

Research Article

Modeling of Legal Protection of Network Broadcasting Right of Sports Events Based on Data Technology

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In order to avoid the influence of uncertain factors on the network broadcasting of sports events, a legal protection model of network broadcasting right of sports events based on data technology is proposed. Based on the network broadcasting right of sports events itself, this paper analyzes the subject and object of the network broadcasting right of sports events, and establishes a “three-step” trial thinking model. Deploy the legal protection risk monitoring micro base station and integrate the data technology gateway module through data technology to complete the data collection of legal protection risk. After data standardization, establish the legal protection risk evaluation index system, obtain the comprehensive score of each risk index of sports events by using the principal component analysis method, and input data technology to realize the legal protection modeling of broadcasting rights. The experimental results show that this method has good risk prediction performance of legal protection of network broadcasting rights of sports events, the predicted value is almost consistent with the actual value, and has good protection effect.

1. Introduction

With the rapid development of Internet technology and data technology, the broadcasting mode of “data technology + sports events” has caused increasing public attention to sports events, but more and more new types of network stealing and infringing behaviors have followed [1, 2]. The legitimate rights and interests of sports event broadcast subjects are constantly violated, so protection from the legal level is an urgent demand for legal construction and healthy development of sports industry at the present stage [3]. China has no legal system for the protection of the broadcasting right of sports events at present. At present, courts mostly regulate the infringement of pirated broadcasting based on relevant provisions of Copyright Law and Anti-Unfair Competition Law [4]. Based on sports programs work properties, however, has not been in the legal system to clear [5, 6], at the same time the current broadcast rights in the copyright law and the right of information

network transmission right is blurred, and timing is unable to regulate network real-time broadcast play two kinds of behavior, the current law system vulnerabilities, not to steal information tort thoroughly effectively combat and regulation [7, 8]. Only the construction of a complete legal protection system of the right to broadcast sports events is the best way to protect the rights and interests of the right holders in all aspects.

In order to realize the legal protection of network broadcasting rights, reference [9] proposed the cancellation of the legitimacy of the single multiplexer policy on the re regulation process of the Indonesian Broadcasting Act in the media framework. It aims to explain the reality behind the negative coverage framework of the single multiplexer policy in the re regulation of law 32/2002 from a broader perspective. In the whole process of discussing the single MUX policy in parliament, building negative news by establishing readers’ attitude towards the single MUX policy option is regarded as one of the efforts to de legitimize the single

MUX policy. Link the negative news framework around a single MUX policy option to the media agenda of the Indonesian broadcasting industry. Using the concept of framework strategy analysis Cappella and Jamieson as analysis tools, this paper analyzes the data of detikcom content as online news media around the single MUX and multi MUX policy debate in the reporting period 2017-2018. Reference [10] puts forward the Judicial Dilemma and Countermeasures of the protection of network broadcasting right of sports event programs. With the rapid development of network technology, civil disputes involving unauthorized network broadcasting of sports event programs occur from time to time. How to protect the network broadcasting right of sports event program producers is based on the induction and sorting of different views of relevant cases in China. The controversy focuses on the identification of the legal attribute of sports events and the selection of corresponding rights. Originality is the difficulty in identifying the legal attribute of sports event programs. How to apply the right to protect the network broadcasting right of sports event programs is a difficult problem in judicial practice. China should take the copyright law as the main body to build a benign legal protection system, adopt the dual protection mechanism of the combination of copyright and adjacent rights, expand the object of copyright, increase the content of information network communication right, video producer right and broadcasting organization right, so as to effectively protect the rights of producers of sports events. Although the above research has made some progress, the application of Internet technology is not mature enough. Therefore, a legal protection model of network broadcasting right of sports events based on data technology is proposed. Data technology is a technology that mainly serves the public and stimulates productivity. It should be widely used in the legal protection of network broadcasting right of sports events. Data technology lies in mastering huge data information, but in the professional processing of these meaningful data. Compared with other technologies, it has obvious advantages. If data is compared to an industry, the key to the profitability of this industry lies in improving the "processing capacity" of data and realizing the "value-added" of data through "processing".

2. Network Broadcasting Right of Sports Events under Data Technology

Data technology is a core technology of information system and a method of computer-aided data management. It studies how to organize and store the legal protection data of network broadcasting right of sports events, and how to efficiently obtain and process the legal protection data of network broadcasting right of sports events. The network broadcasting program of sports events is the subject of special production, and the further processing of the actual competitions can be recognized as works. Mainly for the following reasons:

First, the online broadcast programs of sports events can be copied. If you want to identify it as a work, it must be able to copy, that is, the results produced by intellectual labor

need to be displayed by certain carriers. However, these carriers are not limited to things, as long as they can fix the results. In the network broadcast programs of sports events, the carrier is the signal to broadcast these programs. These programs are transmitted through signals, and then people watch them on TV and other tools. Therefore, this type of live broadcast program can be copied.

Second, the network broadcasting program of sports events is the result of intellectual labor, and is specifically within the scope of art. In fact, art is a new expression of beauty, which shows the basic spirit of the sports field to all the watching subjects through the way of programs. When watching, the audience feel the pursuit of the spirit of the subjects participating in it. A good competition is not limited to the broadcasting of specific competition conditions, but also needs the participation of the production subject to improve the viewing attribute of the whole program, make the whole competition more intense and attract the attention of the audience. The specific process requires the intellectual labor of the production subject, and the production of programs is also the display of achievements. Therefore, it is reasonable to identify the online broadcasting program of sports events as an intellectual achievement.

