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Edge computing by using LZW Algorithm

K. Mohana Ravali Chowdary
ravalikollajuly20@gmail.com
Centre for Development of Advanced Computing, Pune, Maharashtra

Siddhant verma
sid0308v@gmail.com
Centre for Development of Advanced Computing, Pune, Maharashtra

Vineeta Tiwari
vineetat@cdac.in
Centre for Development of Advanced Computing, Pune, Maharashtra

Dr. M. R. Ebenezar Jebarani
ebebezarjebarani.ece@sathyabama.ac.in
Sathyabama Institute of Science and Technology, Chennai, Tamil Nadu

ABSTRACT

Data compression is one of the enabling technologies for multimedia applications is used to decrease the number of bits required to store and transmit images without any quantifiable loss of information. The impact of using different lossless compression algorithms on the compression ratios and timings when processing various biometric sample data is investigated. The huge challenge in using biometric data is about the handling of enormous data. As this data is increasing day by day, it becomes difficult to store and transmit the data effectively and efficiently in less time. To solve this kind of problem, in this papers presents an Edge computing by Lempel–Ziv–Welch (LZW) Compression.

Keywords— *Internet of Things (IoT), Data compression, LZW Algorithm*

1. INTRODUCTION

Nowadays, the Internet of things makes wonder in humans' day to day life. Data compression is an approach to diminish capacity cost by dispensing with redundancies that occur in many documents. There are two sorts of pressure, lossy and lossless. Lossy compression reduced file size by eliminating some unneeded data that won't be recognized by a human after decoding, this regularly utilized by video and sound pressure. Lossless pressure then again controls each piece of information inside the document to limit the size without losing any information in the wake of unravelling. This is critical in such a case that document lost even a solitary piece in the wake of disentangling, that means the record is defined.

Data compression can likewise be utilized for in-organize preparing system so as to spare vitality since it lessens the measure of information so as to diminish information transmitted and additionally diminishes exchange time on the grounds that the span of information is decreased. There are so many algorithms to resolve the problems in data compression. LZW algorithm is also one of the solutions of data compression as it works in a real-time environment.

2. RELATED WORK

Using the LZW algorithm in data compression has become more challenging, as there will so many related works relevant to the compression. Md. Rubaiyat Hasan [1] proposed an approach in which the transmitting digital image is huge so they will slow up the performance. More the size of data be smaller which provides better transmission and they will save time. Here both LZW and Huffman is taken for the performance. On the average Huffman gives the better results compare to LZW but LZW provide best compression ratio and efficiency. A. Alarabeyyat, S. Al-Hashemi, T. Khdou, M. Hjouj Bus, S. Bani-Ahmad, R. Al-Hashemi [2] proposed an approach to the development of multimedia and digital imaging has diode to high amount of knowledge required to represent. This requires large disk space for storage. Image compressions will reduce the amount of space required to represent and also reducing the image storage/ transmission time requirements. The idea is to remove redundancy of knowledge bestowed inside a picture to scale back its size without reducing the quality of the image. The new approach works as follows: first, applying a Lempel-Ziv-Welch (LZW) algorithm on the image in hand. What comes out of the first step is forward to the second step where the Bose, (BCH) error correction and detected algorithm. To improve the compression quantitative relation, the projected approach applies the BCH algorithms repeatedly to "inflation" is detected. The experimental results show that the proposed algorithm could achieve an excellent compression ratio while not losing knowledge in comparison to the quality compression algorithms. S. Renugadevi and P.S Nithya Darsini [3] proposed an approach showed the use of Huffman coding, minimum-Variance Huffman coding and LZW with arithmetic coding Techniques in wireless sensor networks for saving energy and time while transmission and processing of data. As minimum-Variance Huffman coding technique compressed more as compared to Traditional Huffman Coding and LZW with integrated Arithmetic coding gives better results in compressing a file as compared to traditional LZW coding in wireless networks. M. F. Talu and ø. Türko÷lu, [4] proposed technique for black and

