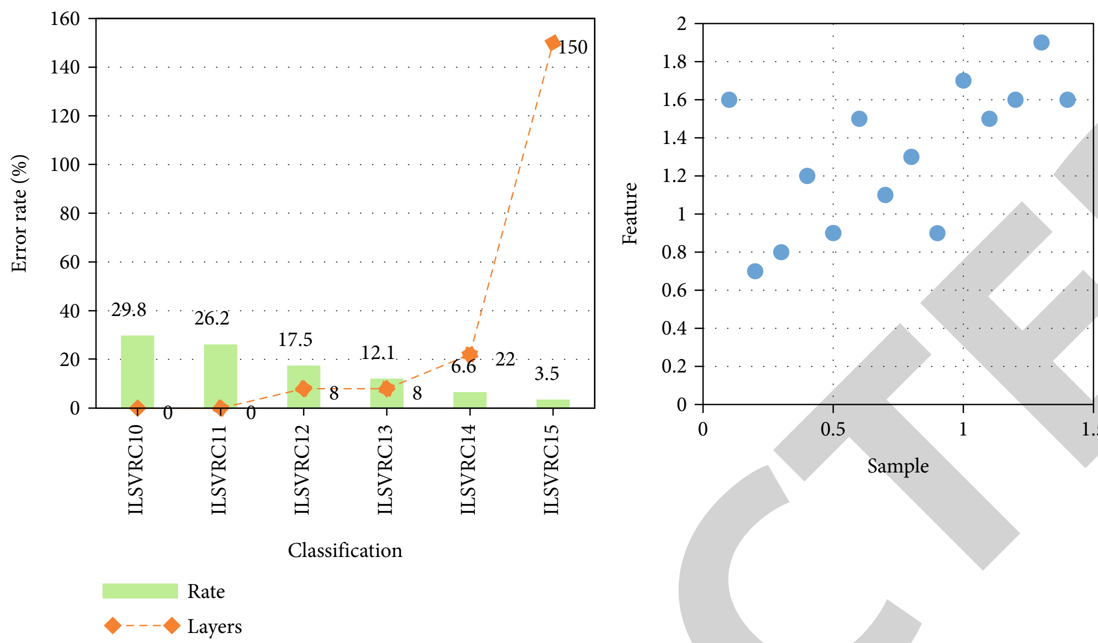

Figure 4: Underfitting of neural network accuracy and model with different layers.

increase of the number of layers may improve the processing power of complex samples, it will also increase the computational complexity [17]. Figure 4 shows the accuracy of the neural network with different layers and the underfitting of the model.

The left side of Figure 4 shows the accuracy under different neural network layers, taking the ImageNet dataset as the object, and the ordinate is the calculation error rate. As can be seen from Figure 4, when the number of layers increases, the computational error rate for the ImageNet dataset decreases, indicating that the accuracy of the neural network is gradually increasing. The right side of Figure 4 shows the underfitting situation. It can be seen that the data samples are difficult to be represented by a linear relationship. Therefore, for the training of neural networks, an optimization model is often used [18]. The training process of DL is mainly divided into bottom-up unsupervised learning and top-down supervised learning [19].

Figure 5 shows the training process of DL. In DL, the first layer of unlabeled data is trained to obtain the initial parameters of the model, and then the output of the first layer becomes the input of the next layer, and so on, to obtain the parameters of each layer. These parameters are then adjusted via top-down supervised learning. There are two-way weights between layers, from top to bottom is the generation weight, from the bottom to the top is the cognitive weight, and each weight is adjusted using the wake-sleep algorithm.

The optimization methods of DL training models are also different. The commonly used activation functions are sigmoid, tanh, relu, leaky relu, softmax, etc. as shown in Figure 6 [20]. The sigmoid function is the most widely used activation function in the early days and played an important role in early shallow network training. But because of the size of the data, the sigmoid function can no longer meet

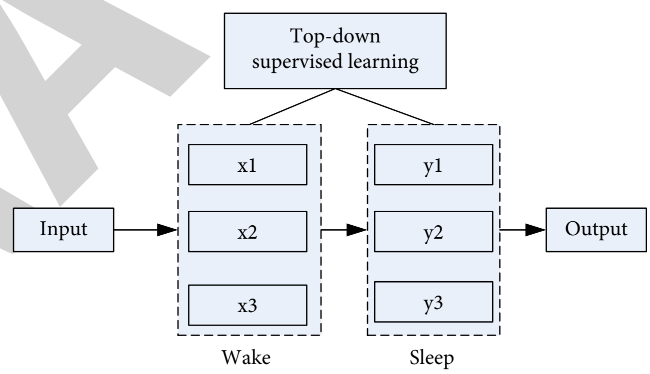

Figure 5: DL training process.