Third, the network broadcasting program of sports events meets the requirements of originality. The key to distinguish works from other types of intellectual achievements is the problem of originality. Only when sports events network broadcast programs are original can they be recognized as works. Originality also includes different contents, that is, independence and innovation. The so-called independence actually means that the subject making the product carries out intellectual labor independently, not copying the achievements of other subjects; The so-called creativity actually means that the works contain the personal attributes of the subject.

Through the unified organization and management of the network broadcasting right data of sports events, establish the corresponding database and data warehouse according to the specified structure; Using the database management system and data mining system, a data management and data mining application system which can add, modify, delete, process, analyze, understand, report and print the data in the database is designed; Finally, the application management system is used to process, analyze and understand the network broadcasting right data of sports events.

3. Constituent Elements of Network Broadcasting Right of Sports Events

The research on the network broadcasting right of sports events should be based on the network broadcasting right of sports events itself. This paper makes a detailed analysis on the subject, object and content of network broadcasting right of sports events.

3.1. Main Body of Network Broadcasting Right of Sports Events. The concept of the subject of civil legal relations is defined as "a person who participates in civil legal relations,

enjoys civil rights, bears civil obligations and bears civil liabilities". Therefore, it can be considered that the subject of sports event network broadcasting right refers to the legal person who enjoys rights, obligations and responsibilities in the legal relationship of participating in sports event network broadcasting [11–13].

3.1.1. Right Subject of Network Broadcasting Right of Sports Events. The right subject of sports event network broadcasting right refers to the legal person authorized by the sports event organizer or organizer to broadcast sports events publicly, as well as other legal persons authorized by the former to obtain Synchronous Broadcasting Authority. At present, sports event programs basically adopt the production method of separating production and broadcasting, "For example, the IOC has set up its own broadcasting company, hired a professional production team to shoot and record the games, and then sent the signals of sports events to those TV stations and online media that have purchased the broadcasting rights [14, 15]. Modern programs are not only TV programs, but also network programs produced by network media companies themselves. The separation of production and broadcasting in network programs means that network media companies entrust authorized sports events to professional production teams or companies to produce network programs, and then determine whether the programs are broadcast or not and the broadcast time by themselves. The sports event programs thus produced belong to the legal persons who decide to broadcast and arrange the broadcast time of the programs, rather than the technicians who make the post production of the programs [16]. As we all know, making sports events into programs to spread to the audience needs to be supported by sufficient economic capacity. It is often large media companies rather than individual individuals or production teams that are engaged in the broadcasting of sports events. Therefore, the real right subjects of sports event network broadcasting rights are those network media companies that arrange the broadcasting time. Moreover, it is these program broadcasters or network media companies that directly introduce program signals for broadcasting that sign authorization contracts with sports event organizers or organizers. It makes the right subject of sports event broadcasting right gradually become diversified, which plays an extremely important role in promoting the development of sports industry.

As a mature and reliable technology, the completeness of data technology reduces the management alertness of network supervisors, leads to the decline of supervision, and provides criminals with opportunities for illegal monitoring, illegal acquisition and illegal transmission of information [17, 18]. Therefore, for different illegal acts of network information, it is necessary to measure the degree of illegality of the actor under the background of cloud computing. The degree value can be calculated by the following formula:

$$K_i = \sqrt{\frac{(\lambda x - \omega)^2}{u \times \alpha}} \quad (1)$$

In formula (1), K_i represents the violation severity of λ subject when the violation type is i , x represents the number of violation operations, ω represents the severity evaluation index, ω represents the violation operations $\text{th}K_i = \sqrt{(\lambda x - \omega)^2 / u \times \alpha}$ can be abandoned after investigation, and u represents the evaluation parameter, α represents the evaluation weight. Find the severity evaluation index corresponding to the number of illegal operations, and bring the index into formula (1) to obtain the specific evaluation results [19]. When the index is $K_i < 10\%$, the punishment will be lighter according to the degree of violation of the behavior subject; When the index is $10\% < K_i < 25\%$, heavier punishment shall be given according to the degree of violation of the act subject; At that time, $K_i > 25\%$, in necessary or extreme cases, required sentencing.

4. Obligation Subject of Network Broadcasting Right of Sports Events

The obligatory subject of sports event network broadcasting right refers to the natural person, legal person or other organization that has no right to synchronously broadcast sports event information for the purpose of commercial interests. Network media companies, other organizations or individuals without Broadcasting Authority have not signed broadcasting contracts with sports event organizers or organizers, nor paid fees for sports event broadcasting authorization to sports event organizers or organizers. Once their illegal broadcasting behavior is found, it is necessary to close other event broadcasting network windows or network platforms, or immediately stop broadcasting and delete the broadcast related information. If the unauthorized broadcasting behavior is stopped in time and effectively, it will undoubtedly cause significant economic losses to the organizers or organizers of sports events [20]. In the process of broadcasting sports events, compared with the traditional TV broadcasting, the network broadcasting is more high-speed and convenient, and the forms of information dissemination are diversified. The audience can not only watch the live video of the event, but also understand the game information by browsing the live picture and text [21, 22]. For live video broadcasting of sports events, the sponsorship fee obtained through plug-in advertising is the main source of economic income for authorized network media companies. Whether the sponsor invests depends on the broadcast volume and hits of sports event program video websites. If some websites without broadcast authorization directly broadcast sports events, There is no doubt that it will cause network diversion to the broadcast volume and click volume of the original authorized website, resulting in the loss of website visitors who have the right to broadcast sports events, and violating the economic interests of the original authorized network media company [23]. In today's paid viewing of sports events, some sports events need to buy VIP privileges of video websites to watch, which infringes the rights and interests of the original authorized network media companies.

