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Badminton Athletes' Ankle Joint Injury Factors and Preventive Treatment in View of Edge Computing

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Abstract: With the rapid economic development, people's material living standards have also improved. People have better conditions to participate in badminton, but more and more sports injuries occur in sports. This article aims to study how to discover the factors that cause sports injuries and prevent badminton athletes from ankle injuries in time. This article proposes how to find out the injury factors of badminton players' ankle joints based on edge computing, and put forward effective preventive measures. In this experiment, from the data in Figure 7, it can be found that starting from 2019, the number of badminton players with ankle injuries has increased. Although the trend is unstable, the lowest rate has reached 5% of athletes' various injuries, and the highest rate even accounted for 30% of athletes' injuries. In 2020, the proportion of ankle injuries has been on the rise, reaching a minimum of 15%. It can be seen that the proportion of badminton players' ankle injuries has been rising. It is the key to find out the factors of badminton players' ankle joint injury and timely prevention and treatment.

1. Introduction

With the vigorous development of national fitness sports, as well as the continuous improvement of fitness awareness and the continuous expansion of the needs of the fitness crowd, more and more people choose fitness programs. Among them, badminton attracts the masses with its unique advantages and fitness value. However, mass fitness often lacks scientific exercise guidance, and it is often easy to cause various injuries or strains. Especially among badminton players, there are more and more cases of ankle joint injuries.

With the continuous development of badminton players, their skills, tactics and physical fitness levels are constantly improving. As a competitive and antagonistic sport, the probability of injury of badminton players in the course of sports has begun to increase year by year. This hinders the level of development of badminton to a large extent.

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While enhancing the physical fitness and enjoying the fun of badminton, the appearance of sports injuries has plagued the majority of badminton enthusiasts. Mitija SP found that badminton players' ankle injuries are common, especially in the ankle area. Pathological range of motion is one of the risk factors for injury. Badminton athletes with ankle joint injuries often have clinically reduced ROM. However, there is currently a lack of scientific research on the changes of ankle ROM of badminton players with ankle injury and its correlation with ankle injury. The purpose of his research is to determine the ankle range of motion for badminton players' ankle injuries based on the existing normative values. By calculating the incidence of ankle joint injury, he found out the potential correlation between the ankle joint range of motion and its injury rate [1]. Owoeye o found that the main factor of adolescent injury is sports, and the most frequent occurrence of sports injury is ankle sprain. He assessed how to prevent the harm of ankle sprains in badminton players. Completed the research on the main types of injuries of young badminton athletes. The results showed that among the 2265 study participants, 171 athletes had 188 ankle sprains [2]. Shi W found that with the emergence of the Internet of Things, a new computing model that requires data processing at the edge of the network-edge computing has also emerged. Edge computing can solve problems such as battery life limitation, bandwidth cost reduction, data security and privacy. He introduced the definition of edge computing, and then introduced some case studies of edge computing. It is hoped that this can arouse the attention of the society and promote further research in the field of edge computing [3]. Taleb t found that edge computing is becoming more and more popular. His purpose is to provide cloud computing platform with the edge of wireless network. Cloud computing can reduce the prolongation of mobile terminal user events. More and more scholars pay attention to basic key enabling technologies. In addition, he also analyzed the MEC reference architecture and some cases. He provided a lot of support to relevant personnel. Finally, he summarized the current general activities and further elaborated on cloud computing [4].Mao y found that mobile edge computing has attracted more and more attention. It completes the unloading by dynamically managing the wireless network in order to meet the computing requirements that change with time. Taleb t found that under the constraint of task buffer, the average constraint of wireless mobile network becomes the most secure and effective. The wireless network method is used to complete calculation unloading and bandwidth allocation [5]. He believes that deep learning can be better developed, and it can make the original data information of Internet of things devices obtained from complex factors more accurate. Deep learning is also suitable for edge computing. So he combined the deep learning of the Internet with edge computing. The results show that this method is better than other methods [6]. Jang takes retired badminton players as the research object to investigate the reasons for their retirement and their psychological conditions. It aims to review the process of re-socialization and its experience in social adaptation, and conduct an in-depth analysis of the results. In order to infer the results suitable for the purpose of this research, a qualitative research method was selected. For the research subjects, he selected 7 players who had played in semi-professional teams. They have the experience level of national team members and are currently retired athletes who are adapting to the society. The collected data is transcribed and converted into text. Through the analysis process of classifying and conceptualizing meaning, the following results are derived. First of all, the reasons why badminton players retire include concerns about occupation, injuries and organizational conflicts. Its psychological state includes the sense of freedom of voluntary retirement and the sense of loss of involuntary or complex retirement [7].Mitija SP found that badminton players are vulnerable to ankle injuries. Is a risk factor for injury, including pathological range of motion (ROM). Badminton players in clinical ROM is easy to decline. However, there is still little progress in the scientific research on the ankle injury of badminton players. The purpose of mitija SP study was to calculate the incidence of ankle injury and find out the correlation between them. His research team consists of all members of the

badminton team. Finally, it was found that there are many factors for ankle injury [8]. According to the research of scholars, it is very common for badminton players to be injured. More and more people are discovering athletes' ankle injuries in sports, but the factors are too complicated. Therefore, further research is needed on the factors and preventive measures of badminton players' ankle joint injury.

