Hindawi
Complexity
Volume 2021, Article ID 2303129, 10 pages
https://doi.org/10.1155/2021/2303129

Research Article

Service Innovation of Insurance Data Based on Cloud Computing in the Era of Big Data

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Received 21 April 2021; Accepted 22 June 2021; Published 23 July 2021

Academic Editor: Huihua Chen

With the advent of the era of big data, great changes have taken place in the insurance industry, gradually entering the field of Internet insurance, and a large amount of insurance data has been accumulated. How to realize the innovation of insurance services through insurance data is crucial to the development of the insurance industry. Therefore, this paper proposes a ciphertext retrieval technology based on attribute encryption (HP-CPABKS) to realize the rapid retrieval and update of insurance data on the premise of ensuring the privacy of insurance information and puts forward an innovative insurance service based on cloud computing. The results show that 97.35% of users are successfully identified in test set A and 98.77% of users are successfully identified in test set B, and the recognition success rate of the four test sets is higher than 97.00%; when the number of challenges is 720, the modified data block is less than 9%; the total number of complaints is reduced from 1300 to 249; 99.19% of users are satisfied with the innovative insurance service; the number of the insured is increased significantly. To sum up, the insurance innovation service based on cloud computing insurance data can improve customer satisfaction, increase the number of policyholders, reduce the number of complaints, and achieve a more successful insurance service innovation. This study provides a reference for the precision marketing of insurance services.

1. Introduction

Insurance is a tool to control the environmental risk of market economy and plays an important role in the social security mechanism. Insurance has the characteristics of economy, commodity, mutual assistance, science, and so on. Insurance services are provided by insurance companies to customers and consist of contract services and policy services [1]. The former includes insurance consultation, underwriting physical examination, and other services, while the latter is the renewal service, filing, and claim settlement service provided by the insurance company after the customer has insured [2]. The core of insurance service is insurance protection, and insurance service has the characteristics of intangibility, interactivity, nonstorability, difference, integrity, and dual attributes [3]. With the advent of the era of big data, insurance services have entered the Internet field, and Internet insurance has developed rapidly [4]. From the perspective of economics, insurance belongs to economic and financial behavior and can also be regarded as a financial arrangement to share the damage. Therefore, the realization of insurance service innovation is a comprehensive system service innovation based on the premise of ensuring the privacy of insurance data [5, 6]. At the same time, insurance data is the core information of insurance companies. Insurance companies not only need to strictly guarantee the security of insurance data, but also need to accurately and quickly retrieve relevant information on the premise of ensuring data privacy, so as to realize the service innovation of insurance data, achieve the purpose of providing real value insurance services to customers accurately, efficiently and quickly, and increase insurance coverage. This is the core competitiveness of insurance companies.

With the development of insurance industry and the increase of insurance service types, accident insurance has been widely concerned. Heller and other scholars found that the gap of accident insurance has a direct impact on the families of policy holders, including radiologists [7]. In addition, dental insurance has become a new focus of insurance services at this stage. Scholar Clouston explained the importance of dental insurance in detail and proved whether parents' dental insurance directly affects their children's oral health care and called on the government to expand the dental coverage of children's oral insurance [8]. Yhya and other researchers found that the cost of medical insurance for prisoners in China was significantly higher than that for ordinary people [9]. These results suggest that insurance service is the most extensive choice for most people to protect their own rights and interests, and insurance service should provide different kinds of services according to the actual situation of the insured. At this stage, the insurance service industry is developing rapidly. Baggio and his team have done relevant research on the situation of young criminals who cannot obtain normal insurance. The results show that the uninsured young criminals are facing major obstacles in medical care, that is, the high medical expenses in the future, which also directly affects the future health status of such people [10].

Insurance data is the basis for insurance companies to carry out business. Only through the statistics, mining, and analysis of insurance related data can insurance companies provide more targeted insurance services to policy holders and enhance their competitiveness. With the advent of the era of big data, the threat and attack of Internet data are increasing, and data leakage is common. How to accurately obtain the required insurance data on the premise of maintaining the privacy of insurance data is an important link in formulating targeted insurance services and innovating insurance services. Yang et al. proposed a keyword extraction measurement method based on specific text spatial distribution, which extracts the required information from encrypted documents to ensure the security of data information [11]. Vm and his team found that communication links and interfaces have become the target platform of security attacks, and these attacks are often concentrated in a variety of deceptive packets and submerged packets [12]. Hu, a scholar, compared the encryption and decryption effects of double encryption algorithm and traditional encryption algorithm under different data volumes. The results show that double encryption algorithm can shorten the encryption and decryption time of data, but its effect on decryption integrity is not good [13]. Big data analysis technology can be widely used in different fields. Shanmugapriya and other researchers proposed to build a secure private medical insurance database in the cloud through fog computing technology and realize secure access to the database and data storage through bait technology [14]. Thokchom and other scholars have designed an effective dynamic data integrity checking scheme for untrusted cloud storage, which allows third-party auditors to audit customer data while protecting data privacy [15].

The above research has made great progress in insurance, insurance services, insurance data, and retrieval application under the protection of data privacy, but there is still a lack of research on how to quickly and accurately retrieve relevant insurance information under the premise of ensuring the security of insurance data and then provide targeted insurance service innovation for policy holders. Under the background of big data, insurance service innovation is realized through the innovation of insurance data retrieval and storage, and a ciphertext retrieval based on attribute encryption is designed.

