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Data Reduction Using LZW Algorithm in FOG Computing

Veena. R*, Jyothsna. R
Associate Professor, Department of Computer Science, Seshadripuram College, Bangalore, Karnataka, India

ABSTRACT

Fog Computing is related to the computational architectures located in the network edge. Fog computing is beneficial since it deals with low latency, real-time analytics, improved security and use of wireless access. There is a need to improve the fog services for faster transmission of data , thereby implementation of data reduction techniques will be beneficial for faster transmission of data. In this paper there is a depiction of data compression algorithm called Lempel- Ziv -Welch. With the incorporation of this algorithm data can be compressed and thereby sufficient data can be passed faster in the fog computing network.

Keywords : Lempel- Ziv -Welch , fog , compression , latency and transmission.

I. INTRODUCTION

Fog computing is used in the field of big data analytics and cloud computing since there is a huge demand for accessing the information from the cloud.The fog networking has a data plane and a control plane.With the help of fog computing, the computing services can obtained from the network edge.Therefore fog computing helps in latency reduction and also is useful in tackling the problems associated with bandwidth , thereby faster transmission of data can take place.In order to improve the QoS (Quality of service) a model is proposed, in which we can use the LZW (Lempel-Ziv -Welch) which is a data compression algorithm that can help in quicker transmission of data in the cloud.

II. LITERATURE SURVEY

There is a lot of research work done based on data compression in the edge computing.

Data compression means minimizing the size of huge data. Md. Rubaiyat Hasan proposed an approach by which the data size can be reduced by using the Huffman coding and LZW algorithm . Data compression techniques like lossless and lossy are also considered. Performance of LZW and Huffman algorithms are also studied. The efficiency of compression algorithms are brought about in detail.

A. Alarabeyyat, S. AlHashemi, T. Khdou, M. Hjouj Bus, S. Bani-Ahmad and R. AlHashemi have presented a paper, which describes that the digital image processing techniques requires a huge amount of storage space, thereby they proposed an approach . According to this view point they required to scale back the size of the picture without reducing the quality of the picture for this they use the LZW algorithm.

P.S Nithya Darsini and S. Renugadevi proposed a technique of incorporating the "Huffman coding" , and LZW with arithmetic coding techniques for saving

energy for wireless networks , that use sensors for saving energy.

III. LZW (LEMPEL– ZIV –WELCH)

ALGORITHM

There are two techniques for data compression i.e., lossy and lossless. Lossy compression helps to reduce the bits by removing the unnecessary information. The Lossless compression helps in eliminating the statistical redundancy by reducing the bits. The Lossless compression technique includes LZW (Lempel Ziff Welch) algorithm .

LZW compression is done by reading the sequence of symbols, then later these symbols are grouped into strings and thereafter the strings are converted into codes. This method is followed since the codes require less space than the strings and thereby these the strings are replaced.

LZW ENCODING ALGORITHM

PSEUDOCODE:

Initialize table with the help of single character strings
P1 = is the first input character
WHILE the input stream is not concluded C
1= is the next input character
IF P1 + C1 is in string table
P1 = P1 + C1
ELSE

Output code for P1
add P1 + C1 to string table
P1= C1

END WHILE
output code for P1

LZW DECOMPRESSION ALGORITHM

PSEUDOCODE:

Initialize the table with single character strings
O= first the input code
output the translation of O

WHILE not end of the input stream
N= next input code
IF N is not in string table
S = translation of O
S = S + C
ELSE

IV. PROPOSED MODEL

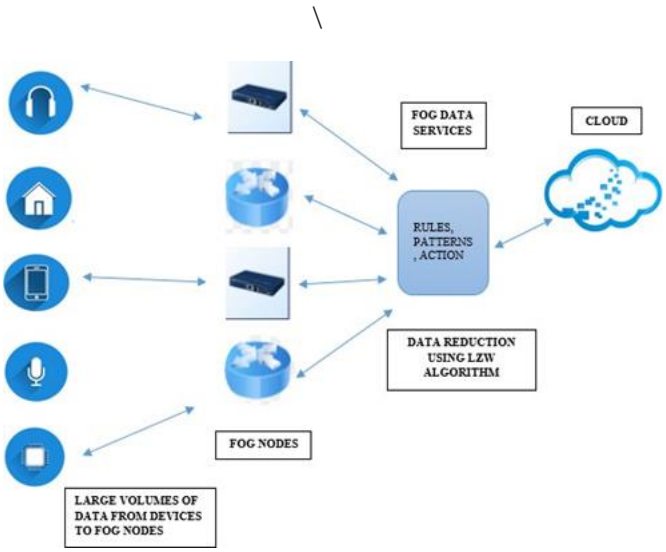

Fig 1: Data reduction using LZW Algorithm in Fog computing architecture

Fog computing was originally coined by Cisco with respect to edge computing. Compared to edge computing, the fog computing platforms are described as dense computational architectures at the edge of the network. The main characteristics of the fog platforms is that they have low latency rate and uses wireless access.

The fog computing involves many types of analytics such as transactional analytics, medium latency real-time analytics, low latency real-time analytics. According to the model, large volumes of data is

transmitted from the devices to the fog nodes. Later in the fog nodes ,there are some of the fog services, this requires large amount of data that needs to be transmitted from the fog nodes to the cloud.

In order to increase the efficiency of the fog, network data reduction must be done. Therefore this can be done that with the help of the LZW algorithm, thereafter the data is sent to the cloud. Using the LZW algorithm the encoding and the decoding of the data is done, thereby the faster analytics takes place between the fog nodes and the cloud.

V. CONCLUSION

According to the proposed model the data reduction is done when the data is transmitted between the fog nodes and the cloud, to increase the efficiency of the fog network we use the LZW algorithm since it helps in data compression by encoding the data and later decoding the data. Although the LZW algorithm is proven to be a very successful algorithm there are many other algorithms like Huffman coding, discrete cosine transform techniques that can be implemented to improve the efficiency of the model.

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