The innovations of this article are as follows: (1) Through the investigation and research of badminton athletes' ankle joint injuries, this article has discovered the problems that cause athletes' ankle joint injuries. Badminton players can better understand and prevent ankle injuries. (2) This article uses edge calculation method to analyze the relevant theoretical knowledge of badminton players' ankle joint injuries. This article finds out the injury factors of badminton players' ankle joints and promotes the development of badminton sports.

2. Edge Computing Method

2.1. Concept and Structure of Edge Computing

Edge computing is to define the core functions of network, computing, storage and application as a distributed open platform and integrate it into the network edge of the data source [9]. Edge computing is developing rapidly with the development of economy. By integrating the five resources of network, computing, storage, application and intelligence, it forms a network edge computing. The network edge can not only promote the quality of service, but also improve the openness of the network. With the wide application of network technology and information such as wireless sensors and communication microprocessors, edge computing also began to flourish[10]. In terms of computing power and speed, the demand for a large amount of data is also increasing. Cloud computing technology provides users with almost unlimited computing power through multiple high-performance servers in the data center. This is one of the important solutions for big data analysis and processing. Mobile edge computing can effectively solve the problems of high network load caused by the rapid development of mobile Internet and Internet of things [11]. In 5g network, the basic architecture of MEC is shown in Figure 1:

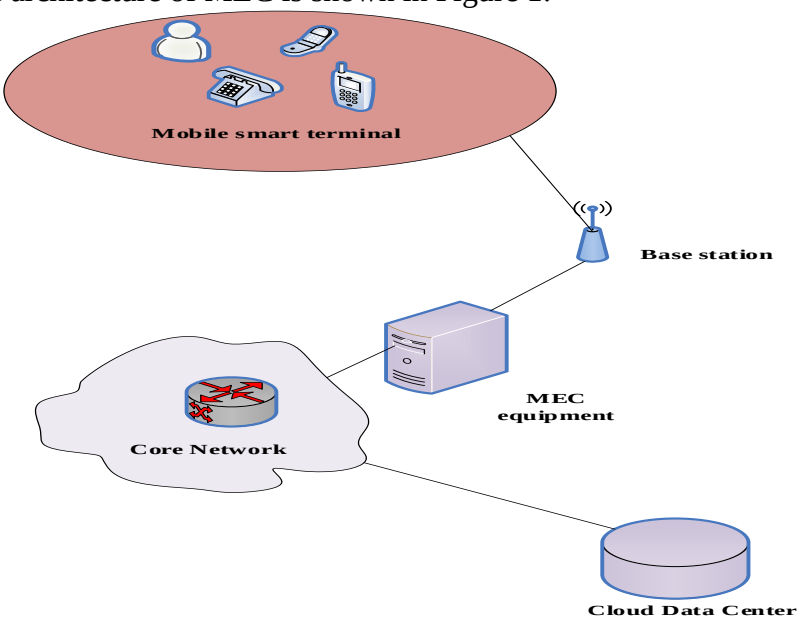

Figure 1. Basic network architecture of MEC in 5G network

As can be seen from Figure 1， the MEC network architecture is mainly composed of three parts: smart terminals, MEC equipment and cloud data center. The cloud data center in the MEC network architecture has the same functions as the cloud data center in the traditional cloud computing network architecture [12]. It is mainly responsible for storing massive data, integrating data information, data mining, and realizing global information sharing.

MEC will enable more emerging mobile applications to develop. It usually consists of five main computing components, as shown in Figure 2：

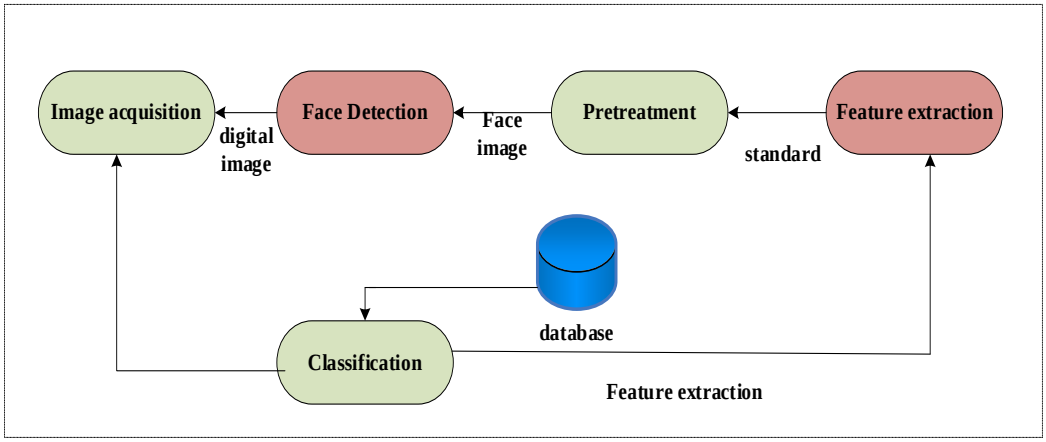

Figure 2. MEC application diagram

Therefore, mobile users can enjoy various benefits brought by MEC, such as reducing delay and saving energy consumption. There is a big difference between the MEC system and the MCC system. Edge computing is easier to implement than other high-performance computing methods, good scalability, and low cost [13]. Edge computing uses a parallel programming model. Compared with serial processing, parallel processing time depends not only on the size of the problem to be solved, but also on the number of processors used. Therefore, the speedup ratio can be defined to measure the performance of parallel computing [14].

