

Retraction

Retracted: Cognitive Computing Model Based on Machine Learning Algorithm in Artificial Intelligence Environment

Security and Communication Networks

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This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

- (1) Discrepancies in scope
- (2) Discrepancies in the description of the research reported
- (3) Discrepancies between the availability of data and the research described
- (4) Inappropriate citations
- (5) Incoherent, meaningless and/or irrelevant content included in the article
- (6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

References

- [1] W. Liu, "Cognitive Computing Model Based on Machine Learning Algorithm in Artificial Intelligence Environment," *Security and Communication Networks*, vol. 2022, Article ID 6577274, 7 pages, 2022.

Research Article

Cognitive Computing Model Based on Machine Learning Algorithm in Artificial Intelligence Environment

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In order to effectively solve problems and complete data processing quickly, a data processing model based on computational knowledge training technology is prepared. First, prepare the cognitive model and then learn the data as techniques (distribution, decision-making, etc.) that can be used in the model and the process of scheduling work in the environment. The main points and progress of the research are as follows. Many people see the purpose of the problem that the data and data streams are difficult to identify and influence. The flow of knowledge data in relation to the use of the Internet is based on content-based counting patterns. It is to learn to correctly analyze the information points. In addition, in view of the problem of unsatisfactory effect caused by the randomness of the optional splitting behavior in the VFDT (Fast Decision Tree) algorithm, the decision tree algorithm for data flow is planned for the distribution of data flow. The accuracy of the algorithm can be close to 96%. The performance of the experiments was evaluated.

1. Introduction

Information is the knowledge base for people to understand and change the world. Because the real world is diverse, complex, and moving, human presentations of things and information are often inaccurate, inaccurate, and vague. Any information people are exposed to is ambiguous. Certainty means that a goal has a continuous, unobtrusive, clear, and distinct character in connection and development. Uncertainty refers to the inconsistency, inconsistency, ambiguity, and predictability that exist in the connection and development of a goal. Facts and uncertainties show the relationship between inconsistency and inconsistency, insight and events, insight and uncertainty, facts and predictions in reality, and continuity and development of goals [1]. In the nineteenth century, decision science represented by Newton's theory developed a method to correctly describe the world. He believes that the entire universe is a dynamic decision-making system that operates according to the laws of harmony and order. From Newton to Laplace to Einstein, he described all the pictures of world science with the development of science. Decision-making encounters

difficulties that a growing number of studies cannot resolve. More impactful on decision-making is the advent of quantum mechanics. Quantum mechanics further confirms that uncertainty is the nature of the situation. Many scholars and philosophers agree with this view. In principle, uncertainty would be the goal of our human intelligence. The limitations of human knowledge of the target world, which makes the description of the target world ambiguous, conceptually reveal the same situation. Due to the differences in intelligence of different people, there will also be differences in teaching strategies, the uncertainty of knowledge, and, ultimately, the uncertainty of the global mission (innumerable points). The uncertainty of the world purpose that maps to the concept of the human brain (subjective world) should also be unclear. Therefore, the development of ideas and the updating of knowledge in the process of human cognition are inevitably accompanied by uncertainty. Conceptual uncertainty leads to uncertainty in calculations and assumptions. Research on the representation, function, and simulation of concepts is unclear. Discover and present the continuity and continuity characteristics of uncertain concepts; let machines simulate

human understanding of the purpose of the world (the continuation of the concept) and personal knowledge (the connotation of the concept), and improve computer skills. The intellectualization of human brain cognitive concepts has become an important task for current AI scientists, as shown in Figure 1 [2].

