International Journal for Innovative Engineering and Management Research
A Peer Revieved Open Access International Journal
www.ijiemr.org

IJIEMR Transactions, online available on 14th Mar 2022. Link :http://www.ijiemr.org/downloads.php?vol=Volume-11&issue=ISSUE-02

DOI: 10.48047/IJIEMR/V11/I03/09

Title **DESIGN AND IMPLEMENTATION OF HIGH SPEED MODIFIED B.K TREE ADDER ARCHITECTURE**

Volume 11, Issue 03, Pages: 52-57

Paper Authors
Kanike Sreenivasulu, T V K Hanumantha Rao

International Journal for Innovative Engineering and Management Research
A Peer Reviewed Open Access International Journal
www.ijiemr.org

Efficient Image coding technique based on Seam Identification and Integer Wavelet Transform

Kanike Sreenivasulu[1]*, T V K Hanumantha Rao[2]
[1]Scientist RCI/DRDO & Research Scholar, Department of ECE,NIT, Warangal, Telangana, India.
[2]Associate Professor, ECE Department, NIT, Warangal, Telangana India
[1]skanike@rcilab.in, [2]tvkhrao75@nitw.ac.in

Abstract: - At the end userImage retargeting is commonly required in mobile multimedia communications. Content-based image retargeting, on the other hand, has a high computational cost and is incompatible with mobile devices with low processing capacity.The research described in thisstudy addresses the rising need for visual signal transmission to terminals with arbitrary resolutions that does not impose a significant computing strain on the receiving end.The seam cutting technique is introduced into a wavelet codec in this study (i.e., SPIHT). In the pixel domain, energy map of a block-based seam is constructed for each input picture, and the retargeted image is transformed using the integer wavelet transform (IWT).Unlike traditional wavelet based coding techniques, coefficient of IWT are categorized and encoded based on the seam energy map that emerges.The bit stream is then delivered in order of decreasing energy. The end user has the final choice for spatial scalability on the decoder side, without having to inspect the visual information; a picture with any aspect ratio may be rebuilt. The received pictures with an arbitrary resolution maintain critical material for end users while achieving excellent coding efficiency for transmission, according to experimental results.

I.INTRODUCTION

Compression of Image

The issue of lowering the amount of data needed to represent a digital image is addressed by digital image compression. The elimination of superfluous data is at the heart of the data reduction process. This is equivalent to converting a 2D pixel array into a statically uncorrelated data set in terms of mathematics. Redundancy of data is a statistically measurable object, not just an abstract term. If n1 and n2 denote the number of information-carrying units in two data sets containing the same data, the first data set's relative data redundancy may be defined as follows:

$$R_D = 1 - \frac{1}{C_R} \quad \text{---------- (1.1)}$$

Where C_R termed as Compression Ratio [2]. It's described a

$$C_R = \frac{n1}{n2} \quad \text{--------(1.2)}$$

Coding redundancy ,phychovisal redundancy and interpixel redundancy, are three basic data redundancies that may be found and utilized in picture compression. When one or more of these redundancies are reduced or eliminated, image compression is achieved.

Most commonly compression of image used in image transmission and image storage. Image transmission uses include facsimile transfer, aircraftradar, broadcast television, satellite remote sensing, and sonar, and teleconferencing. Storage of Image is required for a variety of purposes, including educational and commercial papers, medical images created by Magnetic Resonance imaging, Computer Tomography (CT), and weather map, motion picture, digital radiology, satellite shots, and geological surveys, among others.Image compression methods are divided into two categories.

- Image Compression Without Loss
- Image compression that is lossy

Lossless Image Compression

Image Compression without Loss provide acceptable amount of data without any loss of information from image. Compared toImage compression that is lossy Image compression without

International Journal for Innovative Engineering and Management Research
A Peer Reviewed Open Access International Journal
www.ijiemr.org

loss has a low compression ratio. Lossless image compression approaches have two steps: creating an alternate picture representation with fewer inter pixel redundancies and coding the representation to remove coding redundancies

Medical imaging, corporate paperwork, and satellite photographs, among other things, all benefit from Image Compression Without Loss.

Image compression that is lossy

Image compression that is lossydecreases data by more than half while resulting in a less-than-perfect image reproduction. Its compression ratio is excellent.

Lossy image compression is useful in cases where a certain amount of inaccuracy is tolerated in exchange for better compression performance, such as broadcast television, facsimile transmission, and videoconferencing.

