



Research on Real-Time Monitoring Method of Physical Training Health Load Data Based on Machine Learning

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Abstract. At this stage, the people are facing a general decline in physical fitness. Physical fitness training has become an upsurge of the whole people, but physical fitness training also needs to be scientific. One of its important contents is to monitor the exercise load of physical fitness training. The rapid update of real-time load monitoring methods is continuously promoting the continuous improvement of competitive sports. This study studies and compares the real-time monitoring system of physical training health load data through traditional monitoring methods and monitoring methods based on machine learning, and analyzes that the real-time monitoring system of physical training load data using monitoring methods based on machine learning can more accurately solve various practical problems in the process of mass fitness, The integration and development of machine learning technology for load monitoring methods can promote the transformation and innovation of physical training monitoring more quickly.

Keywords: Machine learning; Physical training; Load data; Real time monitoring; Health exercise;

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1 INTRODUCTION

Regular and regular physical training can help activate the body's immune system, prevent or improve some diseases, improve mental health, enhance pressure resistance, and improve insomnia. Regular physical training can increase a person's life expectancy and the overall quality of life, and beyond the body's load, there will be unrecoverable injuries. The real-time monitoring of health load data, the monitoring of human heart rate, and the real-time warning function. The technical algorithm embedded in machine learning can get the appropriate functional training load, and scientifically and effectively evaluate the sports effect and the body's recovery time. Feng Wenkui (2021) aimed at the low monitoring accuracy of traditional physical training load data monitoring methods, explored the real-time monitoring method of physical training load data based on graph convolution network, constructed the constraint variable and explanatory variable characteristics of physical training load data, monitored the physical function parameter indicators in real time, and realized the real-time monitoring and supervision of physical training health load

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data according to the analysis of the characteristics of load data [3]. Wang Shaoli (2020) and others combined the continuous monitoring of center rate and abnormal data analysis in the process of functional training, and used big data analysis methods to achieve healthy and accurate training, so as to improve the level of physical training [10]. Wang Wei (2022) and others deeply explored the interrelationship between various factors through the association analysis of different types of monitoring data, and the internal mechanism, characteristic relationship and movement law of functional training. They believed that real-time exercise monitoring could better monitor the level of health load by collecting exercise data of load through multi-dimensional data [11]. Shi Lei (2022) used modern scientific and technological means to provide support for the development of competitive sports. Through the intelligent training monitoring platform, he collected data, analyzed and evaluated it, and provided digital information to improve the ability of sports players to provide auxiliary training [8]. Zhong Yaping (2021) and others proposed accurate load quantification for sports training subjects through data-driven, paid attention to accurate early warning of injuries, and monitored the whole process of functional training to open up new ideas for the new development pattern of sports training with data control, accurate feedback, light load and high efficiency [14].

People pay more and more attention to the demand for health, and gradually pay attention to sports function training. The application and research progress of machine learning algorithms in sports training will play a pivotal role in human function and health. The information collection of this algorithm provides the basis for accurate training. With the powerful driving force of machine learning algorithms, functional training is believed to better serve sports function training. Hu Haixu (2021) and others believe that the new pattern of physical fitness winning + machine learning integrated winning training has been opened, and the reform of sports competitive function training has been accelerated. The new concept of physical fitness training and healthy load sports training data that keep pace with the times can better implement personalized functional training [4]. Jin Chengping (2021) and others created an intelligent system. Machine learning is a learning algorithm that automatically obtains effective information from previous training data and makes personalized predictions in combination with people's physical fitness. It realizes the improvement of technical ability level under the support of intelligent auxiliary training technology [7]. Yue Zhiqiang (2021) proposed that based on the machine learning algorithm, a reasonable functional training plan should be formulated to evaluate the training effect of supervised athletes, and physiological indicators such as heart rate should be selected to predict the training effect of athletes. The results show that the prediction and evaluation error of this algorithm is low and has high practical application value [13].

It can be seen from the search of relevant literature that sports can be developed faster by using machine algorithms, and the endurance of health load can be better managed by appropriate training strategies and real-time monitoring of data. Machine learning algorithm is an indispensable technical method, which opens up a new development trend for sports.