2.2. Edge Computing Model

Edge computing is being developed in more and more fields.This advanced computer technology is used in the field of analysis of badminton players' ankle joint injury factors. It realizes the cross-application between different fields and realizes new breakthroughs in the structural field. The proposed method of health monitoring is to build a structural health monitoring system on a cloud computing platform. It can extract effective information from a large amount of data, This is a new direction of edge computing research, which is to improve the speed of monitoring system and reduce the cost of infrastructure [15]. For computing tasks that need to be offloaded to the cloud for execution, the execution of a task requires two steps: offloading and execution. For computing task T_J , among which $j=1,2,3,...,n$, Sending data to MEC server needs to be realized through transmission equipment. If the Tu unit can only upload the data of one calculation task to the MEC server at the same time. The transmission power of Tu unit is represented by p_{tu} , The transmission rate is equation 1:

$$R(p_{tu}) = \omega \log_2 \left(1 + \frac{g_o \left(\frac{Q_0}{Q} \right)^2}{N_o \omega} \right) \tag{1}$$

For a computing task, the following two conditions must be met before it can be executed by the MEC server. First of all, the data of this calculation task has been uploaded to the task queue of the MEC server. Secondly, the MEC server is idle and can perform a new computing task. Let the symbol p_{ready}^{j} and the symbol $\frac{b_{\beta k}}{R(ptu)}$ respectively denote the time when the upload of the calculation task $R(ptu)$ is completed and the time when the execution is completed, then the formula 2:

$$p_{ready}^{j} = \sum_{k \le j} \frac{b_{\beta k}}{R(ptu)}, 1 \le j \le N_2 \tag{2}$$

The factors affecting the task completion time are: calculate the upload completion time of the task; Previously uploaded calculation tasks p_{ready}^{j} has been executed. Therefore, $R(ptu)$ can be expressed as Equation 3:

$$t_{comp}^{j} = \begin{cases} t_{ready}^{j} + \frac{d_{\beta j}}{f_{ser}} \\ \max\left\{ t_{ready}^{j}, t_{comp}^{j-1} \right\} \end{cases} \tag{3}$$

Among them, the symbol f_{ser} is used to represent the computing power of the MEC server, and $\frac{d_{\beta j}}{f_{ser}}$ is the execution time of task t_{ready}^{j}, next, analyze energy consumption [16]. Energy consumption has nothing to do with the specific execution sequence of specific computing tasks. Let the symbol t_{comp}^{j-1} represent the energy required for uploading, then formula 4:

$$e_{ser}^{n_2} = \sum_{j=1}^{n_2} e_{ser}^{b_2} = \sum_{j=1}^{n_2} qtu \cdot \frac{a_{bj}}{r(ptu)} \tag{4}$$

Then, the total energy consumed by all tasks that need to be uninstalled can be expressed as Equation 5:

$$e_{ser}^{n_2} = \sum_{j=1}^{n_2} qtu \cdot \frac{a_{bj}}{r(ptu)}, 1 \le j \le n_2 \tag{5}$$

In the same way, the total time consumed by all tasks can also be obtained as formula 6:

$$t_{ser}^{n_2} = \sum_{j=1}^{n_2} t_{comp}^{j} \tag{6}$$

Cloud computing has many advantages and promotes the development of various computer fields such as the Internet, but it can also combine various conventional algorithms to complete it [17]. At the same time, the MEC server has limited computing resources, that is, it can only meet a certain number of users for computing at the same time, denoted as C. Excessive computing tasks can be offloaded through the backbone network to a remote central cloud server for execution. If the available computing resources of the central server are unlimited, as shown in Figure 3:

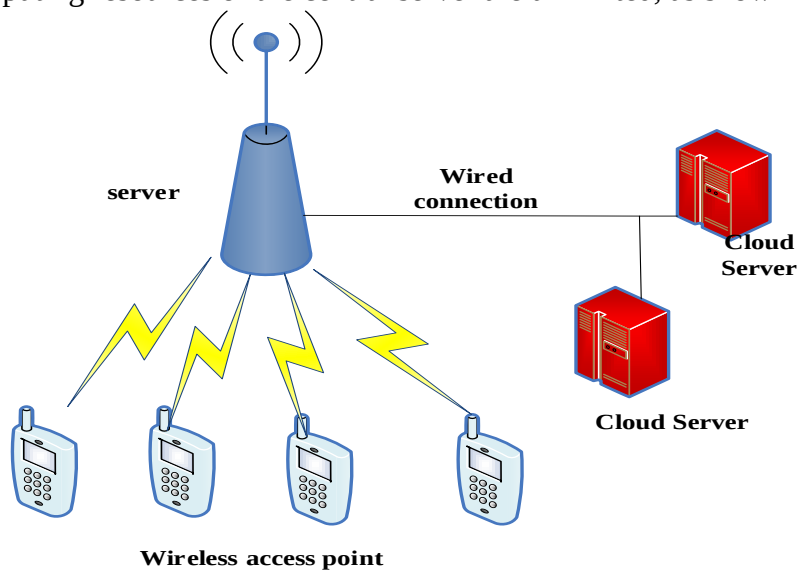

Figure 3. Cloud computing center server

Therefore, as shown in Figure 3, each computing task needs to go through a two-stage offloading decision: (1) On the mobile terminal, first determine whether it is executed locally or on the MEC server. (2) When the computing resources on the MEC server are insufficient, whether to queue in the waiting queue of the MEC server or continue to unload to the remote center server for execution[18].

