# Comparisons between Discrete Cosine transform, Accordion Discrete Cosine Transform and Accordion Wavelet Transformations for Video

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***Abstract-*** *In this paper video Compression using discrete cosine transform, Accordion Discrete Cosine Transform (ACC-DCT) and Accordion Discrete Wavelet Transform (ACC-DWT) method are analyzed. Video compression technologies have become an integral part of the way we create, communicate and consume visual information .The main objective of this paper is to apply simple methodology in video coding used for video applications to reduce the amount of video data for storing or transmission purposes without affecting the visual quality. The desired video performances depend on applications requirements, in terms of quality, disks capacity and bandwidth. In this paper analysis of compression using Discrete cosine transform(DCT), Accordion Discrete Cosine Transform( ACC-DCT) and Accordion Wavelet transform (ACC-DWT) by selecting proper threshold method, better result for PSNR have been obtained.*

***Keywords***- Discrete cosine transform ,Accordion Discrete Cosine Transform, Accordion Wavelet transform, PSNR, video compression

## I. INTRODUCTION

Over the past decades, video compression technologies have become an integral part of the way we create, communicate and consume visual information. Digital video communication can be found today in many applications such as broadcast services over satellite and terrestrial channels, digital video storage, wires and wireless conversational services and etc.

The data quantity is very large for the digital video and the memory of the storage devices and the bandwidth of the transmission channel are not infinite, so reducing the amount of data needed to reproduce video saves storage space, increases access speed and is the only way to achieve motion video on digital computers.

For instance, we have a 720 x 480 pixels per frame, 30 frames per second, total 90 minutes full color video, then the full data quantity of this video is about 167.96 G bytes. This raw video contains an immense amount of data, and communication and storage capabilities are limited and expensive. Thus, several video compression algorithms had been developed to reduce the data quantity and provide the acceptable quality as possible as they can. This tutorial starts with an explanation of the basic concepts of video compression algorithms and then introduces two international standards, known as MPEG-1 and MPEG-2. High-quality video compression of the MPEG-4 Part 2 era and later has made digital video a daily part of your entertainment menu, especially if you run your own media server at home, or like to watch video on your phone, media player, or other portable device.

MPEG-2 is still clinging to life with stubborn determination, but the reasons for hanging onto that outdated technology will fade away over the next few years. When the last of the cable and satellite companies convert their digital set-top boxes to hardware powerful enough to both encode and decode H.264 video or better, there will be no reason to use MPEG-2 anymore.

The future of entertainment is coming fast, and it is highly compressed[5].

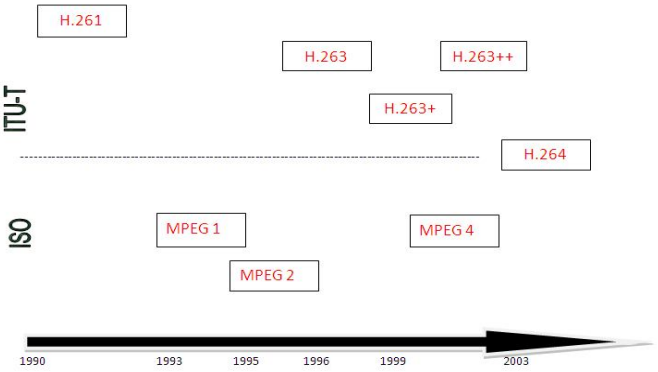


Fig 1: Video Compression Standards.

Historically, exploiting the temporal redundancy has been the main research topics in video compression technique.

## II. COMPARISON AMONG DCT, ACCORDIAN DCT AND ACCORDIAN DWT TECHNIQUE

Table 1: Comparison among DCT,ACCORDIAN DCT and ACCORDIAN DWT Technique

| Video | Methods | compression rate | PSNR |
|---|---|---|---|
| vipmen video | DCT-YCbCr | 35.8446 | 9.6751 |
| | ACC-DCT-YCbCr | 37.1403 | 13.8992 |
| | ACC-DWT-YCbCr | 37.4403 | 30.1822 |
| Viptraffic.avi | DCT-YCbCr | 31.5423 | 8.6972 |
| | ACC-DCT-YCbCr | 33.7563 | 9.9415 |
| | ACC-DWT-YCbCr | 33.9563 | 25.5415 |
| Scenevideo clip | DCT-YCbCr | 28.6835 | 6.2561 |
| | ACC-DCT-YCbCr | 30.1161 | 7.2538 |
| | ACC-DWT-YCbCr | 30.2161 | 21.2538 |

## III. CONCLUSION

Accordion transformation converts the spatial and temporal correlation of the video signal into a high spatial correlation. This technique transforms each group of pictures(GOP) into one picture with high spatial correlation. The main advantage of applying Discrete Wavelet Transform(DWT) is to achieve high compression while maintain reconstruction quality. Since, the large data block size is considered compared to Accordion-Discrete Cosine Transform (ACC-DCT); there will be less probability of occurrence of the blocking artifact. The compression ratio was found more for those videos having less motion and vice-versa. Many experimental tests have been conducted to prove the technique efficiency especially in high bit rate and with slow motion video. Since motion is low, temporal redundancy is high and it is expected that ACC-DWT becomes efficient.
However compression rate is not only the main issue we should also care about error in original and reconstructed video. These errors cannot be removed because of losses during quantization and DCT coefficient approximation. But they can be reduced to meet the human eye perception. From table 5.1 we can observe that using ACC-DWT based compression we are getting higher PSNR in comparison to ACC- DCT and DCT compression.

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