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Edge Computing-Based Athletic Ability Testing for Sports

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Abstract

INTRODUCTION: After the 2008 Olympic Games, China has gradually become a prominent sports country, but there is still a certain distance from a sports power. China should improve the level of sports ability testing while continuously strengthening the construction of sports power. At present, the method of sports professional athletic ability tests in China can not be better combined with algorithms, so it is crucial to study the athletic ability test of edge computing.
OBJECTIVES: To improve the ability of sports testing of sports majors in China, to improve the technical level of the construction of China's sports power, to solve the problem that China's sports ability testing cannot be better combined with algorithms, and to solve the problem that China's physical education disciplines cannot be well applied to computer technology.
METHODS: Use the motor function theory and edge computing to establish the model needed, test the athletic ability of swimming sports according to the model, and analyze the advanced level and shortcomings of China's swimming sports with measurement according to the results of the athletic ability test.
RESULTS: Firstly, edge computing and other algorithms are more accurate for professional athletic ability testing of swimming sports, and improving the iteration level of algorithms can improve the problem of the inconspicuous effect of sports testing; secondly, edge algorithms combined with traditional testing tools can calculate athletic ability more accurately in athletic ability testing.
CONCLUSION: China should vigorously improve the level of edge computing and other algorithms to improve the problem of China's sports disciplines not being able to apply computer technology well and technically improve the level of sports training.

Keywords: edge computing, physical education and sport, physical majors, athleticism

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1. Introduction

Physical mobility training is a new concept and approach to physical mobility training that differs from traditional physical mobility training in that it provides flexibility and stability to each joint during the workout(Pothier et al., 2021). An athlete's ability to maintain correct posture is critical, and exercising through the body's physical functions is a very effective way of learning to improve the regulation of body sensation and control of nerves and muscles. Exercise enables athletes to adapt to the external environment, improve neurofeedback in time, improve body control, and enhance performance in specific sports environments(Gijsbertse, 2021). Therefore, the use of exercise training helps athletes improve their physical fitness and performance and meets the needs of scientific sports training. Sport strength is a sport dominated by professional sports, and its design cannot be distinguished from improving the overall strength of professional

sports. The construction of sports strength is a fundamental and essential project after competitive sports, which is a strong support for the competitiveness of professional sports in China(Reid et al., 2023). Young athletes play an essential role in the country's Olympic strategy, winning gold and silver medals for the country and being responsible for the splendor of the Games. The Olympic Games are primarily concerned with athletic training, which is often a vital indicator of the strength of professional sports in the world(Rosen et al., 2022). This is an essential and equally important challenge. The main feature of achieving sporting goals is the participation of individuals or groups in sporting competitions. After all, it is a necessary means of improving the competitiveness of athletes through sports training to ensure good results on the field of play.

Athletic ability is one of the athletes' competitive skills, which is an essential quality requirement for athletes and a necessary basis for improving athletic performance. It plays a vital role in the negotiation of professional sports(Zambarano et al., 2021). Youth sports have been a hot spot in the research of professional sports in China, but there has yet to be systematic and reasonable research. Youth athlete training has long been an essential part of the three-stage selection system of Chinese professional sports. It is responsible for providing a talent pool for Chinese professional sports(Rynkiewicz et al., 2022). The quality of primary Education directly affects the future development of professional sports in China. For the continuity of the exercise process, it is necessary to create a reserve for young sports teams, establish a scientific and reasonable education system, cultivate more athletes with potential and sustainable development, and develop professional sports, which is an essential cornerstone for the sustainable development of professional sports.

The purpose of this paper is to analyze existing research on athletic training and to apply athletic training methods and concepts to the athletic training of young athletes. Functional exercises were screened to identify and train physical weaknesses in young athletes to reduce the risk of injury(Hannington et al., 2021). Functional training improved the physical condition of young athletes and provided practical experience and guidance for cross-country athletic training. Professional walking is a sport that focuses primarily on physical training. The level of exercise has a significant impact on the competitiveness of athletes. Ineffective exercise is also one of the areas for improvement of Chinese athletes. Functional physical training is an advanced school intervention with important research implications for the physical training of young athletes(Rodríguez ln Osell et al., 2021). The professional sports level is currently at a critical stage of development. Benefiting from physical training, it provides training services for sports teams, collects information related to changes in athletes' physical training performance before and after training, and provides reference standards and insights for sports coaches and researchers(Eason, 2021). It enriches the theoretical education system of physical activity, and also promotes the development and research of sports teams in the field of physical training, and has reference value for practical training.

2. Background of the study

Today, professional sports in China show an unprecedented development trend, but it also reveals existing problems. For example, the development of university sports competitions does not contribute to the overall improvement of students' physical health(Stanton et al., 2021). Students' physical health affects not only healthy growth but also the content, methods, and means of exercise, which have become more personalized in the past. Learning focused only on increasing loads rather than on making the most of the learning outcomes, which led to students losing interest in sports. Functional learning systems are fully adapted to the development of professional sports, emphasizing the multifunctional and multifunctional effects of the whole muscle and avoiding permanent contraction of individual muscle groups(Franke et al., 2021). The goal of standardization and automation of sports has been achieved through the development of professional sports models. However, research has shown that current higher education and physical education in higher education institutions have had a significant impact on the dual thinking of "competence," while practical training, technical training, and physical training are faced with a "dual" confrontation(Takenaka et al., 2023). The focus is on individual sports and professional training. In the training process, coaches and athletes put more emphasis on training techniques and physical fitness. With the development of sports and changes in the rules of sports, the demand for athletic skills is increasing. If the gap between athletes is small, adequate exercise is the key to winning(Singleton & Mcallister-Deitrick, 2023). Therefore, it is essential to incorporate functional training into sports training to improve the level of professional sports training.