The main body of network broadcasting right of sports events and the main body of TV broadcasting right have the characteristics of regionality. For example, NBA authorizes Tencent as the exclusive official partner of network media in China, while in the United States, it is authorized to NBA League pass. However, the regionality of the subject does not mean that the object of network broadcasting right has regionality. Even abroad, NBA events can be watched through Tencent website or Tencent mobile app.

4.1. Object of Network Broadcasting Right of Sports Events

4.1.1. Scope of Network Broadcasting Right Object of Sports Events. The object of rights refers to the object of civil rights and civil obligations. Therefore, the object of sports event network broadcasting right refers to the network media company that has obtained the network broadcasting license of sports events, and transmits sports event video direct broadcasting, replay and competition information to the public in the form of PC port and mobile port. The transmission path of network broadcasting of sports events is different from that of TV stations. Generally, TV stations need to set up large TV towers to receive and transmit TV program signals, and then connect the signals to each TV by laying optical cable equipment. However, network program signals do not need such large equipment tools. Network broadcasting can be wireless connection, Compared with the cable transmission of TV, it is more convenient. In addition to providing live video to directly watch sports events, network broadcasting can also provide graphic live broadcasting to the audience to let the public know the relevant information of sports events, which is the uniqueness of network broadcasting of sports events [24, 25]. Because the greatest value of sports events lies in real-time, the live broadcast in graphic form also only exists in real-time broadcast sports events, and the post game report of sports events does not belong to this scope. This kind of fixing the game scene and sports event information on the network communication medium is a necessary procedure for network broadcasting and even TV broadcasting. At the same time, it also has the legal significance of copyright. After obtaining the public broadcasting right of sports events, network media companies shoot and record sports events, so that they have better viewing, and finally become the sports event program watched by the audience. In the whole process of program production and dissemination, it condenses the intelligence and skill labor of the main creators and the independent production of investors. According to the results, the object structure diagram of network broadcasting right of sports events is obtained, as shown in Figure 1.

According to Figure 1, the object of the network broadcasting right of sports events is all kinds of sports events held by the organizers of sports events. Since the subject of the broadcasting right is the network broadcaster legally authorized by the organizers of sports events or guilds, it determines that the literal object of the broadcasting right is owned by the authorized network broadcaster through websites, mobile TV Event program signals broadcast by digital television and other network media.

4.1.2. Characteristics of the Object of Network Broadcasting Right of Sports Events. The network broadcasting right of sports events is different from the object of other rights because of its unique characteristics. It has three characteristics: limitation, exclusivity, uniqueness and rarity. The limitation of exclusivity comes from the sports event itself. It is not only the competition between different opponents on the field, but also the sports competitive spirit and sports culture conveyed from it. Therefore, based on its public welfare, the right subject of sports event network broadcasting right has no right to interfere with normal news reports, Therefore, the exclusivity of network broadcasting right is also limited [26, 27]. In addition, due to the limited resources of sports events and the different characteristics of various competitions, the object of network broadcasting right of sports events also has uniqueness and scarcity.

4.2. Establish a “Three-Step” Trial Thinking Model. Identify the subjective and objective behavior of the behavior subject according to the indicators to measure the degree of violation of the behavior subject. The threat to the security of the network broadcasting right of sports events is divided into two aspects. On the one hand, under the influence of the subjective ideology of the user subject, the network users’ active violations [28]; On the other hand, under the influence of non subjective ideology, the user subject is affected by objective conditions, that is, hacker monitoring, malicious web page connection at the attack end, and network users fall into traps due to improper user operation. These are network user information leakage caused by objective factors. Therefore, it is necessary to identify the subjective and objective behavior of the behavior subject, So as to ensure the division of responsibility of actors [29]. Assuming that the subjective behavior is represented by Z_1 and the objective behavior is represented by Z_2 , the relationship between the two can be described as:

$$O_o = \frac{z_1}{z_2} \times \frac{Z_1}{Z_2} \times \ln \frac{1}{K_i} \quad (2)$$

In formula (2), O_o is the illegal degree index of the behavior subject calculated in formula (1), and z_1 is the behavior description parameter; represents the correlation function. According to the above formula, confirm the subjective and objective behavior of the behavior subject, count the network information disclosure subject for this behavior, and analyze whether the network broadcasting right information of sports events is actively leaked by network users or passively leaked by phishing websites and black background websites. From the judicial perspective of trial, after defining sports events as “audio-visual works”, the judge can make a clear judgment according to the following thinking model steps according to the relevant laws, and the problem of different judgments in the same case will be solved.

