

Negative Information Filtering Algorithm based on Text Content in Multimedia Networks

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Abstract

In the multimedia network environment, it is necessary to effectively filter negative information in the multimedia network and enhance the ability to mine and identify valid data. This paper presents a new algorithm of negative information filtering based on text content in multimedia networks. The principal component features of negative information in multimedia networks are extracted, and matched filters are designed to filter the negative information reasonably. All text contents and negative information are normalized and sorted. They are transformed into the same text format for classification and processing, and the filtering and detection of negative information are realized. Finally, based on the semantic features of text content, the support vector machine algorithm is used to extract negative information features from data. Experimental results show that the algorithm improves the filtering accuracy and performance for negative information in multimedia networks, and it has good application value.

Keywords: text content; multimedia network; negative information; filtering

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1. Introduction

With the rapid development of multimedia network and big data, we have entered the era of negative information. Multimedia network technology is a network structure closely combined with computer technology and communication technology. The emergence of multimedia networks represents a turbulence of information industry in the world. Multimedia networks realize intelligent control, information sharing, and network connection through big data and network structure. Currently, people are paying more and more attention to the negative information technology of multimedia networks. Data mining technology is used to extract the negative information features of massive multimedia networks, and it is combined with multimedia network technology, data collection, and data management. It has been proven that in the multimedia network environment, removing the negative information in the multimedia network can improve the effective use of data. Research on negative information filtering and mining algorithms in multimedia network environments can effectively enhance the control and recognition of data. With the rapid development of cloud storage and cloud computing technology, multimedia network negative information has become the key technology of cloud storage and database construction for the future. With the continuous expansion of the scale of data resources, a large number of cloud storage resources are distributed in the cloud integrated database system [1-2]. With the mode of cloud combination service and multimedia network negative information management, cloud storage resource sharing is realized. In order to improve the data scheduling performance of the cloud storage system, it is necessary to filter and process the multimedia network negative information and combine it with the multimedia integrated learning method to optimize the resource information scheduling. The mining method of association rules is used to integrate the information of negative information resources, which promotes the improvement of the retrieval efficiency of negative information of multimedia networks.

Nowadays, in order to suppress the negative information noise and reduce the dimension of multimedia networks, it is necessary to filter and mine multimedia networks. There are three main algorithms that can solve this problem, namely the

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particle filter algorithm, neural network control algorithm, and support vector machine algorithm. The negative information in multimedia networks is eliminated and preprocessed, realizing dimension reduction for multimedia network negative information. Research on the filtering and mining of negative information in multimedia network environments has certain research value. The multimedia network negative information filtering algorithm based on the genetic algorithm was adopted in reference [3]. Through the effective preprocessing of multimedia networks, the dimension reduction of negative information for multimedia network was realized, and the performance of data mining was improved, but the algorithm had the problem of complex computation and difficult realization. In addition, the PSO particle swarm clustering algorithm and the discovery and discrimination algorithm of association rules were proposed to realize the filtering and mining of negative information in multimedia networks. Because it is difficult to find the characteristics of the negative information in multimedia networks, when the distance between different density regions in data set is shortened, the misjudgment of edge points should be reduced. In the case of large data noise, the traditional particle filter algorithm has higher requirements for the initial trajectory of the particle filter, resulting in poor mining performance. In reference [4], an integration algorithm of multimedia network negative information resource information based on hybrid differential parallel scheduling was proposed. Firstly, the data structure and grid structure model of multimedia integrated learning resource information distribution in cloud storage environment were constructed, and the sample clustering analysis method of resource information flow was used to classify and process the attribute of resource information in the cloud storage environment, so as to improve the ability of resource integration. However, the computational overhead of this method was large, and the real-time performance of multimedia network negative information filtering was not good.

For the above problems, this paper proposes a filtering and mining algorithm for negative information in multimedia networks based on semantic feature extraction of text content. The simulation results show that the algorithm in this paper can remove the negative information in the multimedia network environment and mine its characteristics.

2. Model Construction and Feature Extraction

2.1. Overall Architecture of System Model

The main purpose of data mining is to extract the negative information features of data stream or time series in multimedia network environments and remove the useless features. In the multimedia network architecture environment, the sources of multimedia network negative information and most of the data published by publishers will use logical sensors to collect real-time data. Firstly, the network control model of the data generation model is constructed [5-6]. The model of the multimedia network negative information feature control system in a multimedia network environment is shown in Figure 1.