the demand. Therefore, the researchers proposed the tanh function to slow down the gradient problem of the sigmoid function. The calculation formulas of the two activation functions are as follows:

$$f_{\text{sigmoid}}(x) = \frac{e^x}{e^x + 1}, \quad (1)$$

$$f_{\tanh}(x) = \frac{e^x - e^{-x}}{e^x + e^{-x}}. \quad (2)$$

The tanh function also failed to solve the gradient problem well, so the researchers proposed the relu function and the leaky relu activation function. The calculation formulas of these two functions are

$$f_{relu}(x) = \max(0, x), \quad (3)$$

$$f_{\text{leakyrelu}}(x) = \begin{cases} mx, & \text{if } x \le 0 \\ x, & \text{if } x > 0. \end{cases} \quad (4)$$

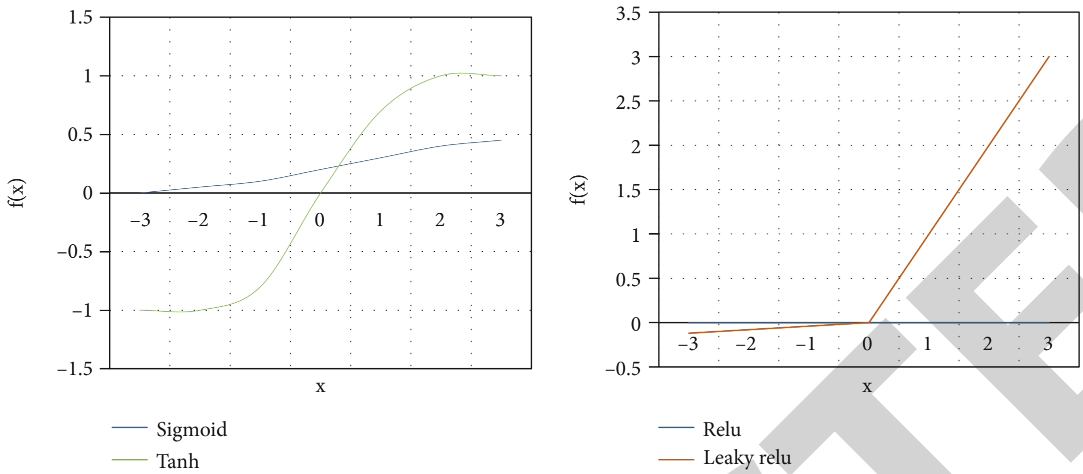

Figure 6: Activation function image.

It can be seen from the formula that the relu function and the leaky relu activation function are the closest to the linear function, and the function gradient of a linear function is not affected by the function value, so these two activation functions are more effective than sigmoid and tanh on the gradient problem.

The calculation formula of softmax is

$$f_{\text{soft max}}(x) = \frac{e^x}{\sum_{k=1}^{n} e^k}. \tag{5}$$

The training network of DL will calculate the training error in the calculation. The error function should take into account the distribution of training samples in the training set. The calculation formula of the error function is

$$f(P, Q) = -\sum_k P_K \log Q_k. \tag{6}$$

Among them, P and Q represent the probability density functions of two different distributions, and k is the serial number of the classification problem.

In addition to using the activation function to improve the gradient problem, there is also a corresponding gradient descent method. In the DL mode, the commonly used gradient descent methods include Momentum, Nesterov, AdaDelta, Adam, and RMSprop.

The feature of Momentum is that the descending direction of the previous iteration is considered in each iteration calculation, so it is more beneficial to capture the minimum point in the entire descending process. The calculation formulas are

$$f(a_t) = \frac{\omega b_t - b_{t+1}}{\lambda}, \tag{7}$$

$$a_{t+1} = a_t + b_{t+1}. \tag{8}$$

Among them, a_t represents the parameter at time t, ω is the Momentum coefficient, it is an adjustable parameter, generally, the value is 0.9, λ is the descending step size, and b_t represents the descending speed at time t.

Based on the characteristics of Momentum, the initial point position of the next iteration is also considered. This is the Nesterov gradient descent method. The calculation formula is

$$f(a_t + \omega b_t) = \frac{\omega b_t - b_{t+1}}{\lambda}. \tag{9}$$

Among them, $a_t + \omega b_t$ represents the estimation of the initial point position for the next iteration (refer to formulas (7) and (8) for the meanings of other parameters).

In the iterative calculation process, the uniform step size may make the obtained update amount too large, resulting in a large result error. Therefore, considering this problem, the AdaDelta gradient descent method appeared, and the calculation formulas are

$$f_t = -\frac{\Delta a_t \times g(f)_t}{g(\Delta a)_{t-1}}, \tag{10}$$

$$a_{t+1} = a_t + \Delta a_t \tag{11}$$

Among them, Δa_t represents the variation of the parameter, $g(x)$ is the root mean square, f represents the gradient of the parameter at a certain moment, and the calculation formula is

