**What is Image Compression?**

In the field of Image processing, the compression of images is an important step before we start the processing of larger images or videos. The compression of images is carried out by an encoder and output a compressed form of an image. In the processes of compression, the mathematical transforms play a vital role

The general representation of the image in a computer is like a vector of pixels. Each pixel is represented by a fixed number of bits. These bits determine the intensity of the color (on grayscale if a black and white image and has three channels of RGB if colored images.)

**Why Do We Need Image Compression?**

Consider a black and white image that has a resolution of 1000\*1000 and each pixel uses 8 bits to represent the intensity. So, the total no of bits req= 1000\*1000\*8 = 80,00,000 bits per image. And consider if it is a video with 30 frames per second of the above-mentioned type images then the total bits for a video of 3 secs is: 3\*(30\*(8, 000, 000)) =720, 000, 000 bits

As we see just to store a 3-sec video we need so many bits which is very huge. So, we need a way to have proper representation as well to store the information about the image in a minimum no of bits without losing the character of the image. Thus, image compression plays an important role.

What Are The Types Of Image Compression?

Image compression has two prime categories - lossless and lossy image compression. These vary based on the image file resizing process. While the former ensures the image quality remains intact, the latter removes some parts to get a smaller size.

Lossless Compression

Lossless compression refers to a process of resizing the images into a smaller version. This technique does not fiddle with the image quality.

Though it is an excellent method to resize your image files, the outcome may still not be too small. That is because lossless compression does not eliminate any part of the image.

For example, it will convert an image of 15 MB to 10 MB. However, it will still be too large to display on a webpage.

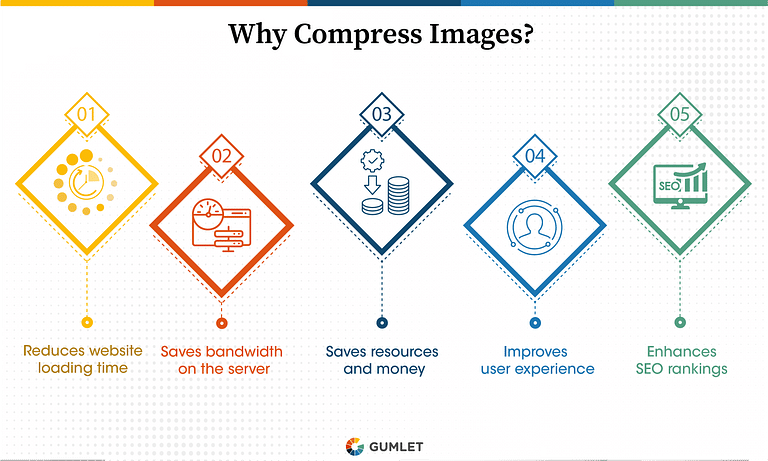
Lossless image compression is particularly useful when compressing text. That is because a small change in the original version can dramatically change the text or data meaning.

Pros

* Image parts remain intact
* Zero loss in image quality
* It is a reversible process

Cons

* The image output is too large
* Decoding is challenging



Lossy Compression

Lossy compression reduces the image size by removing some of the image parts. It eliminates the tags that are not very essential.

If you opt for this method, you can get a significantly smaller version of an image with a minimal quality difference. Additionally, you can enjoy a faster loading speed.

Lossy compression works with a quality parameter to measure the change in quality. In most cases, you have to set this parameter. If it is lower than 90, the images may appear low quality to the human eye.

For example, you can convert an image of 15 MB into 2200 Kb as well as 400 Kb.

That said, Image optimization services like Gumlet do not require you to enter the quality parameter. We use a new technique developed through machine learning - Perceptually Lossless Compression.

The system automatically identifies the required parameter for lossy image compression.

Pros

* Get a highly reduced image size
* Fast load time
* Ideal option for websites

Cons

* Loses image components
* It is irreversible

The Image Compression Techniques

Whenever we think about website optimization, the first thing that comes in our minds is keywords, backlinks, and other SEO practices. It’s true that all such techniques are needed for website optimization, but your SEO must solely not rely on it. There are a plethora of other factors involved that influence a page rank and are not purely content or backlink driven.

In fact, based on these considerations, Google announced that page load speed is a crucial ranking factor for mobile as well as desktop searches. And one way to enhance your website’s page load speed and improve its ranking is – Image Compression.

