



Research on the Application of Information Technology in Physical Education Teaching in Colleges and Universities

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Abstract. With the development of the times, most of the students do not pay attention to physical exercise, which leads to their failure in the physical test, and the school does not make good use of the physical test data. Therefore, this paper uses the tensor flow platform, uses the deep neural network classification method, and uses SPSS pairing analysis to get the problems existing in College Physical Education Teaching in China, so that the school can accurately grasp the physical condition of students, so as to make the physical education teaching plan. The experiment shows that DNN can not only improve the accuracy and reduce the error, but also put forward the scientific class division strategy.

Keywords: College students · Physical fitness · BP neural network · MATLAB program

1 Introduction

College students are the important talent resources of the country, and their physical quality is the basis of all qualities, which not only directly affects their own healthy growth, but also affects their ability to serve the society in the future. According to the monitoring results of the Ministry of education in recent years, college students' physical fitness continues to decline, and the situation is worrying. Therefore, it is of great significance to establish a scientific and objective evaluation model to evaluate the physical quality of college students.

College Students' physical quality evaluation refers to the overall evaluation of College Students' physical quality according to their body shape, physiological function and sports ability. From the previous research results, most of the mathematical models reflecting the relationship between College Students' special performance and physical fitness use the methods of probability statistics and multiple regression analysis. However, probability statistics and multiple regression analysis are greatly affected by the sample space of sampling test, and the prediction accuracy is not high. Therefore, this paper uses BP neural network algorithm to solve the problem accurately, in order to further optimize the evaluation of College Students' physical fitness [1].

2 Basic Theory of BP Neural Network

Artificial neural network is a kind of simulation of the working mode of human neural network. It is an information processing system that imitates the structure and function of brain neural network. It is a large-scale nonlinear adaptive system which can carry out complex logic operation. It has strong adaptive, self-learning, associative memory, high error tolerance and other characteristics. It is suitable for dealing with problems with complex information, incomplete data and difficult to accurately describe by mathematical model [2].

The artificial neuron (processing unit) model can be simulated by Fig. 1, and the symbols in the figure are given by formula (1).

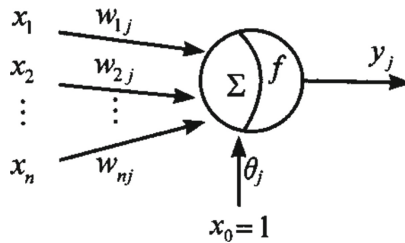


Fig. 1. Schematic diagram of artificial neuron (processing unit)

The relationship between input and output can be expressed as:

$$\begin{cases} s_j = \sum_{i=1}^n w_{ij}x_i - \theta_j \\ y_j = f(s_j) \end{cases} \quad (1)$$

BP neural network is a kind of artificial neural network which is more mature and widely used. It is composed of input layer, hidden layer and output layer. The processing units between layers are fully interconnected, and the processing units in the same layer are not connected. The basic idea is that the information processing process consists of two processes: forward propagation and error back propagation. In forward propagation, the input information is input from the input layer and output from the output layer after being processed by each hidden layer. If the output information of the output layer is inconsistent with the expected information, the output error is transferred from the output layer to the input layer in some form, and the error is allocated to the processing units of each layer to gradually correct the calculation error. Because BP neural network model can approach any continuous function with high precision, and can achieve good fitting effect for complex problems with multi factors and nonlinearity, this paper uses BP neural network to establish the evaluation model of College Students' physical fitness.

3 Design of Flipped Classroom and Volleyball Teaching Experiment Based on MOOC

The main purpose of experimental teaching of volleyball skills is to test the influence of flipped classroom of sports skills teaching based on MOOC on College Students' sports

skills learning, and to test whether this teaching mode can improve students' learning efficiency and teachers' teaching efficiency, Whether it can enhance students' learning interest, learning initiative, learning self-confidence and learning will in the learning process, so as to provide certain data support and practical basis for the application research of MOOC based flipped classroom in motor skill teaching [3].

The flipped classroom based on MOOC consists of traditional teaching classroom and MOOC classroom. Relying on the normal use of the network MOOCS platform in teaching experiment, the students who participate in the experiment also need to have intelligent mobile terminals for MOOCS learning. According to the understanding of the experimental objects before the teaching experiment, they all use mobile phones as the media of MOOCS learning. Now there are many MOOCS platforms to choose from. The MOOCS platform of Xuetang online is the online platform in this experiment. Xuetang online, a Chinese MOOC platform developed and launched by Tsinghua University in 2013, is an online course platform for the whole world. As long as there is a network around the students can be in this platform for video learning courses. In 2016, Xuetang online was rated as one of the top three platforms with "the most excellent courses" in the "global MOOCS ranking". The diversity and quality of the number of courses attract more users to register and select courses.