2. Service Innovation of Insurance Data Based on Cloud Computing

2.1. Ciphertext Retrieval Based on Attribute Encryption. After insured, the relevant insurance data contains some privacy information that is not allowed to be disclosed. In order to achieve fine-grained access control of data, resist keyword guessing attacks, and perform complex retrieval operations by cloud server, this section proposes a keyword retrieval scheme based on attribute encryption (hidden policy–ciphertext policy attribute-based encryption with keyword Search (HP-CPABKS)) [16, 17].

The HP-CPABKS model shown in Figure 1 consists of trusted authority, cloud server, and cloud tenant (data owner and data user). The trusted authority initializes the public parameters of the system and distributes the private key according to the properties of the cloud tenant; the cloud server provides storage and computing services; the data owner encrypts the data file and keyword index and uploads it to the cloud server; the data user generates the corresponding retrieval token of the pre-Search keyword and uploads it to the cloud server [18].

HP-CPABKS mainly includes six algorithms. Given the security parameter λ, a secure hash function $H_k\colon \{0,1\}^* \longrightarrow Z_p$ with key is defined, and the key K is secret shared by the data owner and user [19]. For different attributes $i, 1 \leq i \leq n$, generate the corresponding random value $\left\{a_{i,t_i} \in Z_p\right\} 1 \leq t_i \leq n_i$, calculate $\left\{A_{i,t_i} = g_1^{a_{l,tl}}\right\} 1 \leq t_i \leq n_i$, select $a, b \overset{R}{\leftarrow} Z_p$, and calculate $Y = e(g_1, g_2)^{\alpha}$ and $B = g_1^b$.

$$\mathrm{PP} = \left(e, p, g_1, g_2, G_1, G_2, G_T, Y, B, \left\{\left\{A_{l,t_l}\right\} 1 \leq t_l \leq n_l\right\} 1 \leq i \leq n\right), \quad (1)$$

$$\mathrm{msk} = \left(a, b, \left\{\left\{a_{l,t_l}\right\}_{1 \leq t_l \leq n_l}\right\} 1 \leq i \leq n\right). \quad (2)$$

Formula (1) is the calculation formula of the public parameter PP of the system, and formula (2) is the calculation formula of the main private key MSK of the system, where i is the attribute and $g_1 \in G_1, g_2 \in G_2$, and G_1, G_2 are prime order cyclic groups of order P. Set the user attribute list $L = \{L_1, L_2, \ldots, L_n\} = \left\{u_{1,t_1}, u_{2,t_2}, \ldots, u_{n,t_n}\right\}$. When the cloud tenant U registration request appears, the trusted authorization center randomly selects $x_u \overset{R}{\leftarrow} Z_p$ and calculates