$$g(x) = \sqrt{\frac{{x_1}^2 + {x_2}^2 + \cdots + {x_n}^2}{n}}. \tag{12}$$

RMSprop is very similar to AdaDelta, and its calculation formulas are

$$G(f^2)_t = 0.9G(f^2)_{t-1} + 0.1{f_t}^2, \tag{13}$$

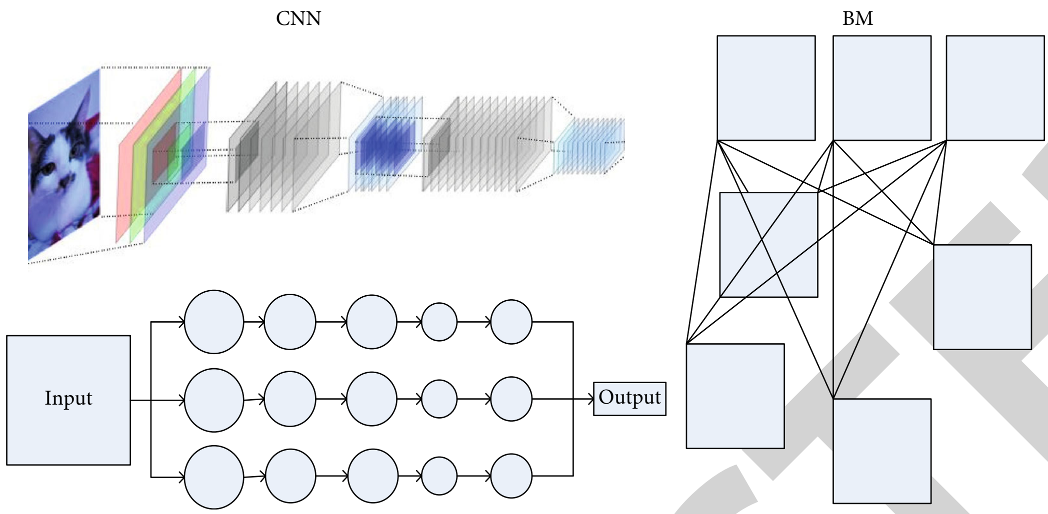

Figure 7: Schematic diagram of convolutional neural network structure and RBM.

$$a_{t+1} = a_t - \frac{\lambda \cdot f_t}{\sqrt{G(f^2)_t + \sigma}}. \quad (14)$$

Among them, σ is infinitesimal.

Adam is a gradient descent method updated on the basis of RMSprop and AdaDelta. The calculation formula is

$$a_{t+1} = a_t - \frac{\lambda e_t{}'}{\sqrt{b_t{}' + \sigma}}. \quad (15)$$

Among them, $e_t{}'$ and $b_t{}'$ represent the two inertial quantities of offset correction, and the calculation formulas are

$$e_t{}' = \frac{\eta_1 e_{t-1} + (1-\eta_1) f_t}{1-\eta_1{}^t}, \quad (16)$$

$$b_t{}' = \frac{\eta_2 b_{t-1} + (1-\eta_2) f_t{}^2}{1-\eta_2{}^t}. \quad (17)$$

There are many types of neural networks, including the convolutional neural networks (CNN) and restricted Boltzmann machine (RBM). The organizational structure of CNN includes convolutional layers, pooling layers, and weights, and CNN can train data with two-dimensional structure [21]. The RBM is a random neural network. During the processing of training samples, the sampling process is completed, and the expected value is estimated through probability calculation. The special feature is that the neuron nodes between the hidden layer and the visible layer are connected to each other.

Figure 7 shows the flow chart and specific representation of the structure of the convolutional neural network. The CNN first inputs the original data for convolution processing, processes it into a feature map, weighs iteratively, and obtains the final result. The RBM behaves as an unsupervised stochastic learning process and can fit random discrete distributions.

Assuming that the total number of samples is T and the sample set is $T1, T2, T3, \cdots Tn$, the calculation formula of the optimal solution of the RBM according to the logarithmic function is

$$\varsigma = \arg_{\varsigma} \max \sum_{x=1}^{T} \text{In}(p(T(x)|T)). \quad (18)$$

Among them, p is the probability distribution function of the nodes in the visible layer.

The RBM can also obtain the joint probability distribution of random variables according to the sampling algorithm, so as to continuously iterate the state for sampling, n represents the number of layers, and the calculation formula of the visible layer in the sampling process is

$$K^{n+1} \longrightarrow p(K|H^n). \quad (19)$$

The calculation formula of the hidden layer in the sampling process is

$$H^{n+1} \longrightarrow p(H|K^n). \quad (20)$$

3.2. An Overview of the Application Model of the Successful Physical Education Teaching Model in Basketball Teaching. The application research of successful physical education teaching mode in basketball teaching is mainly the research of text type data. Supposing there is a text collection, each document element in the collection has a corresponding category label, and the binning elements are category-integrated through a supervised learning process.

Figure 8 is a schematic diagram of a text classification process. In a text classification training process, features are mainly extracted from the text, and the trained text classifier is used to extract the category of the document.

