Content- Based Spatial- Scalable Image Compression for Arbitrary-Resolution Display Devices

E.Agalya[1], A.Josephine Sugan Priya[2]

[1,2]Assistant Professor

[1,]Department of Electronics and Communication Engineering

Idhaya Engineering College for Women Chinnasalem, Tamilnadu, India

*Abstract***— An Image compression is a technique used to reduce the storage required to save an image. The existing image coding methods cannot support content-based image compression for an arbitrary resolution display devices. In this Paper Content –Based Spatial-Scalable Image Compression Provide high Compression than EZW. The EZW is a Very Effective and computationally Simple technique for image Compression. In the mean time discrete wave let transform (DWT) is performed. Here we Present a new and different implementation based on Set Partioning In Hierarchical Trees (SPIHT), While Provides better Performance than EZW. The SPIHT technique can be used for Image Compression to provide high compression Ratio, and Reduce the Image Size Without affecting Object by using Seam Carving technique .the proposed method introduce a new hybrid image enhancement approach driven by both global and local processes on luminance and chrominance components of the image. The result of this approach produced high image quality and PSNR values, and also mean square values. The approach was compared with other well-known image enhancement techniques. The experimental results have shown the superiority of the proposed approach**

Keywords- Image Compression, Spatial-Scalable, Discrete wavelet Transform (DWT), Set Partioning In Hierarchical Trees(SPIHT), Seam Carving (SC),image enhancement

I. INTRODUCTION

The fundamental goal of image Compression is to Obtain the best possible quality, for a given storage or Communication Capacity. Wavelet based Image Coding algorithms are very popular in recent years because Wavelet transform provides an efficient Multi Resolution representation of the signal. In Wavelet transform, the successive decomposition is performed in the low frequency region. If an Image contains information in mid and high frequency region, then Wavelet transform is not an Optimal tool to represent the Image. In such cases, wavelet packet transform can be employed to represent the image.. Image Compression may be lossy or lossless. The methods of lossy Compression that we shall concentrate on are the following: the EZW algorithm, the SPIHT algorithm, the WDR algorithm, and the ASWDR algorithm. These are relatively recent algorithms which achieve some of the lowest Errors Per Compression Rate and highest perceptual Quality yet reported. After describing these algorithms in detail, we shall list some of the other Algorithms that are available. Lossless Compression is preferred for archival purposes and often for medical Imaging, Technical drawings, clip art, or comics. This is because lossy Compression methods, especially when used at low bit rates, Introduce Compression artifacts. Lossy methods are especially suitable for Natural Images such as Photographs in applications where minor (sometimes imperceptible) loss of fidelity is acceptable to achieve a substantial reduction in bit rate. The lossy compression that produces imperceptible differences may be called visually lossless.

This paper proposes an implementation of discrete-time wavelet transform based image codec using Set Partitioning in Hierarchical Trees (SPIHT) coding in the MATLAB environment**.** The discrete-time wavelet transforms (DWT), which produces multi-scale image decomposition. By employing filtering and sub sampling, result in the form of the decomposition image (for classical dyadic approach) is produced, very effectively revealing data redundancy in several scales. A coding principle is then applied in order to compress the data. We can use Scalar-Based coding (such as JPEG2000's EBCOT scheme), or Process the Image with vector methods, taking advantage of so-called Zero trees (structures that result from data similarity across different sub bands). Typically this is a case of Embedded Zero tree Wavelet (EZW) or Set Partitioning In Hierarchical Trees (SPIHT)**.**SPIHT is used for encoding of wavelet packet transform coefficients. Results are compared in terms of PSNR,bit rate and quality with other state of art coding.