Different sports have common characteristics and roles in sports training. At present, the research on the training of soccer reserves is pervasive, and the research on sports programs is mainly limited to teaching methods and means. The lack of evaluation of athlete education has seriously affected the development of college sports in China. Today, the traditional content of individual learning and general learning methods forget individual differences, forget the importance of individual learning, and seriously lack the stability, balance and flexibility of learning(Franklin et al., 2023). The coaches' concept of functional Education needs to be more comprehensive, in-depth and systematic, which restricts the development and progress of college sports in China. Combining functional training with physical training is an urgent issue. With the development of professional sports in China, people's interest and participation in sports are increasing(Caniza et al., 2023). In the field of sports, China was the first country in the former Soviet Union to study sports.

However, the learning process focused only on the practice of sports because the learning theory was not understood and recognized in the social context. During sports, the body is divided into parts, of which only one part works, ignoring the training function of the whole body.

The theory and learning process lacks functional strength training for small muscle groups and the ability to coordinate and control the nervous system through the body during training(Raya-Gonzalez, 2021). Although American scholars believe that athletic training is based on strength, it divides functional training into two parts: basic motor training and core training, emphasizing the importance of core training in all training, as evidenced by the level of strength training in the United States. Functional training is a training method that utilizes body strength to improve athletic performance(Brisinda et al., 2021). The establishment of the first sports laboratory at the College of Physical Education made a significant contribution to the development of Physical Education. Afterward, local researchers and experts began to give academic lectures in Beijing and Shanghai, laying a solid foundation for the cultivation of practical talents in functional sports in China.

Motor modeling is an integral part of functional Education, and the learning process is based on motor models that include polygons, polygons, and multidirectional learning systems. The content of university physical training is individualized, and coaches often regulate topics such as student sports, the integrity of the body's energy chain, and physical stability(Loffeld et al., 2022). Due to the blind pursuit of high physical activity and intense learning loads, early professional physical Education does not match the physical and mental development of young people. Some young people are in poor posture for a long time, which leads to unbalanced muscle development. During exercise, the body is inevitably affected by compensation and exercise power modeling, and dangerous phenomena such as sports injuries may occur over time(Urdaneta et al., 2021). In complex cases, this can outright ruin an athletic career and ultimately lead to poor health. Sport is a physical activity that primarily affects the other side of the body. In sports, basic techniques such as quick stops, drafting, and fast jumps require basic functional training, especially flexibility and stability of the wrists, knees, and ankles, as well as the ability to coordinate and control nerves and muscles(You et al., 2021). Therefore, scientific monitoring, effective diagnosis and evaluation are critical in the process of sports training. Since its introduction to China, functional exercise has made significant contributions to the prevention of sports injuries in the fields of rehabilitation medicine and professional sports(Rogers et al., 2022). The role of functional exercise in promoting and supporting physical activity among physical education students was investigated.

3. Research methodology

3.1 Motor Function Theory and Edge Computing

Physical Education began at the end of the last century. With the development of professional sports, theories and methods of sports training, also known as "functional training," emerged. Scientists transformed it into functional learning. Its predecessor was rehabilitation training for rehabilitation doctors aimed at restoring musculoskeletal function after surgery. With the change of time, the development of professional sports, the diversity of sports needs, the similarities and differences in the development of the individual athlete, and the basic requirements for the creation of excellent sports goals, functional training has been incorporated into professional sports. It has evolved into a unique system of teaching materials. This feature combines the corrective methods of physiotherapy in the field of medical rehabilitation with training in sports activities in educational science.

On the one hand, using the diagnosis of movement disorders, the athlete is evaluated to find the body balance and correct it. On the other hand, athletes who do not engage in compensatory sports must also be trained. The movement has always been an essential indicator of the quality of the sport, with a focus on managing the correct type of movement. Basically, this means applying advanced strength to athleticism and improving athletic performance. Due to the ambiguity between the CTA and the medical field of functional rehabilitation, some Chinese therapists have studied it and added distinctions such as "exercise" and "youth exercise" before separating functional Education. Motivational analysis of the motor ability test is shown in Figure 1.