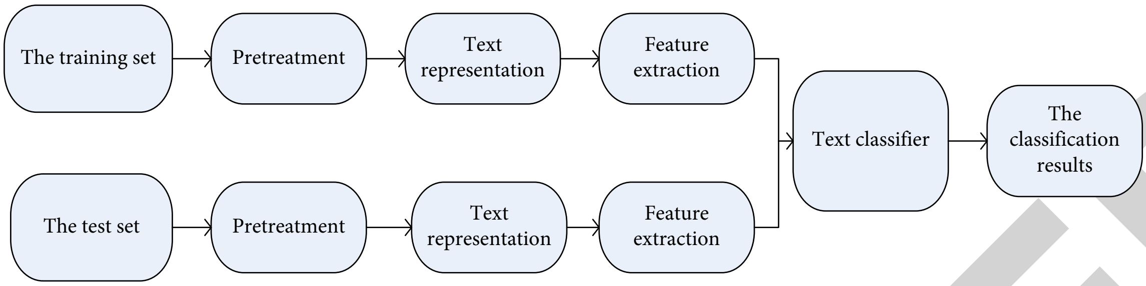

Figure 8: Schematic diagram of the text classification process.

Table 1: Text segmentation methods.

Category	Methods	Theory
Dictionary-based method	Forward and reverse maximum matching method, best matching method, and word by word traversal method	Rely on a dictionary
Based on statistics	N-gram method	Make statistics on the frequency of any N words appearing at the same time in the article. The higher the frequency, the more likely it is to be a word
Based on natural language understanding	Natural language	It simulates the process of human brain understanding sentences and achieves the effect of word recognition

Table 1 shows the text segmentation methods and their respective principles. Chinese text segmentation methods mainly include dictionary-based, statistical-based, and natural language understanding-based methods.

In the training process of this kind of data, it is necessary to convert the text content into the content that can be recognized by the computer, among which the widely used text representation model is the vector space model. The principle of this model is to use feature selection to express the attributes in the text as feature vectors and calculate the weight of each feature vector.

Figure 9 is a schematic diagram of a vector space model, and the total number of features in the vector space model is the dimension of the feature space.

The principle of text feature selection is to filter the original features and remove some irrelevant or redundant features. The feature classification methods used are shown in Table 2.

Table 2 shows the feature selection methods, concepts, and usage methods. Most feature selection methods are to calculate the probabilities of feature items and categories of texts.

The most commonly used text classification algorithm is the Naive Bayes model, which uses a Bayesian learning method. Assuming that the document features are independent of each other, calculate the probability that the document belongs to each category and the conditional probability of the category and the feature, and finally calculate the posterior probability to classify the document.

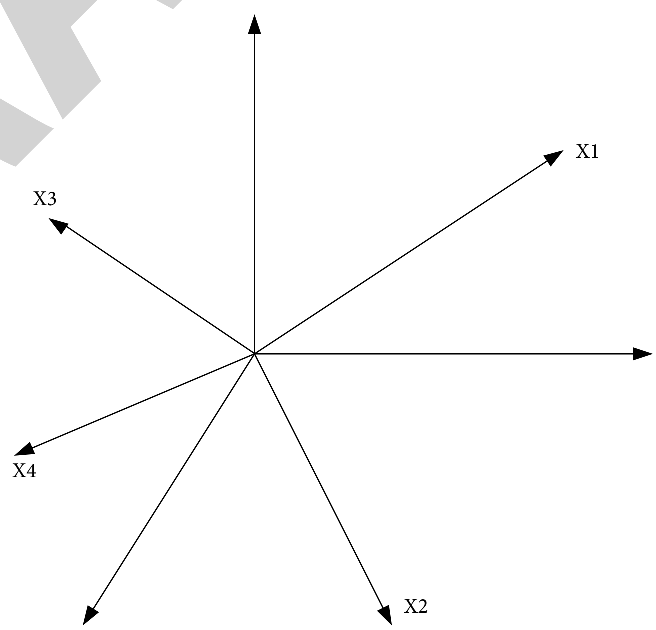

Figure 9: Vector space model.

3.3. The Construction of the Application Model of the Successful Physical Education Teaching Mode Integrating Deep Learning in Basketball Teaching. According to the characteristics of the research object and the overview of the theoretical methods above, the network structure of the application research model of the successful physical education teaching mode integrating deep learning in basketball teaching is firstly established, as shown in Figure 10.

The network structure of Figure 10 includes an autoencoder layer, a deep belief network layer, and a regression classification layer. The autoencoder layer encodes and decodes the initial features. The deep belief network layer

Table 2: Feature selection methods.

Method	Concept	Instructions
Eigenfrequency	The total number of times the feature appears in the text	Take a certain value as the reference point, remove the features whose feature frequency is not higher than the reference point in the original feature set, and retain the features whose feature frequency is higher than the reference point.
Document frequency	The number of samples in which a characteristic appears	Remove features with low document frequency
Information gain	The probability of some feature in the sample	Probability calculation using text and text features
Mutual information	Reflect the existence of features and categories relationship	Set a threshold, remove the features below this threshold from the original features, and use the remaining features as the features represented by the document
Chi-square statistics	Measure how related a feature is to a category	Set a threshold, remove the features below this threshold from the original features, and use the remaining features as the features represented by the document

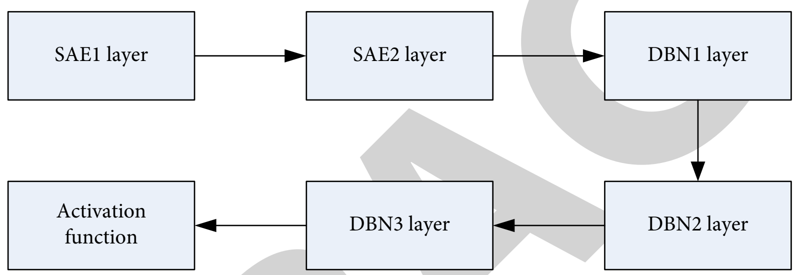

Figure 10: Study model network structure.