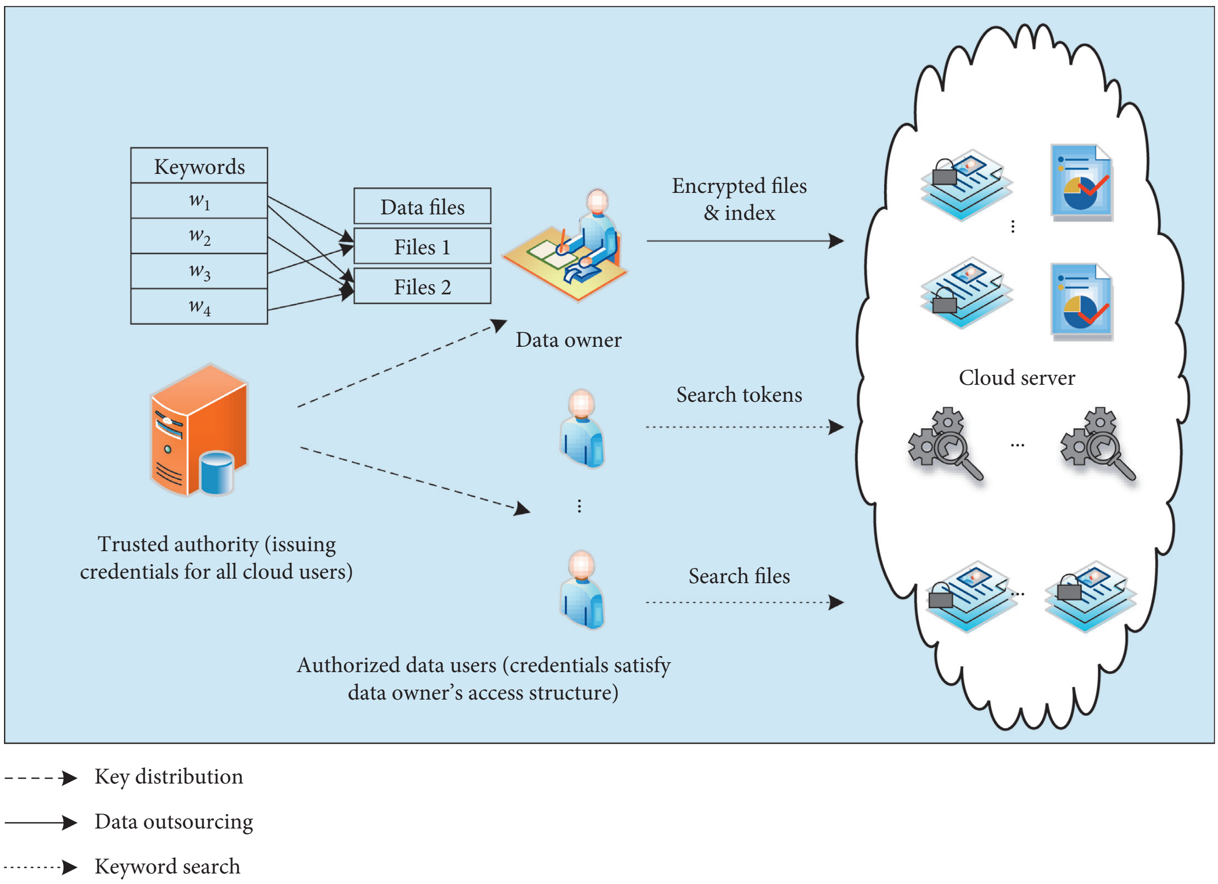


FIGURE 1: Hidden policy ciphertext-policy attribute-based encryption with keyword Search.

$X = Y^{xu}$. At this time, X is a part of the public parameter. The specific operation is as follows: randomly select $\beta \xleftarrow{R} Z_p$, get $K_0 = g_2^{a+\beta/b}$, different $i, 1 \le i \le n$, there is $\lambda_i \xleftarrow{R} Z_p$, at this time $K_{i,1} = g_2^{\beta+ai,ti^{\lambda_l}}, K_{i,2} = g_2^{\lambda_l}$, there is $L_i = u_{l,t_l}$, the corresponding cloud tenant's private key settings are shown in

$$\mathrm{sk} = \left(x_u, K_0, \left\{K_{i,1}, K_{i,2}\right\}_{1 \le i \le n}\right). \quad (3)$$

The cloud server maintains a tenant list U_{List}. Whenever a new tenant is added, the corresponding execution steps of the data owner are as follows: randomly select $r \xleftarrow{R} Z_p$ and calculate $C_U = X^{-r}$; request the cloud server to add (U, C_U) in U_{List}; make $P = \{P_1, P_2, \ldots, P_n\}$ act as an access control $r \xleftarrow{R} Z_p$ policy and encrypt it before uploading it to the cloud server, and the specific steps are as follows: calculate $\widetilde{C} = Y^r$ and $C_0 = B^{r/H_\lambda(w)}$; under different attributes $i, 1 \le i \le n$, select $r_i \xleftarrow{R} Z_p$, let $r = \sum_{i=1}^{n} r_l$, and calculate $C_{l,1} = g_1^{r_l}$; when $u_{i,t_l} \in P_i$, let $C_{i,t_l,2} = A_{i,t_l}^{rl} g_1^{r_l}$; when $u_{i,t_l} \notin P_i$, let $C_{i,t_l,2}$ act as a random number in G_1, and the ciphertext expression is shown in the following formula:

$$\mathrm{cph} = \left(\widetilde{C}, C_0, \left\{C_{l,1}\left\{C_{l,t_1,2}\right\}_{1 \le t_l \le n_l}\right\}_{1 \le i \le n}\right). \quad (4)$$

After encryption, upload to the cloud server, enter the keyword w and private key sk, and select $s \xleftarrow{R} Z_p$.

$$\mathrm{Tok} = \left(\widetilde{T}, T_0, \left\{T_{i,1}, T_{i,2}\right\}_{1 \le i \le n}\right). \quad (5)$$

Formula (5) is the keyword Search token expression, where the attribute $i, 1 \le i \le n$, $s \xleftarrow{R} Z_p$; then, $\widetilde{T} = x_u + s$, $T_0 = K_0^{H_\lambda(w)s}$, $T_{i,1} = K_{l,1}^s$, $T_{i,2} = K_{i,2}^s$. When the server receives the retrieval token from the cloud tenant u, it immediately determines whether the tenant u belongs to the list U_{List}. If it is not the list U_{List} user, the cloud server rejects the request. When it belongs to list U_{List} user, calculate $E_1 = \prod_{i=1}^{n} e(C_{i,1}, T_{i,1})$, attribute $i, 1 \le i \le n$, and when $L_l = u_{i,t_l}$, $C_{i,2} = C_{i,t_l,2}$, calculate $E_2 = \prod_{i=1}^{n} e(C_{i,2}, T_{i,2})$. If $L \ne P$, calculate $E = E_1/E_2 = e(g_1, g_2)^{sr\beta}$, output 1 when $e(C_0, T_0) \cdot E^{-1} = \widetilde{C}^{\widetilde{T}} \cdot C_U$, and otherwise output 0. Under the background of big data, the insurance industry has a high risk. The collection, storage, and analysis of customer information is a scientific way to effectively reduce insurance risk and tap the real needs of policyholders [20]. Taking automobile insurance as an example, after running HP-CPABKS model, the insurance company (data user) can extract the relevant information of the policyholder, as shown in Figure 2.

