Application of Wearable Technology and Equipment in Sports

Guomeng Zhang

Changzhou Vocational Institute of Mechatronic Technology，Changzhou 213164,Jiangsu,China

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Abstracts: With the gradual development of intelligent technology, the application frequency of scientific and technological products in life is also gradually increasing. Wearable technology is related equipment that can be worn on the body to meet various use functions. Typical wearable devices include electronic watches, earphones and other electronic devices used in daily life. It can be used by wearing, including sensing, identification, connection, cloud service and other related concepts and technologies. Its functional diversity and convenience of use have become a major reason for the popularity of the public at present. In the process of sports, wearable technology can also assist the actual development of sports to a certain extent, and can also achieve the function of leisure and entertainment to a certain extent during sports. This paper discusses and analyzes the application of wearable technology and equipment in sports, aiming to put forward relevant strategies that are feasible and meet the needs of users in the future according to the basic functions of wearable equipment and the application status in sports.

Keywords: Wearable Technology; Wearable Equipment; Athletic Sports

1. Introduction

In the actual process of sports, understanding the actual policies of various human indicators and the actual performance in the process of sports can often help sports to be more orderly and reliable, can also predict sports injuries, and timely detect and eliminate the possible dangers in the process of sports. Relevant research shows that in recent years, injuries or deaths caused by improper sports have occurred from time to time. Therefore, it is very necessary to improve the movement mode for the monitoring of the actual state of the human body during the movement. Through wearing wearable devices, real-time data monitoring can be carried out during the movement. A series of protective measures can often avoid accidents and dangers.

2. Current situation and common problems of modern sports development

2.1 Current situation of modern sports development

With the development of the times and the renewal of technology in various fields, sports are also tending to be diversified. In the current era, the development of sports has changed from the original single limit to the present rich and diverse,

which makes everyone pay more attention to sports safety and the diversity of sports experience in the process of sports.[1] In the past, basketball, football, track and field and other sports have been widely loved by people. At present, there are more types of sports, and the common sports that people can contact include billiards, badminton, table tennis, gymnastics, yoga, etc. In different sports, the sports points that need to be paid attention to are different, but for now, sports in the next development process further tend to diversify, which means that the development of sports is accompanied by changes in the concept of the times. The rules of movement and aesthetic trend are also changing to some extent.

2.2 Common problems in modern sports

With the gradual enrichment of the content of contemporary comedy sports and the gradual refinement of the rules, it is also easy to have certain problems to be solved in the process of modern sports. The most common problem is the safety problem in the process of sports. In the process of different sports, accidents due to comprehensive reasons such as the venue and its own equipment occur from time to time. Such accidents are often closely related to the surrounding specific sports activities and environmental monitoring. In order to effectively avoid unnecessary injuries and safety problems in the process of sports, we should further strengthen the use of equipment and pay more attention to the surrounding environmental monitoring and the standardization of our own actions.[2] At the same time, the help that modern sports bring to physical health is also the problem of the rationality of the amount of exercise in some sports that people generally pay attention to. In the actual exercise process, the state of the human body and various parameters of the human body can reflect to some extent whether the human body is in a healthy state under this exercise and how to grasp the efficiency and time of sports in the process of sports. It is also a problem that contemporary people focus on in the process of realizing healthy sports and developing physical fitness through sports.

3. Application status of wearable technology and equipment in sports

3.1 Sports safety: environmental monitoring and hidden danger troubleshooting

At present, with the diversification of sports models and the gradual enrichment of the types of curve sports, the importance of sports safety issues in different sports processes is also gradually increasing, and the application of wearable technology and equipment in the process of sports safety has been more extensive, mainly reflected in the time measurement of the surrounding environment and the troubleshooting of hidden dangers.[3] Some wearable devices can use infrared sensing and image capture recognition. The method assesses and detects the safety of the surrounding environment, and reminds the contents of the potential safety hazards at present, so that users can effectively avoid areas and objects with potential safety hazards during sports, and truly achieve safety and reliability during sports.

3.2 Physical health: human body monitoring and exercise intensity calculation

In the process of sports, in addition to paying attention to sports safety, the health of sports is also involved to a certain extent. Wearable technology and

equipment can be used for various parameters of human body, such as heart rate, blood pressure, etc. Conduct real-time monitoring to understand the actual situation of the human body during exercise.[4] At the same time, the exercise intensity can be converted according to the actual exercise results in the actual exercise process. For example, the partial headset can monitor the actual mileage of the human body in the actual exercise process in real time based on GPS technology and big data. The running speed is calculated according to the change of position, and the fitness index is calculated according to the height and weight of the human body. When the exercise intensity is higher than the recommended value, it can remind people to exercise healthily according to the recommended index when exercising to avoid damage to the body and harm to human health due to excessive exercise..

3.3 Leisure and entertainment: auditory relaxation and fun games

In addition to troubleshooting the surrounding safety hazards, monitoring the specific parameters of the human body and calculating the exercise intensity of the environment, the current wearable equipment can also help the sportsman to have leisure and entertainment during or after the exercise. Taking the headworn sports headset as an example, the headworn sports headset can play music during the exercise, and help the sportsman to use his hearing to relax his body and mind during the exercise, it can make the sportsman keep a better state of motion during the exercise, and relax through soothing music after exercise. It can also make them quickly enter the relaxation state, and rest and supplement energy as soon as possible. At the same time, some wearable devices also have certain entertainment and interaction functions, such as communicating with users through voice, allowing users to amuse themselves through the process of communicating with the device voice during the use of such forms as brain twister, interactive encyclopedia, etc, These interesting small games can give sports players more choices of leisure and entertainment modes in the process of sports or during the rest period of comedy sports.

