

Research Article

The Analysis of Internet Commercial Judicial Based on Big Data Alliance and Mining Service Process Model

Zhao Zhonglong¹ and Wang Hongliang ²

¹Law School, Yunnan University, Kunming 650000, Yunnan, China

²Electric Power School, Kunming University of Science and Technology, Kunming 650000, Yunnan, China

Correspondence should be addressed to Wang Hongliang; 2016123450@jou.edu.cn

Received 28 May 2021; Accepted 30 June 2021; Published 9 July 2021

Academic Editor: Shaohui Wang

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At present, a series of economic structural changes created by the network economy have brought challenges to the entire economy and society. Traditional social commerce has also suffered severe tests under the background of network economy and global integration, and the rise and development of network commercial activities lack legal constraints. Based on the Big Data technology, in view of the characteristics of data mining services, this paper expands and changes the traditional model and proposes the Big Data alliance data mining service process model. Moreover, this paper uses intelligent decision-making theory and knowledge reasoning methods to construct a fast-responding, service-reusable, and intelligent service model to realize the scalability of data mining services. In addition, this paper constructs system function modules according to the requirements of Internet commercial judicial data mining and verifies the performance of the system constructed in this paper through experimental analysis. The research results show that the system constructed in this paper has certain practical effects.

1. Introduction

With the development of network technology and the popularization of network applications, the geographical boundaries of civil communication are becoming more and more blurred. What follows is that the number of foreign-related civil disputes under the network environment has increased year by year. Whether the civil relationship is foreign-related is the primary issue that the dispute resolution agency has to resolve. It will affect the subsequent trial procedures and substantive laws to be applied to the case and in turn affect the distribution of rights and obligations of the parties. Therefore, determining the criteria for determining the foreign-related nature of civil relations in the network environment is of great significance for the correct resolution of foreign-related civil disputes in the network environment and safeguarding the legitimate rights and interests of the people at the time [1].

By comparing the theoretical research on commercial behavior in different countries, it can be found that

commercial behavior is a concept belonging to the civil law system. According to the “German Commercial Code,” commercial behavior is all behaviors performed by merchants for business. There is no unified commercial code in our country, and there is no clear legal concept of commercial behavior [2].

The rapid development of information technology has led to continuous innovation and upgrading of production, circulation, and consumption models. The emergence of the Internet has promoted the vigorous development of the network economy. Moreover, the emergence of the network economy has changed the characteristics of the traditional economy from the foundation, and the series of economic structural changes created by the network economy have brought severe challenges to the entire society. Throughout the history of mankind, the agricultural revolution, the industrial revolution, and the current network economic revolution have greatly changed the social exchange mode and the evolutionary level of civilization. At the same time, traditional social commerce is also undergoing severe tests

in the context of network economy and global integration. However, since the legislative content of the commercial law has not yet involved the network economy, most of the activities of the network economy are not regulated by the commercial law. Therefore, it is necessary to propose corresponding improvement and innovation measures for the regulation of the network economy by the commercial law, and it is necessary to put forward corresponding commercial regulatory measures and methods from the aspects of commercial legislation, commercial customs, and commercial law value in combination with the characteristics of the network economy [3].

A series of economic structural changes created by the network economy have brought challenges to the entire economy and society. Moreover, traditional social commerce has also suffered severe tests in the context of network economy and global integration, and the rise and development of network commercial activities lack legal constraints. Therefore, studying the rules of commercial law under the network economy can provide a research foundation and theoretical preparation for the improvement and innovation of the entire commercial legal regulation. This is the theoretical significance of this topic.

The rise and development of the network economy have led to new production and transaction models. At the same time, the network economy has also had a multifaceted impact on social life. At present, my country's commercial law mainly focuses on the regulation and management of the traditional economic model and lacks the commercial legal regulation of the network economy. Only when the commercial law restricts and regulates the development of the network economy in a timely manner, can it ensure the sound and orderly development of the network economy. In view of the characteristics of the network economy and the current status of the development of the network economy in China, this paper combines the differences between the network economy and the traditional economy to study and explore the construction of the commercial law legislation, customs, and value rules of the network economy suitable for China's national conditions, which can provide a basis for future commercial law reforms and commercial judicial activities.

Therefore, this paper analyzes Internet commercial justice with the support of Big Data technology and obtains corresponding data support through data mining. Moreover, on this basis, this paper analyzes the current Internet commercial justice and puts forward the corresponding points of this paper to provide a theoretical reference for the follow-up Internet commercial justice.

2. Related Work

On the theoretical research of the network economy, some experts and scholars have conducted more in-depth research, and a group of scholars have made many useful explorations on the research of the network economy [4]. Since commercial law is a law with a long history, along with the needs of transactions, the society has transaction rules and customs, and commercial law has also developed as a

result. The earliest commercial law is in the form of business practices and business customs [5]. Taherkhani and Pierre [6] regulated the network economy from the aspects of business entities and commercial behavior according to the transaction characteristics of the network economy.

Judging from the status quo of foreign research, it can be seen that scholars have their own emphasis on the research of the network economy and the research directions also cross each other. Karthick [7] analyzed the unique externality characteristics of the network economy and compared it with traditional economies of scale and emerging industries to further analyze the impact and benefits of the development of the network economy on the information industry. Foreign scholars' research on the General Principles of Commercial Law focuses on commercial behavior and merchant's leading legislative model, and explores which legislative model is more suitable for the regulation of commercial transactions. The main basic system research has reached a high level [8].

In the era of Big Data, data resources have become an important resource in people's production and life. The huge "knowledge wealth" behind it has an important impact on global economic development, consumer activities, and corporate activities. How to fully tap the value of data resources has attracted the attention of a large number of scholars.

According to the characteristics of data mining technology, data mining models can be divided into predictive modeling, clustering, data induction, historical modeling, discovering changes, and deviations, and according to data types, data mining can be divided into numerical mining, text mining, web mining, graphics and image mining, audio mining, and video mining [9]. Li et al. [10] proposed an adaptive parallel mining algorithm that overcomes the problem of large error rate in the image segmentation process through an adaptive control method. Aiming at the large amount of original data in the enterprise database, Cheng et al. [11] proposed a data segmentation algorithm to analyze customer behavior and solve the optimization problem in data segmentation. Mydhili et al. [12] believed that predicting this behavior is very important to the market and competition in real life and built a three-stage predictive model for the problem of customer churn. In the first stage, a *K*-means algorithm for data filtering and a multilayer perceptual artificial neural network (MLP-ANN) for prediction are proposed. In the second stage, a hierarchical clustering method is proposed to realize the clustering of data. In the third stage, a self-organizing map with MLP-ANN was designed to achieve accurate prediction of user churn. Mirmozaffari et al. [13] used virtualization and Big Data-related technologies to build a Hadoop-based Big Data platform and proposed an improved apriori parallel algorithm to solve the problem of data mining cloud services for small- and medium-sized enterprises. Starting from the application requirements of Big Data, Chegini et al. [14] analyzed the application scope and potential application value of Big Data with the characteristics of distributed and liquid technology. Aiming at the insufficiency of traditional algorithms to efficiently process massive social network data

and accurately analyze user influence in a Big Data environment, Nandi et al. [15] comprehensively considered the degree of user connection and activity. Aiming at the problem of frequent itemsets mining in Big Data, Parker and Barnard [16] adopted the idea of vertical datasets to arrange the datasets vertically and proposed a parallel mining algorithm for FP-Growth frequent itemsets based on the Spark framework. Aiming at the problem that the efficiency and accuracy of traditional parallel collaborative filtering algorithms cannot meet the needs of data analysis in terms of the efficiency and accuracy of data mining, Smiraglia and Cai [17] improved the traditional parallel collaborative filtering algorithms and verified them in terms of running time and recommendation accuracy.

3. Internet Commercial Judicial Mining Algorithm Based on Big Data Alliance Standardized Data Mining

The Big Data alliance standardized data mining service, as a virtualized service product, is different from general material products. What is shown in the virtual product market is that different standardized data mining service products have different effects for different judicial objects. The calculation formula is as follows [18]:

$$U = a_i Q_i - \frac{Q_i^2}{2} - p_i^s Q_i. \quad (1)$$

Among them, U is the service utility function of Big Data alliance users, Q_i is the demand function of standardized data mining service product i , a_i is the market capacity of standardized data mining service product i , and p_i^s is the service price of standardized data mining service product i .