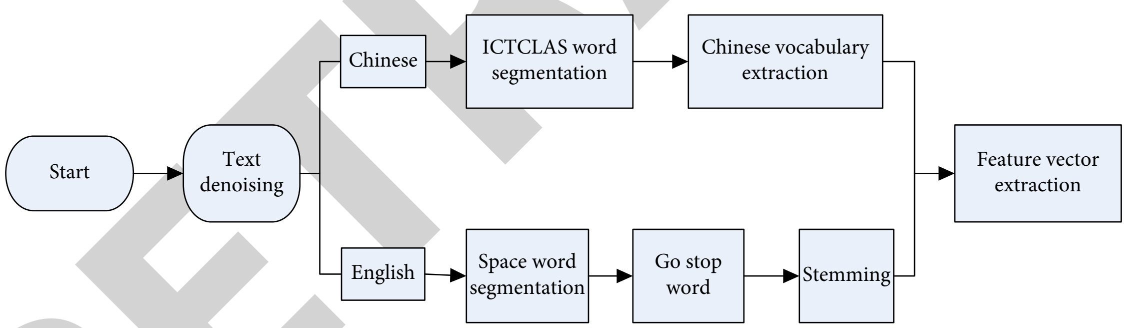

Figure 11: Text preprocessing.

is composed of RBM and is aimed at extracting the features of the training data and finally using the regression classification layer to classify the data. In text classification, the text is preprocessed first, then the feature learning is performed on the text, and finally the classification and recognition are performed. The text preprocessing needs to take different processing methods according to the text type, but the processing process is similar. First, the useless information is removed, the document is segmented, and then the stop words are removed, the mapping relationship between the text vocabulary and the number is established, and the feature vector is formed, and the text preprocessing is completed.

Figure 11 is a flow chart of text preprocessing. The text types are divided into Chinese and English, and each of them compares with different classification processing methods and finally obtains a feature vector.

Table 3: Preschool physical fitness survey.

	A	B
4×20 m back run(s)	14.01 ± 0.65	13.97 ± 0.71
Standing long jump	2.24 ± 0.37	2.23 ± 0.38
20 s push-ups (pieces)	30.17 ± 3.24	30.54 ± 4.01

4. Application Experiment of Successful Physical Education Teaching Mode Integrating Deep Learning in Basketball Teaching

4.1. Experimental Objects and Test Indicators. In the experiment, 50 basketball fans from a certain university were

Table 4: Test table of basketball skills.

	A	B
Five-point shooting in place (piece)	2.84 ± 1.51	2.86 ± 1.54
Spot shooting skills review (points)	3.71 ± 1.23	3.69 ± 1.28
Passing and receiving the ball with both hands on the chest during the march (points)	4.03 ± 1.25	4.08 ± 1.17
Breakthrough with the ball on the spot (points)	3.15 ± 0.89	3.22 ± 0.81

Table 5: Evaluation form of basketball skill level of group A and group B after the experiment.

	A	B
Five-point shooting in place (piece)	5.16 ± 1.38	4.01 ± 1.09
Spot shooting skills review (points)	6.91 ± 0.87	6.29 ± 1.04
Passing and receiving the ball with both hands on the chest during the march (points)	6.38 ± 0.92	6.61 ± 0.98
Breakthrough with the ball on the spot (points)	6.52 ± 0.93	6.29 ± 0.95

divided into two groups according to their physical fitness. Group A was the experimental group using the successful physical education teaching mode, and group B was the control group using the traditional physical education teaching mode. The experiment was set up for 20 hours, twice a week, 90 min each time. The experimental test indicators are five-point shooting in place, fixed-point shooting in place, passing and catching the ball with both hands in front of the chest, and cross-step breakthrough with the ball in place. The content of the questionnaire design mainly grades the classroom from the degree of recognition, participation, and learning effect.

Firstly, the physical fitness of the two groups of students before school was investigated, and the final results are shown in Table 3.

Table 3 shows the physical fitness of the two groups of members before the test. According to the test results in the table, it can be considered that there is little difference in the physical fitness of the two groups of members.

The two groups of members were then given a preschool test of basketball skills. The test results are shown in Table 4.

Table 4 shows the basketball skills test for groups A and B before the start of the experimental course. The test was conducted with reference to the experimental test indicators. The final results showed that the basketball skills of the two groups of experimental subjects were not significantly different.