II.WAVELET APPROACH

The hunt for effective picture compression solutions has been prompted by storage constraints and bandwidth limits in communication systems. Lossy compression is utilised in multimedia applications and real-time video when a decent approximation to the original signal may be accepted. Wavelet-based image reduction methods have become increasingly popular in recent years. The wavelet transform's features allow it to outperform other compression algorithms like the DCT. As a result, the wavelet technique to image compression has been adopted bythe FBI fingerprint compression system andthe JPEG2000 compression standard.

The wavelet coding methods work on the principle that the transform co-efficient that connects pixels in animage can be coded more effectively than the pixels themselves.. If the wavelet, include a large amount of important visual information in a limited number of co-efficient, the leftover co-efficient with minimal visual distortion can be coarsely quantized or decreased to zero.

Current coders of DWT based have exceeded coders of DCT-based in terms of PSNR and CRbecause of the wavelet transforms' energy compaction and multi-resolution features, as well as their capacity to handle signals (PSNR).

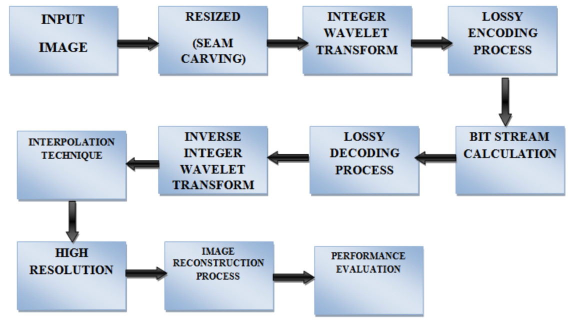


Figure 1. Block Diagram

The Wavelet transform is used to convert the compressed picture into the frequency domain. The pictures are separated into odd and even components in the wavelet transform, and image is then divided into four frequency component levels. LL, LH, HL, and HH are the four frequency components, after that, using SPHIT coding image is encoded. The stream of bits are then retrieved. SPIHT decoding is used to decode the results. Finally, the compressed picture is produced using the inverse wavelet transform.

Seam Carving For Image Retargeting

A horizontal seam is a continuous line of pixels that runs across an image from left to right, whereas a vertical seam runs from top to bottom. Image size can be reduced by eliminating a continuous line of pixels (seam) from a provided image.

Implementation of Algorithm

The gradient image for the original picture is the initial stage in computing a seam enabling insertion or removal. For computing both horizontal and vertical seams, the gradient image is commonly used. It may be made from an HSV image's brightness channel, or individually for each of the RGB channels, then averaged. In Figure 3, you can see a gradient picture. In this project, the gradient picture was calculated using the sobel operator; however, other gradient operators might be employed.

International Journal for Innovative Engineering and Management Research
A Peer Reviewed Open Access International Journal
www.ijiemr.org

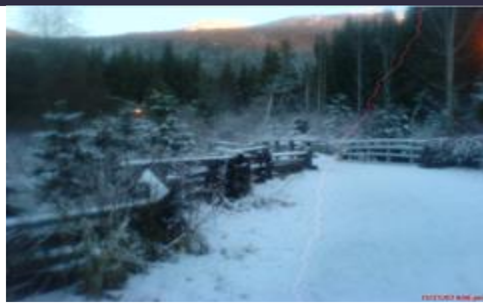


Figure 2.Image with vertical seam

Figure 3.Resized Image

The technique may be continual to eliminate a series of seams, either vertically or horizontally, resulting in a smaller picture with the same total scene information. Figure 7 shows an example of this, in which the picture was shrunk from 640x480 pixels to 320x240 pixels, and as can be seen, removing a high number of seams results in artefacts.

III.PROGRESSIVIE IMAGE TRANSMISSION

SPIHT is used after the picture pixels have been converted to wavelet coefficients. The original image is thought to be made up of a collection of pixel values, with the pixel coordinates (i, j). The WT is applied on the array, which is provided by.

$$c(i,j) = DWT\{p(i,j)\}.$$

The wavelet coefficients are represented by c (i, j).

When the coded message is received, the SPIHT decoder starts with a zero reconstruction vector and updates its components. The decoder can rebuild the image using the inverse wavelet transform, often known as "progressive transmission," after getting the value (approximate or precise) of certain coefficients.

$$\hat{p}(i,j) = IDWT\{c(i,j)\}$$

A main goal of a progressive transmission method is to send the most relevant information first, which results in the greatest decrease in distortion. The mean squared error (MSE) distortion measure is used to make this decision.

$$D_{MSE}(p-\hat{p}) = \frac{1}{N}\left\|p-\hat{p}\right\|^2 = \frac{1}{N}\sum_i\sum_j (p_{i,j}-\hat{p}_{i,j})^2$$