In the Big Data transaction market environment, the demand for services of alliance data mining service demanders will be affected not only by price factors but also by factors such as the quality of service products. Therefore, on the basis of the traditional demand function, the standard data mining service demand function of the Big Data alliance is as follows [19]:

$$Q_i = a - p_i^s + \frac{\lambda_i}{\sqrt{e_i}}. \quad (2)$$

Among them, λ_i is the granularity of standardized data mining service products. The smaller the granularity, the deeper the mining and the richer the service product content. e_i is the cost of data mining. Therefore, under the premise of satisfying the maximum utility of judicial objects, the standardized data mining service profit function of the Big Data alliance is as follows:

$$\pi_i = p_i^s Q_i - \frac{\lambda_i e_i^2}{2}. \quad (3)$$

When we take the first-order derivative of p_i^s , we can get

$$\frac{\partial \pi_i}{\partial p_i^s} = \alpha - 2p_i + \frac{\lambda_i}{\sqrt{e_i}}. \quad (4)$$

Due to

$$\frac{\partial^2 \pi_i}{\partial p_i^{s2}} = -2 < 0, \quad (5)$$

the Big Data alliance standardized data mining service profit function π_i is a strictly concave function about p_i^s , and it has a maximum value. It can be found that the optimal service price when the utility of the service demander is maximized is [20]

$$p_i^s = \frac{\alpha e_i + \lambda \sqrt{e_i}}{2e_i}. \quad (6)$$

In summary, service providers can conduct scientific and commercial justice based on the data market capacity and mining costs of the current standardized data mining service product i , so as to maximize the utility of service demanders and improve their satisfaction.

According to the characteristics of the customized data mining service of the Big Data alliance, this paper draws on the strategic thinking of commercial justice and combines the user service quality to construct a commercial justice model based on the customized data mining service of the Big Data alliance. For users of customized data mining services of the Big Data alliance, according to their specific service requests, the establishment of a service quality utility function is as follows:

$$U_i(p_i, t_i, c_i) = U_0 - \alpha p_i - \beta t_i - \lambda c_i. \quad (7)$$

Among them, $U_i(p_i, t_i, c_i)$ represents the user's service quality utility function for customized data mining service content i , which is determined by three parameters p_i , t_i , and c_i . p_i represents the price of customized service i , t_i represents the service response time of customized service i , and c_i represents the service stability of customized service i . U_0 represents the initial utility of the user. α , β , and λ are, respectively, expressed as the coefficient of service price, service response time, and service stability, which represent the user's preference for price, time, and stability. Meanwhile, we set $\alpha + \beta + \lambda = 1$.

For the customized data mining task force of the Big Data alliance, the service cost function is as follows [21]:

$$C = G + \sum_{j=1}^n h_j. \quad (8)$$

Among them, h_j represents the partial cost of each member after the service task is decomposed and G represents the collaboration cost of each member organization. Therefore, according to the centralized commercial judicial strategy, the price function of the customized data mining service of the Big Data alliance can be defined as follows:

$$P_i^C = C \times [1 + \text{profit}(i)] \times U_i(p_i, t_i, c_i). \quad (9)$$

When users submit personalized demand tasks through the Big Data alliance data mining service platform, the platform will split the submitted service demand tasks according to the data mining process. It can be divided into

data collection subtasks, data processing subtasks, data analysis subtasks, and data interpretation subtasks, which are jointly completed by a task team formed by data resource enterprises, data technology enterprises, and data application enterprises with matching service capabilities. The task decomposition process is shown in Figure 1.

After the Big Data alliance data mining service platform decomposes the customized data mining service tasks, task groups need to be formed according to the needs of each subtask. The core idea of the formation is that the core abilities of the members of the task team meet the needs of users for service cost, time, and reliability as much as possible on the basis of meeting the needs of the subtasks. Therefore, the formation process of the service team can be regarded as the process of solving the optimal solution under certain conditions. Therefore, this paper draws on the ant colony algorithm and uses its powerful search and solving capabilities to form task teams through the ability vectors of alliance members.

The core idea of the ant colony algorithm is to simulate the process of forming a customized service task group for data mining through the behavior of ants looking for food. That is to say, the user demand is regarded as the starting point for the ants to find food (that is, the starting point S). Then, a number of alliance members who meet the needs of the subtasks are combined into services (that is, the process of setting up task group A) to jointly complete the overall task of customized data mining services (that is, target point T). In this way, the problem of data mining customized service composition can be transformed into the problem of selecting alliance member companies that meet the requirements and have better QoS from the starting point S to the target point T , as shown in Figure 2.

We set the Big Data alliance's customized data mining service task group set to be a nonempty set, that is, $A = (A_1, A_1, \dots, A_i)$. Then any A_i has a capability vector $B = (b_{i1}, b_{i2}, b_{i3})$, which is used to quantitatively describe the size of the subtask capability of customized data mining services that A_i can provide. Among them, the value of b_{i1} is expressed as the size of the service cost capability of A_i , the value of b_{i2} is expressed as the size of the service response time capability of A_i , and the value of b_{i3} is expressed as the size of the service reliability capability of A_i . Therefore, the

service capability $B^A = (b_1^A, b_2^A, \dots, b_j^A)$ of task group A is the sum of the capability vectors of m alliance member companies. Among them, B^A is the standard for judging the quality of the customized data mining service provided by task group A . The larger the value of B^A , the more positive the service combination is by the users. At the same time, it can also indicate that the quality of the service is better and the efficiency of completion is higher. The distance calculation formula of its ability vector is as follows:

$$B_p - B_q = \sqrt{\sum_{p=1}^i \sum_{q=1}^i (b_{pm} - b_{qm})^2}. \quad (10)$$

Among them, $m, n \in J$. Therefore, the problem of customized service composition of Big Data alliance data mining can be transformed into the process of solving the optimal solution of alliance service composition ability based on ant colony algorithm. That is to say, through the ant colony algorithm, the ants select the alliance member companies that meet the requirements to form the task group A with the largest B^A value.

When selecting task groups, the ability vector set of alliance members is constructed, and then the ant colony algorithm is used to solve the optimal solution. We assume that X ants are placed on a given position of n members of the alliance, and each ant will move according to the following principles:

- (1) It moves to other alliance members with a certain probability according to the pheromone concentration on the path between members.
- (2) When the ants select alliance members, they will no longer select the alliance members that they have passed in this cycle as the next moving direction.
- (3) When the movement from one alliance member to another alliance member is completed or all n alliance members have been visited once, the residual information concentration on the path of the ants must be updated. Then, the probability that the ant k located in the alliance member i at time t selects the alliance member j as the task team member partner is as follows:

$$P_{ij}^k(t) = \begin{cases} \frac{[\tau_{ij}(t)]^\alpha [\eta_{ij}(t)]^\beta}{\sum_{ij \in \text{allowed}_k} [\tau_{ij}(t)]^\alpha [\eta_{ij}(t)]^\beta}, & j \in \text{allowed}_k, \\ 0, & \text{otherwise.} \end{cases} \quad (11)$$

Among them, $\tau_{ij}(t)$ is the concentration of residual information on the path connecting member i and member j at time t , $\eta_{ij}(t)$ is the heuristic information transferred from member i to member j , and $\eta_{lr}(t) = 1/D(ij, lr)$. $D(ij, lr)$ represents the distance between the capability vector of member firm ij and member firm lr , and a is the information heuristic

factor. It is used to express the relative importance of the trajectory, and reflects the importance of the pheromone accumulated by the ant during the movement process to the ant's path selection. The larger the value is, the more likely the ant is to choose the path taken by other ants, which indicates that the collaboration between the ants is stronger. β is the

