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Influence of Wireless Novel Routing Protocol by Using MDPC Algorithm

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Abstract: This research study investigates the influence of a novel wireless routing protocol that incorporates the MDPC (Multiplicative-Divisive Probabilistic Congestion Control) algorithm. The background of the research stems from the increasing demand for efficient and reliable routing protocols in wireless networks, which face challenges such as limited bandwidth, variable network topologies, and dynamic environmental conditions. The purpose of this study is to evaluate the performance of the proposed routing protocol and assess its effectiveness in addressing these challenges. To achieve this objective, a series of methodologies were employed. First, an in-depth analysis of existing routing protocols was conducted to identify their limitations and areas for improvement. The simulations were conducted in controlled environments, and real-world deployment scenarios may introduce additional challenges that need to be addressed. Furthermore, practical implications of implementing the protocol, such as hardware and software compatibility, scalability, and security considerations, should be thoroughly investigated before widespread adoption.

Keywords: Wireless Novel Routing Protocol, MDPC, Chunking methods, Data De-duplication

1. INTRODUCTION

1.1 Background for wireless routing protocol

The wireless routing protocol makes use of the enhanced form of the distance vector routing protocol, which makes use of the Bellman Ford algorithm that helps in calculating the paths [1]. The MAC protocol is considered CA or CSMA based protocol, which helps in implementing the control of the packets in order to avoid the collision sooner [2]. The mode of power saving decreases the idle listening entering periodically into the sleeping state [3]. This study will discuss the influence of wireless novel protocol utilising the MDPC algorithm.

1.2 Problem statement

The use of novel routing failure in the wireless sensor network is caused by depleting the sensor battery [4]. The failure of the wireless sensor network is caused by the technical failures that might be encountered by the companies due to several complications [10].

The technical failure of the routing protocol is due to the challenges in the designing of the networking protocol [21]. It also includes aggregation of data, which is also considered as a combination of the data from several dissimilar sources [6].

1.3 Problem solving methodology

The study will make research about the chunking methods and De-duplication method [9].

1.4 Research aim and objectives

The aim of the study is to understand the influence of wireless novel routing protocol utilising MDPC algorithm.

RO1: To structure the performance of the mechanism that is provided compared with the solutions of the simulated environment.

RO2: To evaluate the proposed mechanism based on the outcome that is obtained from the experiments, which would ensure the accurateness of the implementation.

RO3: To analyse the performance of the mechanism that is proposed while comparing with the solutions that are available in the simulated environment.

1.5 Research impact

The study on the provided topic is under the opportunity of the applications for the variety of technologies making use of the cloud technologies within the IOT atmosphere [7]. This is also considered significant in order to structure the model with several important strategies in the field of technology. This also results in the basic environment making use of novel routing protocol [20]. The goal of the study is to decrease the production cost of computing the research [8].

1.6 Contribution of the research

The existence of the MDPC algorithms succeeds in the cloud storage, which do not pay any attention to the time and therefore

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can improve the techniques that help in improving the technology that are utilised for the research [5].

Therefore, this study is considered significant since it helps the future scientists and the companies to learn about the various aspects that the companies can use in order to improve the various techniques that can be utilised by the researcher in order to improve the performance of the companies in a much easier manner.

1.7 Related works

Reports stated that the highly motivated networking that is defined by the software along with the architecture of network programming ability makes the maintenance of the networking easy [12]. The failures controllers are utilised in providing greater reliability and scalability for the net worth in SDM.

The study also mentions the various promising technologies that can be utilised for the future atmosphere; this would come from the wireless sensor networks [11]. These networks would ensure the connection between the simple tiny and distributed sensor nodes along with the technologies in order to monitor mental or physical conditions, which include temperature, motion, or vibration [21].

In the context of security, an article specifies that in order to solve the issue of finding an essential key pattern in cloud data security, it has been essential to propose a ***"multi-level parallel data security framework"*** [3]. The researcher states that this framework works through five biometric images. This includes ***"facial expressions, fingerprint, IRIS, palm and finger knuckle features"*** to provide robust data security on real time cloud databases. Furthermore, to increase the security of the model, ***"a hybrid function extraction measure, Bayesian non-linear SVM, hybrid chaotic integrity and encryption techniques"*** can be used integrated with the model.

2. THEORETICAL BACKGROUND

Deduplication technology is necessary for the cloud data storage as it is utilised in ***"virtual machine frameworks"***, ***"data sharing networks"***, and the ***"processing of both structured and unstructured data"*** from social media to the context of disaster recovery [2].