For an Arbitrary Spatial-Scalable Image Codec, it is a big challenge to reduce the amount of transmitted overhead (e.g., image content indicator and position information). the proposed a Content-aware MultiSize Image Compression is used to significance map based upon SC, an Image is decomposed into two components:ROI and non-ROI. F the ROI, is used to encoded the image by using SPIHT codec and the size is to be altered and the non-ROI, the pixels are grouped as a sequence of seams, i.e., a connected path of low-energy pixels crossing the non-ROI region from top to bottom (a vertical seam), or from left to right (a horizontal seam). The seam information is encoded by adaptive arithmetic coding algorithm and during image decoding with the need of resizing; the seams with low energy are deleted. Then the coding efficiency is far below the wavelet-based SPIHT codec: a 2.68-bpp SPIHT-coded image achieved the same peak-signal-to-noise ratio (i.e., PSNR 40.5 dB) as a 5.85-bpp seam-coded image. In addition, since the ROI and non-ROI are encoded using different image coding schemes, severe block-artifacts occur on the boundaries of the ROI and non-ROI regions.

The principle of this codec is as follows: at the encoder side, the original image is first partitioned into ROI and non-ROI regions similar to the pixels in the non-ROI are then grouped into seams by a hierarchical search process, the resultant seams are removed ,that is, for the non-ROI region, no data are encoded and transmitted other than the position information of each seam; the ROI regions are encoded using SPIHT codec. At the receiving seams, a SPIHT-decoded image with a retargeted size can be obtained by a simple linear interpolation. According to the simulations in the CD-based coding architecture can achieve similar R-D performance compared with that of SPIHT; however ,due to the simple dilution process at the decoder side, the resized image has visible interpolation artifacts and severe shape distortion.

We propose a simple image operator, we term seam-carving, that can change the size of an image by gracefully carving-out or inserting pixels in different parts of the image. Seam carving uses an energy function defining the importance of pixels. A seam is a connected path of low energy pixels crossing the image from top to bottom, or from left to right. By successively removing or inserting seams we can reduce, as well as enlarge, the size of an image in both directions for image reduction, seam selection ensures that while preserving the image structure, we remove more of the low energy pixels and fewer of the high energy ones .For image enlarging, the order of seam insertion ensures a balance between the original image content and the artificially inserted pixels. These operators produce, in effect, a content-aware resizing of images.

The proposed method, which works as an automatic enhancement method using parameters with default values, is compared with four classical enhancement methods (linear contrast stretching, contrast reverse, gamma correction and histogram equalization and some recent developed histogram equalization based methods, such as DRSHE,BPDHE and GC-CHE using test images. The test images include well-known typical test images including *Mountain*, *Scene*, *Meat* etc, with an image resolution of 500x362 or721x481 or 768x768 or 731x487 pixels.

In this paper, a new hybrid approach based on a virtual histogram modification for color image enhancement is proposed. The novelty of the proposed method is that color image enhancement is based on modification of a virtual histogram distribution, which is a new way to integrate color and brightness information extracted from salient local features, for global contrast enhancement. The special contributions of the proposed method are the output value scaling bounds control and output range boundary control for the enhancement mechanism to ensure the better maintenance of color for the enhanced mages. The proposed approach introduces the parameters to increase the visibility of specified features, portion or aspects of the image. If the parameters are set up to default values, the proposed method will work as an automatic process. The proposed approach has a potential for various applications to enhance specific categories of images, such as surveillance videos/images, biomedical images and satellite images.

II. DISCRETE WAVELET TRANSFORM

A discrete wavelet transform (DWT) is any wavelet transform for which the wavelets are discretely sampled. As with other wavelet transforms, a key advantage it has over Fourier transforms is temporal resolution: it captures both frequency and location information (location in time).Wavelets are functions that satisfy certain mathematical requirements and are used in representing data or other functions. A wavelet transform combines both low pass and high pass filtering in spectral decomposition of signals. In case of discrete wavelet, the image is decomposed into a discrete set of wavelet coefficients using an orthogonal set of basis functions. These sets are divided into four parts such as approximation, horizontal details, vertical details and diagonal detail.