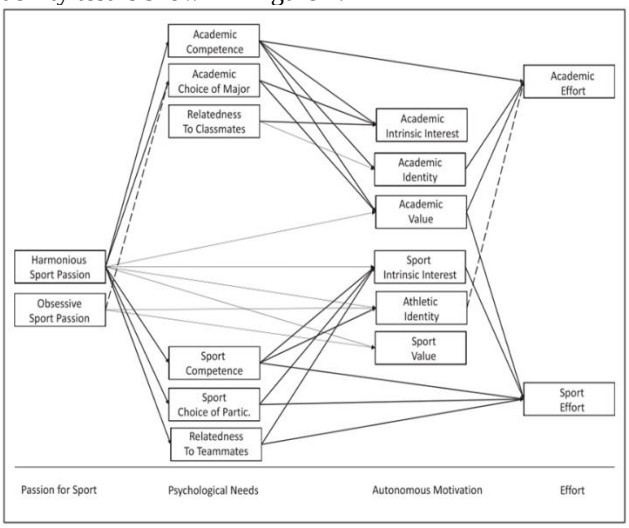

Figure 1 Motivational analysis of motor ability test

In short, sport is the comprehensive physical training of athletes in the field of professional sports, including athletic training, fitness, physical activity and sports training. The main feature of its training is to enrich, adapt or improve the fundamentals of sport as demonstrated by the professional athlete. The ultimate goal is to improve or achieve the athlete's previously defined athletic skills and targets and to prepare them for

a variety of athletic endeavors adequately. The core of athletic training is targeted athletic training. The aim and purpose of this study is to promote physical fitness in athletes. Instructional methods can only be developed with the essential habits of body size, physical function, and quality of exercise that are part of school exercise.

In contrast to the traditional concepts of unilateral joints, inefficiency and neglect of motor function, physical training is based on the diagnosis of the athlete's physical condition in order to achieve the specific goals and functional requirements of the athlete's physical training. Emphasis should be placed on flexibility and stability of exercise, as well as the involvement of multilevel motor skills based on physical activity, an uncertain external environment, and appropriate exercise habits, rather than on muscular strength training. Exercise is more important than physical activity. Motor function is an ancillary concept to athletic training that describes the content of the training itself and the plan of action to meet or fulfill the needs of the athlete. Planning functional directions for specific training goals, training methods, and athlete training systems is more detailed and precise than what is termed. National professional sports facilities have long used traditional sports concepts. In principle, sports training should be synchronized with the classical elements of traditional sports training while retaining existing sports training concepts and methods. This state-of-the-art gymnasium makes physical training more suitable for professional sports. The process of athletic ability improvement is shown in Figure 2.

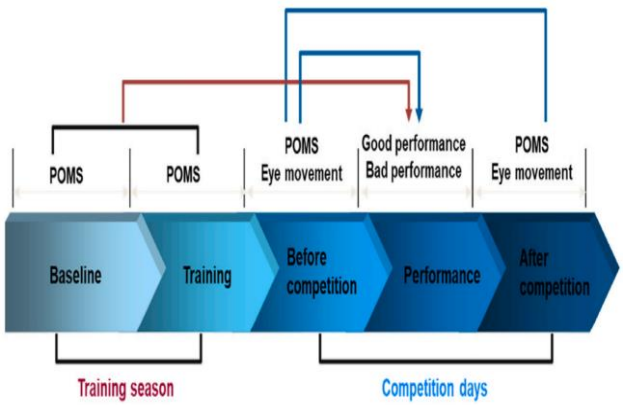

Figure 2 Capacity Enhancement Process

3.2 Theories of Physical Training

Physical activity training began in the United States with functional rehabilitation in the medical field. Functional training consists of three distinct modules: functional training screening (FMS), functional training and regeneration. In recent years, sports have been widely used to train national and professional teams for professional competitions. Improvement of physical activity and skills are the main options for physical activity. Traditional exercises include general and specific exercises. The primary task of general physical training is the overall development of physical training and balancing the development of all body organs. Specific physical training is based on general physical training. Although there is no training that can replace traditional physical training, traditional physical training has many disadvantages. Most researchers view athletic training as a transition between conventional and specialized athletic training. This view explains that when athletic training is shifted to professional sports training, athletic training fully satisfies both transitional needs for improving physical expertise.

On the one hand, sports cover many fields of study that do not include athletics. These new training modules can provide a solid foundation for future professional training. When professional training becomes difficult, a good learning breakthrough can be achieved through sports training. As the World Health Organization explains, "Health is more than the prevention of disease." On the other hand, health is a good state of physical, mental and social well-being. According to the World Health Organization's definition of "health," the meaning of the body can be summarized as the human body changes with the development of society, reflecting the relative stability of its organization, physiological functions, and psychological characteristics. Physical Education (also known as Community Physical Education) is a two-way activity in which teachers combine the two for learning. According to the curriculum standards and the annual curriculum, the main goal of physical Education is to help students recognize the importance of physical activity and develop the concept of sustained physical activity.

The relationship between traditional and functional learning is based on empirical principles. There are three approaches to resistance training: increased workload, deformation and specificity. Progressive overload implies an increase in physical activity. These changes are called "phase changes," and they reflect the body's systematic manipulation of acute procedural variables in preparation for adaptation. Specificity refers to the solutions and methods chosen to adapt to the incentive. It is the specific setting of a particular rule or command. A principle closely related to functional Education is learning specificity. Functional training diversifies rehabilitation methods and techniques for injured people and makes increased physical activity and exercise more useful for healthy people. There is a common link between sports recreation and game coaching, which is the basis of functional training. All activities and routines are related to the mechanical aspects of the principles expressed in the study. These conditions must be taken into account when addressing specific training issues in order to improve competency-related activities. The process of functional training of the whole body allows for accurate control of the improvement of muscle movement and muscle weakness to regulate more chains of nerve energy transfer effectively, increase the number of muscle fibers, improve muscle movement, and increase the efficiency of coordinated muscle movement. Sports practice is

characterized by multilevel and multilevel training, which corresponds to the actual transport characteristics.