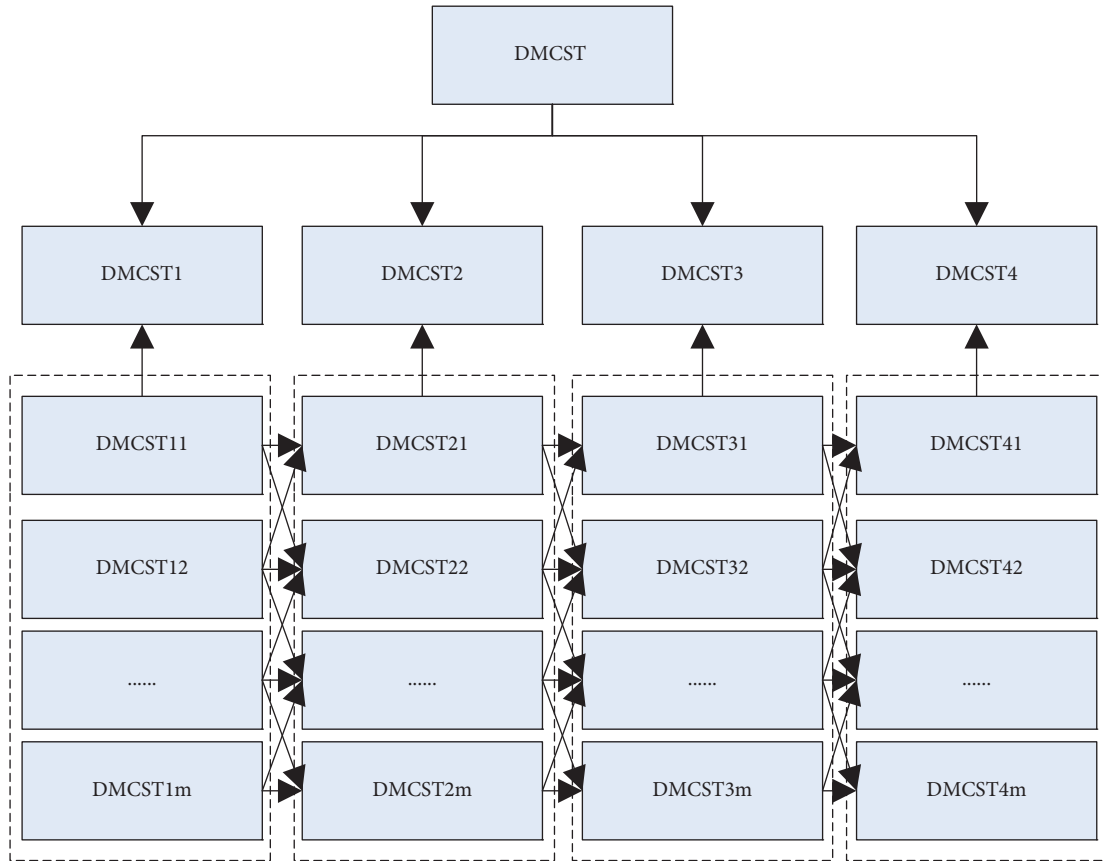


FIGURE 1: The decomposition process of customized data mining service tasks.

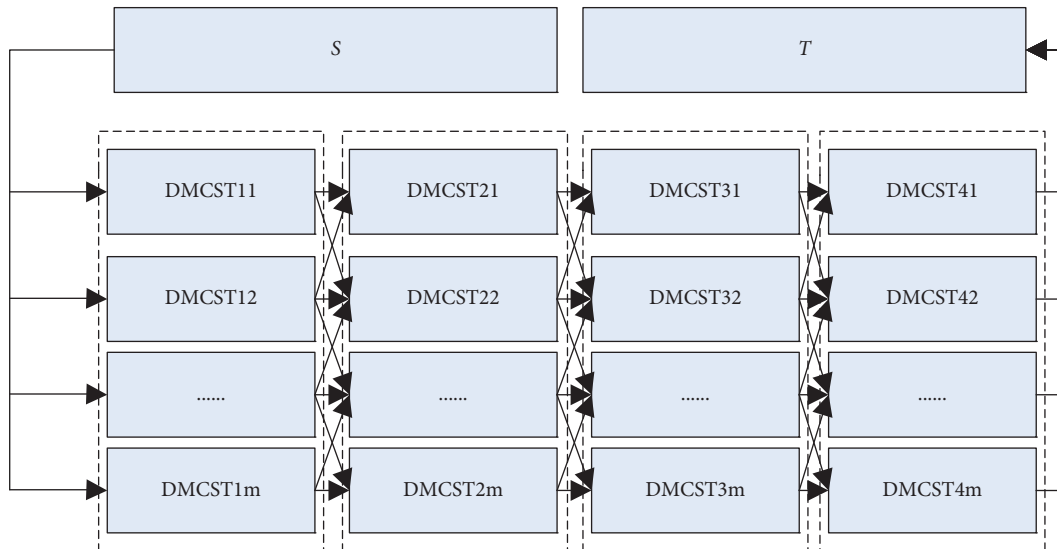


FIGURE 2: Customized service task team formation process model.

expectation heuristic factor, which is used to express the relative importance of expectation, and reflects the importance of the heuristic information in the ant's choice of path during the movement. The larger the value, the closer the state transition probability is

to the greedy rule. $Allowed_k$ is used to represent the alliance member space that the ant is allowed to select in the next step. In order to avoid multiple visits to the same alliance member, each ant saves a list $tabu_k$, which is used to record the alliance

members that ant k has visited so far, and the list will be dynamically adjusted along with the iteration process.

In order to avoid the phenomenon of excessive residual pheromone causing the residual information to cover the enlightening information, after each ant completes a step or completes a traversal search for all alliance members n , the residual information of each node should be updated. Therefore, the amount of information on path (i, j) at time $t + 1$ can be adjusted according to the following formula:

$$\tau_{ij}(t+n) = (1-\rho) \times \tau_{ij}(t) + \Delta\tau_{ij}(t). \quad (12)$$

Among them, $\Delta\tau_{ij}(t)$ is the sum of pheromone left by all ants on path (i, j) , which is defined as follows:

$$\Delta\tau_{ij}(t) = \sum_{k=1}^X \Delta\tau_{ij}^k(t). \quad (13)$$

Among them, ρ is the pheromone volatilization factor and $1-\rho$ is the residual coefficient of the information. In order to prevent the infinite accumulation of pheromone, the value range of ρ is usually $\rho \in [0, 1)$. $\Delta\tau_{ij}(t)$ represents the amount of information left by the k th ant on the path in this cycle, and its calculation formula is as follows:

$$\Delta\tau_{ij}^k(t) = \begin{cases} \frac{Q}{L_k}, & \text{if the } K\text{th ant passes through path } (i, j) \text{ in this cycle,} \\ 0, & \text{otherwise.} \end{cases} \quad (14)$$

Among them, Q is a constant, which is used to represent the total amount of pheromone released by the ant after completing a complete path search. L_k represents the total length of the path taken by the k th ant in this cycle. In summary, the task team member selection process based on ant colony algorithm is shown in Figure 3.

Step 1. Initialize the parameters. The current number of iterations is N_c , the maximum number of iterations is $N_{c\max}$, the amount of initialization information for path (i, j) is $\tau_{ij} = C$, and C is a constant.

Step 2. X ants are placed at the starting position S , and we set $k = 0$, and k represents the k th ant in this cycle $k = (0, 1, 2, \dots, M-1)$, and the initial position is placed in the tabu table.

Step 3. When the number of iterations increases by 1, it can be recorded as $N_c = N_c + 1$.

Step 4. When the number of ants increases by one, it can be recorded as $k = k + 1$.

Step 5. According to the state transition probability $P_{ij}^k(t)$, the next alliance member is selected, and the last visited alliance member is put into the tabu table at the same time. The following members follow the same procedure until they

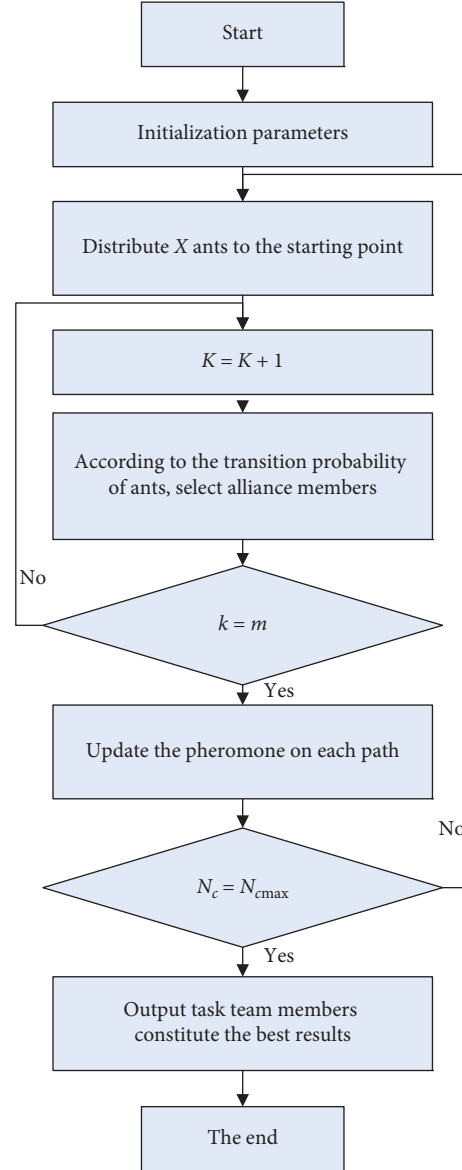


FIGURE 3: Flowchart of ant colony algorithm.

find the end point T , and then the tabu table of the ant who completed the search task is cleared.

Step 6. If the number of ants is equal to X , the algorithm goes to Step 7; otherwise, it returns to Step 4.

Step 7. The algorithm updates the pheromone concentration on each path.

Step 8. When the number of iterations reaches $N_{c\max}$, the algorithm returns the final optimal result as the result of the task team members, and ends the loop. Otherwise, it goes to Step 3 to continue the iteration.