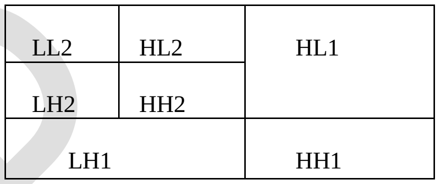

Figure1.Two level discrete wavelet decomposition

As a consequence four sub bands arise from one level of the transform one low-pass sub band containing the coarse approximation of the source image called LL sub band, and three high pass sub bands that exploit image details across different directions HL for horizontal, LH for vertical and HH for diagonal details. In the next level of the transform, we use the LL band for further decomposition and replace it with respective four subbands. This forms the decomposition image is shown in fig(1)

The proposed discrete wavelet SPIHT (DWT-SPIHT) technique is used to compress the image efficiently band produce high compression ratio by using Set Partioning sorting algorithm. The DWT-SPIHT coder is limited to images of square resolutions of power of 2 and grayscale (256levels, that is 8 bit per pixel) information only. It produces a reconstructed output in spatial domain for comparison and also automatically computes PSNR(Peak Signal to Noise Ratio) as a measure of the difference between source and compressed (destination) images.

III. SET PARTIONING IN HIERARICHAL TREES (SPIHT)

The powerful wavelet-based image compression method called Set Partitioning in Hierarchical Trees (SPIHT).SPIHT was designed for optimal progressive transmission, as well as for compression. One of the important features of SPIHT (perhaps a unique feature) is that at any point during the decoding of an image, the quality of the displayed image is the best that be achieved for the number of bits input by the decoder up to that moment. Another important SPIHT feature is its use of embedded coding. This feature is defined as follows: If an (embedded coding) encoder produces two files, a large one of size *M* and a small one of size *m*, then the smaller file is identical to the first *m* bits of the larger file.

Set partitioning in hierarchical trees (SPIHT) is based on the multiscale 2-D DWT and exploits the self-similarity across Scales by using set partitioning. It provides better performance than the EZW. This algorithm is capable of lossless as well as lossy compression. it provide higher compression ratio and it also used in JPEG 2000.

The proposed SPIHT codec is applied, processing the image respectively to a lowering threshold. The difference is in the concept of zero trees (spatial orientation trees in SPIHT). This is an idea that takes bounds between coefficients across sub bands in different levels into consideration. The first idea is always the same: if there is an coefficient in the highest level of transform in a particular subbed considered insignificant against a particular threshold, it is very probable that its descendants in lower levels will be insignificant too, so we can code quite a large group of coefficients with one symbol. SPIHT makes use of three lists – the List of Significant Pixels (LSP), List of Insignificant Pixels.

SPIHT makes use of three lists – the List of Significant Pixels (LSP), List of Insignificant Pixels (LIP) and List of Insignificant Sets (LIS). These are coefficient location lists that contain their coordinates. After the initialization, the algorithm takes two stages for each level of threshold – the sorting pass (in which lists are organized) and the refinement pass (which does the actual progressive coding transmission). The result is in the form of a bit stream. The proposed SPIHT technique is produced set Partioning sorting algorithm.

IV. SET PARTIONING SORTING ALGORITHM

One of the main features of the proposed coding method is that the ordering data is not explicitly transmitted. Instead, it is based on the fact that the execution path of any algorithm is defined by the results of the comparisons on its branching points. So, if the encoder and decoder have the same sorting algorithm, then the decoder can duplicate the encoder's execution path if it receives the results of the magnitude comparisons, and the ordering information can be recovered from the execution path. One important fact used in the design of the sorting algorithm is that we do not need sort all coefficients.

The SPIHT algorithm creates a pyramid structure based on a wavelet decomposition of an image. The SPIHT algorithm bases its efficiency by iteratively searching for significant pixels throughout the pyramid tree. A wavelet coefficient at location (i,j) in the pyramid representation has four direct descendants (off-springs) at locations:

The proposed SPIHT algorithm sends the top coefficients in the pyramid structure using a progressive transmission scheme. This scheme is a method that allows obtaining a high quality version of the original image from the minimal amount of transmitted data. The pyramid wavelet coefficients are ordered by magnitude and then the most significant bits are transmitted first, followed by the next bit plane and so on until the lowest bit plane is reached.