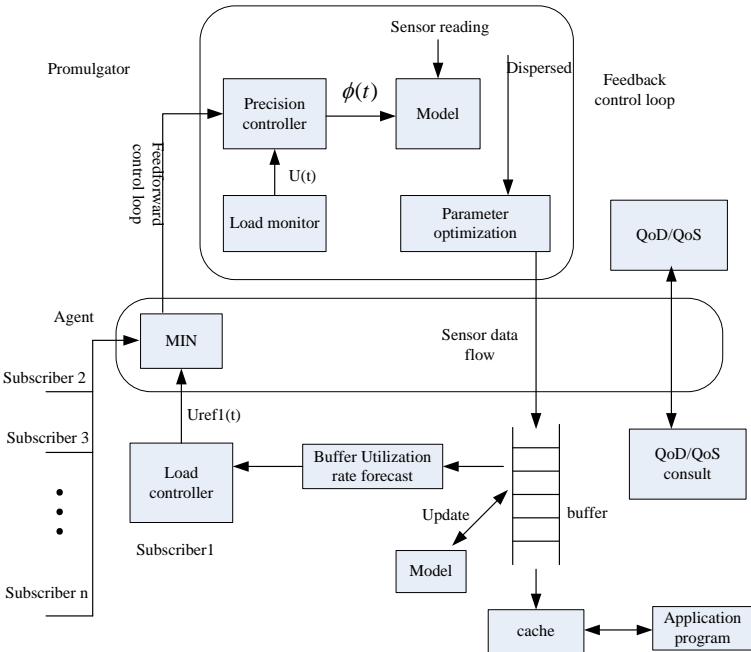


Figure 1. Filtering model of multimedia network negative information in multimedia network environment

In Figure 1, the cloud retrieval mechanism of multi-source information resources can be monitored for different

application platforms. All publishers use the sensors in the lower layer to collect data and transmit the collected results to the subset. Considering that the data of the lower sensor in the time slice t is recorded as $stream_n$, v is used to represent the receiver, and the corresponding connection points of $d_{uv} \leq r = \delta \cdot r_{\max}$ ($\delta \in (0,1)$) are x and y . The received signal is at the front end of $a = kXr/2$, $b = (k+1)Xr/2$, and $k=1,2,\dots$, and data acquisition is taken as $r_{\max} = \left(P(N_0\beta)^{-1}\right)^{1/\alpha}$. For any two senders $x, y \in S_t$, the data collected by the lower sensor can be distributed and counted. The collected information is encoded by $C_x \cap C_y = \phi$, and the negative information coding characteristics of the multimedia network in the multimedia network environment are obtained.

$$X = 2 \left(\frac{P}{N_0} \left(9 + \frac{3}{\alpha-1} + \frac{6}{\alpha-2} \right) \left(\frac{P}{\beta N_0} - r^\alpha \right)^{-1} \right)^{1/\alpha} \quad (1)$$

Data mining is used for feature analysis. Data mining technology is a modern and advanced data deep processing technology. It uses the related features between data and data as the research object and extract features according to the depth mining method. A large amount of data in the area to be excavated is equivalent to a multi-layer system structure by using the system layering method. On this basis, the negative information filtering of the multimedia network is realized through the iteration between the layers [7].

2.2. Extraction and Processing of Information Features in Multimedia Networks

On this basis, the information in multimedia networks is preprocessed, and the information features are extracted. Because the information in the multimedia network space cannot be gathered together, a large number of scattered points is more important, so it is necessary to reduce the dimension of the information characteristics in the multimedia network [8]. The information features in the multimedia network are divided, and the starting time is marked. The negative information of the multimedia network is distributed at the level of the layer, so the return status $x_0(t_k)$ is

$$\dot{Y} = AY + B[f(Y) + u] \quad (2)$$

Set S as the encoding of the B -bit string, and set the initial value to 0. According to the map reduce data processing flow, the data vector X is divided into V non overlapping subsequences $\{X_v, v=1,2,\dots,V\}$ by using the differential evolution method of excellent gene loci. Using the SVM algorithm to reduce the dimension of information feature space in the multimedia network, the expression of data feature is as follows:

$$g_{mn}(t) = g(t-mT)e^{j2\pi(nF)t}, \quad m, n = 0, \pm 1, \pm 2, \dots \quad (3)$$

Assuming that the observation value of the multimedia network sensor S_k is θ , the data feature segmentation satisfies

$$x_{id}^{t+1} = wx_{id}^t + c_1 r_1 (p_{id} - x_{id}^t) + c_2 r_2 (p_{gd} - x_{id}^t) \quad (4)$$