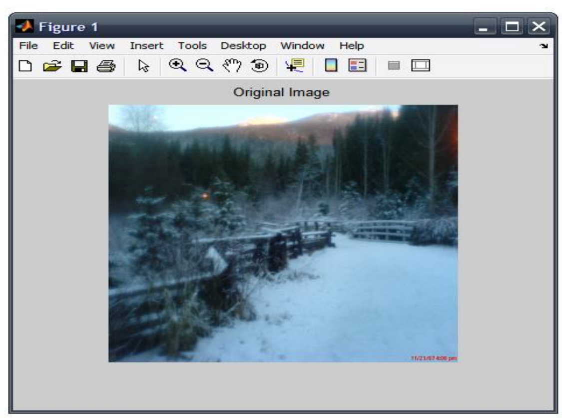
Where $p_{i,j}$ is the original pixel value ,Nis the number of pixels in an image and $\hat{p}_{i,j}$ is the pixel value that has been rebuilt.

IV. Results and Discussion

Measures of Image Quality

The peak signal to noise ratio (PSNR) and mean square error are used to evaluate the reconstructed image's quality (MSE).The σq2 reconstruction error variance is also known as the MSE. In the decoder, the MSE between the original picture f and the reconstructed image g is calculated as follows:

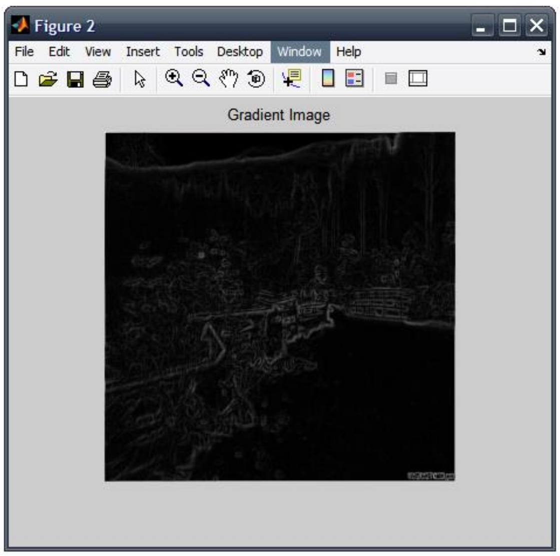
$$MSE = \sigma_q^2 = \frac{1}{N}\sum_{j,k}(f[j,k]-g[j,k])^2$$

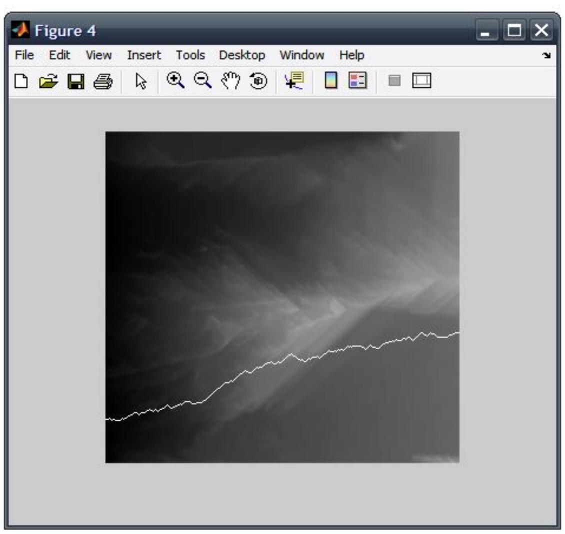


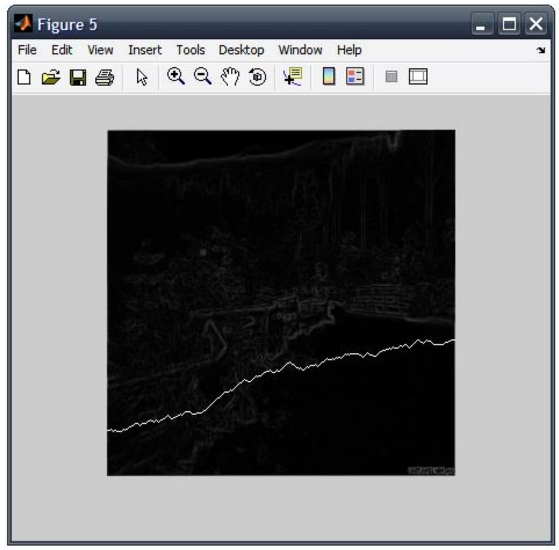
Where N is the total number pixels in each image, j represents the the total number of pixels in the picture, and k denotes the the total number of pixels in the picture. The PSNR is defined as the ratio of signal variation to reconstruction error variance as a result of this. In decibels (dBs),the peak signal to noise ratio between two images with an 8-bit per pixel resolution is calculated as follows:

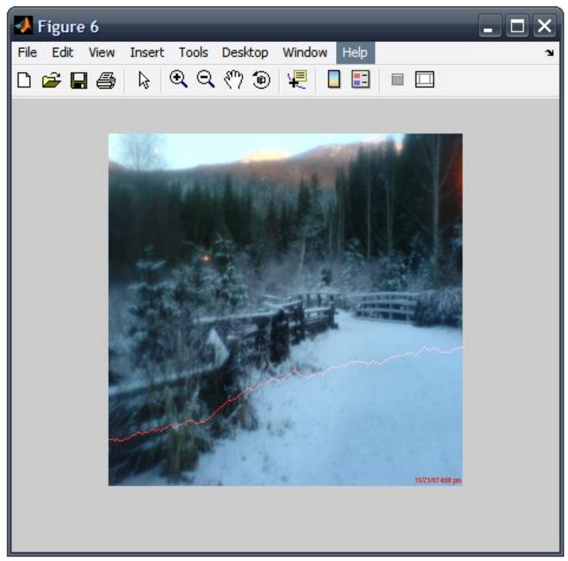
$$\text{PSNR} = 10\log_{10}\left(\frac{255^2}{MSE}\right)$$

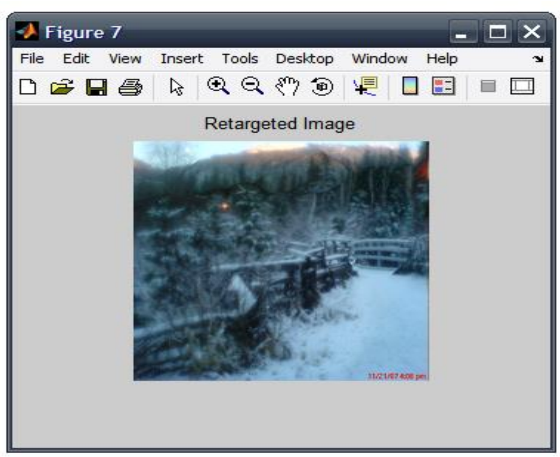
The reconstructed and original pictures are nearly indistinguishable to the human eye when the PSNR is 40 dB or higher.