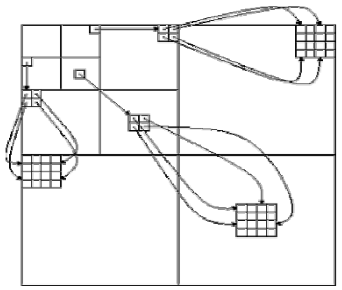

Figure 2.Off-spring dependencies in the Pyramid structure

It has been shown that progressive transmission can significantly reduced the Mean Square Error (MSE) distortion for every bit-plane sent. The advantage of the spatial relationship among the coefficients at different levels and frequency bands, the SPIHT coder algorithm orders the wavelets coefficient according to the significance test defined as:

$$\boldsymbol{i,j^{max} \in \tau_m |c_{i,j}| \geq 2^n}$$

Where $c_{i,j}$ is the wavelet coefficient at the nth bit plane, at location (i,j)of the τ_m subset of pixels, representing a parent node and its descendants. If the result of the significance test is yes the flag is set to 1 indicating that a particular test is significant. If the answer is no, then the flag is set to 0, indicating that the particular coefficient is insignificant.

V. SPATIAL ORIENTATION TREES (SOT)

Normally, most of an image's energy is concentrated in the low frequency components. Consequently, the variance decreases as we move from the highest to the lowest levels of the sub band pyramid. Furthermore, it has been observed that there is a spatial self-similarity between sub bands, and the coefficients are expected to be better magnitude-ordered if we move downward in the pyramid following the same spatial orientation. A tree structure, called spatial orientation tree (SOT), naturally define the spatial relationship on the hierarchical pyramid. .The SOT is defined in a pyramid constructed with recursive four-sub band splitting.

This structure is defined in a way that exploits the spatial relationships between the wavelet coefficients in the different levels of the sub band pyramid. For each SOT, biplane scanning is performed from the most Significant biplane (MSB) to the least significant biplane (LSB). At the biplane n (LSB≤n≤MSB), we can use an Indicator as $S_n(T)$ as

$$\begin{cases} 1, & if max\{|c_{i,j}|, (i,j) \epsilon T \geq 2^n\} \\ 0, & otherwise \end{cases} ,$$

To indicate the significance of a SOT *T*, where $c_{i,j}$ denotes the Coefficients in T and $2^n$is the quantization step with regard to the biplane *n*. If S_n (*T*) = 0, all the coefficients in *T* are insignificant and one bit “0” is sent to the decoder; If $S_n(T)$ = 1, one bit “1” is sent to the decoder and the SOT T is spitted into four sub-SOTs $T^m(1 \leq m \leq 4)$and the significance test is then applied to each T^m. This SOT split process continues until all the tree leaves are tested.

The DWT coefficients are grouped as spatial orientation trees (SOTs). In the conventional SPIHT scheme, the SOTs are scanned and encoded in a zig-zag order and the coding process is performed from the MSB to the LSB.Let the SOTs and the encoded bit stream be denoted as T_i (i=1,2,……n) and $\{T_1^{MSB}, T_2^{MSB}, \ldots\ldots, T_1^{MSB-1}, T_2^{MSB-1}, \ldots., T_1^{LSB}, T_2^{LSB}, \ldots.\}$,respectively.

VI. PROPOSED IMAGE CODEC DESCRIPTION

A block-based seam energy map is used as an indication of the importance of image content. Here, we propose a seam-guided SPIHT scheme for the encoding of wavelet coefficients