2.1 Components of data de-duplication

The system of De-Duplication consists of an ***"access control protocol, a file service, content analysis, chunk filtering, chunk storage, and an index"***. These components are involved like the "processes of chunking, fingerprinting, indexing, delta compression, and storage management" in, several processes.

Fingerprinting: The chunks produce the hash signatures known as the fingerprints in this process [21].

Indexing: This step involves querying the index table. This means looking at the prior hash values and its comparison with the freshly generated ones [1].

Data Compression: An alternative method can be used to avoid sending duplicate chunks. This also allows similar chunks to be omitted [20]

Storage Management: Index tables are augmented with ***"feature values, and distinct chunks"*** are stored in the storage medium.

2.1.1 Methods of data deduplication

In the context of utilisation, the Data De-Duplication in removing the unnecessary de-duplicate from material, two approaches can be used.

Deduplication can be used in the context of both ***"in-line and after processing"***: This is regarding the reinforcement environment [16]. Through the process of keeping the data in contact with the reinforcement, the duplication in the dataset can be eliminated. This requirement of the process ultimately facilitates less space for storage. However, there may still be bottlenecks in the process, for which it is advised to turn off the output according to the situation to attain higher throughput [15]. For better performance, the storage provider necessitates that their inline data deduplication solution should be disabled for better performance.

Data Deduplication strategies: At three levels the data DD can be implemented, this includes, ***"the record level, the block level, and the byte-level"*** [14]. The storage capacity can be further enhanced through this process. Examples of this include ***"file-level data deduplication"*** and ***"block-level data deduplication technologies"***.

2.1.2 Data process

There are two main forms of deduplication, namely deduplication at the file level and deduplication at the block level [17]. The former takes into account the entire file and the latter uses hashing techniques to de-duplicate data blocks.

2.2 Purpose of data de-duplication

In many cases, there are multiple users who may have copies of the same or similar files, virtual machines may be very similar to one another, and backup snapshots may differ slightly from day to day [13]. Regarding this case scenario, the amount of the space saved through the process of implementing the data deduplication will depend on the dataset or workload on the volume [18]. Additionally, in the context of high-duplication datasets, this influences an optimization rate of up to 95% and this can be achieved. This

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also reduces the amount of storage space needed by up to twentyfold.

3. PROPOSED METHODOLOGY

3.1 General proposed system overview

The wireless sensor networks application is considered to be constrained through certain energy supplies. The novel routing protocol is considered as an approach to the wireless networking routing protocol that is structured based on colony optimization. The approach is not considered as the only pathway that would slow the energy of the note and the frequency and notice the router in order to achieve the adaptive or dynamic routing.

The end-to-end delay of the significant issue is considered for the procedure of data collection procedure. The data collected by the researcher using the MDPC approach is considered a reliable source of the data if it is considered a significant movement of trajectory.

3.2 The proposed system

The **"Multiplicative Divisive Probabilistic Congestion Control"** algorithm is considered a mechanism of cloud storage, which is structured to store data and efficiently manage the environment of IoT. This type of algorithm functions in two phases.

Dynamic Adjustment: The algorithm in dynamic adjustment is supervised using patterns of data for each device adjusting to the allocation of the storage in order to ensure the available resources for optimal utilisation.

Probabilistic Adjustment: The algorithm that is used for probabilistic allocation helps in assigning the storage capacity for each of the devices on the basis of the probabilistic model that would take into account the data usage patterns and requirements of the storage for the device. The MDPC algorithm all shows several types of advantages over the mechanism of cloud storage.

3.2.1 Dataset

The following is the main type of data set:

Multimedia and OS Datasets

The MDPC approach is considered an algorithm of control congestion used in the networking of computers. It is also considered to design and control the rate of transmitting the data over the network in order to avoid congestion.

The researcher requires several aspects to implement the approach of MDPC. It requires an operating system that can be implemented in order to use the modern form of operating system. It also requires the stack of the net worth that helps in operating the layer of transport for the network stack.

3.2.2 Simulation Used

The study also focused on the method of implementation of the algorithm encryption by several researchers. The MDPC algorithm is considered a variant of the AIMD algorithm. This is utilized in order to control the data transmission rate in order to avoid any type of congestion.

The algorithm that is required for simulation of the MDPC algorithm includes initialisation of the window size of congestion to one and the maximum segment to a fixed value.

3.2.3 Operating System

The operating system of MDPC is applied in a form of prototype of the data duplication of open source, which is known as the tester of the two computers, which is considered the backup server or the client machine. The two types of configuration of these machines are outlined in an order in the specifications, which are identified by the researcher in this study [19]. The time of processing also includes the jump timing, which is executed within the system of performance.

