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# Video Compression using Encoding Technique

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***Abstract*— The process of reducing the size of a data file is known as data compression. Compression can be of two types lossy or lossless. In lossless compression bits are reduced by identifying and eliminating redundancy. None information is lost in lossless compression and Lossy compression reduces bits by identifying unnecessary or redundant information and removing it. Data compression or bit-rate reduction involves encoding information using fewer bits than the original representation. In the context of data transmission, it is called source coding encoding done at the source of the data before it is stored or transmitted through network. Compression is of two types lossy or lossless. Lossless compression is preferred more than lossy for archival purposes and often for medical imaging, technical drawings, video clips, clip art, or comics and cartoon films. Lossy compression method is required especially when used at low bit rates, Lossy methods are especially suitable for natural images such as original photographs in applications where minor loss of accuracy is acceptable to achieve a substantial reduction in bit rate. The lossy compression which cannot identify differences may be called visually lossless. Compression is used because it helps reduce resource usage, like data storage space or transmission capacity. Compressed data must be decompressed to use, this extra process thrusts some computational or other costs through decompression method. Data compression is subject to a space–time complexity trade-off. For example, a compression scheme for video may requires expensive hardware for the video to be decompressed fast enough to be viewed as it is being decompressed, and the option to decompress the video in full it may be inconvenient or require additional storage. The design of data compression strategy involves trade-offs among various factors, including the degree of compression, the amount of distortion introduced.**

***Index Terms*— Bit Rate, Lossless, Encoding, Compression, Lossy.**

## I. INTRODUCTION

### *A. Lossless:*

Lossless data compression algorithms usually make use of statistical redundancy to represent data without losing any information, so the process is reversible. Lossless compression is possible because most real-world data shows statistical redundancy. For example, an image may have areas of colour that do not change over several pixels; instead of coding "blue pixel, blue pixel" all the time the data may be encoded as "278 blue pixels". This is a typical example of run-length encoding; there are many methods to reduce file size by eradicating redundancy.

### B. Lossy

Lossy data compression is the opposite of lossless data compression. In this type, some loss of information is acceptable. Dropping of nonessential details from the data source can save storage space upto some extend. Lossy data compression schemes are designed by research on how people recognize the data in question. For example, the human eye is more sensitive to delicate variations in luminance than it is to the variations in color. JPEG image compression works in parts by rounding off redundant bits of information. There is a corresponding trade-off between preserving information and reducing size. There are many of popular compression formats exploit these interpreting differences, including those used in music files, images, and video. Lossy image compression is now-a-days used in digital cameras, to increase the storage capacities with minimal degradation of picture quality. Similarly, DVDs also use the lossy MPEG-2 video coding format for video compression. In lossy audio or speech and voice compression, methods of psychoacoustics are used to remove non-audible or less audible and distorted voice components of the audio signal. Compression of human speech is usually performed with even more specialized techniques and processes. Speech coding or voice that is audio coding is sometimes regarded as a separate area from audio compression. Different audio and speech compression standards are generalized under audio coding formats. Voice compression is used in internet telephony or internet calling, for example, audio compression is used for CD ripping and is decoded by the audio players.



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## II. LITERATURE SURVEY

Video compression has been the topic of intensive research in the last thirty years. Video compression technique is now mature enough as is proven by the large number of applications that makes use of this technology. This paper gives the idea about different technologies available for video compression. H.264/AVC exhibits superior coding performance improvement over its predecessors. The next generation standards are being generated by both VCEG and as well as MPEG. [5]

The predicted growth in demand for bandwidth which is driven largely by video applications, is probably greater now than it has been ever.

There are four primary drivers for this:

1) Recently introduced formats such as 3-D and multi view, both coupled with pressures for increased dynamic range, spatial resolution and frame rate, all require increased bitrates to deliver improved levels of immersion or interactivity.

2) Video-based website traffic continues to grow and dominate the internet through social networking and catch up TV. In recent years, Youtube has been accounted for about 27% of all video traffic and, by 2015, it is predicted that there can be 700 billion minutes of video downloaded. That represents a full-length movie for every person on this planet.

3) User expectations continue to drive flexibility and quality, with a move from linear to nonlinear delivery. Users are demanding My-Time rather than Prime-Time viewing.

4) Finally new services, in particular mobile delivery through 4G/LTE to smart phones. Some mobile network operators have estimated the demand for bandwidth to double every year for the next 10 years.