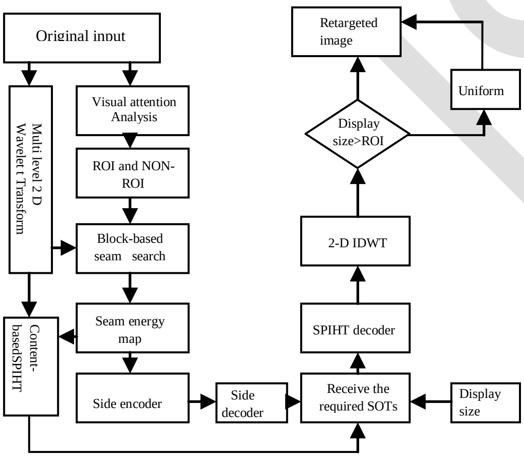

Figure 3.Flow chart of the proposed image codec description

From Fig.3 we can see that at the encoder side, multi-scale DWT is performed and similar to the SPIHT codec, wavelet coefficients are grouped into SOTs. On the other hand, the original image is decomposed into regions of interest (ROIs) and non-ROIs via visual attention analysis. The purpose of ROI extraction here is to use different energy weights for different regions in the seam search process. The resultant seam energy map is used to guide the encoding order of the SoT’s. The ROIs and non-ROIs here use the same coding architecture and the main difference for ROIs and non-ROIs is the scanning and encoding order of different SOTs. The code stream and the overhead information of the energy map and ROI size are transmitted. At the decoder side, the SOTs (i.e., the wavelet coefficients) are reconstructed in energy descending order, and if one would like to obtain an image with the size smaller than that of ROI, uniform scaling is performed.

The proposed method of this flow chart is introduce addition of two blocks (anti aliasing filter and image enhancement resolution).this blocks used 1. Improve the PSNR values 2.reduction of mean square error value and possible to reduce blurring and artifacts.

VII. SEAM CARVING

Seam carving (SC) is an emerging image resizing paradigm. For SC, the importance of pixels is defined by an energy function and based upon this function; the image size can be changed by gracefully carving-out or inserting pixels in different parts of the image. A seam is an 8-connected path of pixels crossing the image from top to bottom (i.e., vertical seam), or from left to right (i.e., horizontal seam). Seam carving can support several types of energy functions such as gradient magnitude, entropy, visual saliency, eye-gaze movement, and more. The removal or insertion processes are parameter free ;however, to allow interactive control, we also provide a scribble based user interface for adding weights to the energy of an image and guide the desired results. This tool can also be used for authoring Multi-size images.

Seam carving, for content-aware multi-size image compression. Our proposed codec encodes an image into a content-aware progressive bit stream that allows decoding into arbitrary display resolution. In addition, seam insertion is incorporated into the proposed framework to improve the performance in low bit rate image transmission applications. Seam carving can also be used for image content enhancement and object removal. Let s_i denote the i^{th} component of a seam, and thens_i^x ands_i^yrepresent its vertical and horizontal aspects, respectively. Mathematically,a vertical seam is defined as

$s^x = \{s_i^x\}^N{}_{i=1} = \{x(i), i\}_{I=1}^N \forall i, |x(i) - x(i-1) \leq 1|$

where x is a mapping of x=:[1,….. n]→[1,…..M]. Similarly, if y is a mapping of y=:[1,…..M]→[1,….N]then a horizontal seam is,

$s^x = \{s_i^y\}^M{}_{j=1} = \{y(j), j\}_{I=1}^M \forall i, |y(j) - y(j-1) \leq j|$

The pixels of a seam S (e.g., vertical seam {s_i })will therefore Be $I_s = \{I(s_i)\}_{i=1}^N = \{I([x(i), i)\}_{i=1,}^N$where I(.) denotes the NXM original image. In [10], dynamic programming is used to search the seam path with minimal energy, and we look for the optimal S* seam that satisfies

$S^* = \arg\min_s \sum_{i=1}^J E[S_i)]$

7.1. Object Removal

The target object to be removed and then seams are removed from the image until all marked pixels are gone. The system can automatically calculate the smaller of the vertical or horizontal diameters (in pixels) of the target removal region and perform vertical or horizontal removals accordingly .Moreover, to regain the original size of the image.

7.2. Seam Energy Map

The propose a block-based seam to reduce the overhead of the position information, while maintaining acceptable retargeting performance .Different from the original vertical (or horizontal) seam with only one-pixel width(or height), here we consider a $2L \times 2L$ block as the seam unit(L is a non negative integer).