Without a module generated by task simulation, various usage scenarios cannot be simulated flexibly. The issues that need attention in the mobile edge computing simulation experiment are shown in Figure 4:

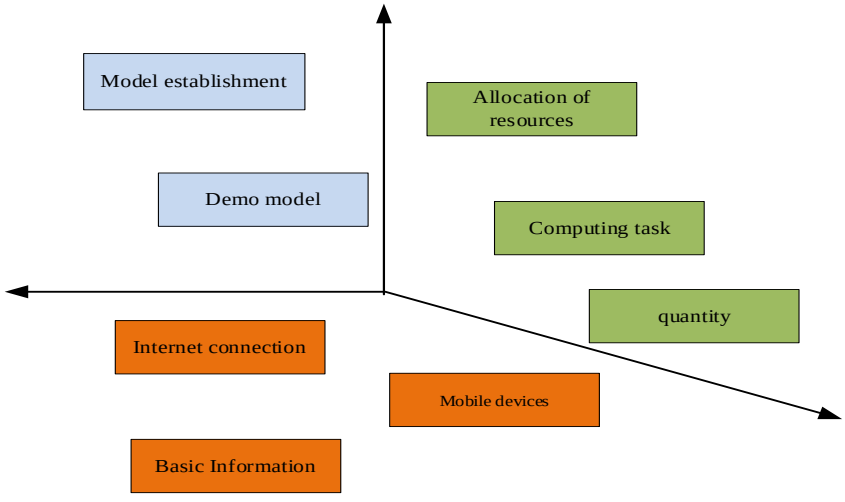

Figure 4. Issues that need attention in mobile edge computing simulation experiments

Therefore, as shown in Figure 4, in the simulation experiment of mobile edge computing, mobile devices and network communications need to be considered. In the proposed simulation tool EdgeSim, these two issues are taken into consideration in a modular form.

During the simulation process, tasks are initialized by random assignment, and the final simulation result is the average value after multiple experiments, as shown in Table 1:

Table 1. Simulation results experimental table

Parameter type	Q	U1	U2	U3	U4	U5	U6	U7	U8
Calculation speed	123	7	7.5	8.7	9.6	9.8	9.5	9.2	7.3
Uplink bandwidth	6	53	76	89	64	86	98	94	47
Downlink bandwidth	6	54	67	75	67	79	86	74	85
Other delays	12	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9

As shown in Table 1, when the delay performance of the three is close, the requested data becomes less. If the number of users increases,because the cloud server is far from the user terminal and the bandwidth is limited, the transmission of large amounts of data to the cloud will cause a larger communication delay.

Therefore, the algorithm in the sd-cen network structure is expressed as Formula 7:

$$Q = \max \frac{Task_{pre}}{C_C} + W_{wf} \tag{7}$$

$\frac{Task_{pre}}{C_C}$ indicates whether there is a subtask distribution relationship between MEC devices. The distribution of subtasks is shown in Figure 5:

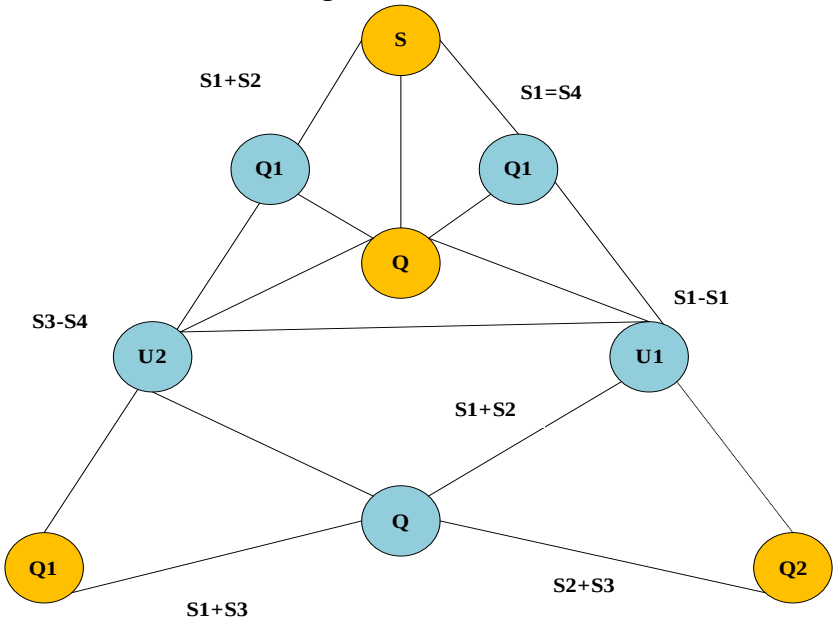

Figure 5. Undirected graph of network equipment

As shown in Figure 5, The goal of minimizing service response delay should be achieved by reducing the extension of service response, using a set of optimal task allocation coefficients δ I to minimize the delay t in equation 7. Therefore, the service response extension can be expressed as formula 8：

$$\min \max\left\{\frac{\delta Task}{c_{v1}}+W_{w_i y_j}\right\}+W_{w_i c} \tag{8}$$