When data transmission is carried out, other nodes are not allowed to send data within the same time. The definition of monitoring data association is that the probability of generating a layer of aggregation tree frequent pattern set X in behavior set t is recorded as $p(X, T_d)$, and semantic ontology feature extraction is obtained as follows:

$$p(X, T_d) = \prod_{i_u \in X \wedge X \subset T_d} p(i_u, T_d) \quad (5)$$

The cumulative interference of the node in the multimedia network is calculated, and the interference filter is designed to filter the noise interference from the characteristic data. The system function of the filter is expressed as follows:

$$\Re(\rho, \theta) = \frac{p(z_t | x_t) p(x_t | u_{t-1}, \dots, z_0)}{p(z_t | u_{t-1}, d_{0, \dots, t-1})} = \eta p(z_t | x_t) \int p(x_t | x_{t-1}, u_{t-1}) Bel(x_{t-1}) dx_{t-1} \quad (6)$$

Set $x(t)$ and $t=0,1,\dots,n-1$ as training sample sequences. $t=0$ removes the irrelevant information in the multimedia network, sorts the key semantic text information of the data, and extracts the principal component feature quantity of the negative information of the multimedia network. The expression of mining probability density value a of useful features from node i to node j in time t is obtained as follows:

$$I_{i,j}(t) = \frac{\sum D_{i,k}''(t) D_{k,j}''(t)}{\sum D_{i,k}''(t)} \quad (7)$$

To sum up, we preprocess the multimedia network information, extract the semantic ontology features, and use the matched filter to remove the negative information in the multimedia network, which effectively enhances the ability of removing and mining the negative information in the multimedia network [9].

3. Introduction of Support Vector Machine and Implementation of Data Mining Algorithm

Based on the previous section, a filtering algorithm of negative information in multimedia networks is proposed. In the traditional information filtering method of multimedia networks, a particle filter algorithm is used for information filtering and mining [10]. In the case of large data noise, the algorithm requires high initial trajectory of the particle filter, which results in poor mining performance. Therefore, a new algorithm based on the semantic feature extraction of text content is proposed. The idea of improving the algorithm is described as follows:

Firstly, the support vector machine (SVM) algorithm is used to clean up the multimedia network, eliminate the collected abnormal data (such as noise data and non-associated data), summarize the collected data to a unified device, and convert the data. Based on data integration, all the text content and negative information are normalized, sorted, and converted into the same text format for classification processing. Finally, negative information filtering detection is carried out, and a data mining rule is established. A matching filter is designed based on the text content semantic feature extraction SVM algorithm to filter the negative information reasonably and achieve the data negative information feature mining. The key technologies of the algorithm are described as follows:

Set the distortion sensitive parameter $\{S_j^{(n)}, j=0,1,\dots,N-1\}$ in the SVM training algorithm, and obtain the correlation of $d_{j*} = \min_{0 \leq j \leq N-1} \{d_j\}$. The data aggregation tree with minimum distance is a kind of data dependency. In the behavior set D of filtering negative information data, the correlation intensity of the data aggregation tree is recorded as the expected support number of X , and the unbiased risk estimation value based on the aggregation tree is defined as $expSN(X)$.

$$expSN(X) = \sum_{T_d \ni X \wedge T_d \in D} P(X, T_d) \quad (8)$$

Where T_d is the sampling interval of the data association information extracted from the observation. The standard support vector solution is represented as

$$\min_{0 \leq \alpha_i \leq c} W = \frac{1}{2} \sum_{i,j=1}^l y_i y_j \alpha_i \alpha_j K(x_i, x_j) - \sum_{i=1}^l \alpha_i + b \left(\sum_{i=1}^l y_i \alpha_i \right) \quad (9)$$

Where (x_i, x_j) represents the sample. In the process of adjusting the weight vector α_c , the support vector machine is used for data mining, and there are n negative information data samples in the set S_s . The association rule matrix of the negative information data is expressed as follows:

$$Q' = \begin{bmatrix} 0 & y_1 & \cdots & y_n \\ y_1 & Q_{11} & \cdots & Q_{1n} \\ \vdots & \vdots & \ddots & \vdots \\ y_n & Q_{n1} & \cdots & Q_{nn} \end{bmatrix} \stackrel{def}{=} \begin{bmatrix} 0 & y^T \\ y & Q \end{bmatrix} \quad (10)$$