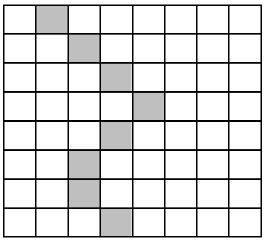

Fig 4.1.Original seam with One-pixel width

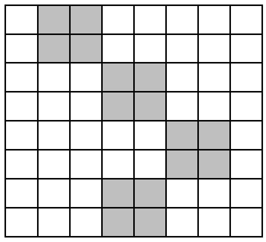

Fig 4.2.proposed block- Based seam($2^L \times 2^L$)

For an $N\times M$ original image, $E_B$and $R_B$can be calculated as:

$$EB(S_B) = \frac{\sum_J M_B(N/2^L, J)}{M/2^L}$$

$$R_B(S_B)=R_C(S_B)+(S_B)$$

where $M_B(N/2^L, J)$ represents the last row of the cost matrix MB. J is the column index and $J\epsilon[0,M/2^L]$; $Rc(S_B)$ and $Rs(S_B)$ are the coded bits generated by encoding the wavelet coefficients and the position information of the corresponding seam paths, respectively

Algorirhm1:Block-Based Vertical Seam Search

The optimal block-based seams can be found, and in pseudo Scode form, this process is illustrated by Algorithm-1

for each N X M Input image I **do**
initialize the forward cost matrix $M_{B=\Phi}$
for each 2^L rows of I **do**
for each 2^L columns of I do
calculate the forward cost $C_L^B, C_U^B and, C_R^B$
and store the minimal one of the three costs
if key regions of the image **then**
Assign large weight parameter W
else
W=0
Calculate the average forward seam energy E_B,
Generate the $R_S(S_B)$ by encoding the position of the block-based seam paths
while 2^L-width vertical seam path calculation **do**
SOT bit plane scanning with L-scale DWT

Generate the $R_C(S_B)$
for all L **do**
$J(L) \leftarrow E_B(S_B)+\lambda[R_C(S_B)+R_S(S_B)]$

Sort J(L) in descending order
Select the optimal block size S_B^e with the lowest value of J(L)

The block-based seams are the optimized trade-off between the retargeting performance and the coding efficiency. After seam search, a block-based seam energy map can be generated by sorting the resultant seams in energy descending order and this map would be used to control the scanning and coding order of the wavelet coefficients (sorted as SOTs).SPIHT cannot support content-aware spatial-scalable coding. To address this limitation, in the proposed content-based SPIHT framework, the SOTs are sorted based upon the obtained seam energy map.

Algorithm 2: Seam-Guided Sots Scanning

The prototype of seam-guided SOTs scanning is expressed by Algorithm2.

for each N X M input I **do**
Output the wavelet coefficient $c_{i,j}$ by performing
L-scale 2-D DWT, where $L\leq 5$
Output the MSB: $p=[\log_2(\max_{i,j}\{|c_{i,j}|\})]$
Set the truncated bit plane p_t
for all the wavelet coefficients $c_{i,j}$ **do**
Group $c_{i,j}$ as SOTs Ti(i=1,2…..n) based upon the Block-based seam energy map
Put all the SOTs in energy descending order:
$\{T_{E1}, T_{E2} \ldots\ldots T_{En}\}$,where $E_1 > \ldots > E_n$
for each T_{Ei} where i=1:n **do**
for j= p: p_t **do**
If the indicator in eq.7 is:$S_j(T_{E_i}^j)=0$
then
Output one bit “0”
else
Output one “1”
Split $T_{E_i}^j$ into four sub-SOTs $T_{E_i}^{j,m}$,where $1\leq m\leq 4$
while$T_{E_i}^{j,m}$ has children in the next finer Scale **do**
Continue to test the significance of $T_{E_i}^{j,m}$, i.e., the indicator in eq

In order to utilize the resultant energy map in the image domain to guide the SOT scanning in the wavelet domain, a corresponding -scale 2-D DWT should be performed before the SOTs scanning. Also, by doing so, the number of coefficients in the low-frequency sub band is equal to the number of seam blocks.