Assuming that the total task Task is accepted by the MEC device, the total service delay t can be obtained from Formula 8 as Formula 9:

$$t(TA)=\max\left\{\frac{task_2}{u_{u1}}+w_{v_i}\right\}+w_{vi} \tag{9}$$

Therefore, the modeling optimization problem is as Equation 10:

$$\min\{u(TA)\}\geq 0 \tag{10}$$

In Equation 10, u represents the search space, which is expressed as Equation 11:

$$U=\prod_{i=1}^{k}[task_{\min},task_{\max}]=\prod_{i=1}^{k}[0,task] \tag{11}$$

2.3. Firework Algorithm

The process of fireworks explosion leads to the generation of fireworks algorithm, in which each fireworks can be regarded as a solution in the solution space [19]. The origin of fireworks algorithm is not only because fireworks with high adaptability will produce more fireworks in the center of explosion. Also because its local search ability is very strong, on the contrary, the fireworks explosion with low adaptability will produce less fireworks. The larger the explosion radius, the higher the global search ability.

The current research on the firework algorithm has shown that the algorithm has good performance in solving various optimization problems [20].

Therefore, this paper uses the firework algorithm to optimize the solution. The main steps of the firework algorithm optimization problem are as follows:

(1) Randomly initialize N positions in the solution space, that is, N fireworks. Where N represents the number of fireworks, and the position of each firework TAi can be expressed as formula 12:

$$TA_i=(task(1),task(2),...,task(n))^T \tag{12}$$

(2) The adaptability of fireworks is calculated by the optimized objective function. The fitness value is used to evaluate the quality of fireworks, which can be evaluated by its adaptability, and can also be used to calculate the explosion radius and explosion spark number of each fireworks.

The explosion radius R_i of each firework TA_i can be expressed as Equation 13:

$$R_i=R\times\frac{t(TA_i)-t_{\min}+\varepsilon}{\sum_{I=1}^{N}t(TA_i)-t_{\min}+\varepsilon} \tag{13}$$

The number of explosion sparks Q_i is formula 14:

$$S_i = Q \times \frac{t_{\max} - t(TA_i) + \varepsilon}{\sum_{I=1}^{N} t_{\max} - t(TA_i) + \varepsilon} \tag{14}$$

(3) When the fireworks explode, the explosion radius will change. The changed position can be added to the Z dimension selected from the fireworks, and then a new explosive spark is born. as formula 15:

$$Z = round(d * v(0,1)) \tag{15}$$

The selected z dimensions form set zs. Therefore, the kth dimension of the explosion spark TA_i in the set C is expressed as Formula 16:

$$TA_{ik} = TA_{ik} + R_i \times v(-1,1), k \in zs \tag{16}$$

If the k-th dimension of the explosion spark TA_i exceeds the range of the feasible solution space, update the value of this dimension as shown in Equation 17:

$$TA_{ik} = TA_{LBK} + |TA_{ik}| \bmod(TA_{vBK} - TA_{LBK}) \tag{17}$$

Where TA_{LBK} and TA_{vBK} respectively represent the upper and lower bounds of the k-th dimension value in the solution space.

(4) First T_g firework TA_i is randomly selected. Secondly, select z dimensions for each of the Mg fireworks according to Formula 17 to perform Gaussian mutation operation. The Kth dimension of the generated Gaussian variation spark TA_i is calculated as Formula 18:

$$TA_{ik} = TA_{ik} \times K(1,1) \tag{18}$$

The diversity of the population needs to be protected. The probability of selection for the diversity of the population is shown in the formula 19:

$$P(TA_i) = \frac{K(TA_i)}{\sum_{TA \in K} TA_i} \tag{19}$$

Among them, k is the current set of individual fireworks, including fireworks, explosion sparks and Gaussian mutation sparks, as shown in Formula 20:

$$R(TA_i) = \sum_{TA \in K} k(TA_i - TA_j) = \sum_{TA \in K} \|TA_i - TA_j\| \tag{20}$$

The computing task diversion strategy using fireworks algorithm needs to obtain the total computing tasks, computing power and communication resources of ECs and mec devices in advance. Introducing a central control node into the network to obtain the information of the whole network is the basic condition for the use of fireworks algorithm. The central node in the edge computing network architecture is the SDN controller. SDN controller can transmit a lot of data. Edge computing can not only solve the problem of 5g network delay, but also be widely used in new fields such as the Internet of things in recent years.Edge computing technology can effectively

solve the problems in cloud computing. The intelligent services provided by edge computing technology include: compilation and connection, real-time business, data optimization, application intelligence, etc. It can also satisfy privacy.

3. Experiment and Analysis

3.1. Experiment and Analysis of Questionnaire Survey

Badminton is a very popular sport for all people. Because of its simple and convenient sports equipment, it is not restricted by the venue, it has high fitness value and the exercise intensity can be adjusted at will. Therefore, it has become one of the sports events with the largest age span and the largest number of participants in the national fitness exercise. It is deeply loved by the masses . With the continuous expansion of participating groups, the popularization level of badminton has been improved to a certain extent.