2. Literature Review

Tadjeer A. et al. found that since the mid-1990s, information technology, especially the Internet, has developed rapidly [3]. Cheung H. et al. believe that, today, the Internet and the World Wide Web have developed into a platform for ideological communication and spiritual collection. People all over the world communicate on an unprecedented scale. People's perceptual and cognitive abilities have broken away from the constraints of time and distance and have been greatly extended. The development of information network has brought more uncertainty to the research of artificial intelligence [4]. Yan W. et al. found that since 1984, IP protocol has gradually been widely used on the Internet, forming "everything is over IP," providing a connectionless communication through packet exchange, and realizing the best effort service, which is a breakthrough in connection oriented communication. The scale, topology, access mode of nodes, and transmission path of data packets are uncertain [5]. Mohammed S. et al. found that the World Wide Web appeared in 1989, which conveniently realized the release and sharing of information through web technology. The scale and distribution of Website content and the structure of hyperlinks are uncertain in the twenty-first century. With the emergence and development of Web services, semantic web, web2.0, and cloud computing, a social computing environment based on Internet public participation has gradually formed, forming a virtual human society. The uncertainty in human intelligence is more reflected in the uncertainty of user behavior, community division, and public cognition on the Internet [6]. Xia Y. et al. found that, with the development of Internet technology, computers and networks have changed human production mode, lifestyle, even leisure and entertainment mode, and even the ideology of the whole social relations. The Internet has become a powerful engine to promote technological innovation and social progress, and the types of network applications are also diversified. People pay more attention to all kinds of communities with different sizes formed through public sharing and interaction on the Internet, as well as the emerging swarm intelligence and even social computing [7]. Zhu H. et al. found that people even use natural language directly. This interaction based on natural language has become a kind of soft computing or computing with words. In a specific situation, according to the context and grammar, the qualitative and quantitative cognitive transformation between concepts and data, soft computing between concepts and variable granular computing, and other uncertain computing will become the core problem of social computing in the Internet environment. It will also become a hot issue for intelligent scientists [8]. Yin Y. et al. believe that it shows the evolution process from a single

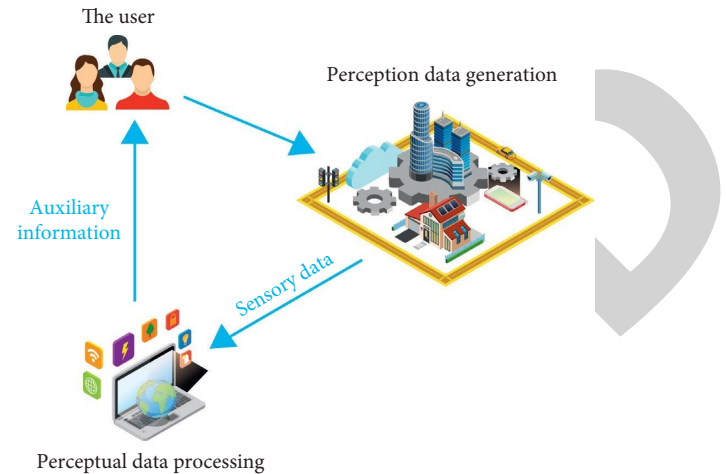


FIGURE 1: Flowchart of machine learning algorithm.

Turing machine to the emergence of cloud computing and swarm intelligence in the Internet environment. It is not difficult to see that, after half a century, artificial intelligence, which uses deterministic mathematics and symbolic logic methods to simulate the thinking activities of human brain, is gradually entering a new era of uncertain artificial intelligence [9]. Wang Z. et al. believe that uncertain artificial intelligence is a new development of artificial intelligence in the twenty-first century, in which the representation and processing of uncertain problems is a new hot issue faced by researchers [10]. Song J. et al. found that how to deal with uncertain information and data more effectively, so as to find the knowledge and laws contained in uncertain information is an important research topic [11]. Kocak B. et al. found that, with the continuous improvement of human digitization in various fields of the objective world, a large number of data are generated every day or every moment, and their generation speed is faster and faster. These data come from a wide range of sources. Among them, the most important ones are scientific research (astronomy, biology, high-energy physics, etc.), social network, e-commerce, Internet of things, mobile communication, etc. Gartner research report points out that the total amount of digital information is expected to increase 44 times between 2009 and 2020, and the global data usage will reach about 35.2 zb [12].