Image compression is an excellent technique to boost website or page ranking. In this post, we will talk everything about Image Compression and how it can help you rank higher.

**What is Image Compression?**

Image compression is a data compression technique that is mainly applied to digital images. This technique is practiced to reduce the size and space for image storage and transmission.

As compared to generic data compression practices, image compression delivers images that are visually appealing and retain their statistical properties. It involves only reducing the size in a bite of an image without degrading its quality to an unacceptable extent.

With reduced image sizes, it is possible to store more images in a given space. Also, it also needs less time to send images over the internet or download it from webpages. As a result, you are able to get superior images that require less storage space, involve less time for loading, and hence, are able to improve your page ranking.

**What is the Need for Image Compression?**

Using lightweight or small-sized images is essential for websites, especially mobile sites. One of the major concerns for mobile sites is having fast download speed. A convenient way to this is image compression. Compressed images require less space for storage, and hence, the overall time needed by your website will reduce to a great extent.

Just like textual content, images content are extremely important. They are not a piece of decorations. Hence, you must treat them with care just like you care for textual content. This way, it will help to rank your website higher.

Adequate use of image helps to break up the textual content, which makes it easier to scan the entire page. This feature enhances the overall user experience. You can obtain a better user experience and encourage your SEO strategy with image compression.

Hence, rather than using images to create easy to read web pages, images can help to boost your SEO ranking and offer a rich user-experience. The only way you can achieve this is by treating your images as textual content and practicing image compression.

How Does Image Compression Techniques Work?

There are two types of image compression techniques – Lossy and Lossless. The two techniques work differently.

Let’s take a quick glance at both of them.

Lossless Compression:

Lossless compression is a technique used to reduce the file size of an image while maintaining its quality like before. It is similar to a DSLR camera that offers the option to save photos in different formats, like JPEG or RAW.

JPEG files involve less space and will not fill up your hard drive fast, but during the conversion process, you may lose out some data. Files in RAW format have no compression and are excellent if you are a professional user.

Lossy Compression:

The lossy compression technique is another way of image compression that involves cutting some part of the image to create even smaller file sizes.

One way to practice the lossy compression technique is reducing the color space of the image to the most common colors. It is often practiced in GIF and a few times in PNG images to create files of much smaller sizes.

When practiced in the right way and combined with dithering, this can lead to images that are almost identical to the original images.

In order to have a better understanding of both lossless and lossy image compression methods, let’s compare both these techniques.

Lossless vs. Lossy Image Compression Techniques:

Though there are various kinds of image compression methods available, the two most commonly used are Lossy vs. Lossless compression. A comparison of both these practices can help you make the right decision on selecting which one will work best for you.

Lossless Compression:

This is a compression technique that refers to image compression by reducing the image size without resulting in any quality loss. Primarily, this is practiced by removing unwanted metadata from PNG and JPEG files.

BMP, GIF, PNG, and RAW are the common lossless image formats. An important thing that you must note is that JPEG is a lossy format, which means that when you use the maximum preset option it can result in loss of some details or reduce image quality. This can happen even when you export images from Photoshop using the ‘save for web’ function.

One major advantage of lossless compression is that it lets you retain the quality of the image and still maintain a smaller size of the file. Hence, if you wish to retain your image quality then lossless compression is the best solution available.

Pros of Lossless Compression:

No quality loss of images

A slight reduction in the file size of the image

Cons of Lossless Compression:

The files are quite bigger as compared to the lossy compression

Lossy Compression:

This is another kind of image compression that refers to compression of the image where some data from the original image is lost. It is an irreversible process. So, once you convert the image to lossy you cannot alter it back to the original file.

Also, the more you compress an image, the more your image quality will degrade. GIFs and JPEGs are lossy image formats.

One of the prominent benefits of using lossy compression is that it enables you to reduce the file size dramatically. However, this is at the cost of high-quality loss. Most of the software, plugins, and tools available will allow you to select the degree of compression, which you wish to use. Hence, the more you compress the image the lower will be its quality.

Pros of Lossy Compression:

You can reduce the file size to a great extent

The file format is supported by lots of plugins, tools, and software

Cons of Lossy Compression:

With an increase in the higher ratio of compression, the quality of the image also degrades.It is an irreversible process. You cannot get back to the original image after compression.