This article investigates sports injuries with badminton players. This article understands the occurrence of sports injuries of badminton players, analyzes the etiology of general chronic injuries from the perspective of kinematics, and clarifies the factors of ankle joint injuries in badminton sports. Badminton players should take reasonable preventive measures to actively prevent and reduce the occurrence of sports injuries .

A survey of badminton players showed that among the 300 people surveyed, 254 suffered from sports injuries. This article investigates the injured parts of the injured badminton players, as shown in Table 2:

Table 2. Questionnaire on injured parts of badminton players

Injury site	Number of cases	Composition ratio
Impatient	102	61%
Knee	89	10%
Wrist	67	8%
Elbow	54	6%
Waist	36	4.7%
Shoulder	16	4.2%
Thigh	20	4.9%
Foot	12	3.5%
Upper arm	17	3.9%
Calf	6	4.2%
Hand	3	0.5%

As shown in Table 2: Among the injured parts of athletes, the number of ankle injuries is the largest, reaching 102, accounting for 61%. The number of hand injuries was the least, 3 people,

accounting for 0.5%. So it can be known that athletes usually injured the ankle joint, so this issue should be paid attention to.

Then this article investigated 102 people with ankle injuries. The study investigated whether they would have residual symptoms after ankle sports injury, as shown in Table 3:

Table 3. Whether badminton players have residual symptoms after ankle sports injury

Type	Male	Female	Composition ratio
Running hurts	20	18	43%
It hurts to jump	10	5	32%
Weakening of power	8	6	18%
Unable to squat	3	4	10%
Can't run	6	8	8.7%
Unable to walk	2	1	1.2%
Poor balance	12	10	8.9%

As shown in Table 3, among the 102 people with ankle joint injuries, the number of people who could not jump after ankle joint sports injury was the largest, and some even could not walk. It can be seen that the harm of ankle joint injury is still relatively large.

This article divides the gender of badminton players' ankle injuries into male and female parts to investigate. The experiment compared the trend of ankle injuries in 2018 and 2019, as shown in Figure 6:

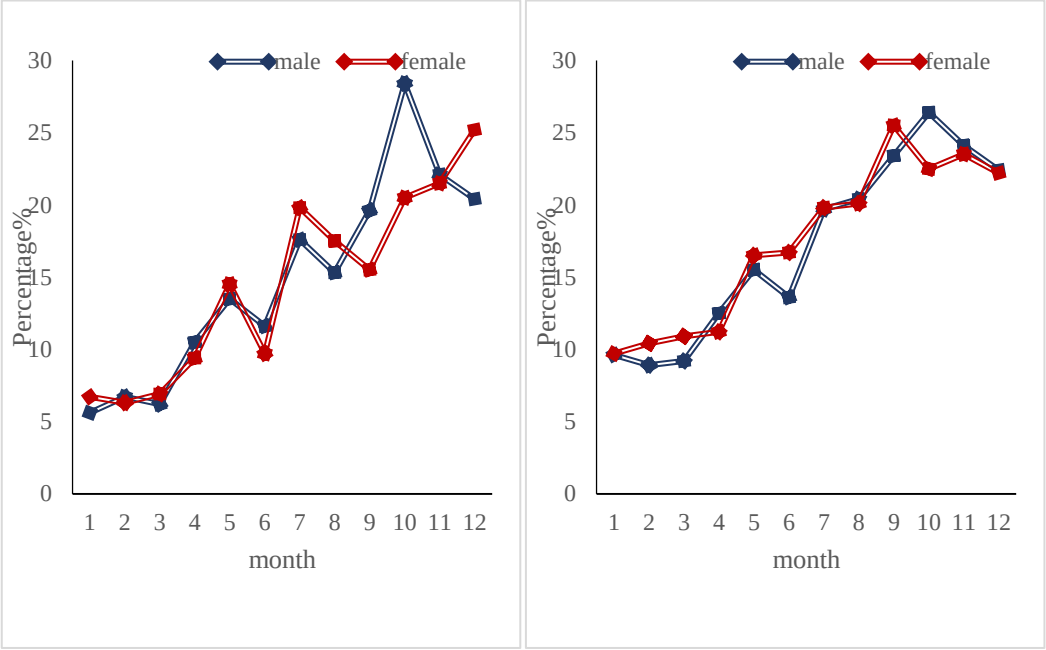

Figure 6. Comparison of trends in ankle joint injuries in 2018 and 2019

As shown in Figure 6, the proportion of ankle joint injuries among badminton players in 2018,

regardless of male or female, is rising. The lowest was in January, reaching 5%, and the highest was in October, when male injuries reached 28%. 2019 has risen a lot from 2018, the lowest January also reached 10%, but the highest was not as high as 2018, only 25%.