3. Methods

With the continuous improvement of the use of Internet technology, information services can be seen everywhere in people's daily life. In the face of a large amount of perceptual information in the environment, how to accurately analyze and process the information and provide users with services that suit their needs in a timely manner has become one of the most important teachings in business and education today [12]. In order to meet the needs of users, the application and operation of data services should be able to identify and process large amounts of data because only adequate information can be considered to provide better decisions. In these contexts, information about technology

has become more popular through education and commerce [13]. Today, applications based on information technology have many uses, such as intelligent transportation, communication, and financial information. When users use information applications such as intelligent delivery, connection analysis, real-time tracking of financial data, and data text recovery, they will generate more familiar data flow and data knowledge. These types of traffic data are characterized by fast transmission speed, high traffic volume, chaotic dependencies, and negative returns. It is very difficult to delete the required data and understand its meaning, which presents a serious challenge to standard data processing. Therefore, to address this issue, this study explores cognitive models based on cognition, knowledge based on data flow, and knowledge for critical analysis of cognitive information and obtains valuable knowledge. Furthermore, as part of the data flow, a decision tree is proposed as a data flow process to identify the data flow quality [14].

During the detailed information retrieval process, the system will record data and information flow from users using Internet services. Hardware (sensor networks, wearable devices, and smart terminals such as smartphones) allows the system to receive large amounts of information [15]. The data-receiving layer that knows the content will list all of the above data that can be written and sent to the data-storage layer that knows the content. Furthermore, in order to increase the efficiency of data collection and reduce operating costs by storing and counting erroneous data, we have developed filtering procedures that make it easier to receive information about the content of the data. The filtering mechanism has two processes. First, filter according to the data attribute to determine whether it is the required sensory data. If it is, it is sent to the context-aware data computation layer, otherwise the data is discarded. After this layer of filtering, some invalid or corrupt data will no longer occupy system resources. Then, filter based on the valid range of the data. For example, if the ambient temperature is -150°C , we consider the data measurement to be wrong and should be discarded [16]. Using this data filtering mechanism, we can effectively reduce system overload.

Since the data and data streams generated by various hardware and services are massive data and take up a lot of memory space, it is also necessary to determine how to store this data more efficiently and securely and how to process the data streams. Decide: therefore, we have reworked the storage layer storage rules. We design a context-aware data-storage layer. In this layer, we propose a distributed database based on data classification, which we call DDB-DC. The storage distribution model based on data allocation is shown in Figure 2. For data distribution based on data distribution, with data distribution a , we first divide the data into static data and dynamic data, and different types use different processes data [17]. For static data (time and data processing), it is stored in prepartitioned files, and the static data publishing interface is provided by the data entry high data count layer. Such data are in high demand over time in order to understand the flow of data (such as temperature over time). If done as soon as possible, it can make good decisions on the record as soon as possible. For such data, our final

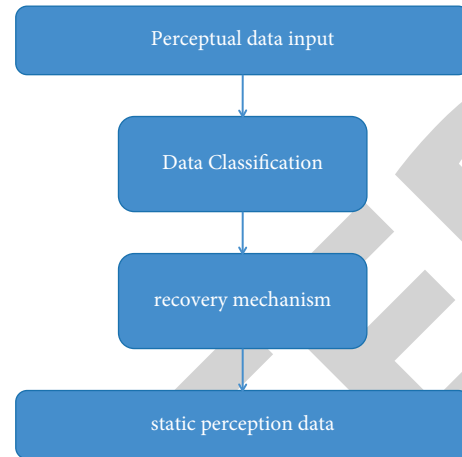


FIGURE 2: Distributed storage system based on data classification.

approach is to send the data directly from the cache location to the count layer to the top layer. However, this can cause problems. Data in the cache can easily be lost. To address this issue, we have developed a damage-resistant recovery mechanism to maintain a backup when the data are loaded to ensure its ability to withstand data errors. In this way, unconfirmed data can be retrieved from the backup for analysis and statistical correction after shutdown, even if abnormalities occur during system operation [18, 19].