white (binary) images consist of encoding algorithm & it also uses a new edge detection algorithm which comes under lossless compression technique. This proposed technique defines two major steps: 1) encodes a binary image data by using the proposed algorithm, with the help of new edge tracing method. 2) Compressing the image which comes from the first step by Huffman & Lempel-ZivWelch (LZW). Alireza Yazdanpanah and Mahmoud Reza Hashemi [5] proposed an approach In a new prediction algorithm has proposed which predicts whether a file would or would not compress with the LZW Technique. It also predicts the compression Ratio which helps storage systems to decide whether the file should be compressed or not (helping in auto-accommodation of the file). This method can reduce the compression time by 17.79 %. Nam Ky Giang∗, Rodger Lea†, Michael Blackstock‡, and Victor C.M. Leung [6] proposed an approach the experiences in building an edge computing platform: Distributed Node-RED. Through the three iterations of the project, they explored a number of challenges associated with developing fog applications that span across the edge network to the cloud. Several novel solutions have been introduced that were incorporated into the platform. We also show that in developing fog applications, exogenous coordination provides a reusable and scalable application model thanks to the explicit separation of communication and computation activities.

3. EDGE COMPUTING

Edge computing is defined as processing the data at the edge of the network. In simple words, it can be said that process the data as much as it can be processed at the edge of the network because data always produced in bulk at the edge and then send the processed data to the cloud. Data is increasingly produced at the edge of the network, therefore, it would be more efficient to also process the data at the edge of the network. Previous work such as microdata centre, cloudlet, and fog computing has been introduced to the community because cloud computing is not always efficient for data processing when the data is produced at the edge of the network. In this section, we list some reasons why edge computing is more efficient than cloud computing for some computing services, then we give our definition and understanding of edge computing. Here we define "edge" as any computing and network resources along the path between data sources and cloud data centres. For example, a smartphone is an edge between body things and cloud, a gateway in a smart home is the edge between home things and cloud, a micro data centre and a cloudlet is the edge between a mobile device and cloud.

4. PROPOSED SYSTEM

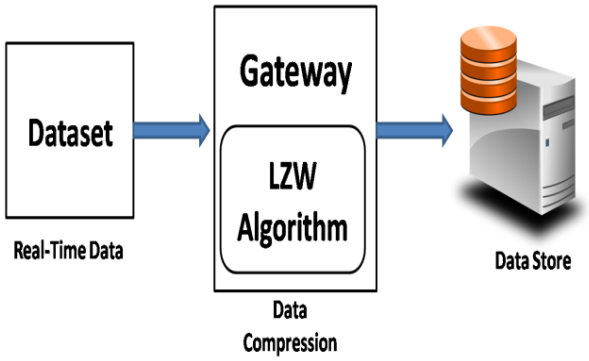

Fig. 1: Block diagram for edge computing using the LZW algorithm

In this block diagram, Dataset will collect all the real-time data from various sources like Face recognition, Biometric, etc.., The data which are gathered by dataset then send the real-time data are to the gateway, here edge computing plays a vital role as gateway in which we are using LZW algorithm to compress the real-time data. Once the process gets over in gateway block then the compressed data is sent to the data store where the data is stored permanently like a database.

Table 1: Comparison of coding algorithms

S. no.	Property	Huffman Coding	Run Length Encoding	LZW Coding
1	**Working principle**	Distinct symbols have distinct probabilities of incidence	The principle of RLE is to exploit the works best on certain source types in which repeated data values are significant	many groupings of pixels are common in images
2	**Compression ratio**	70-75%	50-56%	83-87%
3	**Speed (Encoder/ Decoder)**	990/1300	770/1000	5700/8400
4	**Memory (Encoder/ Decoder)**	48/12	2/2	8/8
5	**Hardware Decoder Components**	4	(3 components, R, G, B, each 8 bits wide),	2
6	**Parallel Decompression**	No	No	Yes
7	**Tables involved**	Look-up tables	Scan-line tables	String tables

5. CONCLUSION

These days, an ever-increasing number of service are pushed from the cloud to the edge of the system since preparing information at the edge can guarantee shorter reaction time and better dependability. Additionally, data transfer capacity could likewise be spared if a bigger segment of information could be taken care of at the edge as opposed to transferred to the cloud. The expanding of IoT and the universalized portable gadgets changed the job of an edge in the processing worldview from information customer to information maker/buyer. It would be progressively productive to process or back rub information at the edge of organizing. In this paper, we thought of our comprehension of edge processing, with the method of reasoning that registering ought to occur in the vicinity of information sources. At last, we tend to hints the challenges and opportunities that square measure value performing on, as well as programmability, naming, information abstraction, service management, privacy and security, also as optimisation metrics. Edge computing is here, and we hope this paper will bring this to the attention of the community.

6. REFERENCES

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