The resultant bit stream is grouped as follows:

$\{T_{E1}^{MSB}, T_{E1}^{MSB-1}, \ldots, T_{E1}^{P_i}, T_{E2}^{MSB}, T_{E2}^{MSB-1}, \ldots, T_2^{P_T}, \ldots\}$ where p_t is the truncated bit plane ,E_i $1\leq i\leq n$, denotes the seam energy of the corresponding SOT and $E1>E2>\ldots E_n$. Such encoded bits can be directly transmitted or even further entropy coded. One point which should be mentioned is that in the optimization process of seam block size (i.e., $2^L x 2^L$), the resultant code stream is considered. At the decoder side, the required SOT corresponding to the horizontal and vertical seams may not be received simultaneously due to the seam order. In such a case, the redundant seams need to satisfy the required aspect ratio. Note that such redundancy must be deleted before image reconstruction.

VIII. PROPOSED IMAGE ENHANCEMENT TECHNIQUE

This proposed method modified image enhancement technique. this technique is used to improve the image quality, reduce mean error vales and also increase the PSNR value and possible to reduce blurring and artifacts. The proposed method also aims at employing a much less time-consuming enhancement mechanism than those used by the existing methods. Histograms are used to depict image statistics in an image interpreted visual format.

First of all, definitions and notations are presented for introduction of the proposed enhancement method.

Let C= $\{c = (c1, c2)|1 \leq c1 \leq M, 1 \leq c2 \leq N$ denote thepixel coordinates of a colour image, where M and N are the height and width of the image, respectively. Compared with the original image, an enhanced image with good contrast will have a higher intensity of the edges. The rescaling process used in the property of the traditional histogram equalization technique, which tends to reduce contrast near histogram minima. For an original image with 256levels of brightness, if the number of the brightness levels is not reduced too many, no significant degradation is Perceive. However, in some rare cases, if the original image have extremely low dynamic range with only few intensity values, the minimum brightness levels control will be applied in the proposed method by adjusting the parameters w and v, in order to ensure that the output dynamic range is not less than 70% that of the original to avoid over contrast enhancement. The threshold of brightness level for applying the control is set to 64. In the proposed method can be used for contrast image enhancement. This image enhancement technique is used to increase the image compression ratio and reduce mean error value.

IX. EXPERIMENTAL AND RESULTS

In this paper proposed the content-based spatial-scalable image compression is conducted to evaluate the spatial-scalability and compression performance of the proposed seam energy based SPIHT codec (denoted as seam-SPIHT).

Figure5.Original Test Images (a)Butterfly (b)Wave

The two test images wave, butterfly were used for he objective and subjective verification. In this proposed method encoding and decoding is performed

At the decoder side, the images we constructed with resolutions: 819×42,819×420.in this proposed work the DWT and IDWT is performed. all he The wavelet coefficients were losselessly encoded by the SPIHT codec. From this technique we can get compression.ratio, PSNR value and correlation value. These values are given below

Test Image	Mean Square Error Bits	PSNR Ratio	Compression Ratio	Correlation
butterfly	2.590865	43.996356(db)	4.257761	0.999479

Table1.The performance of the butterfly

The proposed codec enhanced a increased new value of compression than the EZW .this image enhancement applied this proposed method ,the test image butterfly produce the high compression ratio 4.257761,and PSNR Value 43.996356(db) and it gives correlation value is 0.99479.Similalarly the test image wave gives the values are shown in below

Test Image	Mean Square Error Bits	PSNR Ratio	Compression Ratio	Correlation
wave	4.061561	42.043874 (db)	3.838308	0.998929

Table 2:The performance of the wave

In the performance evaluation, the proposed method, which works as an automatic enhancement method using parameters with default values, is compared with four classical enhancement methods (linear contrast stretching, contrast reverse, gamma correction and histogram equalization and some recent developed histogram equalization based methods, such as DRSHE,BPDHE and GC-CHE using test images.

(a)Input Image (b)After IDWT

(C)Seam Carved Output Image

(d) After Image Enhancement

For the SPIHT-Scale framework, five-level DWT is performed. All of the wavelet coefficients were losslessly. Encoded. In the simulation result we first decoded the images with the nearest dyadic-resolution and then uniformly scaled it to the required size.