In the above formula, given matrix Q , the weight vector of negative information in the sample is gradually increased

or deleted, and the negative information measure characteristics of multimedia network are obtained as follows:

$$\det(Q') = \det(Q) \cdot (-y^T Q^{-1}) \neq 0 \quad (11)$$

The plane area of the multimedia network node is divided into several blocks with SG length and non-overlap, and the shortest unbiased time delay estimation value of data mining is obtained as follows:

$$\tau = \alpha(1 + 2^{-\alpha/2})(\alpha - 1)^{-1} + \pi 2^{-\alpha/2}(\alpha - 2)^{-1} / 2 \quad (12)$$

Furthermore, the unbiased phase characteristics of the parent node on the data aggregation tree T_{DAG} of the multimedia network are as follows:

$$K = \left[\left(4\beta\tau P\ell^{-\alpha} \right)^{1/\alpha} \cdot \left(2^{-\alpha/2} P\ell^{-\alpha} - \beta N_0 \right)^{-1/\alpha} + 1 + \sqrt{2} \right] \quad (13)$$

Considering the data transmission between dominant nodes, in each round of the multimedia network negative information filtering mining process, the topology center of the multimedia network sensor transmits the result to *Sink* through the shortest path. The information in the multimedia network is preprocessed, and the algorithm of negative information filtering and mining based on text content semantic feature extraction is optimized. Finally, the effectiveness of the proposed method is verified by simulation experiments [11].

4. Sampling and Feature Analysis of Negative Information in Multimedia Networks

4.1. Sampling of Negative Information Resources in Multimedia Networks

The statistical analysis method is used to collect multimedia network negative information resources, reconstruct the collected multimedia network negative information resources, and construct the characteristic information flow of multimedia network negative information resources [12]. The distributed structure model of multimedia network negative information resources is constructed by using the linear regression analysis model and grid division technology. x_{n-i} is used to represent the fuzzy distribution autocorrelation of the multimedia network negative information resource attribute set, and η_{n-j} is used to represent the finite distribution set of the attribute vector of the multimedia network negative information resource attribute. Then, the reorganization model of multimedia network negative information resource information flow is represented as follows:

$$x_n = a_0 + \sum_{i=1}^{M_{AR}} a_i x_{n-i} + \sum_{j=0}^{M_{MA}} b_j \eta_{n-j} \quad (14)$$

Where a_0 is the sampling amplitude of statistical data, and b_j is the optimal association rule distribution attribute of multimedia network negative information resources. The piecewise sample statistical analysis method is used to analyze the joint correlation mutual information characteristics of multimedia network negative information resources. The scalar time series of multimedia network negative information resources is $x(t)$, where $t = 0, 1, \dots, n-1$, and it is combined with the fuzzy information feature analysis method. The correlation index reflecting the main resource information is analyzed by using the relevant data analysis and information collection technology, and the limited set of subject information distribution is obtained.

$$X = \{x_1, x_2, \dots, x_n\} \subset R^s \quad (15)$$

Combined with the filtering data clustering model, the correlation feature extraction results of multimedia network negative information resources are as follows:

$$C(l) = \sum_{j=1}^k \sum_{k=1}^{n_j} (\|x_k^j - A_j(L)\|)^2 \quad (16)$$

In the environment of multimedia network negative information processing, the multimedia network negative information resource information management system aggregates a large number of multi-source information resources [13]. In the fuzzy clustering center, the binary semantic feature mapping of multimedia network negative information features is described as follows:

$$\theta: S \rightarrow S \times [-0.5, 0.5] \quad (17)$$

$$\theta(s_i) = (s_i, 0), \quad s_i \in S \quad (18)$$

Set the real number $\beta \in [0, T]$ as the similarity, load the association index parameters into the information processing module, and adopt the association rule mining method to realize information sampling and feature extraction.

4.2. Phase Space Reconstruction and Feature Extraction

The phase space reconstruction method is used to reconstruct the characteristics of multimedia network negative information [14]. When the relative distance of multi-source text topic information distribution clustering center satisfies $\|C(l) - C(l-1)\| < \xi$, the clustering iteration of multimedia network negative information resources is obtained as:

$$A_j(L+1) = \frac{1}{n_j} \sum_{i=1}^k X_i^j, \quad j = 1, 2, \dots, k \quad (19)$$