2 SIGNIFICANCE AND VALUE OF MONITORING HEALTH LOAD DATA OF PHYSICAL TRAINING

In recent years, with the continuous improvement of the popularity of physical education, physical training and the health of the body have received increasing attention. Through real-time monitoring of physical training health load data, comparing the quantitative analysis results of physical training load data, modern physical exercise training with healthy and reasonable load is carried out according to various physical parameter indicators, so as to improve the body shape of people participating in sports or sports athletes, It is of great value to improve the exercise ability of their organs and systems in order to prolong their exercise life. The continuous improvement of the level of competitive sports and the role of physical training have been paid more and more attention, and even reached an unprecedented heat and height. Scientific physical training is conducive to bearing

overload training and high-intensity competition. Modern high-level functional training requires that people who need to bear overload exercise should also have high-intensity competition ability. Therefore, it is urgent to monitor the health load data of physical training. Scientific and targeted physical training can effectively prevent the occurrence of physical injuries, and greatly improve the technical level and sports performance.

Moderate sports can improve the sleep quality of most people and improve insomnia. Excessive physical training is harmful and does more harm than good. The health load data varies from person to person. Many sports can not be adjusted according to the physical condition of individuals, which often leads to injury. Excessive exercise will also cause serious physical function decline. Functional training with healthy load can avoid serious physical injury during training. Hu yukuan (2022) analyzed and calculated the human motion state monitoring device design in combination with the motion information, and the monitoring output results were accurate and reliable, achieving a more accurate body state. This monitoring method can accurately identify the human motion state and monitor and indicate the damage risk, with reliable and stable performance [5]. Wu Jing (2022) mainly discusses the significance of scientific monitoring of sports, the methods of using scientific monitoring to guide health sports and scientific detection to promote health management, enhance people's understanding of the scientific detection of health sports system, safeguard people's health, promote people's development, and bring help to the functional training of relevant personnel [12].

Monitoring the health load data of physical training must be the most correct choice at present. The data results of dynamic monitoring will be combined with their own physical conditions and the effects after exercise through the evaluation system. After a more comprehensive and intuitive comprehensive analysis, the people who scientifically guide sports activities, including coaches and athletes, function training monitoring will become more systematic and will cultivate a good habit of conscious exercise, Strengthen physique and improve physical training level in specific health load training. This method of monitoring functional health load training is of great significance to tap the potential of athletes, optimize functional training, challenge sports limits, and effectively avoid sports injuries and injuries caused by training overload.

3 The Role of Machine Learning In Real-Time Monitoring of Physical Fitness Training Health Load Data

The collection of dynamic monitoring of one's own sports and functional training data can timely understand and improve one's own health, strengthen physical fitness, comprehensively and objectively analyze sports performance from the collected data information, and improve previous sports performance in combination with effective data information. The purpose of real-time collection and monitoring of healthy and green load data of physical training based on machine learning is to evaluate the state and reaction of training, Training monitoring is not only to collect data but also to explore the impact of physical load of functional training, monitor training willingness, own pain and body energy, and it is necessary to carry out periodic exercise management and physical health warning for the sports group with the help of machine learning technology. There are obvious differences in the level of exercise load among different people, and an appropriate level of exercise load can achieve the effect of physical exercise, Through the dynamic real-time monitoring of exercise load, now having the correct data-based information can become a strong advocate of exercise monitoring for functional training, can finely manage the problems in exercise, and correctly treat and adjust the intensity of exercise. Healthy and green sports load can effectively improve people's sports ability. In view of the monitoring and reducing of sports load by machine learning technology for monitoring the results of physical fitness training data or increasing the intensity of sports, in a sense, it can stimulate people's subjective initiative and enthusiasm in sports exercise, It is an inevitable trend for the scientific development of sports training in the future that machine learning integrates and analyzes the multi-dimensional data collection results of real-

time health load sports monitoring. Wang Hongmei (2021) aimed at reducing the sports injury caused by high-load functional training, it is necessary to monitor the state of sports load, analyze the collected indicators of sports load state according to the characteristics of characteristic parameters, and conduct real-time monitoring and health level testing, which can effectively avoid sports injury caused by overload sports [9]. Huang Yuanqi (2021) and others have introduced machine learning into the field of sports injury prevention, providing a new perspective for the prevention of sports injury and promoting the transformation of research paradigm [6] because the generation of sports injury is characterized by multi factors, uncertainty and accident. The real-time monitoring of physical training based on machine learning can monitor high-intensity sports in real time and evaluate the physical health level. The monitored results can effectively avoid sports injury caused by overload.

