International Journal of Electrical and Electronics Engineers
Volume 15, Issue No. 01, Jan-June 2023
ISSN (O) 2321-2055
ISSN (P) 2321 -2045

Image Compression Using Enhanced Run Length Encoding

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1. ABSTRACT

Images are among the most common and popular representations of data. Digital images are used for professional and personal use ranging from official documentsto social media.One of the most common issues associated with using images is the potentially large file-size of the image. Advancements in image acquisition technology and an increase in the popularity of digital content means that images now have very high resolutions and high quality, inevitably leading to an increase in size. Image compression has become one of the most important parts of image processing these days due to this. Therefore, to achieve this perfect balance many compression techniques have been devised and it is not possible to pinpoint the best one because it is really dependent on the type of image to be compressed.

So here we are going to elaborate on converting images into binary images and the Run length Encoding (RLE) algorithm used for compressing binary images. Now, RLE is itself a very effective and simple approach for compression of images but, sometimes, the size of an image actually increases after RLE algorithm is applied to the image and this is one of the major drawbacks of RLE. In this research paper we are going to propose an extension or may be,an upgradation to RLE method which will ensure that the size of an image never exceeds beyond its original size. The objective of image compression technique is to reduce redundancy of the image data in order to be able to store or transmit data in an efficient form.

Run-length encoding (RLE) is a form of lossless data compression in which runs of data (sequences in which the same data value occurs in many consecutive data elements) are stored as a single data value and count, rather than as the original run. This is most useful on data that contains many such runs.

2. INTRODUCTION

There are different compression algorithms like JPEG and PNG but my task here is to explain about **Lossless Compression using Run Length Encoding**. The term lossless means there should not be any loss of data.

Run length encoding:

It is a data compression algorithm that helps us encode large runs of repeating items by only sending one item from the run and a counter showing how many times this item is repeated. Unfortunately this technique is

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useless when trying to compress natural language texts, because they don't have long runs of repeating elements. In the other hand RLE is useful when it comes to image compression, because imageshappen to have long runs pixels with identical color.

Lossless (exact) or lossy (inexact) can be the compression of data. In order to produce the original data, lossless compression may be reversed, whereas lossy compression removes information or presents minor errors in reversal. For text, lossless compression is appropriate, where each digit is significant.

3. EARLIER WORK:

If the image is such that each line consists of rapidly alternating pixels of intensity 0 and 1, it will generate an extra column for each pixel to store its frequency. Thus, the final compressed image can potentially grow to twice the size of the original image.

RLE compresses runs of data but in case of color images there are hardly any consecutive pixels with same intensity value, therefore it gets difficult to compress these images.In some images, there are too many intensity changes in the row while way lesser in column, so it is better to encode the image using columns instead of rows. We will discuss in upcoming sections possible solution to each of the drawbacksmentioned above.

4. PROPOSED SYSTEM:

An extension or maybe an upgradation to RLEmethod which will ensure that the size of an image never exceeds beyond its original size, even in the worst possible scenario is going to be done.

Image Compression is a fundamental part of image processing. High quality images are often large in size and thus transmission of these images is slower and requires more bandwidth. A large file also requires more storage space on servers and thus limits the number of images that can be stored. Compression and be either lossy or lossless. Lossless compression aims to reduce the file size as much as possible without eliminating any of the detail in the image. When the file is decompressed, it gives back the exact original image without any degradation in quality. The compression ratio of the image(trees.tif) is 10.557 .

The RLE takes advantage of the fact that certain data sets contain sequences of recurring; identical symbols. These repetitions will be replaced by declaring the length of the sequence. Run-length coding is one of the simplest data compression procedures and requires only small amount of hardware and software resources. Therefore Run-length coding was introduced very early and a large range of derivate has been developed up to now.

It is the simplest data compression technique. Run- length encoding(RLE) is a form of lossless data compression in which runs of data are stored as a single data value and count, rather than as the original run. Here the size of the image is compressed irrespective with the quality of the image. We have used many compression methods like EZW, DPCM so on .The PSNR value of the compressed image was21.300. This ratio is used as a quality measurement between the original and a compressed image.

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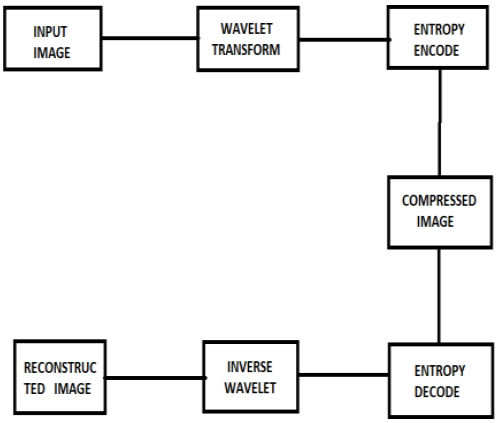
5. BLOCK DIAGRAM OF PROPOSED



6. FRAMEWORK METHOD

A hybrid model of image compression had been discussed that had shown increase in the efficiency of compression without involving comprehensible increase in resource needs. The proposed technique incorporates the concepts of statistical redundancy removal and dictionary method while doing away with the disadvantages of the procedures like compression efficiency for RLE and dictionary storage overhead for dictionary method. The procedure discussed had provided excellent compression percentages that are comparatively better than other standard techniques in present practice.

7. CONCLUSION

The underlying basis of the reduction process is explained using a simple code compression technique. Various techniques of compression are also discussed here. Image compression research aims at reducing the number of bits needed to represent an image by removing the redundancies as much as possible. The present method relates to the digital image processing arts. It finds particular application in conjunction with processing text symbols in a token based compression system, and will be described with particular reference thereto. However, it is to be appreciated that the code is applicable to image output processing of any token based or symbol dependent compression technique. Definitely Image Compression has a great scope of development which intern has many important and diverse applications including tele video conferencing, remote sensing, document and medical imaging, the control of remotely piloted vehicles in military space and many more.Our road map to complete the practicality of our project is as follows: The main philosophy behind selecting comparison technique along with run length encoding technique is based on the intrinsic property of most images, that they have similar patterns in a localized area of image, more specifically the adjacent pixels row differ in very less number of pixels. This property of image is exploited to design a very effective image compression technique. Testing on a wide variety of images has provided satisfactory results

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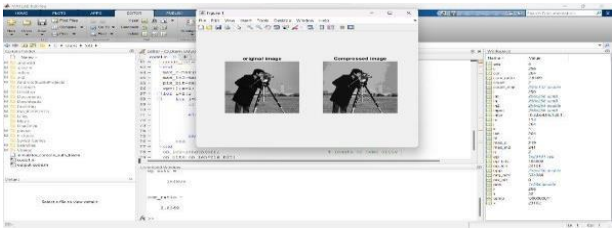
8. RESULT



The RLE takes advantage of the fact that certain data sets contain sequences of recurring; identical symbols. These repetitions will be replaced by declaring the length of the sequence. Run-length coding is one of the simplest data compression procedures and requires only small amount of hardware and software resources. Therefore Run- length coding was introduced very early and a large range of derivate has been developed up to now.

Run Length Encoding is powerful And simple algorithm but only in the most ideal cases, it cannot deal with complex images such as images of forms with lots of data in it, for example an image which has a lot of 0s and 1s in alternate positions consecutively.

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