According to the principles of comprehensiveness, balance, and applicability of the data mining model evaluation index system, this paper constructs the evaluation index system of the data mining model of the Big Data

alliance with a two-tier structure of overview level and detailed level from the three aspects of model correctness, value, and cost, as shown in Figure 4. Although data mining models have different types (classification models, clustering models, and predictive models), the evaluation indexes that summarize the model performance can be abstracted from the model performance and results, which are called evaluation summary factors in this paper. The evaluation factors corresponding to the evaluation summary factors are called evaluation details factors in this paper, which are used to solve the evaluation problems of different types of data mining models. Among them, the calculation formulas of the detailed factors are as follows:

- (1) The expressions of classification accuracy, hit rate, and coverage rate are as follows:

The class precision is given by

$$\text{class precision} = \sum_{i=1}^m \frac{TC_i}{AS}. \quad (15)$$

Among them, TC_i is the number of samples where the predicted classification result and the actual classification result are completely correctly divided for i category and AS is the total number of samples participating in the test.

The hit rate is given by

$$\text{hit rate} = \sum_{i=1}^m \frac{TC_i}{PS_i}. \quad (16)$$

Among them, PS_i represents the total number of predicted samples belonging to category i .

The coverage is given by

$$\text{coverage} = \sum_{i=1}^m \frac{TC_i}{FS_i}. \quad (17)$$

Among them, FS_i represents the total number of category i in the actual prediction sample.

- (2) The accuracy, precision, recall, and F -measure of the clustering results can be expressed by a confusion matrix as follows:

The accuracy is given by

$$\text{accuracy} = \frac{TP + TN}{TP + TN + FP + FN}. \quad (18)$$

The precision is given by

$$\text{precision} = \frac{TP}{TP + FP}. \quad (19)$$

The recall is given by

$$\text{recall} = \frac{TP}{TP + FN}. \quad (20)$$

The F -measure is given by

$$F_1 = \frac{2P \times R}{P + R}. \quad (21)$$

- (3) The expressions of prediction mean square error, root mean square error, and average absolute error are as follows. If it is assumed that the predicted value is $\hat{y} = \{\hat{y}_1, \hat{y}_2, \dots, \hat{y}_n\}$ and the true value is $y = \{y_1, y_2, \dots, y_n\}$, then

The mean square error is as follows:

$$\text{MSE} = \frac{1}{n} \sum_{i=1}^n (\hat{y}_i - y_i)^2. \quad (22)$$

The root mean square error is given by

$$\text{RMSE} = \sqrt{\frac{1}{n} \sum_{i=1}^n (\hat{y}_i - y_i)^2}. \quad (23)$$

The mean absolute error is given by

$$\text{MAE} = \frac{1}{n} \sum_{i=1}^n |\hat{y}_i - y_i|. \quad (24)$$

- (4) The lift degree and running time of the model: the lift degree of the model is mainly evaluated from the lift effect of each detailed factor of the model, and the promotion value of each detailed factor is accumulated and summed, and finally the lift degree of the model is obtained. The running time is to evaluate the model based on the specific running time of the model.

In summary, the model comprehensive evaluation formula P is as follows:

$$P = \alpha \text{Correct} + \beta \text{Value} + \lambda \text{Cost}. \quad (25)$$

Among them, α , β , and λ are the weight of correctness, value, and cost, respectively.

4. Internet Commercial Judicial Analysis System Based on Big Data

This system was developed in the context of commercial business. The main goal is to realize the uploading, receiving, processing, feedback, and updating of commercial registration, filing, administrative license approval, and other related information by the commercial registration authority and the administrative license approval department, realize the interdepartmental data interconnection and information sharing, and improve the approval efficiency. At the same time, it is used to realize real-time disclosure of the data of various approval nodes to the society and promote the orderly development of registration, licensing, and supervision of commercial entities, so as to ensure the implementation of the reform of the "licensing before certification" system for commercial registration. The overall business flowchart is shown in Figure 5.

The following is mainly an analysis of the use case of sending and receiving data, and the data need to be encrypted when sending data. When receiving data, CA authentication is performed on the identity of the sender,

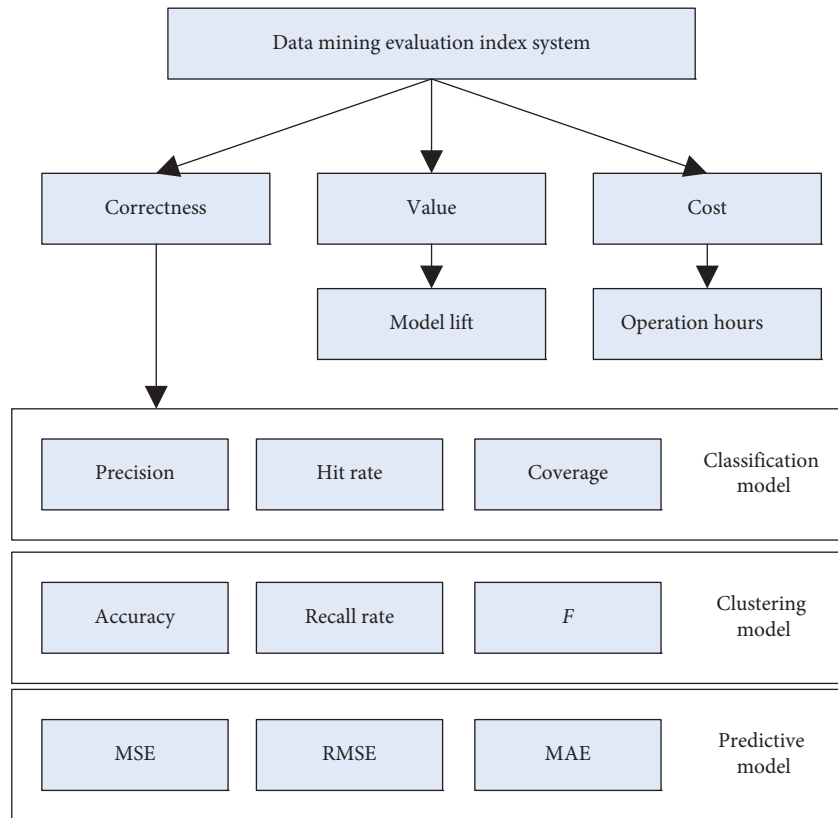


FIGURE 4: Data mining model evaluation system.

and the received data are decrypted. In this process, each data is called back to ensure data synchronization. Moreover, every link in the process is recorded, and abnormal links are automatically processed. The use case diagrams for receiving and sending are shown in Figures 6 and 7, respectively.

The data transmitted from the commercial registration system of the Bureau of Industry and Commerce to the commercial registration management function module of the Administrative Service Center is commercial registration information. The specific data transmission process is shown in Figure 8. The Commercial Registration System of the Bureau of Industry and Commerce, as the client, calls the WebService interface provided by the new commercial registration management information system of the Administrative Service Center to transmit data to the server. After the server receives the data, it analyzes and verifies the data, and finally, the data are loaded into the commercial registration management function module database.

The data transmitted to the self-built system of each department is the administrative license approval information and complaint information that each department needs to accept. The specific data transmission process is shown in Figure 9. The new commercial registration management information system serves as the server side and pushes the data to the client side through WebService. The client side analyzes and verifies the data after receiving it and finally loads the data into the department self-built system of the specific accepting unit.

The data transmitted from the commercial subject information publicity module to the commercial registration management function module is complaint information. The specific data transmission process is shown in Figure 10. First, the commercial subject information publicity module is used as the client to call the WebService interface provided by the commercial registration management function module and transmit the data to the server. After the server receives the data, it analyzes and verifies the data and finally loads the data into the database of the commercial registration management module.

The system adopts an Internet-based five-tier architecture model. The first tier is the supervision client web browser, the second tier is the Web server, the third tier is the business logic tier, the fourth tier is the data access tier, and the fifth tier is the database tier. This system will adopt the method of WebService call to realize the data interaction between the commercial registration management information platform (government extranet) and the commercial registration system of the Industrial and Commercial Bureau (government extranet), data interaction between the commercial registration management information platform (government extranet) and the self-built system of various departments (government extranet), and the data interaction between the commercial registration management information platform (government extranet) and the commercial subject information publicity platform (public network). The commercial registration management information platform (government extranet) provides the