If you have to choose between lossless and lossy image compression methods, then there is no right or wrong choice. You can make a selection on the basis of what works best for your site and visitors. If you are ready to compromise on the image quality and want smaller image sizes then the lossy route is ideal for you. However, you must select lossless compression if you want to compress images without compromising on their quality and visual appeal.

Image Compression Standards:

Whether you use Lossy image compression or Lossless image compression, there are multiple ways in which the image can be compressed. So, here check the common image compression standards that you can use.

1. GIF:

With its full form as Graphics Interchange Format, this is a bitmap image standard that was introduced by CompuServe in 1987. This format supports up to 8 bits per pixel, implying that an image can incorporate up to 256 distinct RGB colors.

The main benefit of GIF format is that it enables for animated images, which other formats or standards would not be able to offer you.

TIFF(.tif, .tiff)

Tagged Image File Format this format store image data without losing any data. It do not perform any compression on images have a high-quality image is obtained but size of image is also large, which is good for printing, professional printing.

2. PNG

The full form of this image standard is Portable Network Graphics. It is a bitmapped image standard that uses lossless image compression technique. It was primarily introduced to replace the GIF format. However, this format is not supported by Internet Explorer, and for this reason, is uncommon as compared to JPEG and GIF formats.

3. BMP

This is another image compression standard that is known as bitmap image device or file independent of a bitmap. It is a faster graphics image format that is useful in storing bitmap digital images and independently displays the images on a device.

This compression method is used especially on operating systems and Microsoft Windows.

4. RAW

A RAW image format is an unprocessed image that contains raw image information. This raw image detail is saved in the RAW format and is useful to send or share among multiple individuals.

Some users prefer RAW over JPEG because RAW contains more details as compared to JPEG files. Also, they have better quality in comparison to image files in JPEG format.

5. JPEG

This is one of the most commonly used image compression formats. It is known as Joint Photographic Experts Group and is a lossy compression format used to create images of extremely smaller file sizes.

One major advantage of this standard is that it enables the designers to fine-tune the compression volume. As a result, designers can attain better image quality when used precisely and at the same time achieve the smallest image size.

However, this standard is lossy compression and hence the images saved in this format can lead to artifacts, where you can witness pixels and strange halos around certain areas of an image. It is highly useful in images having a sharp contrast between colors. It is because such images tend to retain their quality and you can, therefore, have a pleasing looking final image.

Lossless Image Compression Techniques:

Lossless image compression is preferable for archival purposes and is used mainly for technical drawings, medical imaging, comics, or clip arts.

Run-length Encoding

Predictive Coding and DPCM

Area Image Compression

DEFLATE

Chain Codes

Adaptive Dictionary Algorithms

Entropy Encoding

Lossy Image Compression Techniques:

The Lossy image compression techniques are mainly used for natural images like photographs in applications where some minute loss is acceptable.

Decreasing the Color Space

Transform coding

Chroma Subsampling

Fractal Compression

**Advantages of Image Compression:**

Image compression can benefit you by letting your images load faster and boost the loading speed of your webpages. In addition to this, image compression can offer you additional benefits, such as:

1. Reduction of the File Size:

This is one of the significant benefits of image compression. No matter on which file size you are working on, you can compress the image till you reach the desired size.

This implies that the image captures less space on the webpage and retains the original physical size, until you edit it.

2. Create Websites with less Bandwidth:

With smaller image sizes, webmasters can create websites with multiple images without needing much storage space or bandwidth.

3. Faster Loading on Mobiles:

Along with mobiles, people browse websites on various devices like tablets, iPads, and more. If your website has a low image file size then it will be able to load faster on all devices.

4. Maintain Image Quality:

If you are concerned about the quality of your images, then you can practice lossless image compression without any loss in the image quality.

5. Easy Storage:

Since smaller image sizes need less storage space, so you can store more images in your hard drive, which is otherwise not possible.

Conclusion:

The website’s speed plays a critical role in enhancing the user experience and boosting its overall ranking. It is a great idea to make huge investments in the content industry, but it is also essential to focus on the images as they too can influence your website ranking to a great extent.

You now know why image compression is so important and what the various options available are, you must now optimize every image of your webpage and website to optimize your rankings.