According to Figure 2, after HP-CPABKS is running, the insurance company can obtain the basic personal information of the applicant (including age, occupation, mobile phone number, vehicle type, vehicle collection year, etc.), obtain the consumption behavior through the applicant's

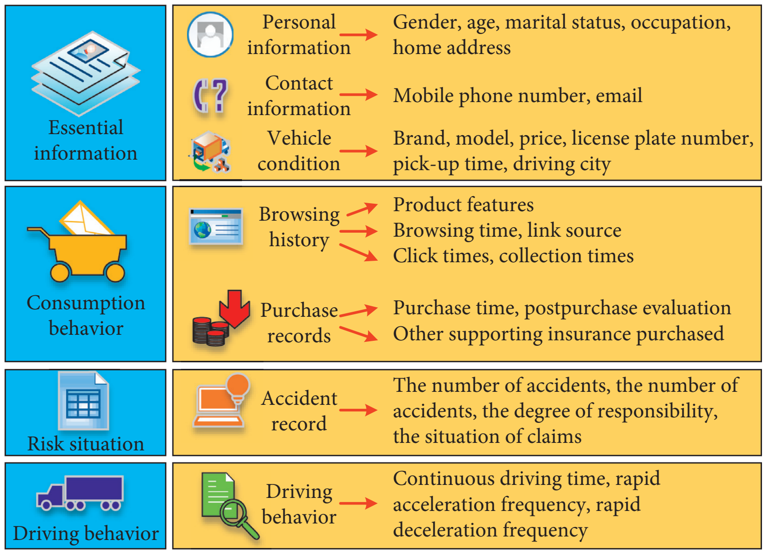


FIGURE 2: Information map of policyholders.

browsing time, product characteristics, and purchase time, and obtain the insured's out of danger and driving behavior through the number of accidents and claims.

2.2. Insurance Service Innovation Scheme under Cloud Computing. With the advent of the era of big data, it has become a trend for the insurance industry to integrate cloud computing, Internet of things, and other technologies into traditional industries such as insurance industry and realize the "ecological integration" of information technology and insurance business. The content described in Section 2.1 can ensure that the insurance related data can be obtained quickly and accurately on the premise of not disclosing the insurance customer information. Then the insurance company establishes the corresponding credit evaluation model according to the obtained customer information, obtains the customer's credit score, and formulates the targeted insurance service according to the actual situation of the customer (Figure 3).

The credit evaluation management of insurance customers in Figure 3 can promote the steady development of the insurance industry. Firstly, the insurance data is preprocessed. It is assumed that the variable f has NF states. The sequence of each state is $\{1, \ldots, N_f\}$, and the rank of x_{if} is r_{ij}, $r_{ij} \in \{1, \ldots, N_f\}$. The weight Z_{if} is used to replace x_{if}:

$$Z_{if} = \frac{r_{if} - 1}{N_f - 1}. \tag{6}$$

The weight of insurance data is realized by (6). Then the decimal point is characterized.

$$x' = \frac{x}{10^j}. \tag{7}$$

Equation (7) is the expression of normalizing X the value of F to X', where j is the smallest integer, so that Max $(x') < 1$. Through the software MATLAB combined with the improved BP neural network algorithm to establish customer credit evaluation model, the momentum method and

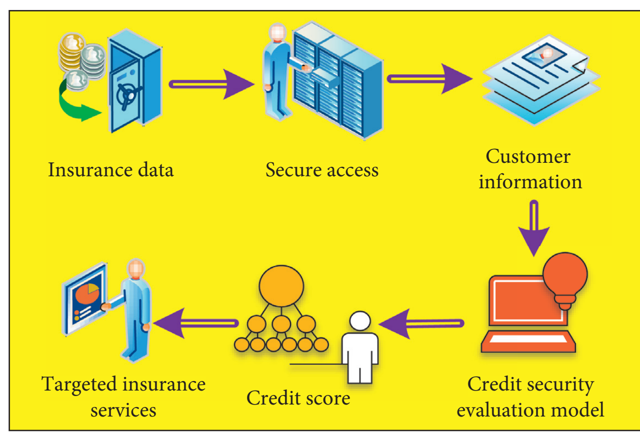


FIGURE 3: Design ideas of insurance service innovation scheme under cloud computing.

learning rate adaptive method are introduced to improve the traditional BP neural network algorithm. The momentum method alleviates the local sensitivity of the network to the error surface, and the momentum factor is $\gamma \in [0, 1]$.

$$w(t+1) = w(t) + \gamma \Delta w(t) + \eta (1 - r) \frac{\partial E}{\partial w(t)}. \tag{8}$$

Formula (8) is the weight adjustment formula of the improved BP algorithm, e is the error function, t is the training times, and η refers to the learning rate. When η is changed, check the reduction effect of the correction value of the weight in the error function.

$$\eta_{t+1} = \begin{cases} \alpha \mu_t, & \alpha > 1, E_{t+1} < E_t, \\ \beta \eta_t, & \beta < 1, E_{t+1} < E_t, \\ \eta_t, & \text{other.} \end{cases} \tag{9}$$

Equation (9) is the adjustment formula, where α, β is the ratio factor, E is the error function, t is the training times, and η is the learning rate. When the attribute index of customer data is 9, the number of neuron nodes is 9, and the number of output layer nodes is 1, then the number of hidden nodes n is determined according to

$$n = \sqrt{n_i + n_0} + a. \quad (10)$$

In (10), a represents the constant in the range of [1, 10], n_i, n_0 refers to the number of hidden nodes corresponding to a specific neural network, and the insurance data has nonlinear characteristics, so SSE is selected as the error function and sigmoid function as the excitation function.

$$O_j = \frac{1}{1 + e^{-\mathrm{net}_j}}. \quad (11)$$

Equation (11) is the expression of output bit O_j of unit J, and net_j is the neural network layer corresponding to unit J. The credit evaluation model is used to evaluate the credit of the insured, and the targeted insurance services are formulated according to the evaluation results, so as to realize the innovation of insurance services [21].