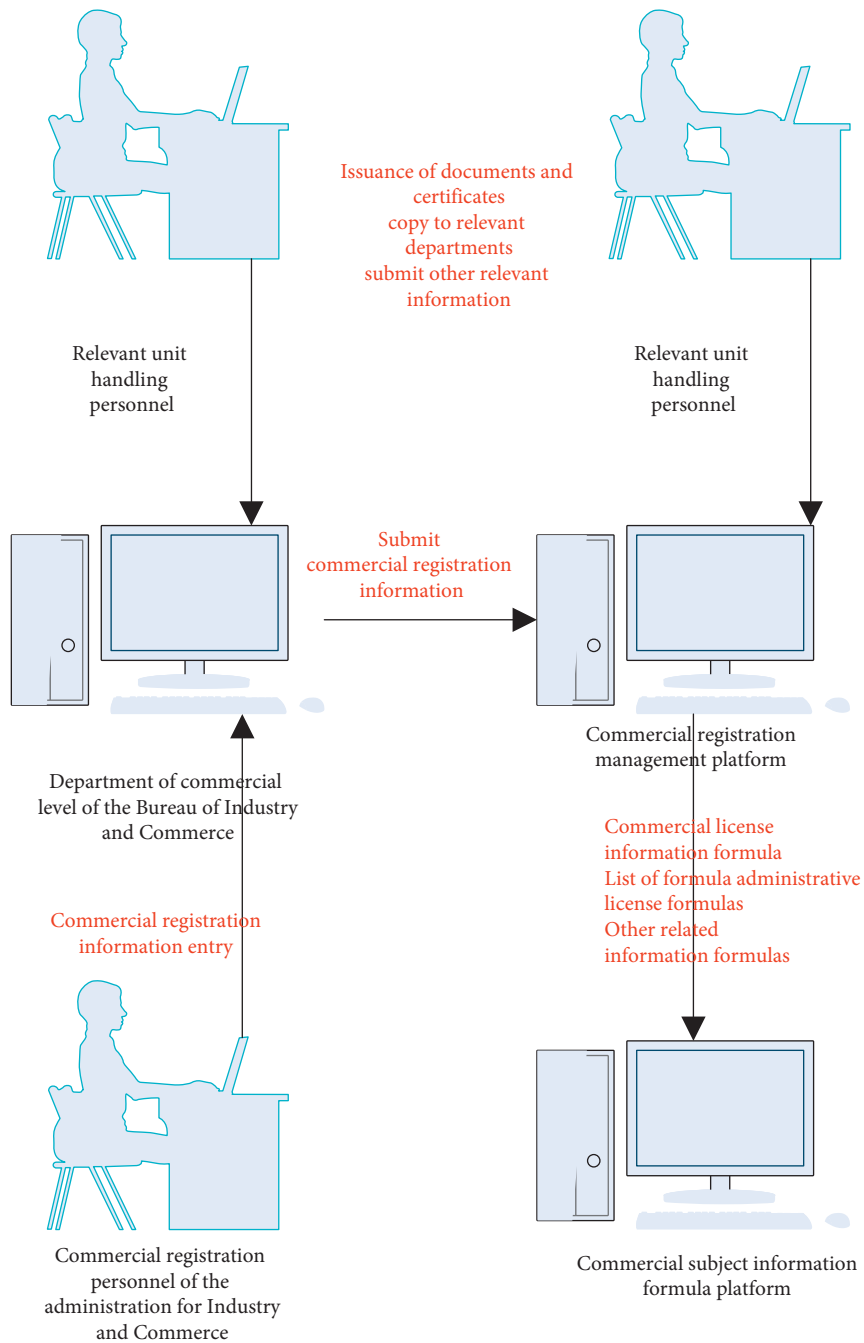


FIGURE 5: Overall business flowchart.

standards required for unified interaction, including data message format (detailed description of operation) and transmission protocol and location. This information is used by the Commercial Registration System of the Bureau of Industry and Commerce (Government Extranet), the self-built system of various departments (Government Extranet), and the commercial subject information publicity platform (public network). The network topology diagram of the system physical architecture is shown in Figure 11.

When constructing the project system structure, it is designed and implemented in strict accordance with the idea of modular planning and hierarchical construction. On the one hand, this kind of planning can better show all the contents of all levels included in the project. On the other hand, it can also clearly show the good adaptability of the designed system to the development of basic technologies at all levels and fully prove the scalability and sustainable development of the system. The more important point is that

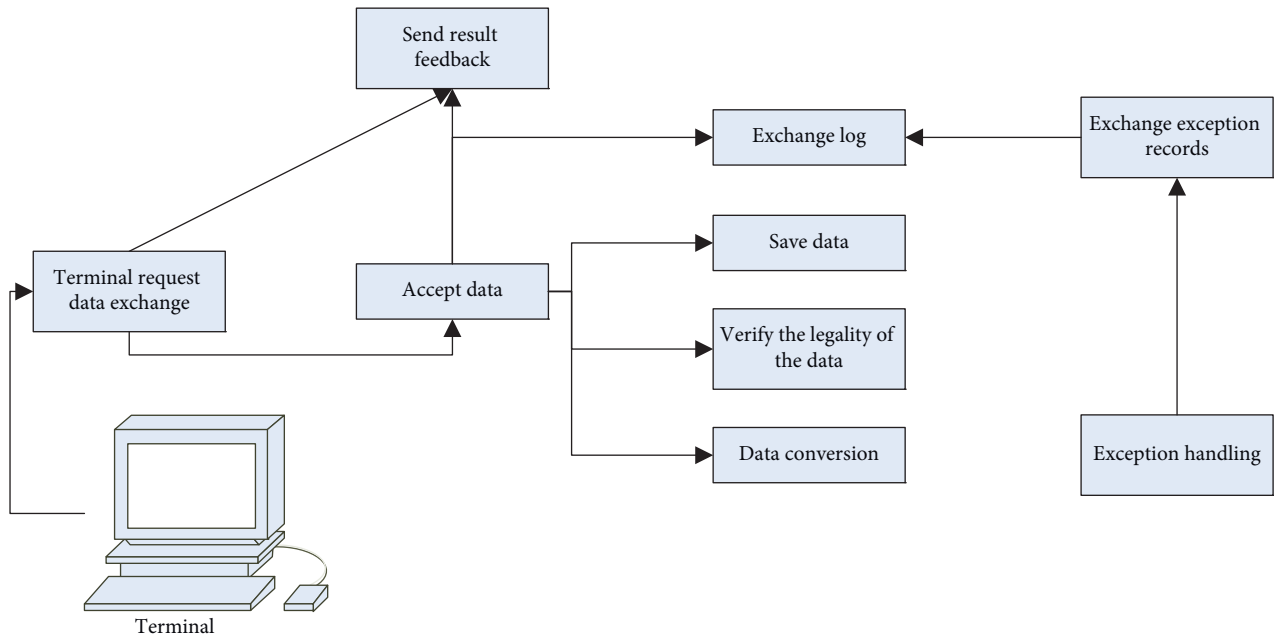


FIGURE 6: Use case diagram of receiving data in Webservice mode.

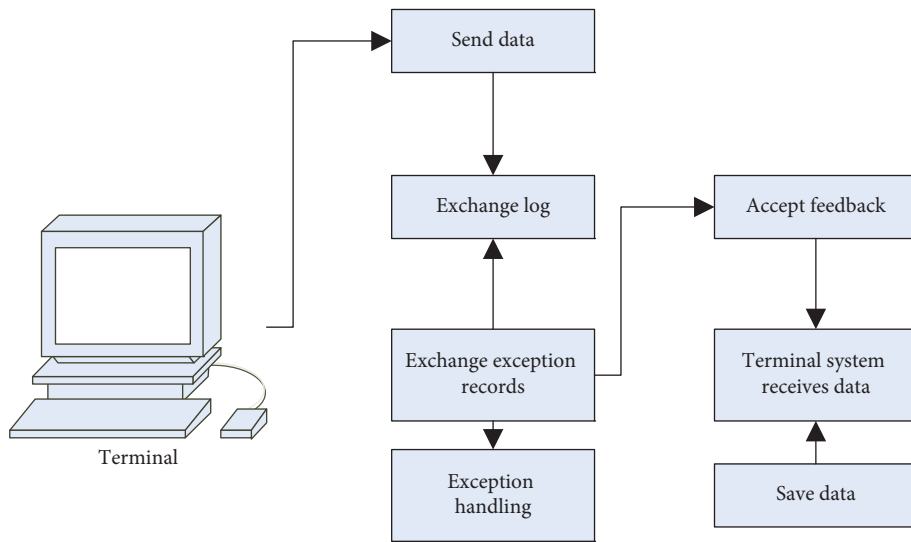


FIGURE 7: Use case of sending data in Webservice mode.

this layering can clarify the decomposition of project tasks, which is conducive to concurrent implementation of project construction tasks on the basis of predefined interface definitions and shorten the overall construction cycle. The system software structure is shown in Figure 12.

After constructing the above system, data can be collected through this system, and on this basis, data mining can be conducted on Internet commercial judicial data mining, and then the effect of the system constructed in this paper will be evaluated through experimental analysis.