Decision tree development algorithms include ID3, C4.5, and CART. However, the above solutions refer to tree-building algorithms such as ID3 and C4.5, while push is for static data. Because data streams are endless, they cannot be used to generate direct data streams. In addition, the data flow will flow into the system at high speed, which also brings serious problems to the training of decision trees. The existing research also has some solutions for data stream processing. The most used tool in recent ten years is incremental learning. According to the related research of incremental learning, incremental learning technology can learn new knowledge from data and retain the original knowledge, and the whole process does not need to repeatedly process the learned data. According to this characteristic, we believe that incremental learning technology can be used to obtain feature attributes [20, 21]. Therefore, a new decision tree training algorithm based on cart is proposed to deal with data flow. The core problem of the algorithm is to determine the optimal characteristic attribute of each node bifurcation. Because we cannot use infinite datasets to calculate the selection of optimal features, we use known data to form a sample set to train the decision tree. In this case, it is easy for us to know that, under a certain probability, the optimal features we get through sample training are consistent with the optimal features that should be selected by the whole data flow. Cart was proposed in 1984. This algorithm can be used for classification or regression. In fact, the essence of cart is to divide all the attributes according to the characteristics into two elements, which can split the attributes continuously. Algorithms such as ID3 and C4.5 use information entropy and information entropy gain to determine the purity of splitting. In other

words, the selected attributes of splitting are determined according to these two parameters. The disadvantage of this method is that the calculation speed is relatively slow and the amount of calculation is large. When cart is measured by Gini index, the amount of calculation will be relatively small; that is, the time required to generate the tree is shorter. Next, we introduce the specific process of cart spanning tree. Cart first creates a root node N_o . In the process of learning, for each specified node N_a , there is a subset S_a of the specified training set s corresponding to it. For the root node, the corresponding is the training set s . When the subsets corresponding to a node belong to the same classification, the node is set as a leaf node, indicating that the training of the node has been completed. If the subsets corresponding to a node do not all belong to the same classification, the algorithm will continue to iterate until all training subsets correspond to the corresponding leaf nodes.

For each available attribute b^i , the value B^i of the attribute will be divided into subsets B_L^i and B_R^i of two intervals. These two subsets divide the training subset S_a into two parts L_q and R_q . In cart, the commonly used impurity measurement method is Gini index. For a training set S_a , the expression of Gini index is shown in

$$\text{Gini}(S_n) = 1 - \sum_{k=1}^k (P_{k,a})^2, \quad (1)$$

where P represents the probability that the training set belongs to the classification, K represents the classification value, and a represents the training subset number. It is easy to see from formula (2) that the minimum value of Gini index is 0. When all samples are correctly classified, the minimum value is obtained. In other words, Gini index reflects the purity of classification results. The smaller the value, the purer the classification and the more accurate the results. When the classification pass probability of the training set in the current node appears, the Gini index appears the maximum. In addition, according to the probability relationship, we can get the weighted Gini index:

$$\text{Gini}_w(S_a, B_L^i) = P_{L,a}(B_L^i) \text{Gini}(L_a(B_L^i)) + (1 - P_{L,a}(B_L^i)) \text{Gini}(R_a(B_L^i)). \quad (2)$$