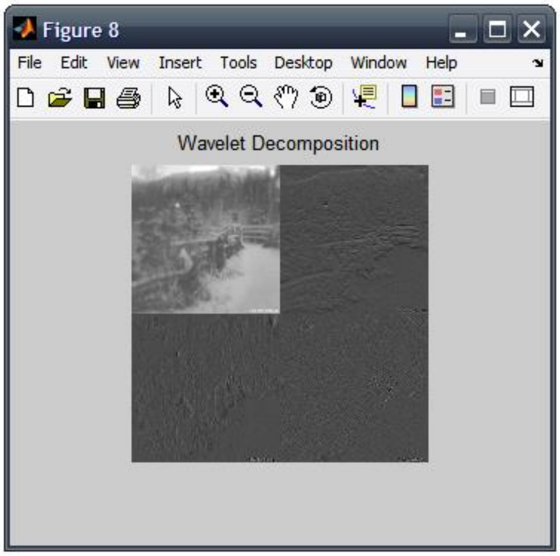


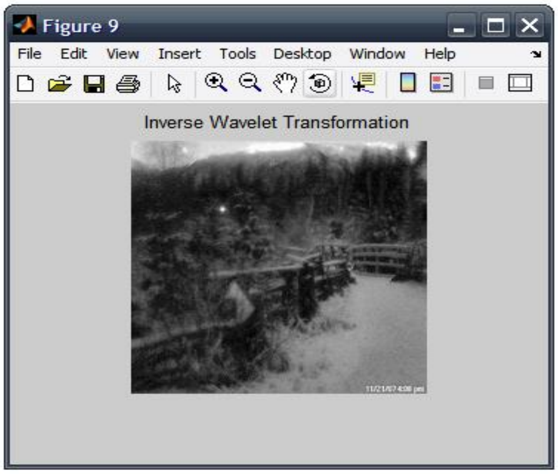




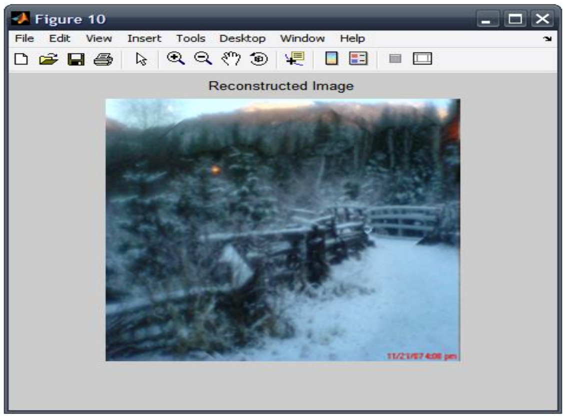


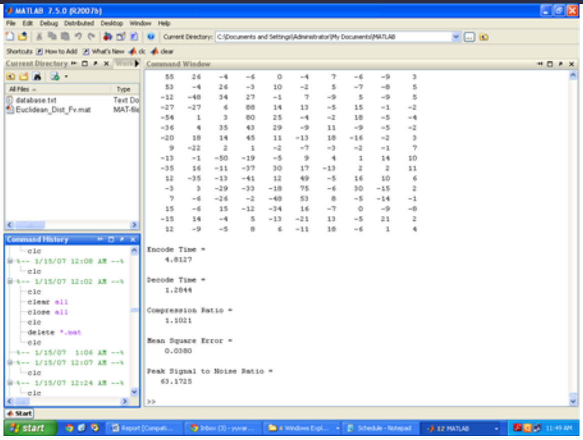
International Journal for Innovative Engineering and Management Research
A Peer Reviewed Open Access International Journal
www.ijiemr.org





Positions are encoded for a horizontal or vertical seam eithersartingfrom left to right or top to bottom, and to identify the places, just coordinates are necessary.





Because of the modified seam transmission sequence, one additional bit is required to represent the status of the first broadcast seam. The size of the seam block unit in each N X M input image with L-scale DWT is 2l X 2l; in this case, N/2l and M/2l positions are encoded in the first pair of vertical and horizontal seams, and the number of positions to be encoded is then reduced by one for each consecutive pair of seams.

V.CONCLUSION

This study uses seam cutting, IWT and set partitioning in hierarchical tress coding to give strategies for enhancing compression ratio with various quantization settings while reducing processing time. In addition, the seam carving method was demonstrated in order to retarget the picture to the display set size. To raise the CR and prevent information loss, lossy embedded coding, i.e., spiht coding, is used. This article will evaluate performance by measuring compression ratio, execution time and picture quality after decompression. Using different transformation technique, different encoding procedure and applying modified SPIHT algorithms efficiency might improve even more.

REFERENCES

[1] M.A. Ansari, R.S. Anand, Recent Trends In Image Compression And Its Application In Telemedicine And Teleconsultation, Xxxii National Systems Conference, Nsc 2008, December 17-19, 2008

[2] Debin Zhao, Y. K. Chan, and Wen GAO, Low-Complexity and Low- Memory Entropy Coder For Image Compression, Ieee Transactions On Circuits And Systems For Video Technology, Vol. 11, No. 10, October 2001

[3] Ahmed Abu- Hajar and Ravi Sankar, Region of Interest Coding Using Partial-Spiht, Icassp, 2004, IEEE 2004

[4] D.VijendraBabu, Dr.N.R.Alamelu, Wavelet Based Medical Image Compression Using RoiEzw, International Journal Of Recent Trends In Engineering, Vol 1, No. 3, May 2009

[5] N. T. N. Anh, W. X. Yang, and J. F.Cai, "Seam carving extension: A compression perspective," in Proc. ACM Conf. Multimedia, Oct. 2009, pp. 825–828.
[6] Maglogiannis, I., Kormentzas, G.: 'Wavelet-based compression with ROI coding support for mobile access to DICOM images over heterogeneous radio networks', Trans. Inf. Technol. Biomed., 2009, 13, (4), pp. 458–466
[7] Doukas, C., Maglogiannis, I.: 'Region of interest coding techniques for medical image compression', IEEE Eng. Med. Biol. Mag., 2007, 26, (5), pp. 29–35
[8] Zhang, Q., Xiaio, X.: 'Extracting regions of interest in biomedical images'. Int. Seminar on Future BioMedical Information Engineering, 2008, pp. 3–6
[9] Yu, Y., Wang, B.: 'Saliency based compressive sampling for image signals', IEEE Signal Process. Lett., 2010, 17, (11), pp. 973–976
[10] Calderbank, A.R., Daubechies, I., Sweldens, W., Yeo, B.L.: 'Wavelet transforms that map integers to integers', Appl. Comput. Harmon. Anal., 1998, 5, pp. 332–369**.**