Let (s_k, a_k) and (s_l, a_l) be the fuzzy closeness vectors between the filtering nodes of negative information resources in the multimedia network, and the phase space reconstruction method is used to reconstruct the features. The phase space reconstruction model is expressed as follows:

$$\max Z = \sum_{i=1}^m \sum_{j=1}^m x_{ij} c_{ij} \quad (20)$$

Where $x_{ij} = 1$ represents the regression coefficient of multimedia network negative information resource filtering, abstracts the association rule characteristic quantity of multimedia network negative information, and obtains the attribute classification and evaluation constraint factor of multimedia network negative information resources.

$$\text{ind}(P) = \left\{ (x, y) \in U^2 \mid a(x) = a(y), \right. \\ \left. \forall a \in P \right\} \quad (21)$$

The fuzzy correlation degree characteristics of negative information resources in the multimedia network are calculated, and the expression of the detection statistical analysis model of information filtering is obtained as follows:

$$TTD = a_1 x_1 + a_2 x_2 + \dots + a_k x_k + \delta \quad (22)$$

Where TTD represents the set of association rules. In the phase space of data filtering, the output after mining the negative information of multimedia network is as follows:

$$X_p(u) = s_c(t) e^{j2\pi f_0 t} = \frac{1}{\sqrt{T}} \text{rect}\left(\frac{t}{T}\right) e^{j2\pi(f_0 t + Kt^2)/2} \quad (23)$$

Where $s_c(t)$ represents the parallel scheduling set of multi-source text topic information, from which the feature quantity of association rules of negative information in the multimedia network is extracted, and the fuzzy multi-layer clustering of information is carried out according to the result of feature extraction [15].

5. Optimization of Negative Information Filtering Model in Multimedia Networks

5.1. Association Rules Mining Model

Based on the distributed reconstruction of multimedia network negative information by the phase space reconstruction method, the optimization design of the multimedia network negative information filtering model is carried out. In this paper,

a multimedia network negative information filtering model based on semantic text content feature extraction is proposed. The association rule feature quantity of negative information in multimedia networks is extracted, and the information flow is reorganized by using the multi-feature static fitting method. Then, the priority attribute of resource distribution set can be expressed as $P(n_i) = \{p_k \mid pr_{kj} = 1, k = 1, 2, \dots, m\}$. The mining method of association rules based on parallel scheduling is used to mine the negative information of multimedia networks on the multimedia network negative information platform [16], and the grouping relationship of resource information flow is obtained as follows:

$$Q^w = \sum_{k \in R_w} F_k^w, \quad w \in W \quad (24)$$

$$V_a = \sum_{w \in W} \sum_{k \in R_w} \delta_{ak}^w F_k^w, \quad a \in A \quad (25)$$

By adopting the multi-element information filtering method, the self-adaptive allocation of the multimedia network poor information flow is carried out, and the resource information flow is obtained as follows:

$$flow_k = \{n_1, n_2, \dots, n_q\}, q \in N \quad (26)$$

Where q represents the set of negative information flow in multimedia networks under the reorganization of multiple nodes, n_q represents the load, and the mining output of association rules for negative information in multimedia networks is represented as follows:

$$u_i = \frac{1}{N} \sum_{i=1}^N u_i = \frac{1}{MN} \sum_{m=1}^M \sum_{i=1}^N x_{mi} \quad (27)$$

According to the results of association rules mining, the method of grouping sample regression analysis is used to filter the subject information.

5.2. Information Filtering

Given the related factors of multimedia network negative information resources filtering, a_1, a_2, \dots, a_k , under the distribution structure model of multimedia network negative information resources, β is taken as the boundary condition to obtain the extended extension M^β .

$$M^\beta = \{x \mid x \in M, |f(x) \cap Y|/|Y| \geq \beta, 0 \leq \alpha \leq \beta \leq 1\} \quad (28)$$

$U(t) = \sum_{M \in E} P[M]$ is used to represent the trust attribute state set of the filtering agent of multimedia network negative information resources, and $A_{st} \subseteq P \times T$. A fuzzy assignment scheduling set of multimedia network negative information resources is constructed, and autocorrelation feature matching technology is adopted to carry on the information integration filtering [17]. The fuzzy clustering method is utilized to carry on the multimedia network negative information feature classification processing, and the C means clustering model is as follows:

$$L_\xi = \begin{cases} |f(x) - y| - \xi, & |f(x) - y| \geq \xi \\ 0, & |f(x) - y| < \xi \end{cases} \quad (29)$$