4 RESULT VERIFICATION AND ANALYSIS

4.1 Dynamic Data Distribution of Real-Time Monitoring of Physical Training Load Data Under Different Monitoring Methods

In recent years, when the state monitors the national physique, it has found that most people have the problem of declining physique and physical fitness. As a result, the attention to physical education is growing day by day, and the scientific nature of physical training and education is also receiving more and more attention. The broad masses expect to promote health through physical training, but lack corresponding scientific guidance. This study proposes a real-time monitoring method of physical fitness training health load data based on machine learning. By using the online monitoring method of health load data such as oxygen uptake VO_2 , CO_2 emissions and oxygen pulse O_2P , a machine learning real-time monitoring structural model of physical fitness training health load data is established. On the basis of machine learning technology, by analyzing and comparing the dynamic data of real-time monitoring of physical training load data under two groups of different monitoring methods, table 1 is obtained :

<i>Group</i>	<i>Oxygen uptake (VO_2)</i>	<i>CO_2 emission</i>	<i>Oxygen pulse (O_2P)</i>
<i>Traditional monitoring methods</i>	<i>71.40%</i>	<i>70.90%</i>	<i>73.40%</i>
<i>Monitoring method based on machine learning</i>	<i>88.70%</i>	<i>86.90%</i>	<i>87.10%</i>

Table 1: Dynamic Data of Real-Time Monitoring of Physical Training Load Data Under Different Monitoring Methods.

In Table 1, through the dynamic data analysis results of real-time monitoring of physical training load data under different monitoring methods in the above table, it can be seen that the monitoring method based on machine learning is more timely to capture the dynamic data of health load data such as oxygen uptake VO_2 , CO_2 emission, oxygen pulse O_2P in the physical training load data,

It is more conducive to optimize the construction and application of the physical training load data real-time monitoring system system.

In order to more intuitively reflect the dynamic data analysis and comparison results of real-time monitoring of physical training load data under different monitoring methods of the physical training load data real-time monitoring system system, the dynamic data comparison results of real-time monitoring of physical training load data under two groups of different monitoring methods in Table 1 are visualized, and figure 1 is obtained:

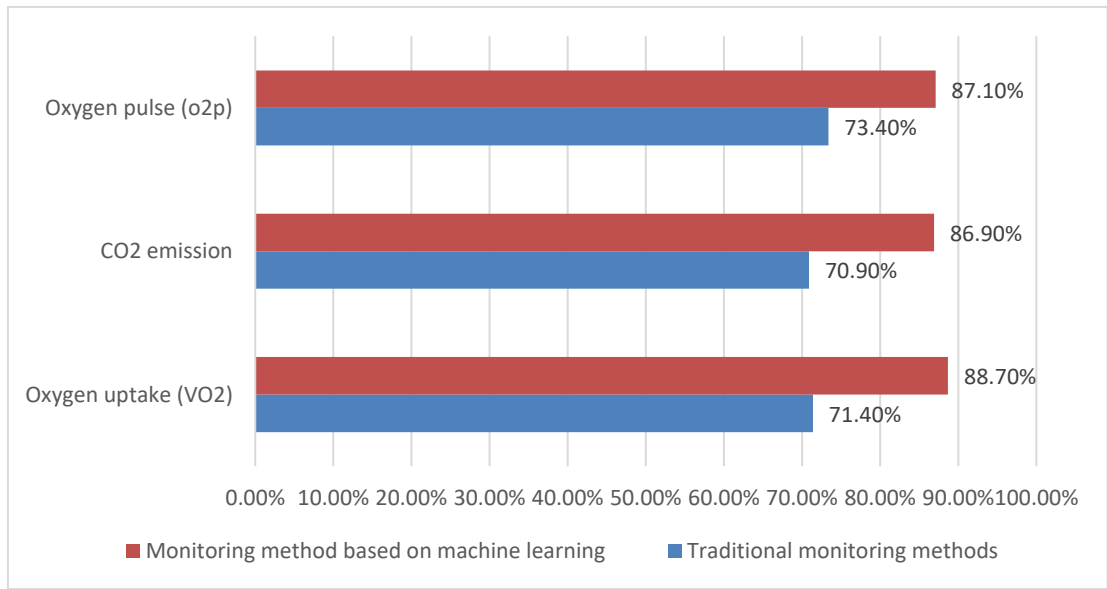


Figure 1: Dynamic Data Visualization of Real-Time Monitoring of Physical Training Load Data Under Different Monitoring Methods.