3.3 Research design

This study examines edge computing-based tests of professional athleticism in sports by measuring meta-physical training in swimming.

In this paper, relevant journal articles, dissertations, master's degrees, and online literature were comprehensively analyzed using Chinese databases such as university libraries, sports, functional training, swimming, Chinese websites, the Wanfang database, foreign science networks, and other Chinese databases. These materials were studied and analyzed in detail. Understanding the research on the impact of sports training on the composition of athletes, a comprehensive understanding of the physical condition of China's youth athletes and future trends provides a solid theoretical foundation and direction for the research of this paper. In order to understand the actual training situation of the swimming team, the swimming team coach was interviewed at the beginning of the experiment. The authors of this paper participated in the Second International Youth Sports Summit held in Shenzhen in 2017, the Sixth Youth Sports Summit held in China in 2018, and the Fourth Collegiate Youth Fitness Exhibition in 2018. In the next phase of the study, discussions were held on the rational choice of study methods, study programs and study cycles. Under the supervision of experts, an indicator questionnaire was developed to assess the physical condition of young swimmers.

An electronic questionnaire was used to investigate the physical condition of 20 swimming coaches. Twenty expert surveys were distributed. Of these, 18 questionnaires were significant and 100% qualified for the needs of this study. A literature review summarized 33 previously proposed physical indicators. For each indicator, the Likert scale was designed to be very large, relatively large, medium, small, and trim with coefficients of 5, 4, 3, 2, and 1. A weighted average was used to calculate the weighted mean for each indicator. Based on the weights of the indicators, the weights of each additional variable were mathematically expressed as follows:

$$w = \frac{\sum an}{N} \tag{1}$$

In Equation (1), w is the weight, n is the subset number of people, and *N* is the total number of people.

$$\varphi_{xs_{ij}} = \alpha_1 \varphi_{xs_{ij}}^{cpu} + \alpha_2 \varphi_{xs_{ij}}^{ram} \tag{2}$$

Where $\varphi_{xs_{ij}}$ is the edge computing algorithm performance, and $\varphi_{xs_{ij}}^{cpu}$ what is the specific energy consumption? The specific calculation of a1 and a2 in Equation (2) is as follows:

$$a_1 + a_2 = 1, 0 \le a_1, a_2 \le 1 \tag{3}$$

$$\varphi_{xs_{ij}}^{cpu} = Var[N^{cpu\_uti}] \tag{4}$$

$$\varphi_{xs_{ij}}^{cpu} = Var[N^{ram\_uti}] \tag{5}$$

In Equation (4) and Equation (5), Var is the type of function to be transformed for CPU and RAM, respectively.

Research suggests that metrics should be based on four key indicators that are relatively high or above average. Therefore, when selecting metrics, the weighted average should be ≥ 4. Reliability was verified by retesting the reliability of the expert survey. The distance between tests was three weeks. The correlation coefficient of six experts randomly selected from 18-year-old males was 0.987. Usually, a reliability coefficient greater than 0.9 indicates good reliability of the test. This means that the questionnaire is stable and meets the criteria for statistical research. The experts' opinions confirmed the usefulness of the questionnaire. Experts confirmed the validity of the questionnaire. The overall satisfaction of the experts with the structure of the questionnaire was 77.8%, while the overall satisfaction with the content of the questionnaire was 83.3%. The effect of exercise on the physical condition, function, health, and essential characteristics of young swimmers was assessed and analyzed using athletes as a control group, and physical performance was changed before and after the experiment in order to reduce the risk of sports injuries.

Factors such as diet, sleep, and exercise were monitored to control for the effect of the independent variable of the experimental intervention on the athletes' test speed. In terms of nutritional control, the team strictly led the sports team and prohibited athletes from leaving the team without consent. Dining in the sports team restaurant, regular distribution of fruits, sports drinks and dietary supplements; scientific advice on athletes' diets to ensure a balanced diet; strict control of athletes' sleep time, adjusting the time; unified cell phone control to avoid athletes playing with cell phones due to a lack of rest; strict adherence to the training program during the training period, regular weekly checks of the athletes' training program, and athletes' blood tests on Thursday to understand the athletes' physiological Indicator changes.

4. Results and discussion

4.1 Principles and Methods of Testing Athletic Ability for Physical Education and Sport Majors

Based on the results of the functional test screening. If the results are the same for each movement, the first step should be to establish movements with significant differences and weight imbalances to eliminate the most remarkable physical differences. Based on scientific results, prioritize the assessment of 1 point of asymmetric displacement, 2 points of asymmetric displacement, and 2

points of identical displacement on both sides. These movements are based on anatomical and biomechanical principles. Starting with a series of basic movements, the athlete is progressively trained to have flexibility, stability and basic movement. The squat is the last function on the functional movement display. Due to the difficulty of many billiards competitions, deep squat fixes only exist for athletes who have scored 3s in other events. Other developmental focuses include incline, straight leg up, flexible shoulder, rotational stability, front and back leg flexion, obstacles, and deep squats. Through progressive levels and relationships of movement patterns, the aim is to improve different movement patterns, increase fitness levels and set the stage for the next level of training. The comparison of Rate1 and Rate2 of the edge computing algorithm is shown in Figure 3.