5. Data Mining and Analysis of Internet Commercial Judicial Based on Big Data Analysis

After this paper combines Big Data mining technology to construct an Internet commercial judicial system based on data mining, it uses this system to conduct data mining on the current Internet commercial judicial to verify the reliability of the system. First, this paper analyzes the effectiveness of the data mining algorithm for the system

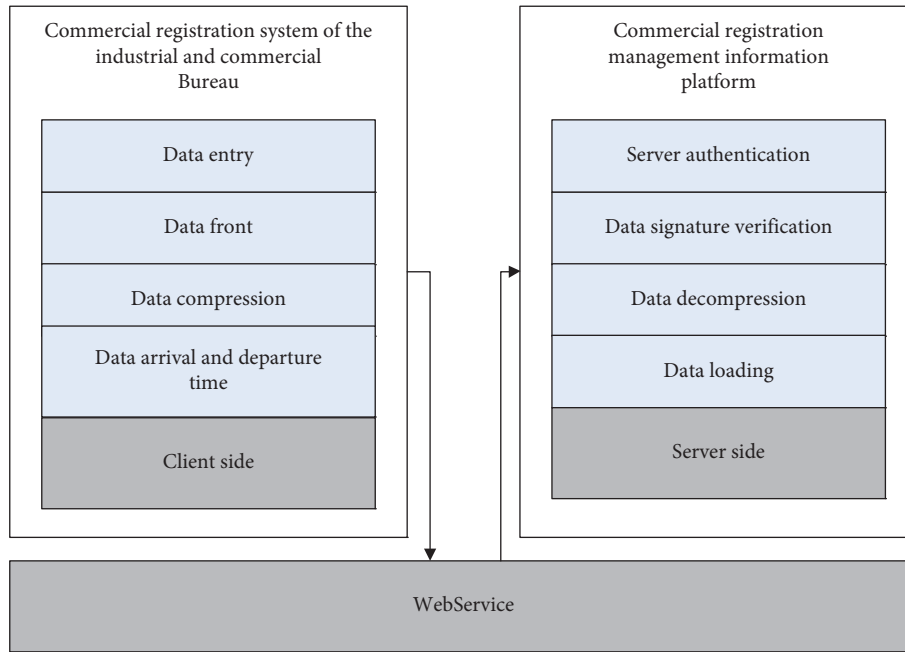


FIGURE 8: Schematic diagram of data transmission from the commercial registration system of the Bureau of Industry and Commerce to the commercial registration management platform.

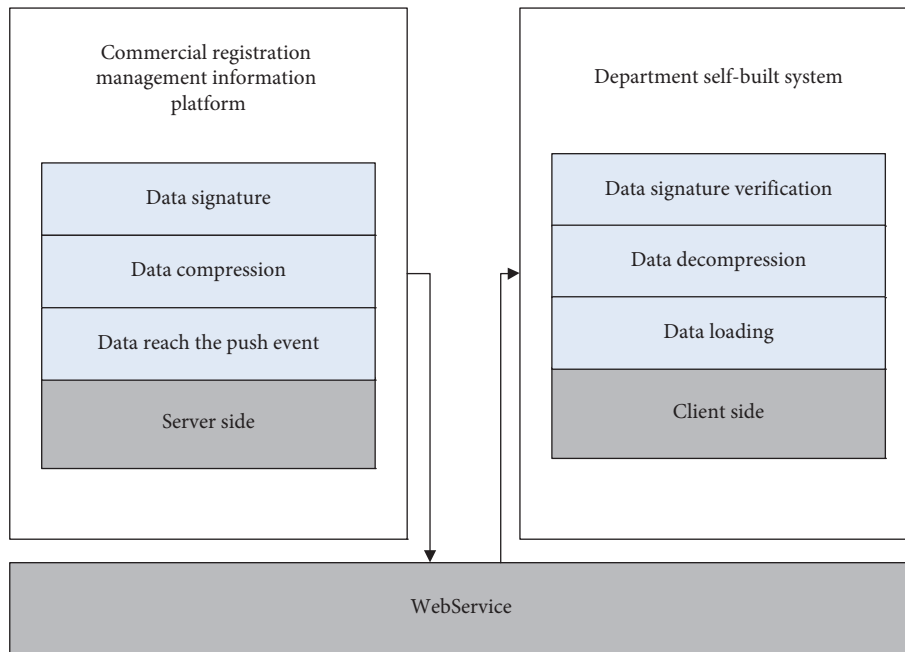


FIGURE 9: Schematic diagram of data transmission from the commercial registration management platform to the self-built systems of various departments.

constructed and evaluates the mining effect through 91 sets of data. The results are shown in Table 1 and Figure 13.

From the above analysis results, it can be seen that the Internet commercial judicial analysis system based on Big

Data constructed in this paper is better in commercial judicial mining. On this basis, this paper conducts system decision-making effect evaluation, and the results obtained are shown in Table 2 and Figure 14.

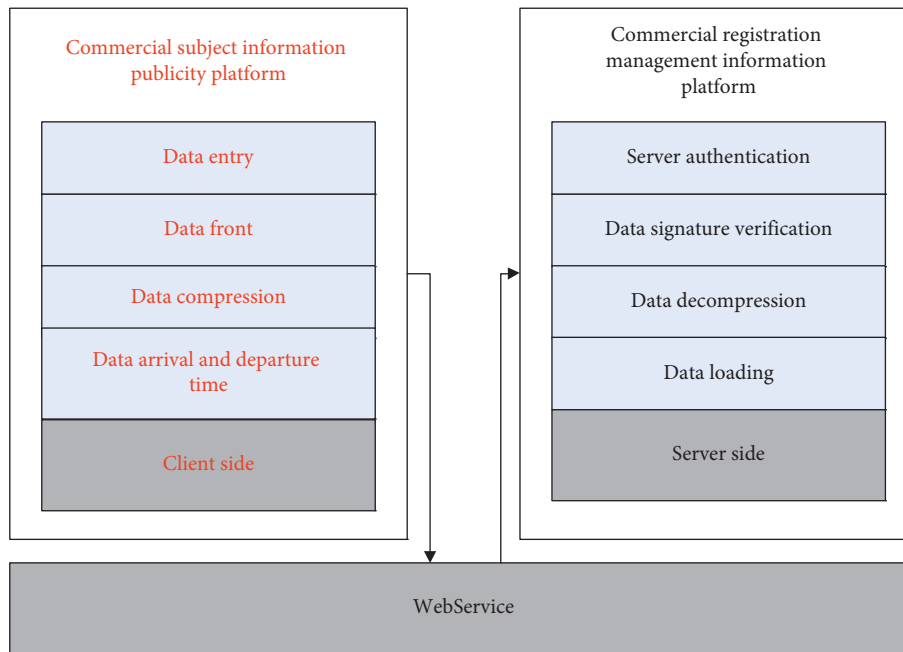


FIGURE 10: Schematic diagram of data transmission from the commercial subject information publicity platform to the commercial registration management platform.

From the above analysis, it can be seen that the Internet commercial judicial analysis system based on Big Data constructed in this paper also has a good performance in problem analysis and decision-making suggestions. On this basis, empirical analysis is carried out through the system constructed in this paper. The current problems in China's Internet business judicial are as follows.

The emergence of the network economy has updated many economic terms and technologies. The research on China's commercial legislation has only been around 20 years, and the legislative technology has not been developed for a long time. While the rapid development of society and rapid technological changes brought about by the network economy, the development speed of China's commercial law has lagged far behind the development speed of the network economy. Moreover, the legislative technology has remained at the level of 20 years ago, so it is difficult to adapt to the technological innovation and progress brought about by the network economy. As a result, many network technologies cannot be placed under the regulation of the law, and disputes in the network economy are facing a situation without a legal basis. Therefore, commercial law can no longer adapt to the speed of social and economic development, and commercial law needs to update its own legislative techniques in the technological innovation of the network economy to adapt to the development of society.

The commercial law does not make any special provisions on the Internet economy, and there is no general commercial law applicable to the Internet economy in the regulation of commercial behavior. Therefore, many disputes caused by the Internet economy can only follow the existing provisions of the commercial law. Moreover, the current commercial individual law only makes relevant legal

provisions for the traditional economy and transactions. As the network economy is highly technical and transactions in the network economy are relatively fast, it is difficult to apply the rules of traditional commercial law to the network economy. At present, the handling of commercial disputes is often faced with the situation that traditional transactions are not available and the existing laws are not easy to use. The application of the current commercial law to the network economy is not able to guide the operation of the network economy well.

The current registration management system can manage and regulate most network operators. However, with the development of computer technology and the advancement of network technology, many online traders see loopholes in the law, and fraud and unfair transactions in the online economy cannot be adjusted through the online registration system. For commercial entities that do not register, they can conduct online transactions as long as they rely on the Internet and adopt certain technical means.

On this basis, the following strategies are proposed.

In view of the above analysis of the lack of commercial legislation in the network economy, from the perspective of the commercial system, it can be seen that China's commercial law has been lacking in general guidelines and regulations, and there are loopholes and gaps in a large number of legal regulations. Therefore, the formulation of the General Principles of Commercial Law is of great significance to commercial law, and the network economy also needs the principled guidance of the General Principles of Commercial Law. Therefore, the legislative provisions of the General Principles of Commercial Law are the basis for the commercial law to adjust the network economy.