Figure 4 shows the evaluation standard system of insurance companies for policyholders (customers), which mainly focuses on personal variables, economic variables, and risk variables. The economic variables of policyholders are mainly reflected in monthly income and bank deposits [22]. In the era of big data, the domestic insurance industry should make rational use of cloud computing, develop accurate and targeted solutions on the basis of full analysis of policyholders (customers), and realize the innovation of insurance services. See Figure 5 for details.

Figure 5 shows the overall situation of the scheme. It can be seen that, under the background of big data, the innovation of insurance service should start from cloud computing. On the premise of ensuring the security of customer information, accurately retrieve customer data, establish customer information map according to relevant data, evaluate customer credit rating by map, and formulate accurate service scheme according to different customer situations to complete the innovation of insurance service New.

3. Analysis on the Effect of Service Innovation of Insurance Data

3.1. Effect Analysis of HP-CPABKS Scheme. Firstly, the HP-CPABKS scheme is analyzed from the aspect of time complexity, mainly from bilinear pairing operation (P), exponential operation (E_1) on prime order cyclic group G_1 with order P, exponential operation (E_2) on prime order cyclic group G_2 with order P, and exponential operation (E_T) on prime order cyclic group G_T with order P. Suppose there are n attributes and then there are N_i possible values for any attribute i.

In Table 1, setup refers to the algorithm for generating public parameters and master private key; Keygen refers to the setting algorithm for u private key of cloud tenant under the operation of trusted authority; Enclndex refers to the encryption algorithm for files before uploading to the cloud server (encryption algorithm); Gentoken refers to the setting algorithm for keyword retrieval token; search refers to the algorithm for searching and checking user retrieval token (retrieval algorithm).

As can be seen from Figure 6, when the number of attributes is 1, the running time of setup algorithm, Keygen algorithm, Enclndex algorithm, Gentoken algorithm, and Search algorithm is 0.025 s, 0.048 s, 0.018 s, 0.039 s, and 0.120 s, respectively; when the number of attributes is 50, the running time of setup algorithm, Keygen algorithm, Enclndex algorithm, Gentoken algorithm, and Search algorithm is 0.150 s, 1.382 s, 0.581 s, and 1.375 s, respectively 958 s; the cost of encrypting Enclndex algorithm is much lower than that of Search algorithm; the complexity of different algorithms of HP-CPABKS increases linearly with the number of corresponding attributes. Next, the protection efficiency of HP-CPABKS scheme for data security is detected, and four test data sets (data sets A, B, C, and D) are set. There are 415 test data in data set A, 405 of which belong to the rejected users and 10 to the passed users; there are 1543 test data in data set B, 1528 of which belong to the rejected users and 15 to the passed users; and there are 1543 test data in data set C. There are 13,278 test data, of which 13,271 are rejected users and 7 are passed users; there are 589 test data in data set D, of which 574 are rejected users and 15 are passed users. HP-CPABKS is used to access and test data in different data sets. The test results are shown in Figure 7.

As can be seen from Figure 7, in test data set A, 404 were successfully identified, accounting for 97.35%; in test data set B, 1524 were successfully identified, accounting for 98.77%; in test data set C, 13,268 were successfully identified, accounting for 99.92%; in test data set D, 571 were successfully identified, accounting for 97.11%. HP-CPABKS scheme can successfully identify more than 97% of rejected users in different test data sets, which indicates that the scheme has good protection effect in maintaining the security of insurance data of insurance companies. Take one million data blocks as privacy protection objects, set different number of challenges to challenge them, and analyze the change of the number of modified data blocks, as shown in Figure 8.

As can be seen from Figure 8, with the increase of the number of challenges, the proportion of modified data blocks accepting different number of challenges is gradually increasing; the more challenges, the proportion of modified data blocks in the data blocks that are the objects of privacy protection is also gradually increasing; when the number of challenges is 120, the modified data blocks only account for about 2%; when the number of challenges is 360, the modified data blocks are gradually increasing. The modified data block is less than 4%; when the number of challenges is 720, the modified data block is less than 9%. The above results show that the proposed ciphertext retrieval scheme based on attribute encryption (HP-CPABKS scheme) can effectively protect the information and data security of insurance customers and reduce the loss of customers caused by insurance data leakage.

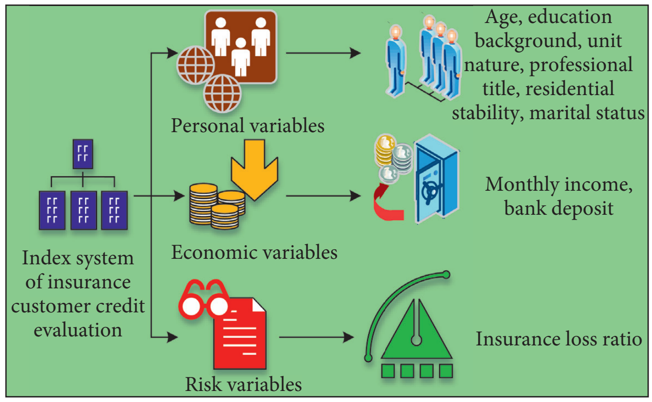


Figure 4: Insurance company customer evaluation index system.