In cart, the node is split according to the gain of Gini index or weighted Gini index, which is similar to the split operation according to the gain of information entropy in ID3 algorithm. Next, the design idea and theoretical basis of the improved cart algorithm in this section are introduced in detail. In the above analysis, all calculations and analysis are based on the whole dataset. Next, we will discuss the analysis of stream data. Because the stream data is infinite, it is impossible to calculate the probability of belonging to a certain classification in the sample like cart, but its probability can only be estimated according to the known data samples. We consider the case of a fixed node. In the previous analysis, we use S_a . According to the previous analysis, we can get the following conclusions, as shown in formula (3) and (4):

$$P_{KL}(B_L^i) = 1 - \sum_{j=1}^{K-1} P_{jL}(B_L^i), \quad (3)$$

$$P_{KL}(B_L^i) = 1 - \sum_{j=1}^{K-1} P_{jR}(B_L^i). \quad (4)$$

In this way, $k-1$ of the K features is considered for calculation. According to this rule, probability p_K can be calculated similarly. The calculation method is shown in

$$P_k = 1 - \sum_{j=1}^k p_j. \quad (5)$$

As can be seen from formula (5), $k-1$ of the K characteristic attributes is important. Note that probability B is not determined according to the selected characteristic attributes, but can be calculated according to $p_L(B_L^i)$, $p_{jL}(B_L^i)$, and $p_{jR}(B_L^i)$. The settlement formula is shown in

$$p_j(p_L, p_{jL}, p_{jR}) = p_L(B_L^i) p_{jL}(B_L^i) + (1 - p_L(B_L^i)) p_{jR}(B_L^i). \quad (6)$$

For any dataset, each constituent element of the dataset belongs to one of the K categories. Gini index can be calculated using

$$\text{Gini}(p_1, p_2, \dots, p_{k-1}) = 1 - \sum_j^k p_j^2 = 1 - \sum_{j=1}^{k-1} p_j^2 - \left(1 - \sum_{j=1}^{k-1} p_j\right)^2, \quad (7)$$

where p_j represents the probability that the data set belongs to the j th classification. In this way, Gini index can be expressed as a function of $k-1$ variables. Similarly, Gini gain can also be expressed by the parameters mentioned above:

$$\begin{aligned} \text{Gini}_g &= \text{Gini}(p_1, p_2, \dots, p_{k-1}) - p_L \text{Gini}(p_{1L}, p_{2L}, \dots, p_{(k-1)L}) \\ &\quad - (1 - p_L) \text{Gini}(p_{1R}, p_{2R}, \dots, p_{(k-1)R}). \end{aligned} \quad (8)$$

We believe that if the Gini gain value calculated according to two different characteristic attributes and sample sets is greater than a given special value, the value will probably reflect the real Gini gain value. According to this basis, we can determine the best feature attribute according to the recently obtained dataset and carry out the decision tree splitting and tree-building operation [22, 23].

4. Experiment and Discussion

We will evaluate the performance of the CART_DS algorithm. First, in experimental experiments, we compare the performance of the proposed CART_DS algorithm with the proposed McDiarmid Tree (MDT) and Gaussian Decision Tree (GDT) algorithms. In this comparative experiment, we set the negative correction factor to 0.0 0.05 and the true factor to be 107. We fixed these parameters unchanged, changed the number of training datasets from 104 to 109, and compared the performance of algorithm classification

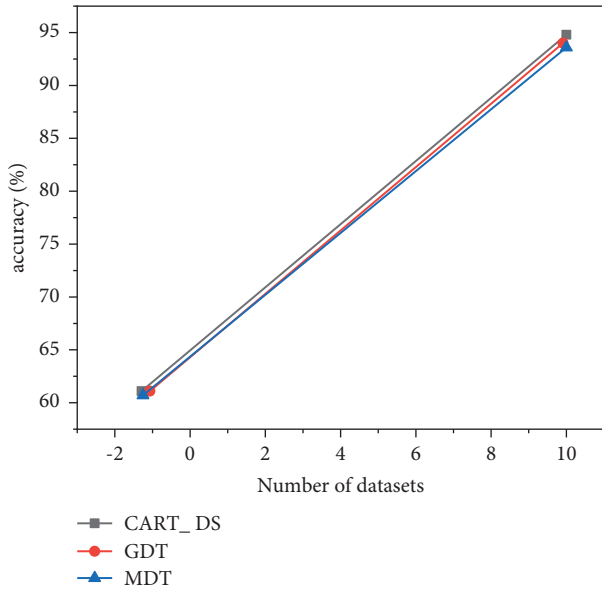


FIGURE 3: Comparison of algorithm accuracy and performance.

