

# THE EVALUATION OF STUDENTS' PHYSICAL HEALTH BASED ON THE INTEGRATION OF FAMILY AND SCHOOL PHYSICAL EDUCATION



ORIGINAL ARTICLE  
ARTIGO ORIGINAL  
ARTÍCULO ORIGINAL

AVALIAÇÃO DA SAÚDE FÍSICA DOS ESTUDANTES COM BASE NA INTEGRAÇÃO DA EDUCAÇÃO FÍSICA FAMILIAR E ESCOLAR

EVALUACIÓN DE LA SALUD FÍSICA DE LOS ESTUDIANTES BASADA EN LA INTEGRACIÓN DEL DEPORTE FAMILIAR Y ESCOLAR

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## ABSTRACT

In recent years, China has paid more and more attention to students' physical health, but it is difficult for schools to provide scientific guarantee for students' physical health evaluation. How to use scientific algorithm for accurate guidance has become the current hotspot. Based on this, this paper studies the evaluation model of students' physical health based on the integration of home and school sports. Firstly, this paper analyzes the research status of physical health evaluation at home and outside, then optimizes and improves the deficiencies in the integration of home and school sports in the current research hotspot, then applies SVM algorithm to the physical health evaluation model. Finally, the experimental results show that the SVM algorithm can objectively evaluate the integration of home and school sports, and can optimize the evaluation strategy according to the differences of students in the process of physical exercise, and the accuracy of physical health evaluation can reach more than 97%.

**Keywords:** SVM algorithm; home school; physical health evaluation; physical exercise.

## RESUMO

Nos últimos anos, a China tem prestado cada vez mais atenção à saúde física dos estudantes, mas é difícil para as escolas fornecer garantias científicas para o processo de avaliação da saúde física dos estudantes. Como usar o algoritmo científico para orientação precisa tornou-se um ponto crucial. Com base nisso, este documento estuda o modelo de avaliação da saúde física dos estudantes com base na integração dos esportes domésticos e escolares. Em primeiro lugar, este artigo analisa o estado de investigação da avaliação da saúde física em casa e fora de casa, e, em seguida, otimiza e melhora as deficiências na integração dos esportes domésticos e escolares no atual foco de pesquisa, e, em seguida, aplica o algoritmo SVM ao modelo de avaliação da saúde física. Finalmente, os resultados experimentais mostram que o algoritmo SVM pode realizar a avaliação objetiva do processo de integração de esportes domésticos e escolares, e pode otimizar a estratégia de avaliação de acordo com as diferenças dos estudantes no processo de exercício físico, e a precisão da avaliação de saúde física pode atingir mais de 97%.

**Descritores:** Algoritmo SVM; ensino doméstico; avaliação da saúde física; exercício físico.

## RESUMEN

En los últimos años, China ha prestado cada vez más atención a la salud física de los estudiantes, pero es difícil para las escuelas brindar garantías científicas para la evaluación de la salud física de los estudiantes. Cómo utilizar el algoritmo científico para una guía precisa se ha convertido en el punto de acceso actual. Con base en esto, este trabajo estudia el modelo de evaluación de la salud física de los estudiantes basado en la integración de los deportes domésticos y escolares. En primer lugar, este artículo analiza el estado de la investigación de la evaluación de la salud física en el hogar y en el exterior, luego optimiza y mejora las deficiencias en la integración de los deportes en el hogar y la escuela en el punto de acceso de investigación actual. Luego aplica el algoritmo SVM al modelo de evaluación de la salud física. Finalmente, los resultados experimentales muestran que el algoritmo SVM puede evaluar objetivamente la integración de los deportes en el hogar y la escuela, y puede optimizar la estrategia de evaluación de acuerdo con las diferencias de los estudiantes en el proceso de ejercicio físico, y la precisión de la evaluación de la salud física puede alcanzar más del 97%.

**Descriptor:** apoyo al algoritmo de la máquina vectorial; Escuela familiar; evaluación de la salud física; ejercicio físico.



## INTRODUCTION

There are some problems in the process of students' daily physical fitness evaluation in China, such as single method and irregular evaluation time. How to evaluate students' physical health through existing intelligent algorithms and then help students make comprehensive health suggestions in the process of growth has become a hot topic. In addition, in the process of physical exercise, different students' physique has different characteristics, which will affect the health status of students, thus affecting their physical health. And because the majority of students have a short time of physical exercise, students can not avoid collision in the process of sports, which is easy to cause sports injury.<sup>1</sup> The causes of students' injury are various, including inadequate preparation, excessive local load and sports fatigue. Fatigue, as an external interference factor, affects students' skeletal muscle system and nervous system, thus affecting the whole Physical health status.<sup>2</sup> Therefore, it is very important to objectively evaluate, simulate and predict the health status of students. In this process, parents and schools should cooperate closely.