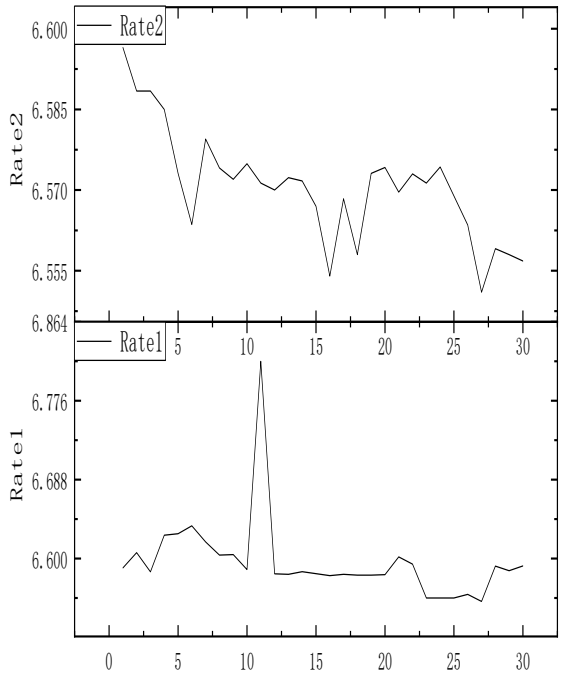

Figure 3 Comparison of Rate1 and Rate2 for edge computing algorithms

Depending on the main tasks of the different training phases and the level of adaptation of the athlete, the difficulty of the movement space should be increased. If the athlete is able to control individual movements, high levels of training should be progressively implemented by reducing the number of assisting surfaces and increasing the equipment. In addition, the structure of the movement increases gradually according to the difficulty, frequency, workload and duration of the training. During running, it is essential to avoid inefficient training of athletes, to perform movements urgently, to avoid inappropriate movements and compensation patterns, to ensure the quality of movements, to standardize the management of movements gradually, and to develop muscular strength. Athletes are improving their motor skills and physical adaptations.

Based on the needs of the swimming program, technical specifications have been introduced to support physical fitness, improve efficiency, reduce swimming resistance, and meet the practical requirements of coaches in the course development process. The content is designed using a teaching methodology that emphasizes the development of upper body strength, improvement of primary stability, continuous improvement of lower body strength, and continuous improvement of joint flexibility. Flexibility and stability of the arms, hips, ankles, chest, arms, knees, and trunk during swimming require close interaction with the thickness of the upper and lower body. Different treatments are based on physical conditions (e.g., level of competition, physiological characteristics of the athlete, and objective conditions). It is necessary to differentiate between injury prevention training and other on-site training activities to address common issues by incorporating outdated or ongoing forms of training in the implementation plan. Training content is also designed differently based on variations in terrain, climate, environment, and equipment. The effectiveness of edge computing is assessed as shown in Figure 4.

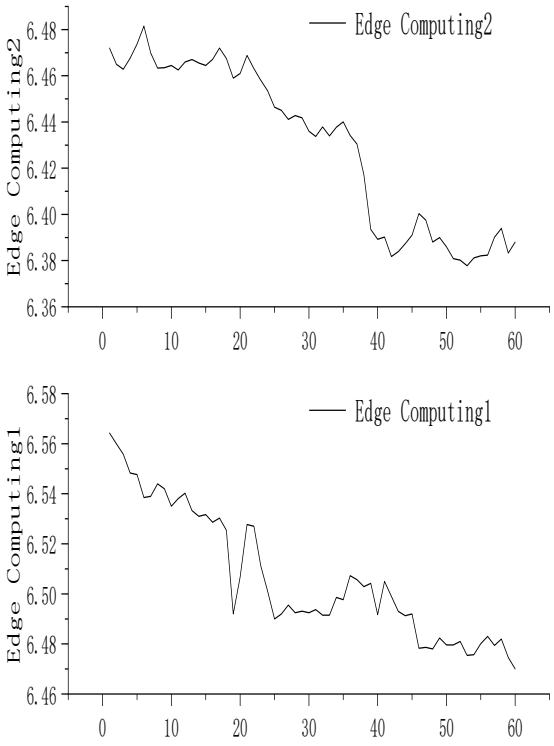

Figure 4 Performance evaluation of edge computing

This paper defines it as, "Functional training is a comprehensive set of theoretical and pedagogical methods that begin with functional training screenings and focus on workout pattern training designed to increase the efficiency of power chain transfer and improve training outcomes, including assessment and training preparation." Using frame bracing, rapid stretching and complex training, explosive strength and rotation, development of

energy exchange systems, regeneration and recovery. A variety of modular approaches to body function were compiled by reading books on the subject and summarizing the learning from the above studies, laying the groundwork for experimental interventions. Seven training modules were developed in cooperation with the trainer, including 60 training modules, including 11 final soft tissue arousal training modules, 3 gluteal muscle activation training modules, 23 dynamic stretching modules, 5 movement integration training modules, 10 training modules, 17 injury prevention training modules including 9 standard team methods of movement correction, 20 power block and walking training boards, 39 nuclear training boards, including 23 classic nuclear training boards, 16 specialized nuclear training boards and 4 rotational training boards, 13 fast stretching boards, 5 energy metabolism training boards and 33 regenerative training boards, which include 11 soft tissue arousal methods, 20 stretches and 2 stretch correction methods. By default, three training sets were used, and the appropriate training method was selected based on the athlete's level and Education. The yearly comparison of edge calculations (I) is shown in Figure 5.