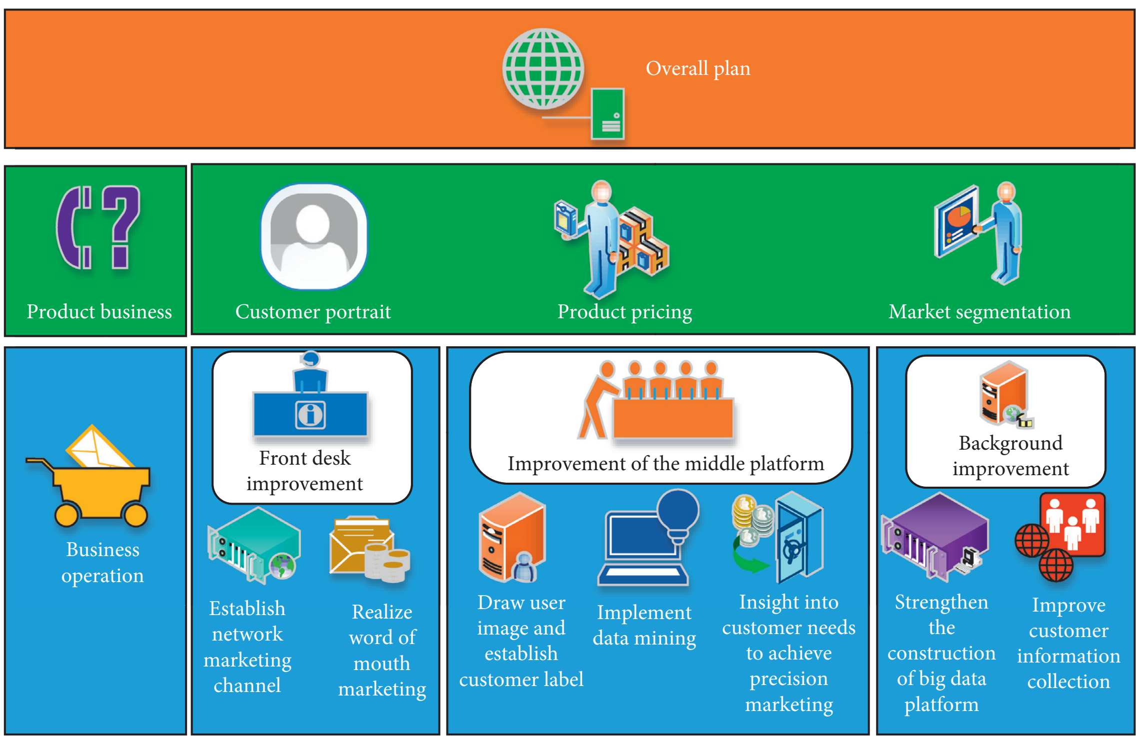


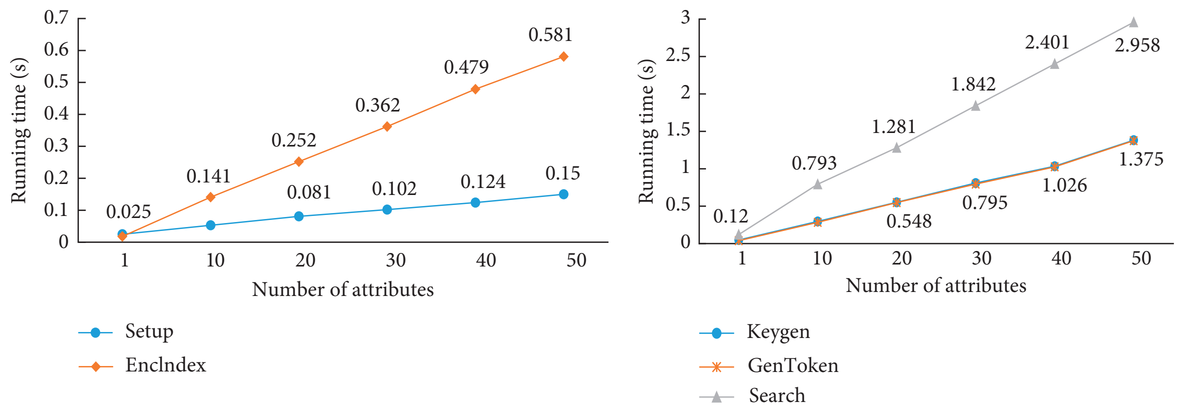
Figure 5: Conceptual design model.

Table 1: Computational complexity of each algorithm in the HP-CPABKS.

Algorithm	Setup	KeyGen	EncIndex	GenToken	Search
Computational complexity	$(\sum_{i=1}^{n} n_i + 1)E_1 + E_T$	$(2n+1)E_2 + E_T$	$(2n+1)E_1 + 2E_T$	$(2n+1)E_2$	$(2n+1)P + E_T$

3.2. Application Effect Analysis. Taking two insurance companies as an example, this paper compares the complaints before and after using HP-CPABKS algorithm, so as to analyze the feasibility of the proposed insurance service innovation scheme.

As can be seen from Figure 9, within one year after the insurance company ran the insurance service innovation scheme based on HP-CPABKS algorithm, the total number of complaints dropped from 1300 to 249; among them, the number of contract disputes dropped from 218 to 96; the number of insurance contract disputes dropped from 52 to 13; and the number of claims/payment disputes dropped from 180 to 21. This is because in the design of insurance service innovation scheme based on HP-CPABKS algorithm, the number of customer complaints has been reduced. Before the operation of the scheme, the proportion of surrender disputes accounted for the largest proportion of the total complaints, reaching 36%; after the operation of the



(a) (b)

Figure 6: Average running time of HP-CPABKS scheme (seconds). (a) Setup and Enclndex and (b) KeyGen, GenToken, and Search.