As a result, the fuzzy function of resource filtering is as follows:

$$f(x) = \sum_{i=1}^l (a_i + a_i^*) k(x - x_i) + b \quad (30)$$

The fuzzy correlation degree characteristics of multimedia network negative information resources are calculated, and the C means clustering method is used to filter the multimedia network negative information [18]. The optimized model can

be expressed as follows:

$$\begin{aligned} \min F &= R^2 + A \sum_i \xi_i \\ \text{s.t.} \quad & \|\phi(x_i) - o\|^2 \leq R^2 + \xi_i \text{ and } \xi_i \geq 0, i = 1, 2, \dots \end{aligned} \quad (31)$$

$$\begin{aligned} \max \quad & \sum_i \alpha_i K(x_i, x_i) - \sum_i \sum_j \alpha_i \alpha_j K(x_i, x_j) \\ \text{s.t.} \quad & \sum_i \alpha_i = 1 \text{ and } 0 \leq \alpha_i \leq A, i = 1, 2, \dots \end{aligned} \quad (32)$$

Because $\sum_i \alpha_i = 1$ and $K(x_i, x_i) = 1$, the optimization model of negative information feature classification in multimedia networks is as follows:

$$\begin{aligned} \max \quad & 1 - \sum_i \sum_j \alpha_i \alpha_j K(x_i, x_j) \\ \text{s.t.} \quad & \sum_i \alpha_i = 1 \text{ and } 0 \leq \alpha_i \leq A, i = 1, 2, \dots \end{aligned} \quad (33)$$

Where $K(x_i, x_j) = e^{-\frac{\|x_i - x_j\|^2}{2\sigma^2}}$. The smaller the σ value, the better the convergence. It can be seen that the designed resource filtering model is robust and convergent [19-20].

6. Simulation Experiment and Result Analysis

In order to test the performance of the algorithm in the implementation of multimedia network negative information filtering, simulation experiments are carried out on Intel (R) 2.3GHz CPU, with 2GB memory, PC of 32-bit Windows 7 system, MyEclipse 8.5, and MATLAB 2010 programming platform. The sensor network structure model is used to build a multimedia network, and sensors are used to collect real-time monitoring data. In the design of multimedia network negative information filtering, the number of rows and columns of the support vector machine is set as $20 \times 1000 = 20,000$, and the weight vector of user parameters and ontology features is set as 20. Table 1 shows the information parameters of the standard data set in the negative information filtering mining.

Table 1. Standard data set required for lab acquisition

Dataset name	Dataset size	Property set size
Text information	564	42
Video information	536	56
Image information	443	64

According to the above simulation environment, the simulation experiment of negative information filtering mining in multimedia networks is carried out. The negative information filtering mining of the given data samples is carried out, and the semantic ontology features are extracted. The results of multimedia network negative information extraction filtering mining are shown in Figure 2.

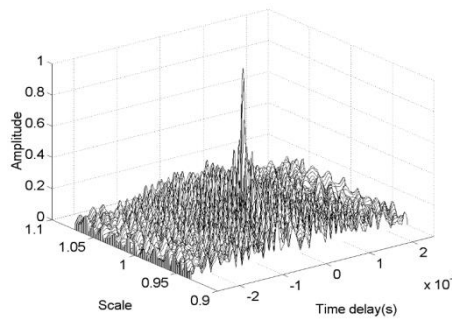


Figure 2. Results of multimedia network negative information extraction and filtering

It can be seen from Figure 2 that the algorithm in this paper can effectively filter out the interference information, realize the filtering and mining of negative information, and improve the performance of feature extraction of negative information in multimedia networks. In order to verify the effectiveness of this algorithm, the classical genetic algorithm and particle swarm optimization algorithm in references [3] and [4] are compared. A Monte Carlo experiment is used to compare the accuracy of data mining of this algorithm, the genetic algorithm, and the particle swarm optimization algorithm. The comparison results are shown in Figure 3.