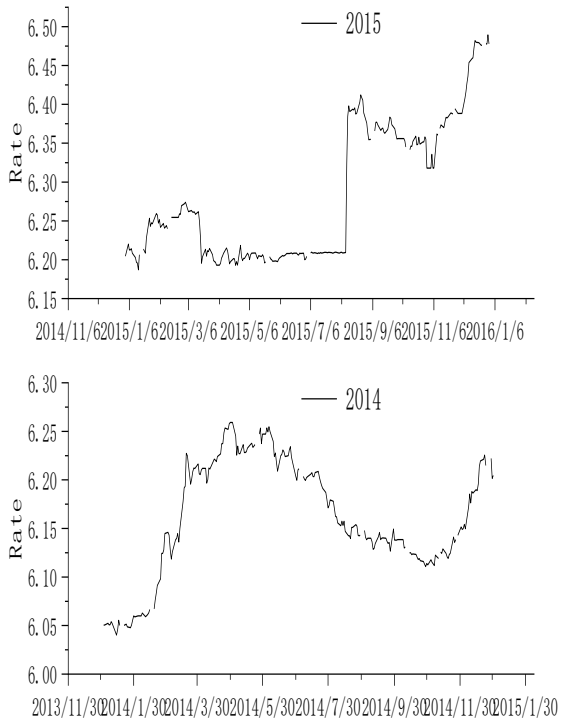

Figure 5 Yearly comparison of edge computing (I)

The training board can be divided into six sections: soft tissue activation, hip muscle activation, dynamic stretching, movement integration, neuromuscular activation and injury prevention. Unlike traditional warm-ups, each section gradually changes from movements to complex movements. The heating process only consumes a small amount of energy in order to maximize the body's ability to move rationally, improve joint flexibility and stability, activate deep muscle groups, and conserve energy for future formal training. Preventive and pathologic training also does not include functional training of athletes who receive different compensatory training. Two types of physical flexibility problems exist, such as poor proper knee flexibility and limited ankle flexibility. The improved use of turntables solved the problem of poor rotational stability in athletes. In the preparatory part of the exercise, other targeted corrective exercises are performed, which can be categorized into nine categories: deep squats, deep squats, arm movements, wings, knee loops, front and back squats, knee dislocations, and ankle instability. These compensatory measures occur in the upper, lower, and lower body of the human body, where more positioning issues exist. The frame is the part of the body that connects the upper and lower extremities and has a significant impact on the structure of the upper and lower extremities. The movement rhythm is based on 4 seconds of eccentric contraction, 2 seconds of isometric contraction and 2 seconds of eccentric compression.

To summarize, many domestic and foreign experts and researchers have conducted long-term practical research on the formation of human function. From theoretical support to primary content, the system of educational content is gradually organized through teaching panels and studies. It can be concluded that functional training screening is based on well-trained joint function and appropriate movement patterns from assessment to injury repair and prevention, including core, explosive power, ability system, regenerative recovery, non-invasive environment and coordinated physical training. The authors note that relatively few studies have focused on the combination of swimming and exercise in young people. Although there are many methods and tools for swim training, researchers still need to become familiar with the physical characteristics, corrective strategies, appropriate training methods, training rules, and feedback assessments for young swimmers. Six principles and 165 training methods are distinguished according to the physical and mental characteristics of young swimmers, combined with training in sports activities to gradually improve the level of the sport and optimize the requirements for competition. Empirical studies should be conducted on the effects of physical training on the health of young swimmers in order to promote local swimming development.

4.2 Training design and results

The fourth learning cycle of the year lasts 15 weeks. Four weeks were defined according to different tasks and training components: introductory training week, competition week, and recovery week. With this knowledge, and in order not to interfere with the regular training program, the authors conducted an experimental intervention with the swimming team during the regeneration weekend. During the first training week, the

13 weeks of training prior to the primary training week ended. Long-term training can be divided into 1-3 weeks of basic training (preparatory phase), 4-8 weeks of basic training, and 9-13 weeks of vocational training (advanced, controlled, and reduced preparatory training). A yearly comparison of Edge Computing (II) is shown in Figure 6.

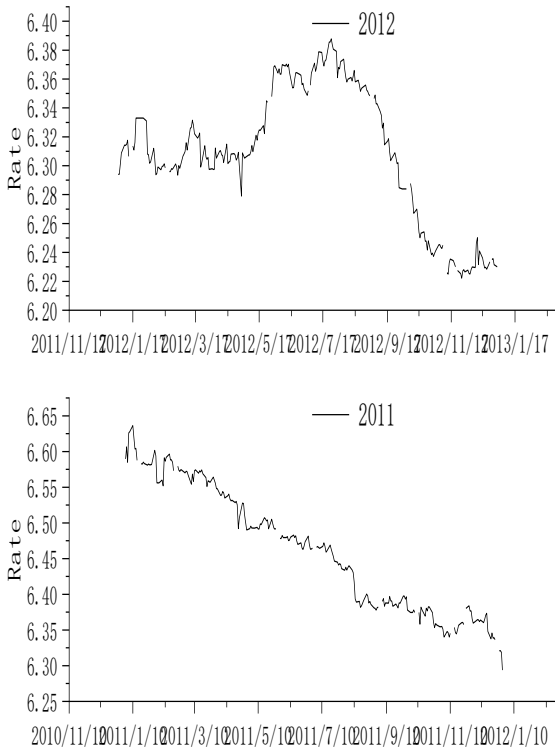

Figure 6 Yearly comparison of edge computing (II)