Figure 1 shows the dynamic data analysis and comparison results of real-time monitoring of physical training load data under two groups of different monitoring methods. It is believed that the machine learning real-time monitoring structural model system based on physical training health load data under the application of monitoring methods under machine learning is more accurate than the data effect of real-time monitoring of physical training load data under the application of traditional monitoring methods, It can better optimize the real-time online load data monitoring system of physical training, and can better analyze the results of quantitative analysis of physical training load data.

4.2 Parameter Index System of Physical Training Load Data Under Different Monitoring Methods

In order to better solve the real-time monitoring of physical training load data, it should not only fit the physical characteristics of our people, but also need the guidance and support of sports fitness experts. The real-time monitoring of physical training load data is based on the dynamic analysis and sensor monitoring of physical training load data. It samples the sensor information of physical training load data and analyzes the characteristics, Realize real-time monitoring of physical training load data. Through the analysis and comparison of the parameter index system data of physical training load data under two different monitoring methods, the results show that the parameter index system of physical training load data under the monitoring method based on machine learning

has higher application and data information collection accuracy in all aspects than the parameter index system of physical training load data under the traditional monitoring method system, According to the parameter index system of physical training load data, the parameter index system data of physical training load data under two different monitoring methods are analyzed and compared, and table 2 is obtained.

Group	Physical load index	Resting heart rate	Ventricular contractility	Arterial wall
Traditional monitoring methods	72.80%	73.60%	72.90%	74.10%
Monitoring method based on machine learning	89.50%	89.10%	88.20%	87.50%

Table 2: Parameter Index System Data of Physical Training Load Data Under Different Monitoring Methods.

In Table 2, through the comparative data of the parameter index system of the physical training load data under the two groups of different monitoring methods in the above table, the physical load index, resting heart rate, ventricular muscle contractility and arterial wall of the system system are analyzed and compared. It can be seen that the parameter index system of the physical training load data under the application of the monitoring method based on machine learning is far superior to the application of the traditional monitoring method in all aspects, which shows that the parameter index system of the physical training load data under the application of the monitoring method based on machine learning is more in line with the construction and application of the real-time monitoring physical fitness data system at the present stage.

In order to more intuitively reflect the analysis and comparison results of the system under two different monitoring methods, the data comparison results in Table 2 are visualized, and figure 2 is obtained:

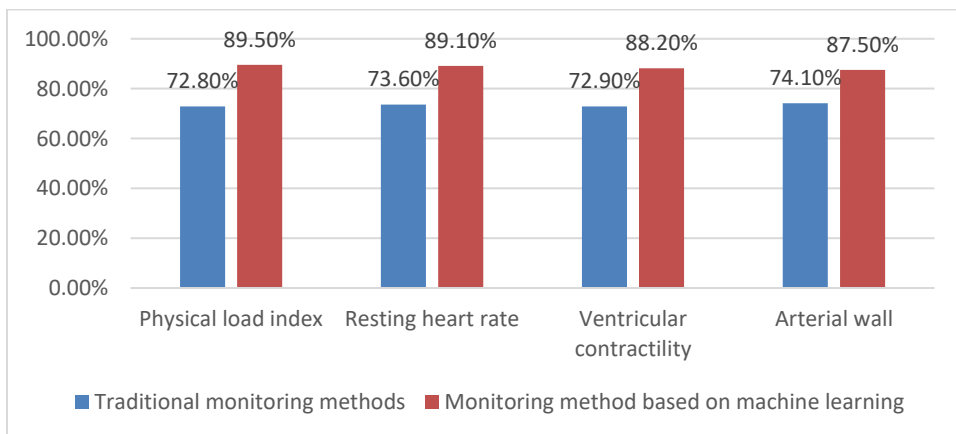


Figure 2: Parameter Index System Data Visualization of Physical Training Load Data Under Different Monitoring Methods.