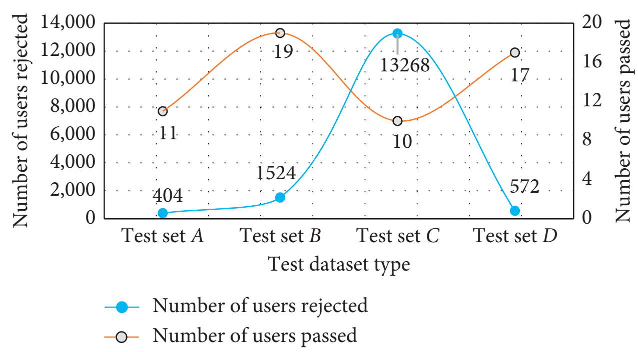


Figure 7: Data access test results of different data sets.

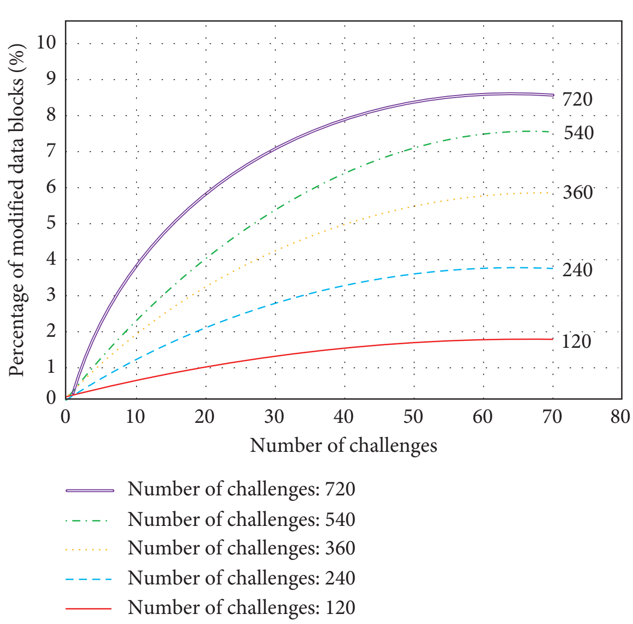


Figure 8: Analysis of data security protection effect.

scheme, the proportion of surrender disputes decreased from 45% to 18%, with a significant decline. These results show that the proposed insurance service innovation scheme based on HP-CPABKS algorithm can effectively reduce the number of complaints, suggesting that the insurance service innovation scheme can develop a more targeted service, which is easier to meet the real needs of customers. In order to obtain the practical application effect of the insurance service innovation scheme based on HP-CPABKS algorithm proposed in the study, apply it to different types of insurance companies in a certain region, and compare the changes in the number of policyholders of each type of insurance within one year before and after the application of the scheme, as shown in Figure 10.

As can be seen from Figure 10, after the application of the insurance service innovation scheme based on HP-CPABKS algorithm, the number of policyholders of different types of insurance increased to a certain extent; the number of policyholders of property insurance increased from 1246 to 1811, an increase of about 45.35%; the number of policyholders of agricultural insurance increased from 967 to 1384, an increase of about 43.12%; the number of policyholders of engineering insurance increased from 133 cases to 168 cases, an increase of 26.32%; the number of insured enterprises' property insurance rose from 246 cases to 310 cases, an increase of 26.02%; the rest of the automobile insurance, guarantee insurance, credit insurance, liability insurance, freight insurance, and ship insurance rose by 29.69%, 40.11%, 21.99%, 24.90%, 23.43%, and 15.44%,

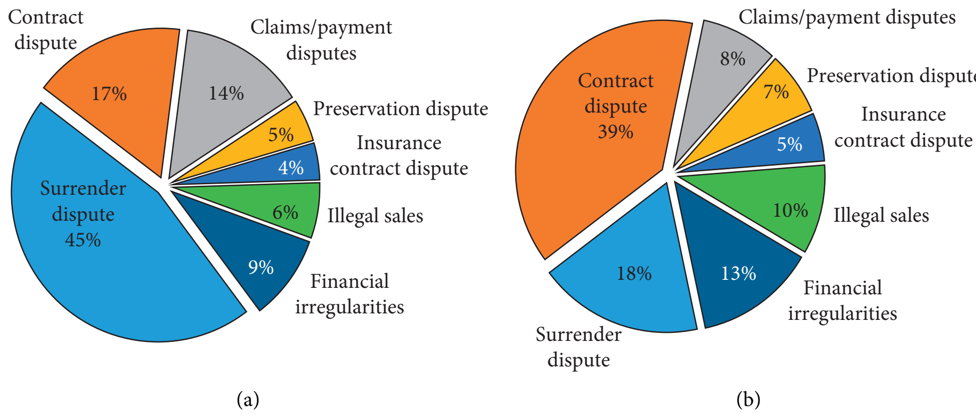


Figure 9: Occurrence of insurance complaints. (a) Quantity (before scheme application). (b) Quantity (after scheme application).