3.2. Investigation and Analysis of the Factors of Ankle Sports Injury

Sports injuries may occur randomly or accidentally, but before the injury, there are already many factors related to the injury. Only by fully understanding the causes of ankle sports injuries and studying the causes of ankle sports injuries in badminton players can they effectively prevent sports injuries . This article designs a questionnaire about the causes of badminton players' ankle joint injuries, as shown in Table 4:

Table 4. Questionnaire on the causes of badminton players' ankle joint injuries

Sort	Injury factor	Score
1	Poor physical fitness	176
2	Participate in training with injuries	158
3	Poor awareness of prevention	143
4	Prolonged fatigue	101
5	Partially overburdened	87
6	Hurt	56
7	Technical error	48
8	exhausted	35
9	Inattention	29

As shown in Table 4, it can be seen that there are many reasons for ankle joint sports injury, the most important of which are the following:

(1) Poor physical fitness

In Table 1, the scores for the decline in physical fitness are the highest, which is also the biggest cause of sports injuries to the ankle joints of badminton players. According to statistics, sports injuries caused by decline in physical fitness accounted for 20.1% of the total. This shows that the decline in physical fitness is an important factor causing ankle joint injury.

(2) Participate in training and competition with injuries

Taking the injury to participate in the training competition is one of the important factors that cause the athlete's ankle sports injury. In the survey on athletes' ankle injuries, the causes of ankle injuries in the injury training competition accounted for 14.7% of all injuries, ranking second. The ankle joint sports injury has not healed, and the athletes still participate in training. As a result, the possibility of ankle joint sports injury will increase. This is because the technical movements of badminton are completed in running, jumping, and moving, which puts a great load on the lower limbs of athletes, especially the ankle joints. After the human body is injured, the body will cause a series of side effects both physically and mentally.

(3) Poor awareness of prevention

In the survey on the causes of athletes' ankle sports injuries, the low awareness of prevention ranked third, reaching 12.5%. This shows that badminton players know almost nothing about sports injuries of ankle joints, and lack understanding of the importance of preventing ankle joint sports injuries.

This article compares the trend of ankle joint injuries in 2019 and 2020 through the investigation of badminton players' ankle joint injuries, as shown in Figure 7:

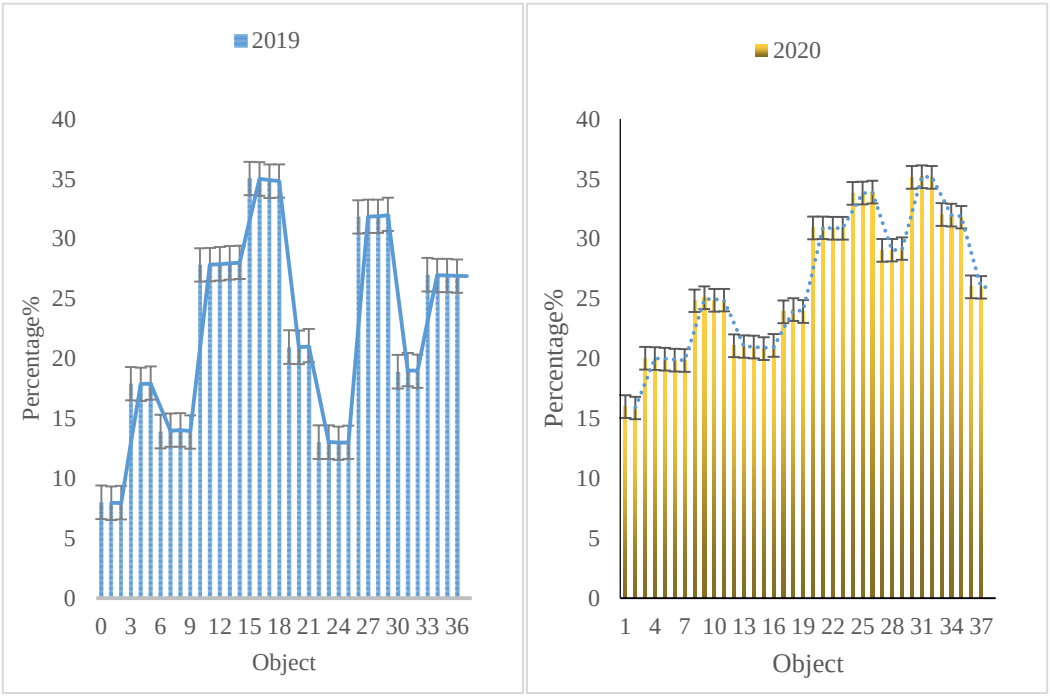

Figure 7. Comparison of trends of ankle joint injuries in 2019 and 2020

As shown in Figure 7, the development trend of the proportion of ankle joint injuries in 2019 is unstable. The lowest is 5% and the highest is 30%. In 2020, the development trend of the proportion of ankle joint injuries is very stable, the lowest is 15%, and the highest is about 35%.