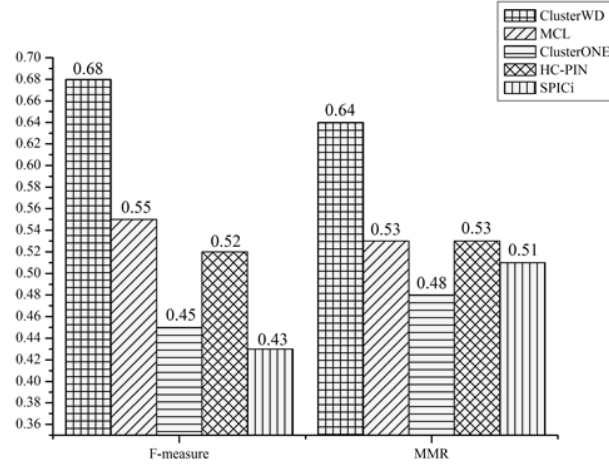


Figure 3. Performance comparison test

According to Figure 3, the data mining accuracy of the algorithm in this paper is 96.7%, which is 175% higher than that of the traditional algorithm, thus verifying the effectiveness of the algorithm in filtering and mining negative data information. In order to test the application performance of this method in the realization of multimedia network negative information filtering and retrieval, the simulation experiments are carried out. According to the experimental results and the relevant parameters of Excel 2007 and SPSS19.0, the correlation statistical parameters are shown as follows: $Q = 200$, $c_1 = 30$, $c_2 = 10$, $c_r = 2$, $\mu_1 = \mu_2 = 0.01$, $\rho_1 = \rho_2 = 0.01$, and $\delta = 0.8$. The multimedia network negative information distribution is shown in Table 2.

Table 2. Statistical analysis results of the distribution of the negative information of the multimedia network

Correlation coefficient	x_1	x_2	x_3	x_4	x_5	x_6
x_1	1	0.546	0.675	0.546	0.674	0.643
x_2	0.568	1	0.232	0.478	0.454	0.657
x_3	0.656	0.656	1	0.598	0.653	0.554
x_4	0.643	0.546	0.753	1	0.658	0.675
x_5	0.575	0.685	0.467	0.464	1	0.546
x_6	0.554	0.546	0.675	0.643	0.647	1

According to the correlation detection results of the multimedia network negative information distribution in Table 2, the association rules are excavated, and the mining results are shown in Figure 4.

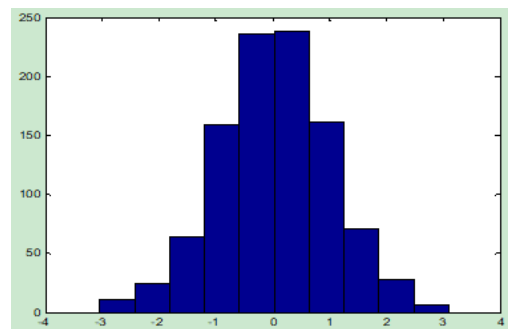


Figure 4. Mining results of association rules for negative information in multimedia networks

Based on the analysis of Figure 4, the method can accurately dig the association rules of the negative information of the multimedia network, so as to improve the information filtering capability and test the recall rate after the text subject information is filtered and processed by different methods. The comparison result is shown in Figure 5. According to the analysis of Figure 5, the characteristic classification of the negative information filtering of the multimedia network is good, the accuracy of data retrieval by the cloud storage center is improved, and the data recall is high.

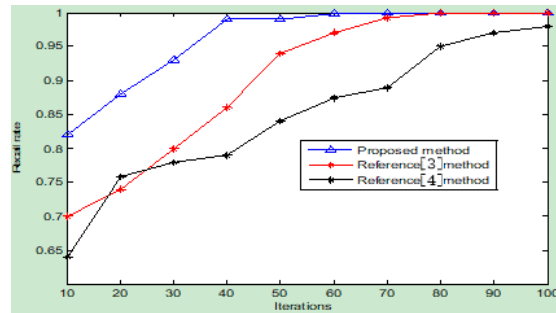


Figure 5. Comparison of recall rates

7. Conclusions

In this paper, a new algorithm of mining and filtering negative information in multimedia networks is proposed. According to the negative information in multimedia networks, the information features are extracted, and the data is collected and managed. In the multimedia network environment, it is necessary to effectively filter the negative information in the multimedia network and enhance the performance of mining and identifying valid data. The research on this algorithm lays a deep foundation for data control and recognition. The matched filter is designed to filter the negative information reasonably, and the feature mining of the negative information is realized. On this basis, the negative information of multimedia networks is filtered based on text content. The simulation results show that the algorithm achieves high accuracy in negative information filtering, so this method thus has a good application value in negative information filtering of multimedia networks.