4.2. Experimental Results. The experimental results were conducted by relevant experts in a unified technical evaluation test. The standards used were consistent with the preexperiment test standards. The experimental results obtained are shown in Table 5.

Table 5 is a comparison table of basketball skills of the two groups after the experimental course. From the data in Table 5, both teaching modes can improve students' basketball skills, students in group A generally scored higher on the basketball skill test than those in group B, which shows that the success of sports teaching model of classroom teaching improves students' basketball skills more significantly.

After the experimental course, a questionnaire was designed to investigate the evaluation of the two groups of students in the classroom. The main content of the questionnaire is students' sense of identity with the classroom, students' participation in the classroom, and students' evaluation of the effect of self-learning. A 10-point system is set for each question in the questionnaire, and the average score is taken. The experimental results obtained are shown in Figure 12.

Figure 12 is a comparison chart of the classroom experience of the two groups of students obtained according to the results of the questionnaire. According to the data in the graph, it can be seen that the students in the experimental group who adopted the successful physical education teaching model had higher participation and recognition in the classroom and had better learning effect.

4.3. Application of Successful Physical Education Teaching Mode Integrating Deep Learning in Basketball Teaching. The students' experimental test indicators and results are preprocessed, and the preprocessed text is used as the original data feature. It should set the score interval to classify the text, calculate the probability distribution of the data in the document in each category, and obtain the category to which the document belongs. Then, the data in the category is archived, and the average score of different categories is obtained, so as to obtain the calculation result. The optimal correct rate obtained is shown in Figure 13.

Figure 13 shows the classification accuracy of the result analysis of basketball skill test and questionnaire results using deep learning. According to the data in the graph, it can be seen that the deep learning model used in the experiment has a very high accuracy rate for classifying this type of data, indicating that the model is suitable for this study.

Figure 14 shows the influence of the number of fine-tuning and the number of hidden layer nodes on the correct rate. From the data in Figure 14, when the number of fine-tuning is 180, the correct rate is the highest at this time, which is 85%, and when the number of hidden layer nodes is 180, the correct rate is the highest at 85.6%.

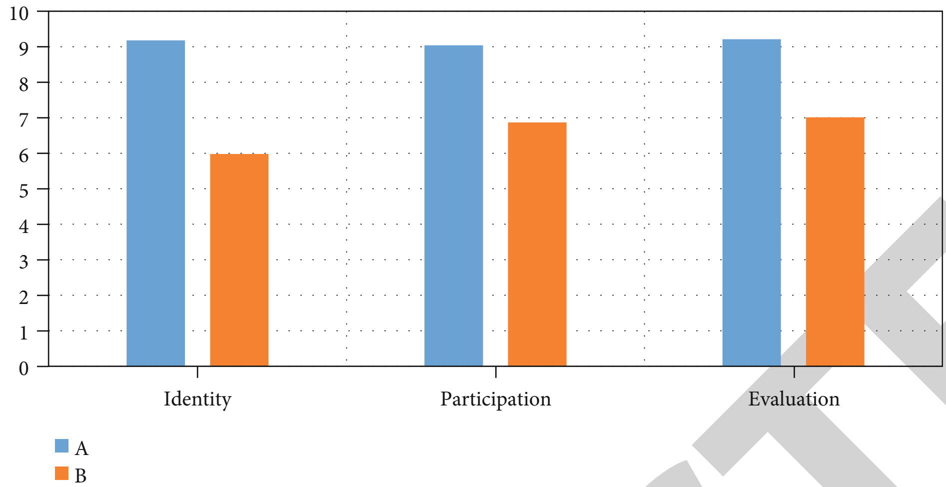

Figure 12: Classroom experience comparison chart.

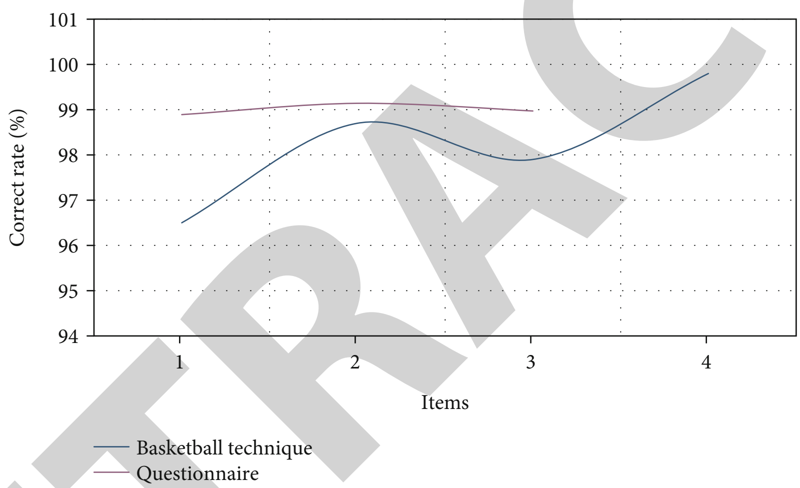

Figure 13: Classification accuracy.

