

# Image compression using modified discrete Fourier algorithm and its comparison with DCT

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## Abstract-

*In this paper a brief description about image compression is being done using modified discrete Fourier transform. Further the proposed algorithm is then compared with the discrete cosine transform in terms of parameters like Compression, Time and Bit error rate.*

Keyword –Image compression; lossless; DCT; DFT; MDFT

## I Introduction

By entering the digital age, the world has faced a vast amount of information .so dealing with this vast amount of information we have to find image difficulties .we must share, receive, analyze and process digital information is an efficient way, so that we can use it practically[1].

As with the increasing growth of technology a huge amount of image data must be handled to be stored in a proper way using efficient techniques .An image is an artefact that depicts as records visual perception [2].If N<sub>1</sub> and N<sub>2</sub> denote the number of information carrying units in two data sets that represent the same information

The compression ratio is defined as follow:-

$$[Cr=N_1/N_2]$$

N<sub>1</sub>=original image and N<sub>2</sub>=compressed image.

For image, compression techniques are rapidly developing [3].

## II Image Compression

By compression we mean to compress the data for easy transmission and easy storage of data. By decompression mean, again converting the compressed data into original data again.

Image compression is generally performed to save the transmission bandwidth for transmission of the data, to save the space for storage of image /data image compression is the technique to reduce the redundancy in representation in order to decrease data storage requirement and hence communication costs [4]

Compression is achieved by removing one or more of the basic data redundancies

## III Types of Image Compression

- (a) Lossless image compression
- (b) Lossy image compression

(a) Lossless image compression: here we get error free compression. But due to error free compression .we get very low compression ratio.

(b) Lossy image compression: there are a number of applications in which some error is tolerable, and then we apply lossy image compression.

The compressed image is similar to original compressed image but not similar as original some information is lost this is what happen in lossy image compression.

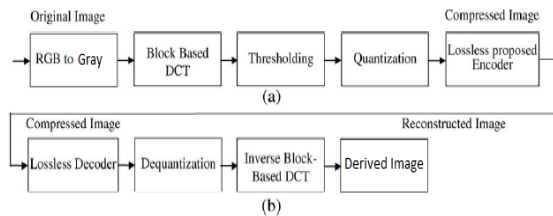
## IV DCT

Discrete cosine transform is the most popular technique for image compression [1] .DCT is used for many non-analytical applications such as image processing and signal processing. Digital image processing applications such as video conferencing. DCT is used in transformation for data compression .DCT is an orthogonal transform, which has a fixed set of basic function.

The process of DCT written as following [5]:-

1 Image is broken into 8\*8 pixels

- 2DCT applied to each block
- 3Each block is compressed through quantization
- 4 Array of compressed block is stored in reduced amount of space
- 5Image is decompressed when desired



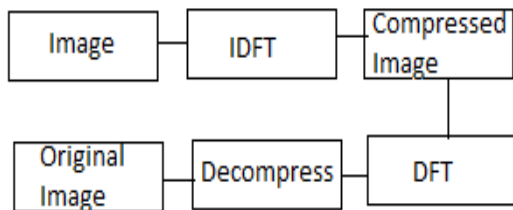
$$D(i,j) = \frac{1}{\sqrt{2N}} C(i)C(j) \sum_{x=0}^{N-1} \sum_{y=0}^{N-1} p(x,y) \cos\left[\frac{(2x+1)j\pi}{2N}\right] \cos\left[\frac{(2y+1)i\pi}{2N}\right]$$

$$C(u) = \begin{cases} \frac{1}{\sqrt{2}} & \text{if } u = 0 \\ 1 & \text{if } u > 0 \end{cases}$$

**V MDFT**

MDFT is modified algorithm of DFT to obtain more compression.

The process of MDFT given as follows in the form of block diagram.



**VI Experiment Result**

While performing the experiment it is found that original image which is of 387 kb, When we use DCT algorithm then we found that compressed image is 269 kb and again receive back that is on decompression the image is 387 kb which shows that it lossless image. Time taken for this process is 1.4196 sec, bit error rate =0.85. Whereas in case of MDFT the original image which is again 387 kb is compressed to 42.5 kb and on decompressing the image is 387 kb. Time taken for this process is 0.6396 sec, bit error rate = 1

**VII Conclusions:**

From upper result we have found that the compression rate of MDFT is better than DCT Mathematics expression;  
 DCT

Compression rate = |compressed-original|/original %

=|269-387|/387%

=30.4%

**MDFT**

Compression rate = |compressed-original|/original %

=|42.5-387|/387%

=89%

MDFT is more efficient than DCT in case of compression as well as in time .But in same time in case of MDFT the BER is more as compared to that of DCT .so for better quality of image DCT is preferred and for better compression of image MDFT is preferred.

**References**

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