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References

1. M. Liu, S. Liu, W. Fu, and J. T. Zhou, "Distributional Escape Time Algorithm based on Generalized Fractal Sets in Cloud Environment," *Chinese Journal of Electronics*, Vol. 24, No. 1, pp. 124-127, 2015
2. Y. Wang, L. Feng, and J. Zhu, "Novel Artificial Bee Colony based Feature Selection Method for Filtering Redundant Information," *Applied Intelligence*, Vol. 48, No. 4, pp. 4868-885, 2018
3. Y. Liu, "Joint Resource Allocation in SWIPT-based Multi-Antenna Decode-and-Forward Relay Networks," *IEEE Transactions on Vehicular Technology*, Vol. 66, No. 10, pp. 9192-9200, 2017
4. C. Du, X. Chen, and L. Lei, "Energy-Efficient Optimization for Secrecy Wireless Information and Power Transfer in Massive MIMO Relaying Systems," *IET Communications*, Vol. 11, No. 1, pp. 10-16, 2017
5. W. Wang, R. Wang, and H. Mehrpouyan, "Beamforming for Simultaneous Wireless Information and Power Transfer in Two-Way Relay Channels," *IEEE Access*, No. 5, pp. 9235-9250, 2017
6. J. Shu, X. Shen, and L. Hai, "A Content-based Recommendation Algorithm for Learning Resources," *Multimedia Systems*, No. 1, pp. 1-11, 2017
7. S. Hu, Z. Ding, and Q. Ni, "Beamforming Optimization in Energy Harvesting Cooperative Full-Duplex Networks with Self-Energy Recycling Protocol," *IET Communications*, Vol. 10, No. 7, pp. 848-853, 2016
8. Z. Wen, X. Liu, and N. C. Beaulieu, "Joint Source and Relay Beamforming Design for Full-Duplex MIMO AF Relay SWIPT Systems," *IEEE Communications Letters*, Vol. 20, No. 2, pp. 320-323, 2016
9. A. Fatehi and B. Huang, "Kalman Filtering Approach to Multi-Rate Information Fusion in the Presence of Irregular Sampling Rate and Variable Measurement Delay," *Journal of Process Control*, Vol. 53, No. 2, pp. 15-25, 2017
10. G. Zhao, F. Chen, Q. Zhang, M. W. Shen, and Z. F. Gao, "Feature-based Information Filtering in Visual Working Memory is Impaired in Parkinson's Disease," *Neuropsychologia*, Vol. 111, pp. 317-323, 2018
11. G. Yang and S. Liu, "Distributed Cooperative Algorithm for k-M Set with Negative Integer k by Fractal Symmetrical Property," *International Journal of Distributed Sensor Networks*, Vol. 10, No. 5, 2014

12. J. M. Batalla, C. X. Mavromoustakis, and G. Mastorakis, "Evolutionary Multiobjective Optimization Algorithm for Multimedia Delivery in Critical Applications Through Content-Aware Networks," *Journal of Supercomputing*, Vol. 73, No. 3, pp. 993-1016, 2017
13. F. Yang, Q. L. Han, and Y. Liu, "Distributed H_∞ State Estimation over a Filtering Network with Time-Varying and Switching Topology and Partial Information Exchange," *IEEE Transactions on Cybernetics*, Vol. 12, No. 99, pp. 1-13, 2018
14. Y. Wang, L. Feng, and J. Zhu, "Novel Artificial Bee Colony based Feature Selection Method for Filtering Redundant Information," *Applied Intelligence*, Vol. 48, No. 4, pp. 868-885, 2018
15. W. Lu, F. L. Chung, and K. Lai, "Recommender System based on Scarce Information Mining," *Neural Networks*, Vol. 93, No. 6, pp. 256, 2017
16. Y. Lin, X. Zhu, Z. Zheng, Z. Dou, and R. L. Zhu, "The Individual Identification Method of Wireless Device based on Dimensionality Reduction and Machine Learning," *Journal of Supercomputing*, Vol. 75, No. 6, pp. 3010-3027, 2019
17. S. Liu, Z. J. Li, and X. C. Cheng, "Introduction of Recent Advanced Hybrid Information Processing," *Mobile Networks and Applications*, Vol. 23, No. 4, pp. 673-676, 2018
18. J. Atkinsonabutrity, C. Mellish, and S. Aitken, "Combining Information Extraction with Genetic Algorithms for Text Mining," *IEEE Intelligent Systems*, Vol. 19, No. 3, pp. 22-30, 2017
19. Y. Lin, Y. Li, X. Yin, and Z. Dou, "Multisensor Fault Diagnosis Modeling based on the Evidence Theory," *IEEE Transactions on Reliability*, Vol. 67, No. 2, pp. 513-521, 2018
20. L. Shi, D. Chang, and X. Ji, "Using Data Mining To Search for Perovskite Materials with Higher Specific Surface Area," *Journal of Chemical Information and Modeling*, Vol. 58, No. 12, pp. 2420-2427, 2018