This article investigates the groups of badminton players with ankle injuries, and investigates the measures taken when they are injured, as shown in Figure 8:

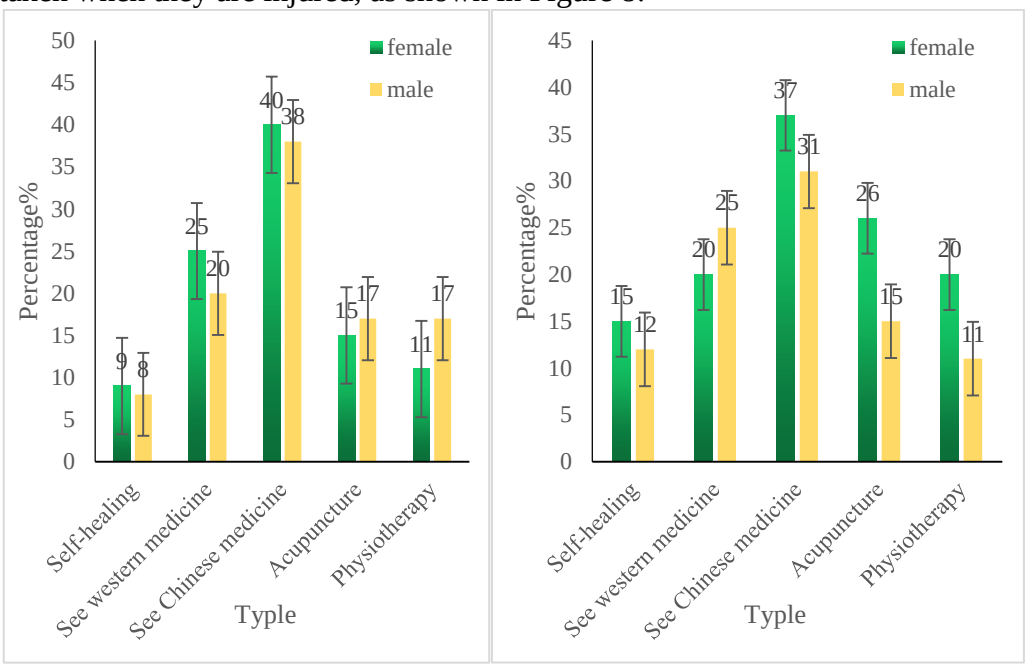

Figure 8. Measures taken by badminton players with ankle injuries

As shown in Figure 8, athletes cannot immediately restore the original level of the court after being injured, which directly affects the training of individuals and teams. Many injured athletes

seek treatment and find that Chinese medicine is the most suitable. There are also many injured athletes who choose acupuncture. This may be because traditional medical treatments are more popular with patients. But physical therapy should also be popularized, which is the fastest way to recover patients.

3.3. Measures to Prevent Badminton Injury

(1) Improve physical fitness

From the experimental analysis in this article, it can be seen that poor physical fitness is the most important factor leading to badminton athletes' ankle injuries. Therefore, the physical fitness of badminton players should be improved, and they should pay more attention to exercise. Badminton is not only a technical training, but also needs to focus on high-quality sports that are vulnerable to injuries. According to different badminton technical requirements, the muscle strength, flexibility and body flexibility should be strengthened and practiced during training.

(2) Learn to master the correct badminton technical movements

Maintaining correct technical movements is the first step to avoid injury. Athletes can watch the instructional video of badminton to learn. If conditions permit, entrust a professional badminton coach to learn technical movements and standardize the movements. Because irregular movements can cause harm, please don't blindly move and don't ignore the importance of technology.

(3) Make adequate preparations before exercise

It is necessary to warm up before exercises. In other words, the pre-exercise preparation activities need to be adequate. Exercise without preheating is particularly prone to cause sports injuries. The form of warm-up activity is determined according to the athlete's physical strength and interest.

4. Discussion

Based on edge computing, this article expounds the related concepts of badminton players' ankle injury factors. This article studies the related theories based on edge computing, and explores how to find out the factors of badminton players' ankle joint injury. And this article discusses the importance of edge calculation to analyze the factors of badminton players' ankle joint injury through the method case of questionnaire survey. In the end, this article takes the edge calculation method integrated into the analysis of badminton players' ankle joint injury factors as an example to explore the correlation between the two.

This article also makes reasonable use of edge computing. With the increasing application of edge computing algorithms and their importance gradually becoming more prominent, many scholars have begun to match the theory of edge computing algorithms with actual application scenarios and propose feasible algorithms. Edge computing algorithm is a kind of mathematical operation. According to this calculation, it is very important to analyze badminton players' ankle injury factors through edge calculation.

Through the questionnaire survey method, this article shows that among the many injury parts of badminton players, the proportion of ankle joint injuries is getting higher and higher. Therefore, combined with the characteristics of edge computing, it is necessary to find out the factors of badminton players' ankle joint injuries and find new prevention methods, so that badminton enthusiasts can correctly develop badminton. Thus it promotes the vigorous development of badminton.

5. Conclusion

Starting from the theoretical knowledge of edge computing and ankle joint injury, this article mainly discusses how to find out the factors of badminton athletes' ankle joint injury based on edge computing, and find new preventive measures. Based on the edge calculation algorithm and the firework algorithm, it can be seen that the edge calculation algorithm is applied to the analysis of the ankle joint injury factors and can obtain better analysis results. It provides a new way of thinking for the analysis of badminton players' ankle joint injury factors. Moreover, its analysis is more accurate, which has certain significance on how to perform correct badminton sports. The edge computing research institute involves a wide range of related scientific fields. Ankle joint injury has also been a problem in recent years, and the author's knowledge has not yet reached this level.

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Data Availability

Data sharing is not applicable to this article as no new data were created or analysed in this study.

Conflict of Interest

The author states that this article has no conflict of interest.

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