accuracy. According to the above experimental conditions, our experimental results are shown in Figure 3 [24, 25]. From Figure 3, we can see that the performance of the three algorithms is basically the same in terms of accuracy and performance, and the proposed CART_DS algorithm is slightly ahead. The reason for this result is that the three algorithms are essentially the improvement of cart-based decision tree algorithm. In other words, for the same dataset, the three algorithms may generate a consistent decision tree. However, from the trend of accuracy change, we can see that the accuracy of the algorithm shows an upward trend with the increase of the number of datasets. When the number of log files is 109, the accuracy of the algorithm can be close to 96%.

Then, the performance of the program’s CART_DS algorithm and McDiarmid tree algorithm is compared. We set the reference value to 0 and the actual value to 0.1. As you can see, the CART_DS algorithm in this group requires less data to split than the McDiarmid tree algorithm. Since the end results of spanning trees are similar, it can be seen from the figure that the actual end weights of the algorithms are the same. Therefore, the biggest difference between CART_DS algorithm and McDiarmid tree algorithm is that CART_DS needs fewer training datasets in a splitting operation. We know that, in the process of using cart to generate decision tree, the most important split (that is, the split with maximum gain) is usually the split of a node for the first time. In the simulation diagram, we can clearly see that the root node splitting operation in CART_DS algorithm is always faster than McDiarmid tree algorithm. This is also a major advantage of this algorithm. In this experiment, we added a certain proportion of noise (interference data) to the sample data [26, 27]. We use the following mechanism to generate interference data. In the process of each data generation, we change the characteristic attribute and label value in the sample data according to a fixed probability ϕ .

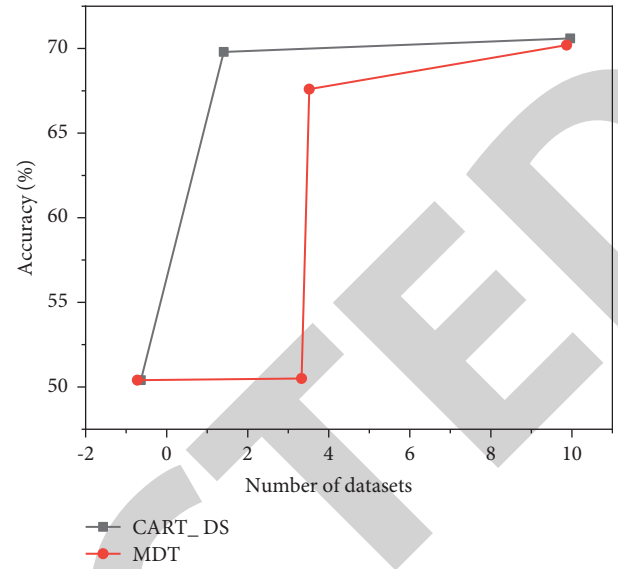


FIGURE 4: Performance comparison between CART_DS and McDiarmid tree algorithm.