According to the final results of the experiment, the deep learning model constructed in the successful physical education teaching mode is applicable to the application research of basketball teaching, which is consistent with the actual results.

5. Discussion

In the course of the development of educational behavior, the classroom teaching in the past and even now, the teacher is the dominant position, and the teaching process is reflected in the teacher's demonstration, the student's practice, the teacher's guidance and correction, and the student's practice until the skills are mastered. During the whole process, students' physical education is in a relatively passive position, which makes the whole teaching process more boring and boring, and it is difficult to arouse students' interest, which makes it difficult for students to obtain results in physical education. In particular, the traditional teaching model has relatively single evaluation indicators for students, and most of them are result-oriented to evaluate students [22]. However, the differences between students are doomed that it is difficult to unify the learning effect of each student. Setting a unified goal is not conducive to teaching students in accordance with their aptitude. Some students will feel that the goal is simple and will not go all out, making it difficult to improve their learning. Some students feel that it is too difficult to achieve their goals, and they fail too many times in the process of contact, which leads to giving up and rejecting the subject, thus affecting the students' learning effect on the subject. The successful physical education teaching mode pays more attention to the dominant position of students. Students set learning goals according to their own conditions, so that students can master the initiative of teaching organization activities and enhance students' sense of participation in the classroom. In the process of actual sports teaching, we set up group exercises according to different situations of students, adopt encouraging evaluation to treat each student, timely feedback students' practice effects, and create a good basketball learning

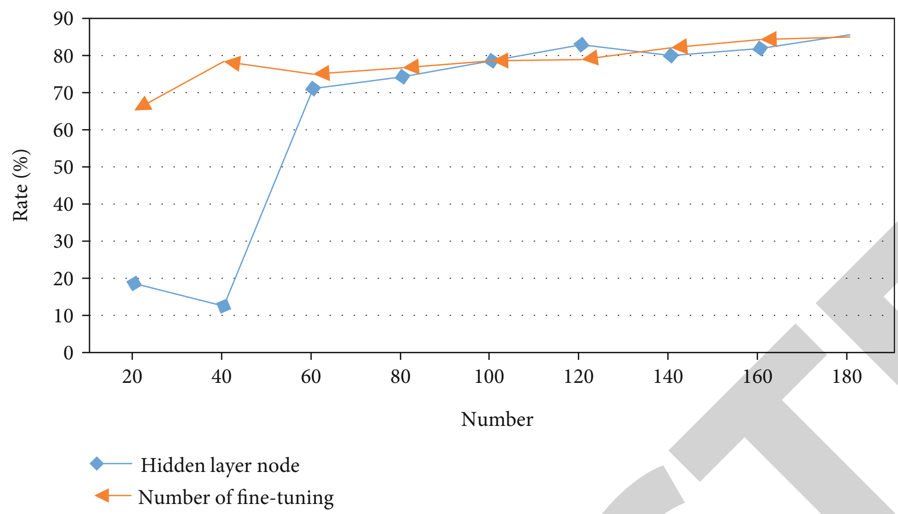

Figure 14: Effects of fine-tuning times and hidden layer nodes on the correct rate.

atmosphere for students. In this way, students can improve their self-confidence and sense of achievement in the process of sports, so that students can have a strong love for basketball from the bottom of their hearts.

Through the comparative experiment, this paper draws the learning effect of the traditional physical education teaching mode and the successful physical education teaching mode and discusses the influence of the two teaching modes on the students' learning psychology from the students' classroom experience. Although before the experiment started, the students' physical fitness and basketball level were tested to verify the differences between the two groups, because the test items were relatively simple and there was no difference test. Therefore, there are certain inaccuracies in the data, which is the shortcoming of this paper. In the application of the deep learning model to the successful physical education teaching model to the application effect analysis of basketball teaching, the experimental method has a certain forward-looking. However, in the final experimental part, the comparison model cannot be set up, so the obtained experimental data are not representative, which is another shortcoming of this paper.

6. Conclusions

By designing a comparative experiment between the successful physical education teaching mode and the traditional physical education teaching mode on the students' learning effect, this paper concludes that both the successful physical education teaching mode and the traditional physical education teaching mode can improve the students' basketball skills in basketball teaching. However, compared with the traditional physical education teaching mode, the successful physical education teaching mode has a more obvious teaching effect in basketball teaching, and the students' training skills have been improved more. Moreover, through the questionnaire analysis and investigation of the two groups of students after class, the students in the experimental group who adopted the successful physical education teaching model had stronger sense of participation, recognition, and self-evaluation in the classroom than the control group who adopted the traditional physical education teaching mode. That is to say, students who adopt the successful physical education teaching model have better classroom experience.

Data Availability

No data were used to support this study.

Disclosure

We confirm that the content of the manuscript has not been published or submitted for publication elsewhere.

Conflicts of Interest

These are no potential competing interests in our paper.

Authors' Contributions

All authors have seen the manuscript and approved to submit to your journal.

References

[1] W. Juhe and W. Zhibin, "Analysis of physical education teaching mode based on computer multimedia and network system," *Agro Food Industry Hi Tech*, vol. 12, no. 1, pp. 311–322, 2017.