This project describes video compression in real time. The main aim is to achieve higher compression ratio in terms of lossless compression. Video compression techniques are used to make full use of the available bandwidth. Lossless means that the output from the decompress or is bit-for-bit identical with the original input to the compressor. The decompressed video should be completely identical to original. In addition to providing improved compression efficiency in real time the technique also provides the ability to selectively encode, decode, and manipulate individual objects in a video stream. The technique used results in video coding that a high compression ratio can be obtained without any loss in data in real time. Index Terms: Compression Ratio, Motion Detection, Video Compression. [5][2].

## III. EXISTING SYSTEM

According to most of existing IEEE papers few major drawbacks in compression are that till now only 50% compression is possible. Delay with startup latency and end-to-end delay, Complexity in terms of computation, memory capacity and memory access requirements as well as Distortion of the decoded video.

The MPEG-4 AVC standard was created to provide a higher compression rate, but often it is at the cost of higher complexity. This compression gain is achieved by many small improvements, when compared to earlier standards. Some of these changes are better motion compensation, an image segmentation into finer blocks, improved entropy encoding schemes and a mandatory de-blocking filter. It is however not a single standard, but rather a family of standards. It defines a set of compression tools, which are then used or not used, based on a selected profile. There are several profiles, designed to match the standard to the user's needs. For example the baseline profile offers a low compression rate and some error resilience, while maintaining a low complexity. The main profile, on the other hand, offers high compression gain, at the cost of a high complexity. Based on these profiles the standard can be used in many fields. For example it is used to store videos on Blue-ray discs, but it is also used to stream videos on websites such as Youtube or Vimeo.

Designed to address several weaknesses in previous video compression standards, H.264 delivers on its goals of supporting:

1) Implementations that deliver an average bit rate reduction of around 50% to 55% given a fixed video quality compared with any other video standard.

2) Error robustness so that transmission errors over various networks are tolerated.

3) Low latency capabilities and better quality for higher latency.

4) Exact match decoding, which defines that exactly how numerical calculations are to be made by an encoder and a decoder to avoid errors from accumulating.

## IV. DATA DIFFERENCING

Data compression can be regarded as a special case of data differencing. Data differencing consists of producing a difference between a source and a target, with patching producing a given target and acquired source with a difference, whereas data compression consists of producing a compressed file according to a given target, and decompression consists of producing a target given of a compressed file. Thus, one can consider data compression as data differencing with empty source data, the compressed file corresponding to a "difference from nothing." This is the same as considering absolute entropy that is corresponding to data compression as a special case of relative entropy that is corresponding to data differencing with no initial data.

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## VI. SYSTEM ARCHITECTURE

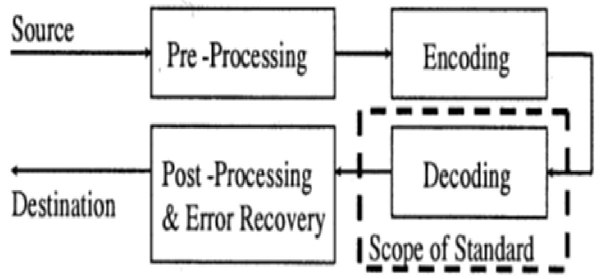


Figure: System Architecture

## V. PROPOSED SYSTEM MODEL

These techniques, along with many others, help H.264 to perform significantly better than any prior standard under a wide range of circumstances in a wide variety of application environments. H.264 can often perform radically better than MPEG-2 video—typically obtaining the same quality at half of the bit rate or even less, especially on high bit rate and high resolution situations.

Like other ISO/IEC MPEG video standards, H.264/AVC has a reference software implementation that can be easily downloaded free of cost. Its main aim is to give examples of H.264/AVC features, rather than being a useful application. Some reference hardware design work is also under way in the Moving Picture Experts Group (MPEG) format. All the above-mentioned are complete features of H.264/AVC covering all profiles of H.264.

## VI. CONCLUSION

The goal of this project has been to provide interested readers with a road map for navigating through coding techniques with a view of targeting visual data compression. The compressions of still pictures as well as the compression of video sequences were overviewed. It is delicate to point out the most promising approach, since this would strongly depend on the application requirements. Although the compression efficiency is the most important feature in any compression scheme, depending on the situation, other functionalities and parameters, such as scalability, error resilience, complexity, and delay, to mention a few, should be taken into account when choosing a best compression scheme. The hope of the authors is that the discussions in this paper can provide enough insights and information so as to allow readers to be able to make the appropriate choice after identifying the needs of their applications.

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