



*CS 208- Design And Analysis Of Algorithms.*

## *ANALYSIS OF VARIOUS IMAGE COMPRESSION TECHNIQUES*

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*Objective: As a part of our project we aim to analyse various image compression algorithms and their time complexity. We selected four common image compression algorithms.*

There are basically two types of compression methods: lossy and lossless. Lossy compression creates smaller files by discarding some information about the original image. It removes details and color changes it deems too small for the human eye to differentiate. Lossless compression, on the other hand, never discards any information about the original file. The four algorithms to be analysed are:

## *1.JPEG:LOSSY*

JPEG stands for Joint Photographic Experts Group. In this project mainly we will focus on analysing JPEG algorithm in detail and find the time complexity of the same. We would also like to implement the same using MATLAB.

In our mobile phones or PC we observe images labeled in JPEG format, but it is an image compression standard and not a file format. JPEG algorithm compresses image to a great extent but information is lossy with this algorithm.

The algorithm can be neatly broken up into several stages: There is an input image, which goes through the following process:

- 1) A colour transform
- 2) A 2D discrete cosine transform on 8x8 blocks(DCT)
- 3) A quantization (filtering) stage
- 4) Huffman encoding.

Finally, a compressed image is returned in the .jpg file format along with the data needed to uncompress it.

## *2.GIF:LOSSY*

Graphics Interchange Format(GIF) format is a raster format, meaning it stores image data by remembering the color of every pixel in the image. In this project we analyse the algorithm of GIF and compare the time complexity with JPEG algorithm.

More specifically, GIF files remember the index of the color in a color table for each pixel. The format supports up to 8 bits per pixel for each image, allowing a single image to reference its own palette of up to 256 different colors chosen from the 24-bit RGB color space. It also

supports animations and allows a separate palette of up to 256 colors for each frame

### **3.TIFF:LOSSLESS**

Tagged Image File Format (TIFF) is a standard file format that is largely used in the publishing and printing industry. The extensible feature of this format allows storage of multiple bitmap images having different pixel depths, which makes it advantageous for image storage needs. Since it introduces no compression artifacts, the file format is preferred over others for archiving intermediate files.

We will try to analyse the algorithm and compare its time complexity to the other three formats.

### **4.PNG:LOSSLESS**

Portable Network Graphics(PNG) compression process is entirely lossless; meaning that the compressed file can reconstruct the source image exactly. Done in two stages: Prediction (aka filtering) and then Compression.

PNG provides a nice, high resolution image format, but that means that there's lots of room for improvement for data compression.

We will try to analyse the algorithm and compare its time complexity to other formats and implement it if it is possible.