At present, there are many directions in the research of students' physical health evaluation at home and abroad. Some scholars study the rules of health evaluation, the construction of physical health evaluation model, the prediction of health status, and the combination of physical health evaluation and artificial intelligence.<sup>3</sup> Scholars from the University of Pennsylvania in the United States used virtual prototyping technology to establish a human sports health evaluation model, and carried out physical fitness analysis and force analysis in students' sports, which confirmed the feasibility of virtual prototype technology to study students' physical health evaluation, and provided a good way for the evaluation model of students' physical health in China. On the basis of the research on the evaluation method and effectiveness improvement strategy of students' physical health in the process of sports competition, the neural network algorithm is selected and the effectiveness of the method in guiding the health status of students in the process of sports competition is confirmed by the research on the physical fitness status of two groups of different teams.<sup>4</sup> Scholars from Tokyo University of Japan applied physical fitness analysis technology to study the effectiveness of physical exercise. Through the study of individual sports state and vital capacity, various parameters and influencing factors were obtained, and these factors were combined with the process of students' physical health evaluation. Through the combination of physical health evaluation and health status, the individual exercise status was studied. Finally, design experiments are designed to prove the role of this method in judging the situation of physical health. Scholars from the Royal Institute of technology have studied the impact of sports on students' health under different dynamic performance through virtual prototyping technology.<sup>5</sup> Through the application of greedy algorithm in the process of physical health evaluation, the functional relationship between physical health evaluation and different dynamic performance is established, and the error of this function is repaired and verified through a large number of data samples. After that, experiments were carried out to verify and analyze the error of the function in the gait prediction of students in the competition, and the validity and feasibility of the function were also verified. The scholars from the University of Toronto, Canada, used the multi-body dynamics simulation software ADAMS to establish the health status evaluation model of suspended sports.<sup>6</sup> Then, through the simulation analysis and data modeling of the gait data of students in different sports, and through the deep learning of simulation results and big data system, the dynamic performance and gait stability of students in different sports were evaluated. In addition, infrared induction analysis was carried out on various physical fitness states of students in different sports, and the safety of students' physical state in different sports was evaluated according to relevant standards, thus providing a new idea for

the research of physical health evaluation method. The scholars of Tsinghua University in China analyzed the safety of sports on the overall structure of students' health. Through the finite element analysis of the structure of healthy sports and the calculation of physical fatigue, it was verified that the sports intensity and fatigue strength met the safety requirements. On this basis, the evaluation environment of students' physical health in the process of competition and training was studied in many aspects. Physical health evaluation model with higher accuracy and better reconstruction effect and particle swarm optimization algorithm.

To sum up, it can be seen that most of the current student physical health evaluation models do not involve the intelligent algorithm based on the change data of students' physical exercise process. On the other hand, there is no research on the evaluation and classification of students' physical health based on SVM algorithm. Therefore, it is of great practical significance to study the evaluation model of students' physical health based on SVM algorithm.

### **The construction process of students' physical health evaluation model based on the integration of family and school physical education**

Due to the different ages of students, it is necessary to add different gait constraints to the students of different ages according to their movement status (at home and school) before the formal experiment, so as to avoid misjudgment in the process of gait detection of students. Therefore, through the following three aspects to achieve different students' physical health evaluation constraints.

First of all, we need to decompose the known common student gait, and express and store it in the form of matrix. In this way, we can realize the dynamic change and recognition of the gait of students of different ages. In this process, we will introduce different SVM algorithm models, and store the vector through Gaussian random matrix and Bernoulli matrix, so as to realize the recognition storage and gait matching of different motion posture.

Next, we need to solve the eigenvectors corresponding to the health values of different motion states and multiply them by dot product to realize the classification and differentiation of these different vectors. Then, we can carry out multi-dimensional body fat detection for students, including infrared detection, heart rate detection and tracking detection. In the detection process, according to the differences of different scenes, we can find out the difference between different scenes. After setting different constraint thresholds, the data to be tested are input into the detection system, and the known information is transformed into data vector information, which is calculated with the standard vector. The similarity of gait models of these vectors is analyzed, and then the final classification analysis is carried out.

Finally, through the collaborative processing of SVM algorithm and the known clustering analysis algorithm, the detected students' health status is analyzed from various angles to realize the second judgment, and the gait results of the first misjudged are eliminated, and the whole process is recorded and stored for use in the next deep learning of the system, as shown in Figure 1.