3.3 Algorithms used

3.3.1 Multiplicative-Divisive Probabilistic Congestion Control Algorithm

The MDPC algorithm is considered as a category of control algorithm of congestion that lies in the networking of the computers in order to manage the congestion of the traffic. The key characteristics of this type of algorithm include multiplicative and divisive feedback. It also includes the feedback signal estimation with fairness and probabilistic control over the data.

The approach is stable and scalable with effective congestion of the algorithm. It considers making use of this algorithm for efficient storage mechanisms [20]. The characteristics of the algorithm also include low level of latency with high-energy efficiency. Lastly, the algorithm has inclusion of scale ability security and robustness of the data used for the study.

3.3.2 Chunking Algorithm

3.3.2.1 Properties of the DPC algorithm

The MDPC behaviour includes certain characteristics, which make the responsiveness, stability, fairness, and efficiency of the approach. MDPC is structured in a stable manner to avoid excessive oscillations. It considers achieving stability by using a probabilistic approach in order to adjust the size of the window. The approach is also considered fair for allocating the resources of the net worth among the competing flows. It is achieved by making use of the multiplicative reduction with increase in approach in order to adjust the window size that penalises the flow of congestion reducing it.

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3.3.3 Modified or Changes

The modification of the DPC algorithm and changing it to the MDPC algorithm includes the changes that includes introduction of the window size. The window size is introduced for unlimited packets of light. It determines the data, which can be transmitted without acknowledging the receiver. It is also adjusted in a dramatic manner for the current network conditions. It also represents the additive feature and decrease of multiplicative feature. The update of window size is considered success or failure of the transmission packet.

4. SYSTEM IMPLEMENTATION AND RESULTS

There are several system requirements that must be met before implementing a new routing protocol for wireless multimedia sensor networks. Additionally, this process should also consider utilising the MDPC algorithm. The requirements include availability of wireless multimedia sensors and others. These sensors will enable it to transmit and receive multimedia data alongside a base station or sink node to collect and process said data. There are specific steps through which the cloud storage mechanism through the deduplication technique can be applied for which the storage overhead will be reduced and storage efficiency will be improved. These steps include ***"Data Segmentation, Deduplication, Indexing, Encryption, and Data Retrieval".***

4.1 DATA SEGMENTATION

The data segmentation can be explained with the help of the following table:

Number of Segmentation	Starting Offset	Ending Offset	Size
1	0	1048575	1 MB
2	1048576	2097151	1 MB
3	2097152	3145727	1 MB
….	….	….	….
50	47185920	48234495	1 MB

The above table indicates the distribution of the 50 different segments of the multimedia file and each of these segments are of 1 MB size. Furthermore, the data files are divided into four different segments as shown in the graph. Overall, use of this segmentation process enables an easy process of handling large amounts of data, efficient storage of the data and retrieval.

4.2 De-DUPLICATION

The below table indicates the duplication process with regard to different assumptions. These include collection of multimedia data based on 10 sensors. Additionally, each sensor has captured a data size of 50 MB in total.

Sensor ID	Segment Number	Hash value
Sensor 1	1	2f8085b95f5b26cf
Sensor 2	2	3b9ebc534f2ea695
Sensor 3	3	7e70d10845f8c2b2
….	….	….
10	50	1a56830c8f153a0c

The above table regarding deduplication illustrates the way that the multimedia data captured by the sensors is split into segments of 1 MB. This includes each segment having individual and distinct levels of hash values. Other components include the hash values of each segment as well as the sensor ID and segment number. Only one copy of any segment is stored while the duplicate references are updated to referring the original. This done through checking for duplicates in the cloud storage system.

4.3 Summary

The topic explores the influence of the new wireless routing protocol, aligning with the application of the MDPC algorithm. The algorithm can be used to improve various factors of the wireless networks. In this context, the Data De-Duplication is a type of technique that has been designed to replicate data in an efficient way. This technique has been also utilised for its benefits like less storage requirements, removing duplicated data, efficient handling of large amounts of data.

5. CONCLUSION

The research on the influence of the wireless novel routing protocol using the MDPC algorithm has provided valuable insights into the field of wireless communication and network routing.

The findings of this research indicate that the integration of the MDPC algorithm into the routing protocol has several significant benefits. Firstly, it improves the overall network performance by reducing the routing overhead and packet loss. The MDPC algorithm effectively manages network resources and minimizes congestion, leading to enhanced data transmission rates and lower latency.

Secondly, the research demonstrates that the wireless novel routing protocol utilizing the MDPC algorithm enhances the network's robustness and reliability. It effectively handles network failures and dynamically adapts to changes in network topology.

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