Figure 2 shows the results of data analysis and comparison of the parameter index system of physical training load data under the application of two different monitoring methods. It is believed that the parameter index system of physical training load data under the application of monitoring methods based on machine learning has significantly improved compared with the system under the application of traditional monitoring methods, and can better improve the construction of the parameter index system of physical training load data, Make the system more safe, simple, easy, personalized, scientific and effective, and can more widely increase the user's use range, enhance practicality and improve security.

4.3 Real Time and Accuracy of Physical Training Data Monitoring Under Different Monitoring Methods

The traditional monitoring methods of physical training load data have some problems such as certain delay and low detection accuracy. This study analyzes and compares the real-time and accuracy of the monitoring data of physical training data under two different monitoring methods. According to the real-time and accuracy of physical training data monitoring under the application of traditional monitoring methods and monitoring methods based on machine learning, the comparison and analysis of data under two different monitoring methods are obtained, as shown in Table 3:

<i>Group</i>	<i>Real time</i>		<i>Accuracy</i>	
	<i>Before use</i>	<i>After use</i>	<i>Before use</i>	<i>After use</i>
<i>Traditional monitoring methods</i>	55.20%	77.40%	54.80%	78.50%
<i>Monitoring method based on machine learning</i>	76.80%	88.60%	76.90%	89.30%

Table 3: Real Time and Accuracy Data Of Physical Training Data Monitoring Under Different Monitoring Methods.

In Table 3, through the comparison of the real-time and accuracy data of physical training data monitoring under the two groups of different monitoring methods in the above table, it can be seen that the application of monitoring methods based on machine learning is more effective than the application of traditional monitoring methods in optimizing the real-time and accuracy of physical training data monitoring. In the physical training data monitoring system, the application of monitoring methods based on machine learning has more advantages than traditional monitoring methods.

According to the data of physical training data monitoring in Table 3, the real-time and accuracy of physical training data monitoring under different monitoring methods are analyzed and visualized. Figure 3 is obtained.

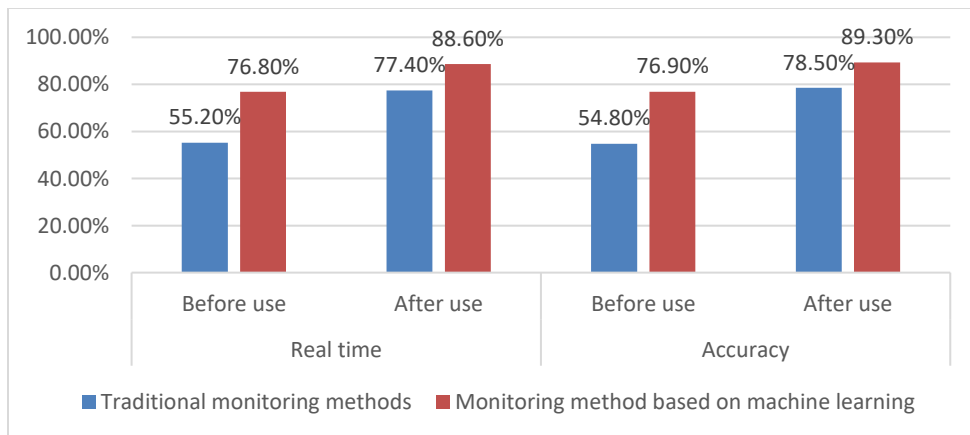


Figure 3: Real Time and Accuracy Data Visualization of Physical Training Data Monitoring Under Different Monitoring Methods.

Figure 3 intuitively compares the real-time and accuracy of physical training data monitoring under two different monitoring methods. It can be seen that the monitoring method based on machine learning has better real-time and accuracy effects on physical training data monitoring. This shows that the real-time monitoring of physical training data based on machine learning improves the data detection ability and dynamic analysis ability, which strengthens the national physique and improves the health level of the whole people, thus further promoting the development of the national fitness campaign.

5 SUMMARY

This study first discusses the significance and value of monitoring physical fitness training health load data, and analyzes the path of real-time monitoring of physical fitness training health load data. It integrates machine learning algorithms to timely and accurately collect functional training data, and gives clear functional training measures according to its own actual situation. This study compares traditional monitoring methods with monitoring methods based on machine learning, The positive effect of the algorithm on functional training is verified by simulation from the distribution law of dynamic data monitored, the constraint variables and explanatory variables of load data, and the real-time and accuracy of collected data monitoring. The significance of healthy load exercise data monitoring is emphasized.

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