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Survey of Multimedia Efficient Compression Features

Kruti Dangarwala and Rutvij Jhaveri
Department of Computer Engg. & Information Technology,
Shri s'ad Vidya Mandal Institute of Technology College Campus, Old N.H. No 8, Bharuch
e-mail: krutidangarwala@gmail.com, rutusoft@yahoo.com

***Abstract*—Uncompressed multimedia (data, image, audio and video) data requires storage capacity and transmission bandwidth. Despite rapid progress in digital communication system performance, demand for data storage capacity and data-transmission bandwidth continues to outstrip the capabilities of available technologies. The recent growth of multimedia-based web applications have not only need for more efficient ways to encode signals and images but have made compression of such signals central to storage and communication technology. The objective of data compression is to represent any media (e.g. file, a speech signal, an image, or a video signal) as accurately as possible using the fewest number of bits. This paper surveys the features for data compression, audio & video compression and image compression.**

Keywords: redundancy, compression ratio, traffic congestion, multiresolution, Irrelevancy;

I. INTRODUCTION

Any Communication, Compression is useful because it helps to reduce the storage space. It means consumption of resources are reduced. Lossy compression means to loss some original data. Lossless compression to get original data when decompressing. Data compression means to reduce the size of file. Audio compression means to reduce the bit rate to represent the Analog signal. Image compression is an important issue in Internet, mobile communications, digital library, digital photography, multimedia, teleconferencing applications. Image compression research aims at reducing the number of bits needed to represent an image by removing the spatial and spectral redundancies as much as possible.

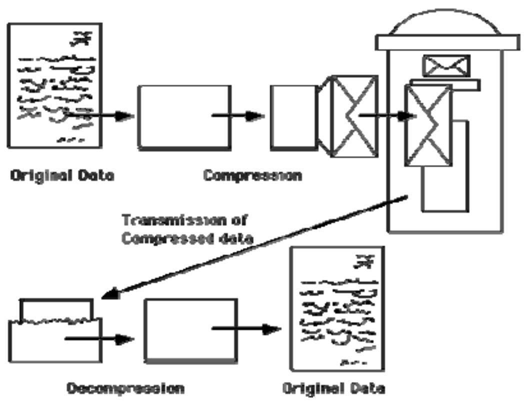

Fig. 1: Concept of compression

Efficient Data compression depends on the data itself. Some of the data are more commonly used and most of the compression algorithm uses this feature to gain better compression. Encoder is device that compresses the data & Decoder is device that decompresses the data.

II. FEATURES FOR DATA COMPRESSION

The objective to develop new lossless Data compression algorithms is to achieve the maximum achievable data compression ratio for several file types. Data Compression algorithm's performance [1] is measured in terms of compression ratio, encoding and decoding times and available bandwidth, traffic congestion and server load.

Data compression offers a technology solution for increasing the efficiencies and decreasing the costs of storing and transferring critical business information. To integrate compression technology into business application requires compression rate is 50 percent per file. The algorithm should be flexible to adjust your compression rate according requirements. It should be work for all data types and support all platforms means platform independent.

By compressing data, physical disk space required is reduced, and disk I/O and memory usage are also reduced, thereby improving performance. However, there are some cases when data compression is not appropriate. Data compression is best suited for data that is updated infrequently. Since most data in a data warehouse is considered read-only, data compression is more compatible with this type of environment. Data is only compressed during bulk loading .If table structure with lots of duplicate values in data, it is ideal for data compression.

III. FEATURES FOR AUDIO/VIDEO COMPRESSION

Audio compression can be estimated by Speed of Compression & decompression, Degree of Compression, Robustness and error correction, product support. When we compress audio, decoded signal should be as close as possible to original signal. It should have lowest implementation complexity.

Algorithm for audio compression like mp3 is designed to greatly reduce the amount of data required to represent the audio recording and still sound like a faithful reproduction of the original uncompressed audio for most listeners. For audio, human ear is the final judge of sound quality and it was performed as a "blind test".

In video compression [4], it compress video streams. Video streams like successive discrete images. Successive images are highly interrelated. Barring cut shots or scene changes, any given video frame is likely to bear a close resemblance to neighboring frames. Video compression algorithm like MPEG exploits this strong correlation to achieve far better compression rates than would be possible with isolated images.

IV. Features for Image Compression

Image compression reduces redundancy of image data. According Human Visual Perception, Good approximation of the original image can be reconstructed from image transmission with minimal number of samples. A useful property of image compression is that adjusting compression parameters according need of file size means if we do not require good quality you make file size too small. If you require good quality and not satisfied with default setting of compression, you can adjust parameters or change default setting according your requirements.

If each pixel value represents a unique and perceptually important piece of information, it would be difficult indeed to compress an image. Fortunately (at least from the standpoint of compression), the data comprising a digital image or sequence of images are often redundant and/or irrelevant. A common characteristic of most images [3] is that the neighboring pixels are correlated and therefore contain redundant information. Main task is to find less correlated representation of the image. Two fundamental components of compression are redundancy and irrelevancy reduction. Redundancy reduction aims at removing duplication from the signal source (image/video). Irrelevancy reduction omits parts of the signal that will not be noticed by the signal receiver, namely the Human Visual System (HVS). I.e. Redundancy relates to the statistical properties of images, while irrelevancy relates to the observer viewing an image Spatial Redundancy means correlation between neighboring pixel values. Spectral Redundancy means correlation amongst samples from multiple sources.. Temporal Redundancy means correlation amongst samples in different segment of time.

With lossless compression the reproduction is identified to the original, and hence, quality is not an issue. In the case of lossy compression, however, the reproduction is only an approximation to the original image. Measurement of quality is thus a central issue with lossy compression, and in particular in video and image compression. There are basically two approaches to estimate quality. The first is to rely on panels of human beings to compare reproductions with the original. This is a direct method, but subject to a variety of difficulties. Human judgment may be significantly affected by the presence of system introduced errors or artifacts. Human judgments vary from one person to another and from one time to another. The second approach is to compute numeric comparisons between reproduction and original, and use this as an objective measurement of quality

V. Conclusion

We conclude that multimedia-based applications have need for more efficient ways to compress the signal, data, images etc.. in communication technology. This paper just surveys all parameter need for better or efficient compression techniques for any multimedia.

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