The first step is to judge whether the place where the review infringement occurs is in the TV environment or the network environment. If it happens in the TV environment, the broadcasting organization right can be directly

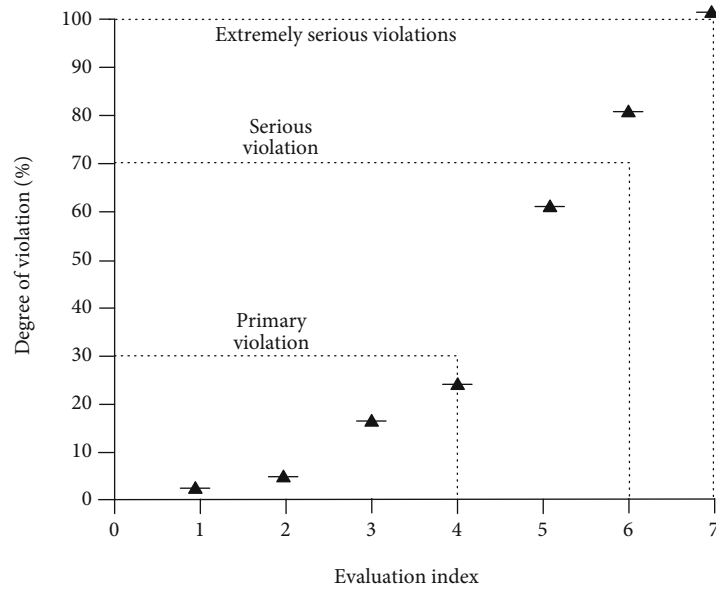


FIGURE 1: Object structure of network broadcasting right of sports events.

cited to regulate the infringement. If it happens in the network environment, it needs to be reviewed in the next step.

The second step is to examine whether the time of infringement in the network environment is at the same time or delayed time point with the video network company that has the right to play sports events [30]. If not at the same time, the network platform that has no right to broadcast sports events broadcasts sports event programs that have been completed and the sports events have been completely recorded, then the stolen broadcasting infringes the on-demand right of the authorized network media company, which is directly regulated by the relevant regulations on the right of information network communication; If the violation is a live or synchronized sports event program, then enter the third step of review.

The third step is to examine whether the object infringed by the infringement under the network environment is the video picture or graphic information in the live broadcast or broadcasting of sports events [31]. If the object of infringement is the former, the duration of stealing broadcasting needs to be calculated. For example, broadcasting the event picture for more than three minutes without obtaining the news reporting right granted by the sports event network broadcaster, or broadcasting the event picture for more than 15 minutes without obtaining the event collection right, which directly infringes the sports event network broadcasting right, It can be regulated directly according to the network broadcasting right.

5. Risk Assessment Model of Legal Protection of Network Broadcasting Right of Sports Events

5.1. Risk Data Collection of Legal Protection of Network Broadcasting Right of Sports Events Based on Data Technology. Establish a wireless sensor network suitable for collecting the risk data of legal protection of network broad-

casting right of sports events by using data technology, and then deploy the micro base station for risk monitoring of legal protection of network broadcasting right of sports events based on the risk monitoring network of legal protection of network broadcasting right of sports events, and adopt the risk data of legal protection of network broadcasting right of collective education events [32]. The topology of data technology is complex and powerful. It can improve the information transmission rate through multi hop transmission, and can complete its own organization and repair. It has good robustness and wide application range.

Establish a risk data monitoring network for legal protection of network broadcasting rights of sports events through data technology mesh network, which mainly includes two parts: initializing network subroutine and node applying for link to the network. There are two network access modes for nodes to apply for link to the network, which are through the coordinator and the existing parent node [33]. Initialize the data technology network, deploy the coordinator at the network node, take the coordinator as the network entry point, the node transmits the connection application to the coordinator, and the coordinator judges the node access based on the network connection status and replies to the application. Data sending and receiving are based on node connection coordinator. Node requests to access the network mainly include: search coordinator, transfer application to join the network, waiting for processing, application for data transfer and reply.

The design core of data technology network is protocol stack, which can determine the logical structure of communication according to the channels and methods of obtaining, transmitting, storing and processing data. In the process of data sending and receiving, the node realizes unlimited data sending and receiving by applying the sending and receiving function in the protocol stack. The coordinator program includes networking, status detection,