4. Application and development trend of wearable technology and equipment in sports

4.1 Sports mode development under big data

In the process of using wearable technology and devices in sports, big data technology has been applied to a certain extent at present, but at present, big data technology is still in the exploration stage in the process of using wearable devices, and the development of different sports modes under big data is in the high-speed development stage, such as wearable devices. We can change the rules and match different sports modes according to the common rules in the current sports, so that the athletes have more choice space for sports matching. At the same time, we can promote the sports mode according to the actual choice of sports mode of the public under the big data, and even compete with other people who are using wearable devices on the same screen through online interaction, in different places. However, the same timing method and real-time data monitoring can be used to get the competitive results, so that the sports realm can be broken. The constraints of time

and place will bring the competitive nature of sports into full play.

In fact, at present, wearable technology and equipment have developed to a certain extent in the development of cross-regional application mode, but the types of applied sports are still relatively limited. At present, the more common sports are track and field, long jump and high jump. Some sports still have some difficulties in program development and competitive platform construction due to the complex sports rules and diverse interaction modes. However, with the gradual improvement and promotion of big data technology, it can be gradually realized in recent years. Breaking through the time and place constraints, and performing the competitive presentation of sports will further meet the sports needs of multiple groups of people, and can also elevate the functionality of wearable devices in sports to a new height.

4.2 Real-time interaction under AI

In the process of wearable technology and equipment application, with the gradual development and maturity of AI technology, it has been possible to communicate and communicate with people in real time according to the current actual human body state and sports intensity, etc. In different situations, AI can interact with people in real time, which can help sports players adjust their sports state to a certain extent. Timely correction and more humanized communication of dangerous behaviors in the process of sports can make sports players feel a certain degree of care, and make sports players realize healthy and reasonable sports through effective communication and communication in the actual process of sports.

With the update of the database and the gradual enrichment of the judging conditions, AI technology can be applied to the relevant content of communication with users in different scenes and contexts, and also the setting of the dialogue content involving different sports and sports will allow sports players to communicate with AI based on their own different states and needs when performing different types of sports, which give instructions to wearable devices in the form of passwords to further improve the convenience of using wearable device functions.

4.3 Automatic protection under condition monitoring

For the use of wearable technology and devices, in addition to leisure entertainment and real-time communication, it will also provide further intelligent protection for the safety of users. At present, some wearable devices can trigger the passive protection mechanism under corresponding conditions through a certain degree of condition monitoring. However, such development mechanism is not perfect. In the future development process, With the gradual improvement of the condition monitoring mechanism and the gradual strictness of the judgment of the surrounding environment, it is possible to eliminate the dangerous situations that occur in the process of physical exercise and actual life of users in a timely manner and implement a certain degree of protection measures according to the condition monitoring technology. At present, the automatic protection of wearable devices has been realized. The most typical is the spare parachute in parachute jumping. If the main parachute does not open when the parachute diver's descent speed reaches a

certain threshold, the spare parachute will be forced to open to protect the personal safety of the parachute diver. In the later development of science and technology, some sports involving more complex environmental conditions and more restrictions will be involved. It can also provide protection for users' sports safety through wearable equipment with automatic protection function under condition monitoring.

The development and improvement of condition monitoring technology is the key prerequisite for the enrichment and sustainable development of sports events. A more intelligent condition monitoring and protection mechanism can ensure the physical safety of sports players for a longer time, and also enable sports players to experience sports more confidently, which has a special significance for the orderly development of sports events in different scenarios.

4.4 Construction and maintenance of virtual scene

Most of the existing sports are often based on the real scene, which is the process of exercise or competition through real sports. However, the construction of virtual scenes can also meet the multi-dimensional needs of sports players, such as leisure entertainment and physical exercise, to a certain extent. At present, the construction and use of virtual scenes also have a certain degree of involvement in leisure and entertainment, such as video game halls in shopping malls. There will be virtual shooting, virtual dancing, and virtual 3D games. At present, some developers have tried to use wearable devices. The set virtual scene is combined with the real sports, such as running, high jump boxing, etc. Through the control of the virtual scene, the dangers in the real sports can be avoided, but also the actual experience of the sports players in the process of physical exercise can be greatly guaranteed.

However, the construction of virtual scenes is relatively difficult. The actual maintenance of virtual scenes and the personal security of users will be the issues that need to be focused on during the development of wearable technology equipment to virtual scene construction in the future. How to protect the equipment when users use the equipment, how to let users carry out sports within the specified limits, and how to avoid the problem of sports players causing damage to the equipment due to illegal operation. This needs to be achieved through the construction of surrounding monitoring equipment and early warning facilities and the improvement of buffer measures in the sports space.

5. Conclusion

The practical application of wearable technology equipment in comedy sports. It has been involved in sports safety, sports health, leisure and entertainment and other fields. In the future development process, it can be realized by relying on big data, artificial intelligence, 3D scene construction and further improvement of condition monitoring technology, but in the security performance of peripheral equipment and equipment use. Further improvement in real-time maintenance and content optimization in the process of function development can further meet the user's experience and needs, and highlight the functionality and safety of wearable devices in sports.

References:

[1]Liu H, Wang C, Ye Q, etc. Application progress and development trend of wearable technology in emotion recognition [J]. Journal of textile 2022;(008):043.

[2]Shi W. Research on the application of sports APP and wearable devices in college physical education practice [J]. Sports - leisure: mass sports 2021; 000(001):P.1-1.

[3]Zhang Q, Zhong J. Research on intelligent wearable technology of sports goods based on interactive concept and its application [J]. Art 100 2022; 38(3):8.

[4]Li G. A step counting method for wearable devices, wearable devices and media:, CN113884101A[P]. 2022.