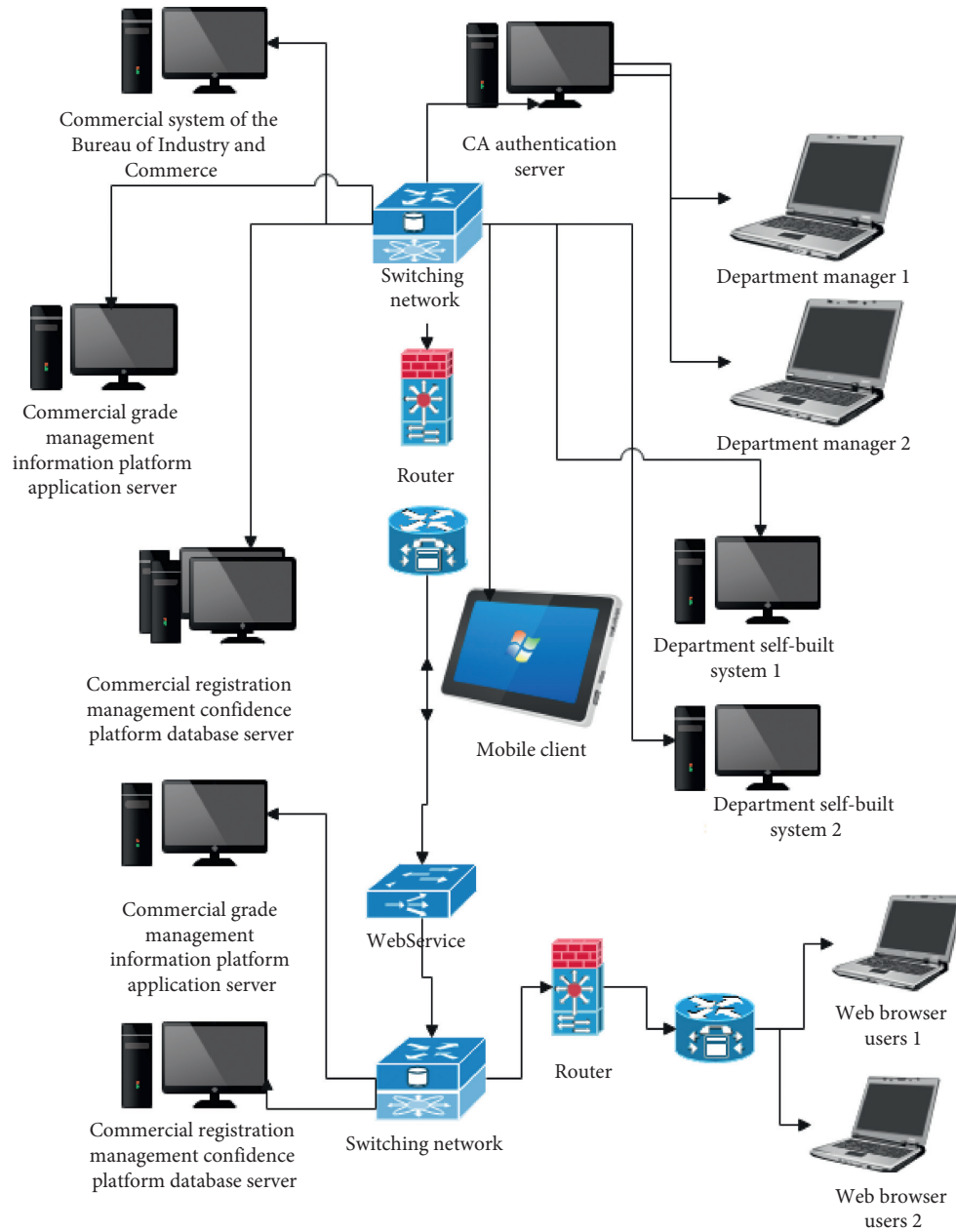


FIGURE 11: Network topology diagram.

The technical characteristics of the network economy can ensure that this economic system occupies a major position in social development. The development of law must keep pace with the development of society, and the backwardness of commercial law legislation technology directly affects the effectiveness of commercial law in adjusting the network economy. Therefore, strengthening the accuracy of the commercial law legislation, integrating and adjusting the existing commercial legislation, and

supplementing the content of the legislation are an important guarantee for the commercial law to adjust the network economy.

Due to the constraints of social conditions and economic foundation, the theoretical research activities of commercial law and the public awareness of commercial law are still at a relatively low level. Therefore, while perfecting commercial legislation, it is necessary to strengthen the theoretical research of commercial

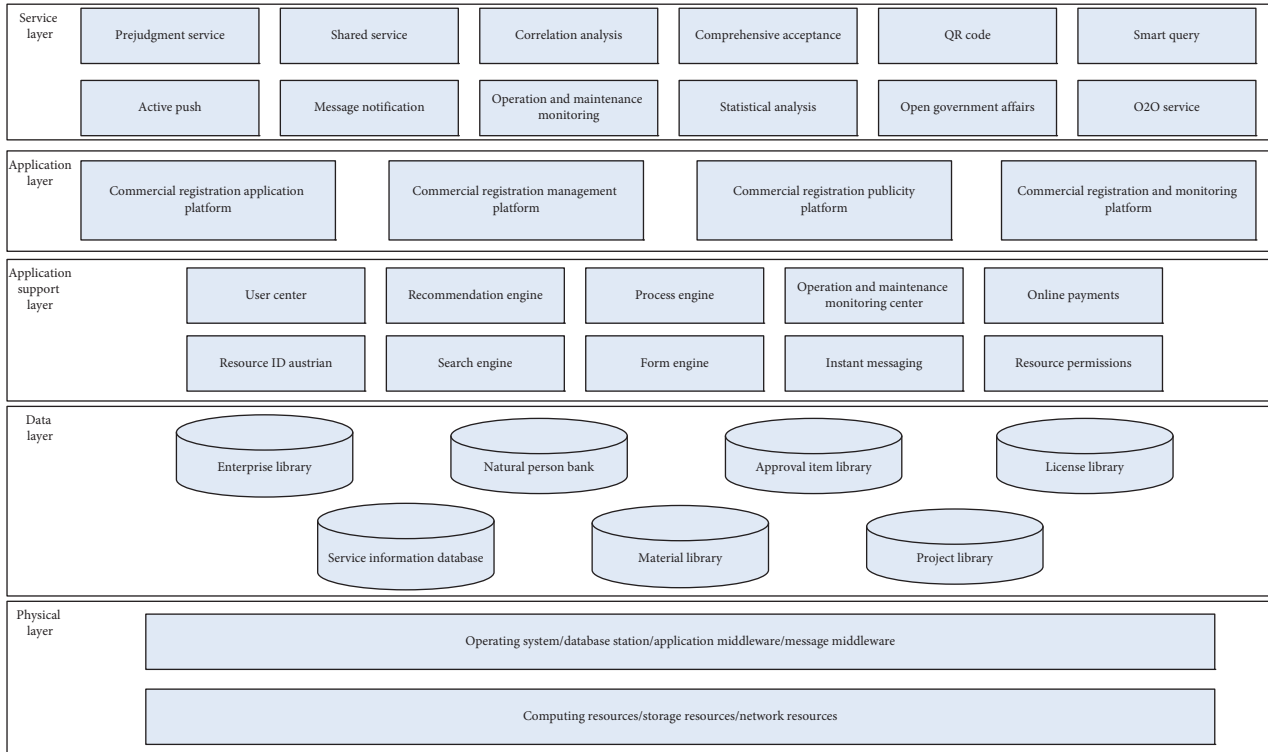


FIGURE 12: System software structure diagram.

TABLE 1: Statistical table of data mining effect evaluation.

Num	Data mining effect evaluation	Num	Data mining effect evaluation	Num	Data mining effect evaluation
1	91.7	32	84.2	62	93.3
2	85.6	33	85.9	63	92.6
3	82.8	34	86.2	64	82.3
4	87.6	35	82.7	65	92.7
5	90.0	36	90.1	66	88.5
6	91.0	37	87.9	67	84.8
7	92.9	38	92.9	68	86.2
8	87.2	39	88.9	69	86.4
9	91.1	40	87.8	70	91.4
10	82.8	41	82.8	71	86.0
11	87.8	42	91.0	72	87.8
12	88.5	43	90.8	73	84.9
13	86.7	44	83.0	74	83.9
14	90.5	45	86.8	75	92.2
15	91.9	46	87.8	76	88.8
16	88.8	47	93.6	77	84.8
17	87.5	48	82.8	78	83.1
18	89.0	49	88.5	79	93.4
19	84.6	50	84.3	80	82.3
20	92.0	51	89.9	81	92.7
21	93.8	52	86.9	82	84.6
22	87.5	53	85.3	83	90.6
23	91.7	54	87.2	84	86.8
24	85.3	55	93.8	85	88.4
25	83.4	56	87.5	86	85.2
26	83.5	57	90.0	87	83.9
27	90.3	58	85.2	88	92.2
28	92.1	59	93.3	89	89.7
29	92.8	60	83.3	90	84.8
30	91.0	61	83.6	91	82.8
31	86.8				