The proposed enhancement algorithm can effectively enhance the overall contrast and the sharpness of the test images. A significant. From the output images, these test images where enhanced by histogram equalization, the histogram equalization with over-enhanced parts of the images and highlighted blocking artifacts caused by image compression. The performance of the proposed approach is much better than the other image enhancement methods

The testing hardware and software are MATLAB R2010 and Microsoft visual studio. The proposed code method achieved by the better compression ratio than the existing methods. and achieve better image quality by using image enhancement technique.

(a)Input Image

(b)After IDWT

(C)Seam Carved Output

(d) After Image Enhancement

CONCLUSION & FUTURE WORK

This paper has presented a brief overview of content – based image retrieval area for compression and image resizing. We have provided a resolution for delivering images to the diversity and versatility of display devices with arbitrary resolutions, and maintaining the important and sensitive content without extra computational burden at the receiving end keeps the decoder's complexity low. In this paper we are using seam carve and SPIHT coded technique. In seam-SPIHT, at the encoder side block based seam energy map is generated in the image domain. According to the resultant map, the coefficients are grouped as seam-guided SOTs, which are encoded in energy descendent order and the side information is also sent to indicate the positions of trees. In this way, one can reconstruct the arbitrary size image in a content – aware manner. The proposed approach is used to reduce mean square error value and possible to reduce blurring and increase the PSNR ratio than the existing method and also reduced the artifact. Experimental results show that this method is applicable for both multimedia applications and in the field of medical images since it preserves the important region while compressing and retargets the image with less computational complexity.

REFERENCES

[1] Said. A and Pearlman. W.A, "A new, fast and efficient image codec based on set partitioning in hierarchical trees," *IEEE Trans. Circuits Syst. Video Technol.*, vol. 6, no. 3, pp. 243–250, Jun. 1996.

[2] Use vitch.B.E, "A tutorial on modern lossy wavelet image compression: Foundations of JPEG 2000," *IEEE Signal Process. Mag.*, vol. 18,no. 5, pp. 22–35, May 2001.

[3] Information Technology-JPEG 2000 Image Coding System: Core Coding System, IEEE Std. ISO/IEC 15 444-1, Sep. 2004.

[4] Liu.D, Sun.X.Y, Wu.F, S. Li.S.P, and Zhang.Y,Q, "Image compressionWith edge-based in painting," *IEEE Trans. Image Process.*, vol. 17,no. 10, pp. 1273–1287, Oct. 2007.

[5] Savidan.S and Shamir.S, "A seam carving for content-aware image resizing," *ACM Trans. Graphics*, vol. 26, no. 3, pp. 10–19, Jul. 2007.

[6] Caldwell.B, Cooper.M, Reid.L.G, and Vanderheiden.G, "WebContent Accessibility Guidelines (WCAG) 2.0 Dec. 2008,[Online].Available:http://www.w3.org/TR/2008/RECWCAG20-20081211.

[7] Avidan .S and Shamir.A, "A seam carving for content-aware imageResizing," *ACM Trans. Graphics*, vol. 26, no. 3, pp. 10–19, Jul. 2007.

[8] Shamir .A and Sorkine.O, "Visual media retargeting," in *Proc. ACM SIGGRAPH ASIA*, Dec. 2009, pp. 11–25.

[9] Anh.N.T.N, Yang.W.X, and Cai.J.F, "Seam carving extension: Acompression perspective," in *Proc. ACM Conf. Multimedia*, Oct. 2009,pp. 825–828.

[10] Deng.C.W, Lin.W.S, and Cai.J.F, "Content-based image compressionfor arbitrary-resolution display devices," in *Proc. IEEE Int. Conf.Commun.*, Jun. 2011,pp.

[11] Savitak.Borate,Yadav.D.N.Image compression using wavelet packet and SPIHT encoding scheme-2012.

[12] *Malý.j, Rajmic.p"*Dwt-Spiht Image Codec Implementation".