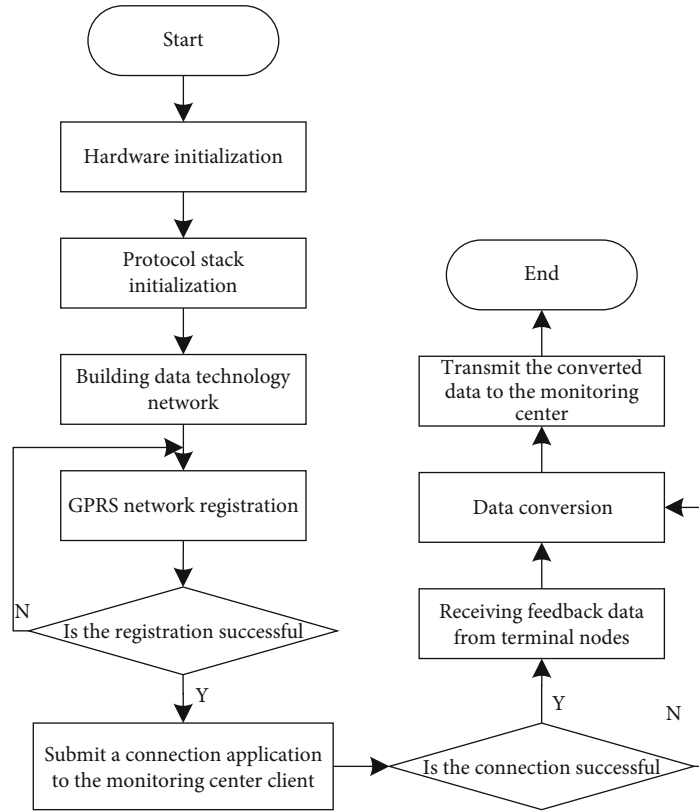


FIGURE 2: Terminal node program flow chart.

network maintenance and information acquisition command sending, etc. After the coordinator starts running, initialize the internal program through the functions in the protocol stack, then build the data technology network and log in to the GPRS network, and send the feedback data to the monitoring center through Ethernet to complete the processing and display the data. The task of the terminal node is to collect the risk data of legal protection of network broadcasting rights of sports events, and periodically transmit the data through the coordinator, as shown in Figure 2 [34].

By deploying the legal protection risk monitoring micro base station of sports event network broadcasting right, the data technology gateway module is integrated, which can distribute the monitoring data of nodes near the event venue, package the legal protection risk monitoring data of sports event network broadcasting right, use the deployed optical fiber to feed back to the monitoring room, and then transmit it to the monitoring management center through Ethernet, Complete online real-time monitoring and risk data collection of legal protection of network broadcasting rights of sports events.

5.2. Risk Assessment of Legal Protection of Network Broadcasting Right of Sports Events. Preprocess the risk data of legal protection of network broadcasting right of sports events collected by data technology wireless network, standardize the data, build the risk evaluation index system of legal protection of network broadcasting right of sports

events, and obtain the comprehensive score of legal protection risk of network broadcasting right of sports events by using principal component analysis.

5.2.1. Establishment of Risk Assessment Indicators for Legal Protection of Network Broadcasting Rights of Sports Events. Take the event risk attribute as the starting point to evaluate the legal protection risk of sports event network broadcasting right. The risk has the characteristics of possibility, uncontrollability and randomness. Its core index is risk probability, which indicates the possibility of risk, the loss degree caused by risk is risk loss, and the risk control level is uncontrollable, which is directly proportional to the risk level. Through expert review, it is preliminarily determined that the evaluation indicators are risk probability, risk loss and uncontrollability. Establish the risk assessment index structure of legal protection of network broadcasting right of sports events, as shown in Figure 3.

According to the risk assessment index structure of legal protection of network broadcasting right of sports events constructed in Figure 3, the risk assessment index system of legal protection of network broadcasting right of sports events is determined, as shown in Table 1 [35].

It can be seen from Table 1 that the risk assessment index system of legal protection of online broadcasting right of sports events includes target layer and criterion layer. The target layer refers to the risk of legal protection of online broadcasting right of sports events; The criterion layer includes risk probability, risk probability and

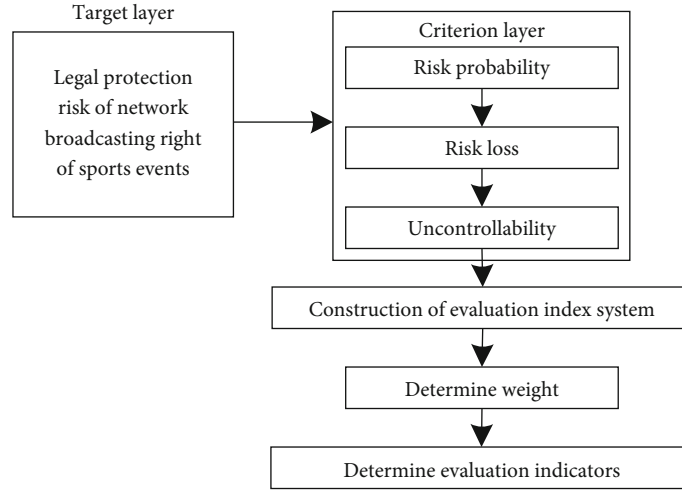


FIGURE 3: Risk assessment index structure of legal protection of network broadcasting right of sports events.

TABLE 1: Risk assessment index system of legal protection of network broadcasting right of sports events.

Target layer	Criterion layer	Primary index layer	Secondary index layer
Legal protection risk of network broadcasting right of sports events A	Risk probability B ₁	Personnel risk C ₁	Staff risk Risks of athletes, coaches and referees
	Risk loss B ₂	Operational risk C ₂	Live audience risk Event schedule risk Traffic risk of event participants
		Facility risk C ₃	Security risk Site quality and safety risk Site lawn and drainage risk
	Uncontrollability B ₃	Economic risk C ₄	Event scale risk Pre competition budget risk Sponsor risk
		External environmental risk C ₅	Natural environment risk Disease food safety risk

uncontrollability. The first level index layer includes personnel risk, operation risk, facility risk, economic risk and external environment risk; The secondary index layer includes staff risk, athlete coach referee risk, on-site audience risk, event schedule risk, event participants' traffic risk, safety guarantee risk, site quality and safety risk, site lawn and drainage risk, event scale risk, pre game budget risk, sponsor risk, natural environment risk and disease food safety risk.