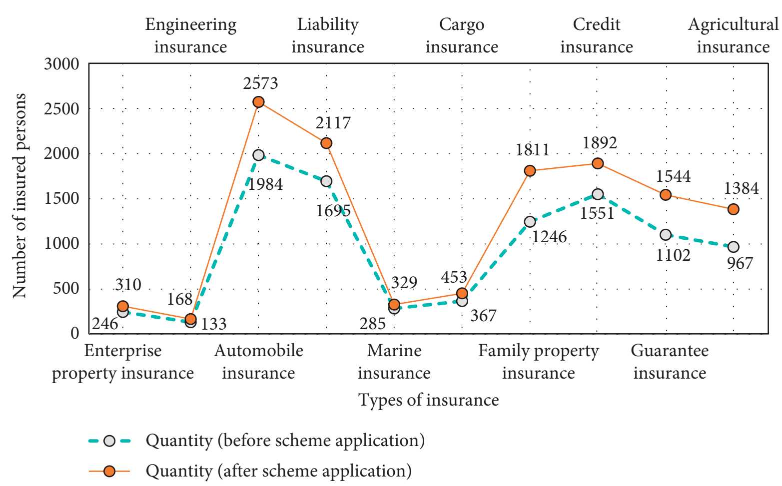


Figure 10: The change of insurance company's income after the application of innovative service scheme.

respectively. The above results show that the proposed insurance service innovation scheme based on HP-CPABKS algorithm can help insurance companies obtain more insured customers, which reflects that the proposed insurance service innovation scheme based on cloud computing insurance data (insurance service innovation scheme based on HP-CPABKS algorithm) has good service effect and can increase the corresponding service cost on the basis of stabilizing the original customer source. Insurance companies should be more attractive to policy holders, improve the core competitiveness of insurance companies, and expand the insurance customer groups. The higher the satisfaction of the insured customers, the higher the recognition of the corresponding insurance services, the higher the loyalty of the customers to the insurance company, and the greater the competitiveness of the insurance company. Therefore, next, we use the questionnaire survey method, set up 1000 questionnaires, and randomly select the policyholders who accept the insurance service innovation scheme based on cloud computing insurance data and the policyholders who do not accept the innovative insurance service scheme to conduct the survey. There are 988 valid questionnaires, and the specific results are shown in Figure 11.

As shown in Figure 11, the number of valid questionnaires for policyholders who accept the insurance service innovation scheme based on cloud computing insurance data is 493, and the number of valid questionnaires for policyholders who do not accept the innovative insurance service scheme (traditional insurance service) is 495. Comparing the results of the two questionnaires, it can be seen that, among the policyholders who accepted the insurance service innovation scheme based on cloud computing, 32.45% (160) of the insurance customers were very satisfied with the innovative insurance service, 41.99% (207) of the insurance customers were satisfied with the innovative insurance service, 13.59% (67) of the customers were relatively satisfied, and only 0.81% of the customers were not satisfied. Compared with the survey results of traditional insurance services (19.60%, 97), it decreased by 18.79%, indicating that the proposed insurance innovation service has realized the targeted insurance service for insurance customers and enhanced the applicability to different customers. On the other hand, the survey results of the policyholders who accepted the traditional insurance services showed that only 4.44% of the customers were very satisfied, 5.45% of the customers were satisfied, 19.39% of the

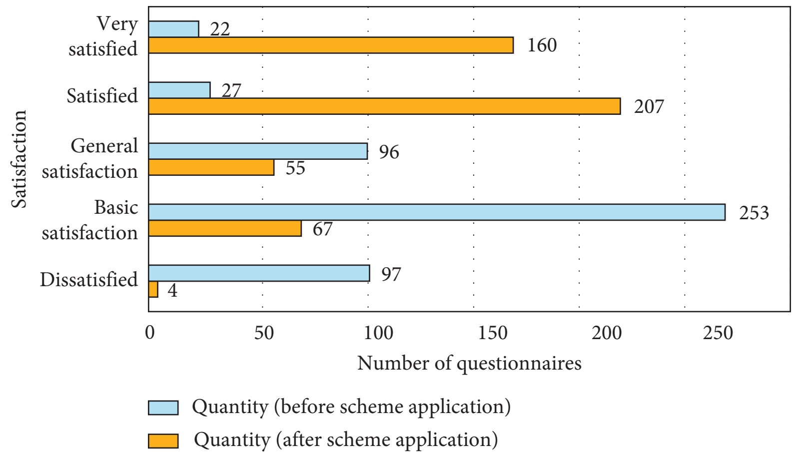


FIGURE 11: The change of satisfaction of the policyholder after the innovation of insurance service.

customers were generally satisfied, and more than 50% (253 cases) of the customers were relatively satisfied. The above results show that the proposed insurance service innovation scheme based on cloud computing insurance data can significantly improve the satisfaction of insurance customers; that is, the service innovation mode is more successful.

4. Conclusion

Insurance data is an important part of the development of insurance industry. In order to realize the innovative service of the insurance industry in the big data environment, a service innovation scheme based on cloud computing insurance data (HP-CPABKS insurance innovation service) is designed. The cost of Enclndex algorithm is much lower than that of Search algorithm; the complexity of the algorithm increases linearly with the number of attributes. The above results show that the insurance service innovation scheme based on cloud computing insurance data proposed in this paper improves the traditional insurance service, improves customer satisfaction, and improves the competitiveness of the company. With the continuous saturation of the Internet market, insurance companies are bound to face a severe test. Precision marketing under big data is the development trend of insurance industry. Therefore, further research in this field will be carried out in the next step.

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.

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