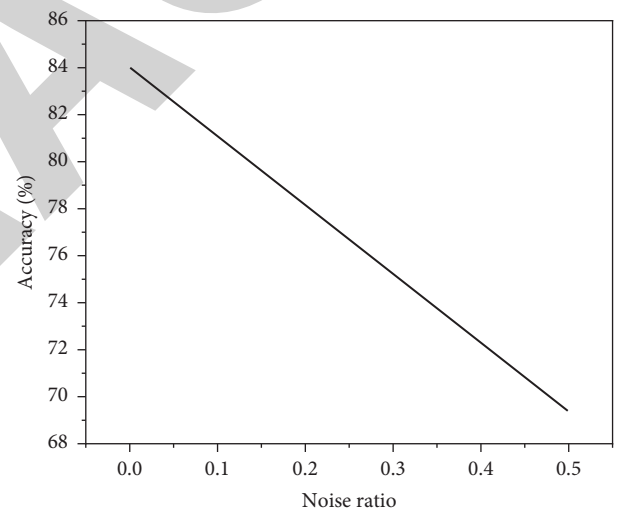


FIGURE 5: Relationship between the accuracy of CART_DS algorithm and the proportion of interference data.

The changed value is all possible values, and the value possibility of each value is the same. The value of ϕ varies gradually from 0% to 50% (inclusive). The simulation results of this experiment are shown in Figure 4 and 5. From the experimental results, it can be seen that the accuracy decreases with the increase of noise.

Next, the performance comparison of the proposed CART_DS algorithm and cart algorithm in training time will be analyzed. We set the interruption factor parameter θ as 0, set the fixed probability value α as 0.1, and change the number n of training sample set. The test results are as follows. The experimental results show that, as the size of the training dataset increases, the performance of training hours is more accurate than that of the shopping cart algorithm. This is because the proposed CART_DS algorithm is

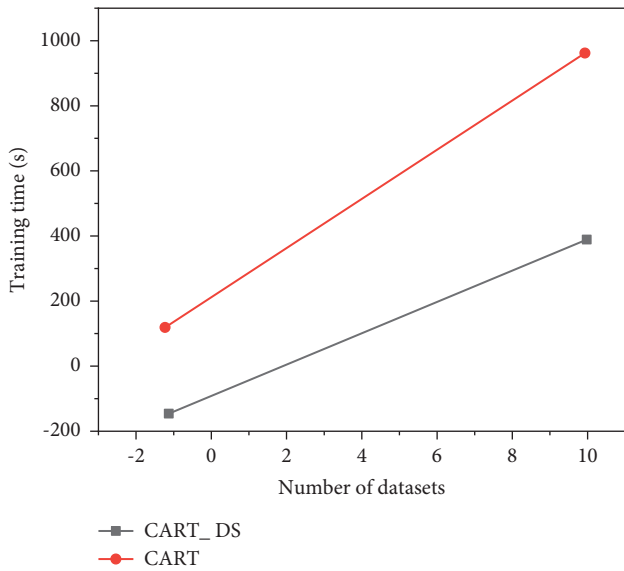


FIGURE 6: Comparison of training time between CART_DS algorithm and CART.

designed on the basis of fast decision tree algorithm. In other words, the proposed CART_DS algorithm has more obvious advantages when used in large data scale, as shown in Figure 6.

5. Conclusion

Nowadays, there are more and more applications based on real-time situation recognition technologies, such as smart transportation, social networks, and financial information. When using this application as a data flow that knows the content, users create a flow of knowledge of various contents and knowledge of the content. These flow patterns are characterized by fast transmission speed, large flow, interdependent chaos, and unstable arrival. It is very difficult to delete the required data and understand its meaning, which presents a serious challenge to standard data processing. Therefore, to address this issue, this study explores cognitive models based on cognition, knowledge based on data flow, and knowledge for critical analysis of cognitive information and obtains valuable knowledge. In addition, for the data flow processing part, this study discusses the data flow oriented decision-making algorithm to effectively analyze the data flow and simulates and analyzes the functional success of the algorithm. Experimental results show that the CART_DS algorithm described in this study has better McDiarmid Tree (MDT) and Gaussian Decision Tree (GDT) algorithms in terms of accuracy and performance. Compared with the Gaussian decision tree algorithm, there is a clear advantage in the time required to train the decision tree. Therefore, the CART_DS algorithm proposed in this study has excellent performance in data stream processing.

Data Availability

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

Conflicts of Interest

The author declares no conflicts of interest.

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