5.2.2. *Principal Component Analysis.* Through principal component analysis, some relevant factors of legal protection of network broadcasting right of sports events can be transformed into non relevant indicators, which can reduce the dimension, process the original indicators and filter duplicate data in the case of a small amount of data loss, highlighting the comprehensive indicators related to the risk of legal protection of network broadcasting right of sports events, with high accuracy and research efficiency.

The principal component analysis steps are as follows:
 (1) Let the study area be , select B_b indicators in this area, and set the sample matrix of this indicator as G_{yb} to obtain

$$G_{yb} = (F_{ij})A_a \times B_b \quad (3)$$

In formula (3), F_{ij} represents the legal protection coefficient of network broadcasting right of sports events, $i = 1, 2, \dots, A, j = 1, 2, \dots, B.A_a$

(2) Let R_u represent the index correlation coefficient matrix, and its eigenvalue meets the condition of $u \geq 1$, then the principal component expression formula is as follows

$$K_i = P_{ej} \times R_u \times G_{yb} \quad (4)$$

In formula (4), K_i represents the principal component, and the normalized eigenvector of the correlation coefficient matrix is P_{ej} .

(3) When the variance contribution rate of the j -th principal component is higher than 50%, only the first n principal component T_1, T_2, \dots, T_n is selected. At this time, n can reflect the information of a initial indicators, and the contribution rate is L_a

$$L_a = \sum_{i=1}^n a_i \quad (5)$$

(4) The comprehensive score of the legal protection risk of the network broadcasting right of the sports event studied is obtained as follows

$$Z = aM_1 + bM_2 + \dots + mM_m \quad (6)$$

In formula (6), M_1 , and represent the eigenvectors of eigenvalues, and , b and m represent the normalized data of initial indicators. According to the comprehensive score of the legal protection risk of the network broadcasting right of sports events, it can reduce the dimension of the original index in the case of a small amount of lost data, effectively filter out the duplicate data, and highlight the comprehensive index related to the legal protection risk of the network broadcasting right of sports events. The accuracy and research efficiency of the comprehensive index are relatively high, so the principal component analysis is completed.

5.3. *Realize the Legal Protection Modeling of Network Broadcasting Right of Sports Events under Data Technology.* In order to realize the modeling of legal protection of network broadcasting right of sports events, the risk characteristics of legal protection of network broadcasting right of sports events extracted by principal component analysis are input to the input layer of data technology, and the prediction results are obtained through its output layer. The neurons of each layer of data technology are only sensitive to the input of feedforward neurons, and the output of neurons of each layer only affects the output of the later layer. Its structure is shown in Figure 4.

According to the specific problems, the number of data technology units is processed and obtained by linear transformation function

$$f(x) = x \times Z \quad (7)$$

In formula (7), the independent variable x represents the number of network inputs of data technology.

Let Q represent the number of hidden layer nodes, W represent the number of input layer nodes, and the number of hidden layer processing units:

$$Q = (W + E)/2 \times f(x) \quad (8)$$

In formula (8), E represents the number of nodes in the output layer. The input data $X = (x_1, x_2, \dots, x_n)$ of data technology is the risk characteristics of legal protection of network broadcasting rights of sports events extracted by principal component analysis. Starting from the input layer,

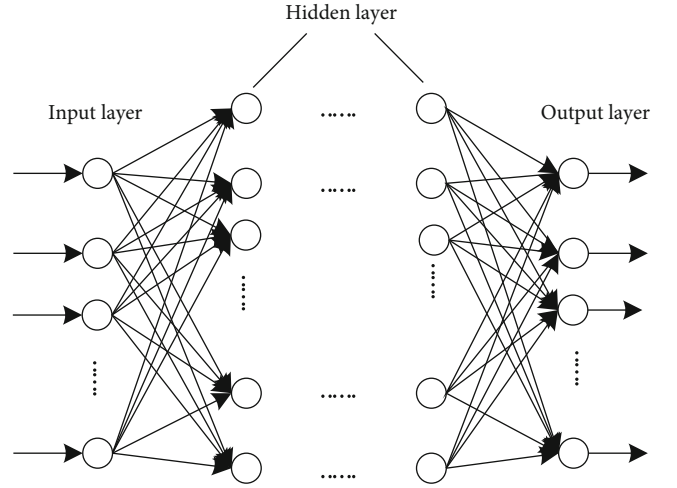


FIGURE 4: Data technology structure.

traverse each hidden layer node to the output layer node, and obtain the output data as follows:

$$V = (v_1, v_2, \dots, v_n) \quad (9)$$

Let A_{in} and B_{in} represent the input and output values of each node of the hidden layer, respectively, and the mapping from input to output is expressed as:

$$A_{in} = V \times \left(\sum_{i=1}^n U_i \times x_i \right) + c \quad (10)$$

$$B_{in} = H_h \times (A_{in}) + c \quad (11)$$

In formulas (10) and (11), U_i represents the input value of each node of the output layer, x_i represents the weight between the input layer and the hidden layer, H_h represents the weight between the hidden layer and the output layer, and c represents the node threshold.