The results showed that the average point was less than 2 points. My push-up performance was good, and my body was stabilized for 3-10 minutes. The study also found that all three were asymmetrical in their movements, with the asymmetrical portion of arm flexibility frequently appearing on the paddlers' homepage. Active weightlifting tests on the right knee and obstacles also showed asymmetric flexibility on the strength side. The results showed that deep squats and simple knee positions dominated movement toward a point. Twelve swimmers and eight swimmers scored 3 points each on two body impact stability and shoulder flexibility tests, indicating that the constant pressure on the shoulders of the athletes resulted in a strong trunk and good shoulder flexibility. Rotational stability frequency, obstacle stride speed, and right lung frequency were higher, while active leg lift frequency, deep squat speed, and shoulder flexibility were lower.

Based on statistical and descriptive analysis, no athletes were selected to participate in the test. Teams were considered at risk if they scored 6 or 50% below 16.5. Six athletes with scores of 16.5 or more were considered low-risk athletes, representing 50% of the total. Second, patterns of punitive behavior were analyzed to identify possible causes. Twelve athletes were statistically compensated 45 times more frequently than the others. Nine athletes reported four axillary hangs (8.89%) and four deep squats (8.89%).

Three had shoulder flexibility deficits, trapezius muscle weakness, and inferior fasciitis. One (2.22%) was due to tension in the left scapula and upper trapezius, while the other (4.44%) was due to weakness in the chest and anterior ribs. One (2.22%) of the eight obstacles was ankle instability. Knee enlargement was observed in 15.56% of the patients due to tightness in the external muscles of the thighs. Shoulder and hip stability was poor, and trunk stability was poor in 11 cases (24.44%). In 6 patients with vertical knee movement, 13.33% had leg limitations due to flexibility of the thigh and thigh surgery.

The results showed hypermobility of the thighs, abdomen, optic cones, back, chest, and upper trapezius flexors and hypomobility of the anterior tibia, anterior serratus, abdomen, and hips. The internal spirals of the right and left hands were asymmetrical, and the central muscle groups were relatively weak, leading to an imbalance in the stability of the rotator muscles. In particular, the deformation and rotational stability of the muscles of the flexed thigh are relatively low, and the flexibility of the posterior thigh muscles is a high-frequency problem related to the lack of non-specific muscle training and the neglect of regeneration and regenerative training. Therefore, there is a need for targeted corrective exercises in functional sports training to prevent sports injuries and diseases, thus improving athletes' compensation for movement patterns and preventing possible sports injuries. The ec3 and ec4 efficiencies of the edge computation are shown in Figure 7.

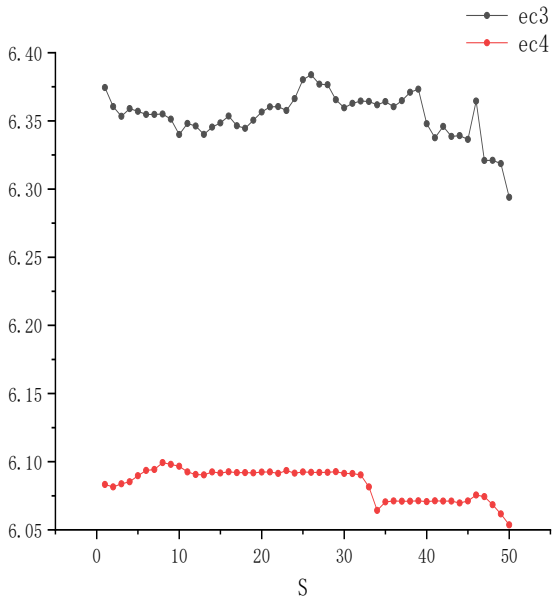

Figure 7 ec3 vs. ec4 efficiency for edge computing

Stable pumps and deep front and back legs get three points. Then, there is the obstacle brace, which increases hand dexterity and maneuverability with simple levers. As

athletes are used to using one-way anchors in professional training, it is not easy to improve specialized skills. Therefore, these three tests always have asymmetrical test elements: shoulder flexibility, active proper knee elevation and rotational stability. After 13 weeks of intervention, all athletes achieved more than 2 training points, 9 deep squats, 6 rotational stabilization points, 4 knee strokes, 8 years of arm flexibility and 2 hurdles. From top to bottom, the order was 12 cases of stabilizing body press, 12 cases of anterior-posterior bending, 10 cases of obstruction, 8 cases of right knee raise, 8 cases of shoulder flexion, 6 cases of rotational stabilization, and 3 cases of the quadrant.