4 BP Neural Network Evaluation Model of College Students' Physical Fitness

The input layer of the evaluation model consists of six indexes: height, weight, vital capacity, endurance performance, flexibility and strength performance; speed and dexterity performance; the output layer has only one neuron y , representing the physical quality of college students.

$$n_1 = \sqrt{n + m} + \alpha \quad (2)$$

n , M represents the number of neurons in the input layer and the output layer respectively, and α is a constant between 1 and 10.

In the flipped classroom based on MOOC, the in class link is the offline classroom teaching link. Teachers should design the classroom teaching according to the teaching objectives, teaching content and students' learning results before class. In the classroom teaching, the teacher first checks the students' learning results according to the pre class learning tasks to determine whether the students have seriously completed the pre class MOOCS learning; and then answers the students' problems in the process of MOOCS learning. This part of the check and answer is convenient for the teacher to more intuitively understand the effectiveness of students' pre class MOOCS learning. Organize teaching activities according to the students' mastery of the teaching content: combine the classroom teaching content and students' acquired knowledge, carry out the internalization and immediate evaluation of knowledge. In the classroom, teachers organize students to group or students to carry out any group for cooperative learning and inquiry learning, so as to increase the communication and discussion between teachers and students and students in motor skill learning.

5 After Class

After the end of classroom teaching, teachers need to evaluate the class in time: To evaluate the students' learning, to evaluate their own teaching, and to make the teaching reflection of this class. In view of the unsolved problems in the classroom, this paper provides corresponding guidance after class, and points out the knowledge points they need to pay attention to in MOOC learning. According to the learning progress of most students, determine the teaching content of the next lesson. In the arrangement of collective learning tasks at the same time, supervise the slow learning progress of students to follow the pace of the collective, strengthen the learning and practice after class. In the whole teaching process, teachers often need to reflect on teaching, and students are also required to summarize and reflect on their own learning process, so as to find problems in the reflection. Through wechat group to seek the help of teachers or save their problems in learning to the next class, and then focus on feedback to teachers, and seek solutions to provide guidance and help for students, at the same time, urge students to complete homework arrangement after class, timely review and preview learning content, improve classroom teaching in continuous communication and reflection [4].

The flipped classroom based on MOOC is different from the traditional physical education classroom in its teaching mode, and their learning places are different, but it can not change the cognitive law of sports skills and its teaching essence. After class, students summarize and reflect on their learning process before and during class, which is another stage of improving motor skills. Teachers can constantly improve teaching design and classroom teaching by reflecting on students' learning situation and classroom teaching effect.

In the teaching experiment, because the students in the experimental class learned MOOCS before class, they can quickly establish the initial movement representation in the initial stage of each technology. Teachers only need to explain the movements a little, students can quickly understand the essentials of the movements and practice, no longer need teachers to repeat in the classroom, for students to save learning time in the classroom, leaving more time to carefully polish their own movement technology, at the same time, it also increases the opportunity and time for teachers to guide students one-to-one. In the classroom practice of students, correct each student's movement, and provide guidance for students to further improve their movement skills, and flexibly master various sports skills in volleyball. Compared with the students in the experimental class, the students in the control class need teachers to repeatedly emphasize the basic essentials of the action in the classroom. Teachers also need to spend more time explaining the details of the action and demonstrating. At the same time, students need to spend more time in the classroom to practice in order to grasp the action essentials of various techniques. Class time is limited. Facing all students, teachers spend enough time on explanation and demonstration, and the time left for students to practice independently is correspondingly reduced. Teachers can not take into account the learning situation of each student. Students' mat practice in class lacks personalized guidance, and it is difficult for students to accurately grasp each sports technology.

6 Conclusion

Using the powerful function mapping ability of BP neural network, this paper establishes the neural network model of the correlation between the total test score and the physical fitness of college students, and realizes it by MATLAB software. The research example shows that the model has higher prediction accuracy and operation efficiency than the multiple regression analysis model, and does not need to determine the expression form of the mathematical model in advance. The operation is simple, and the evaluation results are scientific and reasonable. It can be used as an effective method for the evaluation of College students' physical fitness in the future.

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