According to the output results, judge the risk level of legal protection of network broadcasting right of sports events. According to the importance of legal protection risk of network broadcasting right of sports events, it is divided into three levels: high, medium and low risk. The discrimination criteria are shown in Table 2 [36].

According to the classification results of the risk level of legal protection of online broadcasting rights of sports events in Table 2, the fair and just online broadcasting behavior is realized, and the responsibility proportion of the responsible subject is determined. The necessary condition of the established model is to confirm that there is a significant correlation. According to the identification results, under the data technology, the legal protection model of online broadcasting right of sports events can be constructed. The specific model structure is shown in Figure 5.

According to the legal protection model of network broadcasting right of sports events in Figure 5, according

TABLE 2: Classification of legal protection risks of network broadcasting rights of sports events.

Importance W	Grade	Risk factor
	High risk (III)	Event scale, event schedule, natural environment and pre event budget
$5\% < W < 10\%$	Medium risk (II)	Transportation of participants
$W < 5\%$	Low risk (I) $W \geq 10\%$	Site environment, auxiliary personnel, disease video, investment unit, safety measures, event judges, on-site audience, site quality and safety

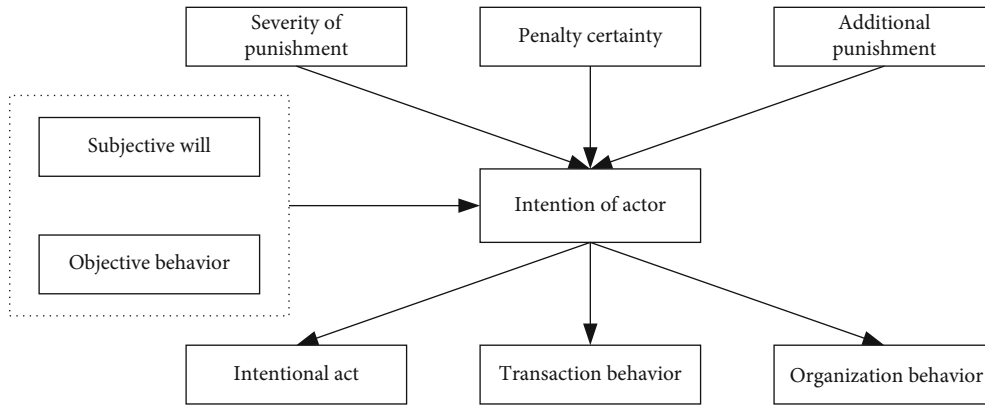


FIGURE 5: Legal protection model of network broadcasting right of sports events.

to the type and responsibility proportion of the responsible person, different punishment mechanisms for network information security of network broadcasting right of sports events shall be established for computer and network hardware developers, computer application websites, network operators and network users, so far, the modeling research on the legal protection of network broadcasting right of sports events under data technology is realized.

6. Experimental Analysis

In order to verify the effect and feasibility of the legal protection modeling of network broadcasting right of sports events based on data technology, an experiment is designed to verify it. Compare the average fitness value of this method, reference [9] method and reference [10] method when modeling the legal protection of network broadcasting right. The results are shown in Figure 6.

By analyzing Figure 6, with the increase of the number of iterations, the average fitness value of the method in this paper tends to be stable after the number of iterations meets the requirements of 22 training times, while the average fitness value of the methods in reference [9] and reference [10] does not tend to be stable when the number of iterations reaches 60. It shows that the average fitness of the modeling method for the legal protection of network broadcasting right of sports events in this paper is good, and has a good performance of legal protection of network broadcasting right of sports events.

The output results of the three methods are used to evaluate the legal protection of the network broadcasting right of sports events in the five competition items of the

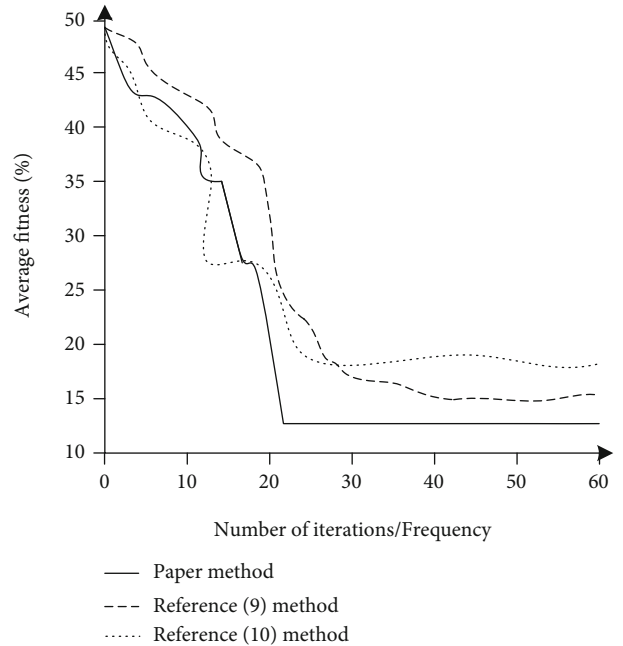


FIGURE 6: Variation curve of average fitness.

experimental object, and compare the legal protection level of the network broadcasting right of sports events protected by the three methods with the actual comprehensive risk level of the experimental event. The results are shown in Table 3.