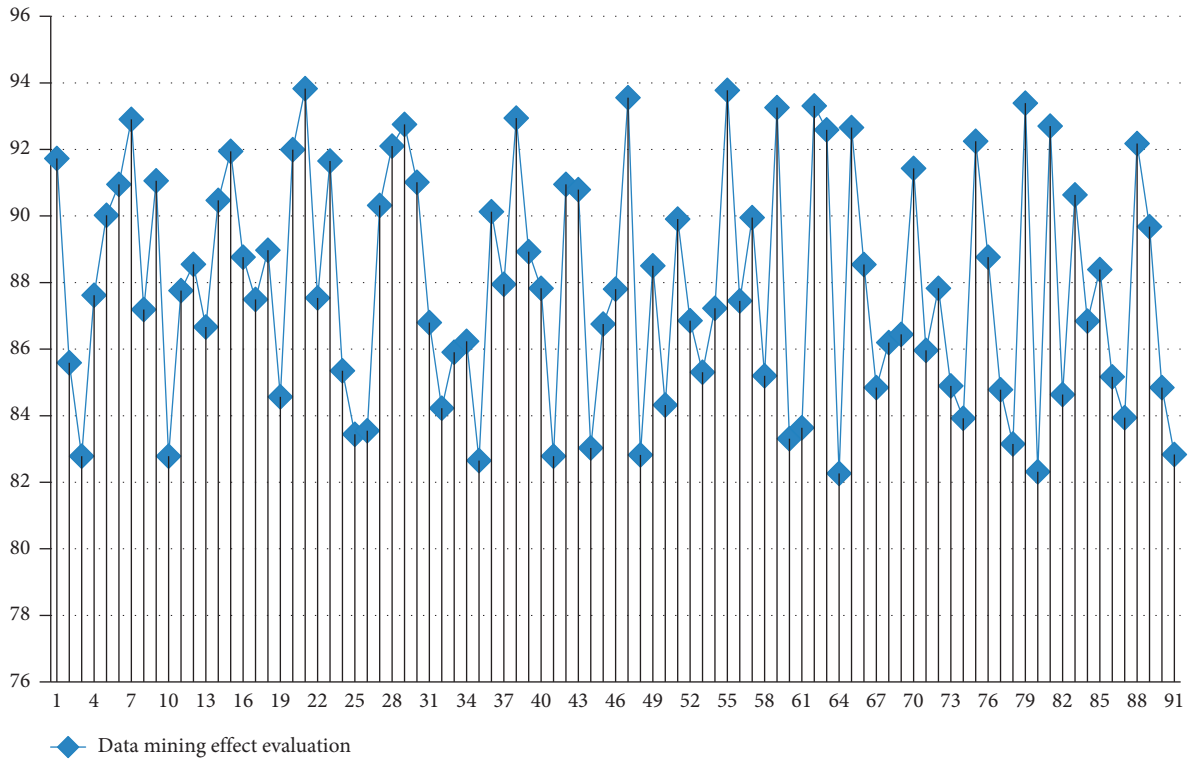


FIGURE 13: Statistical diagram of data mining effect evaluation.

TABLE 2: Statistical table of system decision-making effect evaluation.

Num	Strategy formulation effect	Num	Strategy formulation effect	Num	Strategy formulation effect
1	80.8	32	85.5	62	83.5
2	80.1	33	73.9	63	73.5
3	80.8	34	82.7	64	79.0
4	81.7	35	86.9	65	86.7
5	79.5	36	75.4	66	88.9
6	73.4	37	83.7	67	89.5
7	74.7	38	71.9	68	83.3
8	71.1	39	77.4	69	76.3
9	82.7	40	76.8	70	83.4
10	81.3	41	82.3	71	80.2
11	88.1	42	71.1	72	77.9
12	78.8	43	87.0	73	90.3
13	71.1	44	73.4	74	81.8
14	76.2	45	87.2	75	80.1
15	87.7	46	72.9	76	71.3
16	74.7	47	84.1	77	78.4
17	89.7	48	85.3	78	87.4
18	75.2	49	73.9	79	83.7
19	78.4	50	86.4	80	83.8
20	81.6	51	72.4	81	78.5
21	84.0	52	77.2	82	75.5
22	79.8	53	76.1	83	77.2
23	85.3	54	74.7	84	83.9
24	90.7	55	81.6	85	71.2
25	78.9	56	86.3	86	82.8
26	81.4	57	79.6	87	75.3
27	83.0	58	89.5	88	84.9
28	79.4	59	89.9	89	79.7
29	86.4	60	87.7	90	79.1
30	75.6	61	77.1	91	88.3
31	75.2				

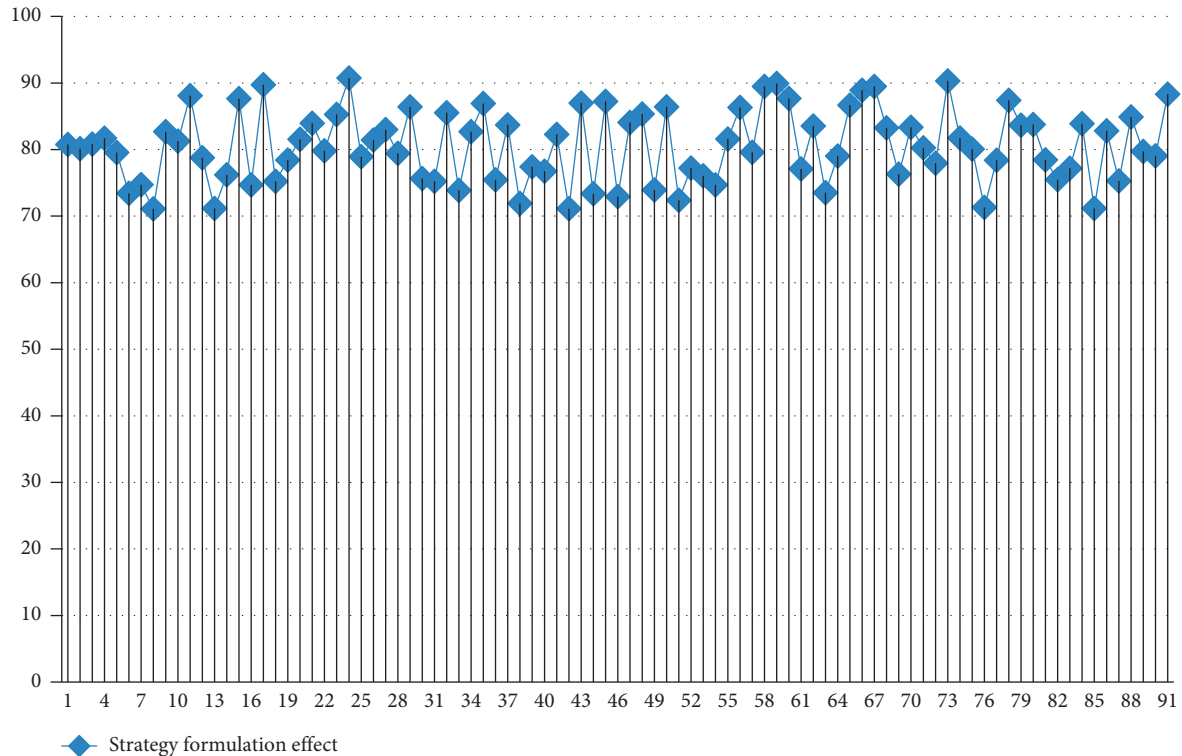


FIGURE 14: Statistical diagram of system decision-making effect evaluation.

legislation, conduct legal training for commercial law operators and commercial subjects, and establish a long-term commercial law theoretical research and training mechanism, so that the development and dissemination of commercial law can reach a new theoretical level.

6. Conclusion

With the help of the development of Internet technology, commercial activities have basically realized a new commercial transaction pattern under the conditions of the Internet economy. The continuous evolution and change of the economic base will inevitably affect the changes of the entire social superstructure. As the most compelling social norm, the law needs to be adjusted accordingly with the change of the economic base. However, the current Chinese commercial law legal system has not formed a legal system suitable for the development of the network economy. Moreover, no matter from the basic commercial legislation or commercial value theory research to the summary and application of commercial customs, the commercial law system under traditional economic conditions all has big problems. After the emergence of the new economic factor of the network economy, the commercial system needs to make deeper adjustments and changes to adapt to the commercial transactions and commercial activities under the modern economic conditions. This article combines Big Data technology to construct an Internet commercial judicial analysis system, constructs system function modules according to the needs of Internet commercial judicial data mining, and analyzes the performance of the system

constructed in this paper through experiments. The research results show that the system constructed in this paper has certain practical effects.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Acknowledgments

This study was supported by the 2018 Yunnan Province Philosophy and Social Science Planning Key Project “Research on Optimizing Yunnan Legal Business Environment Indicator System” (grant no. ZD201805).

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