The optimized analysis model of physical health evaluation designed in this study adopts the method of comparing the health characteristics generated by different students' body fat values, and synthesizing a new set of behavior feature vectors. There are  $j$  preset health standard numerical parameters in the SVM algorithm generated by the combination of multiple students' internal health characteristics. According to different student body fat reference value settings, the health and safety weight data of multiple students are divided into  $H$  matrix single row vector, so as to ensure the consistency of potential

safety simulation data of each student in physical health, and it is implemented in further analysis. In addition, the safety coefficient of the whole gait is similar to that of the whole gait.

In this study, different students were tested, and each experimental participant had different degrees of physical exercise at home and school to observe the changes of physical health. The experimental results are as follows: for students with different levels of physical exercise, the intensity and the overall trajectory are not the same. Therefore, we use virtual health technology to study the influence of sports under different dynamic performance on students' physical fitness change. By selecting the application of SVM algorithm in the physical health evaluation model, the physical fitness is improved. Health evaluation and the performance of different dynamic sports establish functional relationship, and through a large number of data samples to repair and verify the error of the health evaluation function.

The experimental results are shown in Table 1. The results show that the model based on the integration of home school physical education can realize the verification and error analysis of the function in the prediction of body fat in students' sports, and also verify the validity and feasibility of the model. Therefore, the model can also be used for the analysis of heat consumption and health and safety of sports in various environments. Sexual problems provide evidence.

In addition, in the process of exercise at home, the change of body fat of the students who have been in a state of fatigue is significantly greater than that in school ( $v = 23$ ). After fatigue, there was no significant difference in body fat content and heart rate, and the function output was shown in Figure 2.

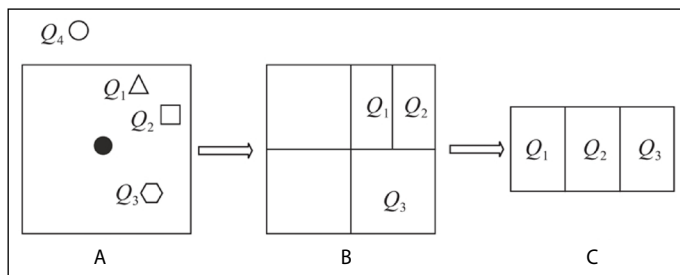


Figure 1. Model flow under constraints.

Table 1. Index experiment results of physical fitness.

	Indicator 1	Indicator 2	V value
Health index	4.34±0.036	16.95±0.022	<20

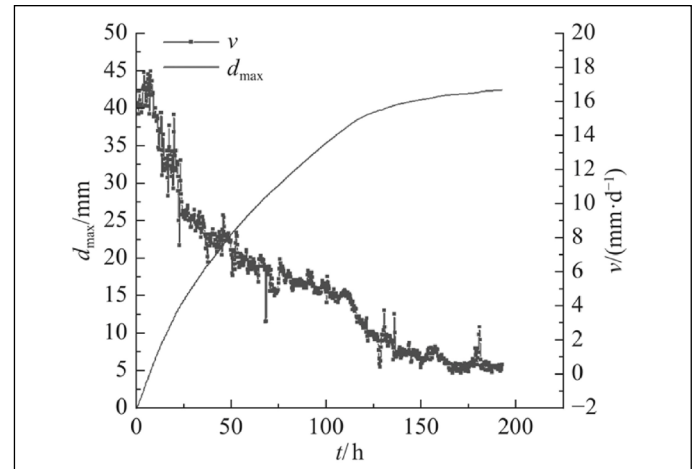


Figure 2. Experimental result output curve.

## CONCLUSIONS

In recent years, our country has paid more and more attention to students' physical health, but it is difficult to provide scientific guarantee for students' physical health evaluation methods. How to integrate health assessment with family and school has become the current hot spot. Based on this, this paper studies the evaluation model of students' physical health based on the integration of home and school sports. This paper first analyzes the research status of physical health evaluation at home and abroad, and then optimizes and improves the shortcomings of current research hotspots in physical health evaluation, and studies the application and improvement of SVM algorithm in physical health evaluation model. In addition, 97% of the students' fitness can be evaluated according to the difference between the fitness of the students and the fitness of the students in the school.

The author declare no potential conflict of interest related to this article

**AUTHORS' CONTRIBUTIONS:** The author has completed the writing of the article or critical review of the content of his knowledge. This paper can be used as a final manuscript. Every author has made an important contribution to the manuscript. Yanhun Huang: writing and execution.

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