After 13 weeks of training, the athletes showed a significant improvement in their functional screening results, with a maximum score of 21 and a minimum score of 16. The mean total score was 18.91 ± 1.38. The percentage of athletes at risk decreased from 50% to 8.33% compared to the pre-intervention period, indicating that the athletes were at a lower risk of injury. The results showed a significant improvement in the seventh test result at week 9, which was significantly different from the pre-test results. The analysis showed that only the bending results of the front and back legs improved significantly compared to the estimated values. The reason for this is that training to increase back and ankle flexibility at this stage is simple, effective and easy to implement. Athletes often stretch their bodies and can achieve results in both conditions, so improvement is more important. There have been some minor improvements in other sports. Particularly in the testing phase, the barrier frame improved slightly but not significantly. In the barrier and simple knee categories, the reason for this was the flexibility of the muscle tissue. Although training focuses on relaxing the muscles of the thigh flexors, lateral thighs, trunk, and hoop, swimmers are required to perform a specific aquatic movement that involves the constant up-and-down kicking of the legs, which is closely related to the contraction of the thigh flexors and thigh muscles. In addition to an extensive exercise routine, excessive muscular activity is unavoidable. Short-term training makes it difficult to assess the overall effect of long-term specialist training immediately. However, in general, athletes tend to strengthen and improve the release of the relevant regional muscle groups. In the shoulder flexibility test, the improvement of shoulder flexibility proceeds slowly due to the frequent use of the shoulder muscle groups in the running technique, indicating that the exercise has already achieved some effect. However, for swimmers who use this region frequently, continuous training is needed to strengthen this region in order to achieve long-term results. Rotational stability was also observed in the interim study. Participants were able to control their movements better than in previous tests. After nine weeks of regular training, shoulder and body strength increased. Some athletes were able to do a three-point movement, but this is unusual because of the tendency to tilt the body in order to gain 2 points. As a result, there is little difference in results. Several joints and muscle groups are required to engage the movement pattern. As a result, improving the deep squat in training is slow, and there is no targeted corrective program for the training activity. Because the deep squat is associated with many joint characteristics, it can also improve progression in other forms of movement. The effectiveness of the training program is confirmed by the fact that all other forms of exercise were improved to varying degrees, with the exception of all physical stability. Based on the pre-competition training cycle design, balance and weight elements were added to improve essential stability preparation.

At 13 weeks post-test, overall results were higher than pre-test overall results and average overall results. The seat, armrest, front and rear seat, and rotational stability improved significantly compared to the first two tests. Athletes earned the highest three points in the endurance test, with significant differences between the two groups. There was a statistically significant difference between the deep squat test and the deep squat test. There was a significant difference before and after the test. Due to the intense training in the weeks leading up to the competition, the athletes were using their shoulder joints a lot. The tension could only be temporarily relieved to ensure there was no risk of injury, and the difference between performance and test would not improve. Knee elevation improved, but not significantly overall. The results of the athletic ability test are shown in Figure 8.

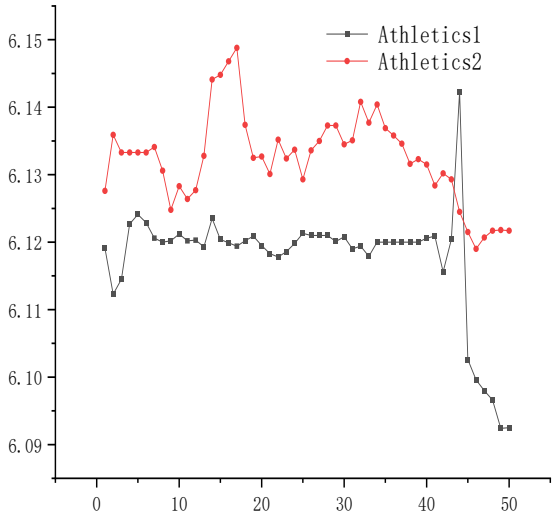

Figure 8 Results of motor ability test

5. Conclusion

After a 13-week experimental intervention, athletes significantly improved musculoskeletal toughness rates through solid ball throwing, long jumps, upward stretching, relative sitting strength, relative squatting strength, nuclear energy, 8-segment abdominal bridges, and ankle flexibility tests. The male athletes did better

than the female athletes in both the 25-meter primary test and the 200-meter primary test. Compensatory comparisons before and after the 13 weeks were corrected for five compensatory exercises, including arm spasms, light ankle exercises, knee raises, squats, lumbar depolarization, and ankle immobilization. This increased upper body stability as well as the flexibility of the flexor and thigh muscles. The screening results of the athletes' functional training improved significantly compared to the initial tests, with significant improvements in the results of the stability tests for all four movement disorders (anterior and posterior leg bends, squats and rotations). The differences between the pre-and post-test were statistically significant. By comparing the vertical progression of the first 13 weeks of traditional athletic training, the athletes were able to significantly improve four movement indices: ankle flexibility, deadlift, abdominal strength, and back endurance. Compared to females, male athletes made significant progress in three metrics: pull-ups, abdominal strength and back muscle strength. Three indicators, pulling strength, long jump and fixed ball, showed significant negative correlations with performance in the 25-meter major event and can be used as test indicators to assess the performance of top 25-meter athletes. In summary, it was found that the indicators of physical fitness testing can be categorized into five groups: physical performance indicators, fat ratio indicators, size and functional capacity indicators, quality of learning indicators and key performance indicators.

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