[2] A. Dania and K. Zounhia, "Introducing physical education teachers to the teaching games for understanding model: challenges and outcomes of a professional development program," *The International Journal of Sport and Society*, vol. 8, no. 3, pp. 51–60, 2017.

[3] M. Li, W. Li, J. Kim, P. Xiang, and Y. Tang, "A conceptual model of perceived motor skill competence, successful practice

trials, and motor skill performance in physical education," *Journal of Teaching in Physical Education*, vol. 40, no. 4, pp. 1–7, 2020.

[4] Y. Chen, Z. Lin, Z. Xing, W. Gang, and Y. Gu, "Deep learning-based classification of hyperspectral data," *IEEE Journal of Selected Topics in Applied Earth Observations & Remote Sensing*, vol. 7, no. 6, pp. 2094–2107, 2014.

[5] D. Shen, G. Wu, and H. I. Suk, "Deep learning in medical image analysis," *Annual Review of Biomedical Engineering*, vol. 19, no. 1, pp. 221–248, 2017.

[6] Y. Dong and J. Li, "Recent progresses in deep learning based acoustic models," *IEEE/CAA Journal of Automatica Sinica*, vol. 4, no. 3, pp. 396–409, 2017.

[7] D. Ravi, C. Wong, F. Deligianni et al., "Deep learning for health informatics," *IEEE Journal of Biomedical & Health Informatics*, vol. 21, no. 1, pp. 4–21, 2017.

[8] R. T. Schirrmeister, L. Gemein, K. Eggensperger, F. Hutter, and T. Ball, "Deep learning with convolutional neural networks for EEG decoding and visualization," *Human Brain Mapping*, vol. 38, no. 11, pp. 5391–5420, 2017.

[9] W. Hou, X. Gao, D. Tao, and X. Li, "Blind image quality assessment via deep learning," *IEEE Transactions on Neural Networks and Learning Systems*, vol. 26, no. 6, pp. 1275–1286, 2017.

[10] X. X. Zhu, D. Tuia, L. Mou et al., "Deep learning in remote sensing: a comprehensive review and list of resources," *IEEE Geoscience & Remote Sensing Magazine*, vol. 5, no. 4, pp. 8–36, 2017.

[11] N. Majumder, S. Poria, A. Gelbukh, and E. Cambria, "Deep learning-based document modeling for personality detection from text," *IEEE Intelligent Systems*, vol. 32, no. 2, pp. 74–79, 2017.

[12] N. Codella, Q. B. Nguyen, S. Pankanti et al., "Deep learning ensembles for melanoma recognition in dermoscopy images," *IRBM Journal of Research & Development*, vol. 61, no. 4/5, p. 5:1-5, 2017.

[13] J. Sandberg and Y. Barnard, "Deep learning is difficult," *Instructional Science*, vol. 25, no. 1, pp. 15–36, 1997.

[14] L. June-Goo, J. Sanghoon, C. Young-Won et al., "Deep learning in medical imaging: general overview," *Korean Journal of Radiology*, vol. 18, no. 4, pp. 570–584, 2017.

[15] Y. Jian, J. Ni, and Y. Yang, "Deep learning hierarchical representations for image steganalysis," *IEEE Transactions on Information Forensics and Security*, vol. 12, no. 11, pp. 2545–2557, 2017.

[16] Z. Zheng, W. Chen, X. Wu, P. C. Y. Chen, and J. Liu, "LSTM network: a deep learning approach for short-term traffic forecast," *IET Intelligent Transport Systems*, vol. 11, no. 2, pp. 68–75, 2017.

[17] L. He, K. Ota, and M. Dong, "Learning IoT in edge: deep learning for the internet of things with edge computing," *IEEE Network*, vol. 32, no. 1, pp. 96–101, 2018.

[18] J. Han, D. Zhang, G. Cheng, N. Liu, and D. Xu, "Advanced deep-learning techniques for salient and category-specific object detection: a survey," *IEEE Signal Processing Magazine*, vol. 35, no. 1, pp. 84–100, 2018.

[19] D. Ravi, C. Wong, B. Lo, and G. Z. Yang, "A deep learning approach to on-node sensor data analytics for Mobile or wearable devices," *IEEE Journal of Biomedical and Health Informatics*, vol. 21, no. 1, pp. 56–64, 2017.

[20] P. P. Brahma, D. Wu, and Y. She, "Why deep learning works: a manifold disentanglement perspective," *IEEE Transactions on Neural Networks and Learning Systems*, vol. 27, no. 10, pp. 1997–2008, 2016.

[21] G. Chartrand, P. M. Cheng, E. Vorontsov et al., "Deep learning: a primer for radiologists," *Radiographics*, vol. 37, no. 7, pp. 2113–2131, 2017.

[22] L. Chen, "Classification and selection strategy of physical education teaching mode," in *ICEEHSS 2019, Proceedings of 2019 International Conference on Education, Economics, Humanities and Social Sciences*, Wuhan, China, 2019.