It can be seen from Table 3 that the evaluation level of legal protection of broadcasting rights of five projects by this

TABLE 3: Comparison of evaluation results of legal protection of network broadcasting right of sports events.

Legal project	Sports law	Copyright law	Anti unfair competition law	Contract law	Sports event broadcasting cooperation agreement
Paper method	III	II	III	I	II
Reference [9] method	III	III	I	I	II
Reference [10] method	II	II	III	I	II
Actual comprehensive risk level	III	II	III	I	II

TABLE 4: Calculation results of weights and scores of alternative measurement indicators.

Primary index (weight)	Secondary index (weight)	Level III index (weight)	Score	
Basic conditions of the event	Event funds	Budget	0.97	
	Venue facilities	Source of funds	0.65	
	Logistic service	Standardization degree of sports equipment	0.84	
	Event funds	Safety of site facilities	0.8	
	Pre competition preparation stage	Venue facilities	Medical security	0.81
			Security work	0.80
			Composition of organization and operation organization	0.8
			Set the competition scheme	0.8
			Event insurance	0.99
			Site layout	0.8
Event organization and management	Event stage	Propaganda work	0.77	
		Coach, team leader and referee meeting	0.17	
		Physical examination of athletes	0.85	
		Performance statistics and announcement	0.94	
		Risk prevention	0.77	
	Final stage of the event	Event evaluation	0.83	
		Event file storage	0.75	
		Number of participants	0.78	
		Record breaking situation	0.23	
		Participant satisfaction	0.83	
Sports culture	Sports system culture	Event management system	0.81	
		Traditional sports events	0.67	
		Athlete code	0.86	
	Sports spiritual culture	Sports slogan and logo	0.98	
		Concept of sports events	0.8	
		Sports ethics	0.75	
	Sportsmanship of athletes	0.95		
	Spirit of fair competition	0.96		

method is consistent with the actual comprehensive risk level, the risk level of copyright law projects and anti unfair competition law projects evaluated by reference [9] method is inconsistent with the actual comprehensive risk level, and the risk level of sports law projects evaluated by reference [10] method is inconsistent with the actual comprehensive risk level. The experimental results show that the risk evaluation result of legal protection of sports event network broadcasting right based on this method is more accurate and has high application value.

After completing the information clustering, this method will obtain the alternative measurement indicators of sports event level, continue to use this evaluation to calculate the weight of each alternative measurement indicator, and calculate the corresponding indicator score, and select the first 15 indicators as the final measurement indicators of the school according to the order of score from large to small. The calculation results of the weight and score of the alternative measurement indicators are shown in Table 4.

According to Table 4, this method can effectively calculate the weight of alternative measurement indicators and solve the scores of each indicator. The scores are sorted from large to small, and the top ten indicators are selected as the final measurement indicators, which are event insurance, sports slogan and logo, fund budget, spirit of fair competition, sportsmanship of athletes, performance statistics and announcement, sportsmanship code Physical examination of athletes, standardization of sports equipment and event evaluation. Experiments show that this method can effectively construct the measurement index of sports event level, and has good protection effect.

To sum up, the modeling method of legal protection of network broadcasting right of sports events based on data technology has good performance of legal protection of network broadcasting right of sports events, high application value and good protection effect.

7. Conclusions and Prospects

7.1. Conclusion. In this paper, the average fitness of the modeling method for the legal protection of network broadcasting right of sports events is good, and it has a good performance of legal protection of network broadcasting right of sports events; The evaluation level of the legal protection of the broadcasting right of the five projects is consistent with the actual comprehensive risk level, and the risk evaluation result of the legal protection of the network broadcasting right of sports events is more accurate; It can effectively construct the measurement index of sports event level, and has good protection effect.

7.2. Prospects. In order to effectively protect the sports event network broadcasting right based on data technology, we must build a complete relevant legal protection system. From the transaction of sports event broadcasting right to the protection of sports event program signals, we need to implement it through legislation or amendment, so as to truly safeguard the legitimate rights and interests of sports event organizers and TV network media institutions. In the future, more in-depth research can be carried out from the following aspects:

- (1) The network broadcasting right of Sports Events belongs to intellectual property rights, and it is classified into different rights due to different national legislation, such as "copyright" in the United States and "audio-visual communication enterprise right" in France. In contrast, in China, due to the unclear definition of the legal status of sports event programs, there are different opinions on the right attribute of sports event network broadcasting right, and the regulation of illegal broadcasting has always been on the edge of the law. The next work should be studied
- (2) The research on the network broadcasting right of sports events needs to clearly define the definition of the network broadcasting right of sports events, and then start from the source of the network broadcasting right of sports events, and gradually analyze the attribute and structure of the network broadcasting right of sports events, which can be further studied in the future
- (3) The great economic value contained in the network broadcasting of sports events directly affects the development of sports industry. Its broadcasting process not only condenses the labor achievements of producers and communicators, but also promotes sports culture and competitive spirit, which is related to the national image. Therefore, legislation should be adopted to clarify the status of sports events and establish "network broadcasting right". At the same time, relevant judicial protection and law enforcement protection should also be combined to create a benign atmosphere for the dissemination of sports events on the Internet

Data Availability

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation."

Conflicts of Interest

The authors declared that they have no conflicts of interest regarding this work."

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