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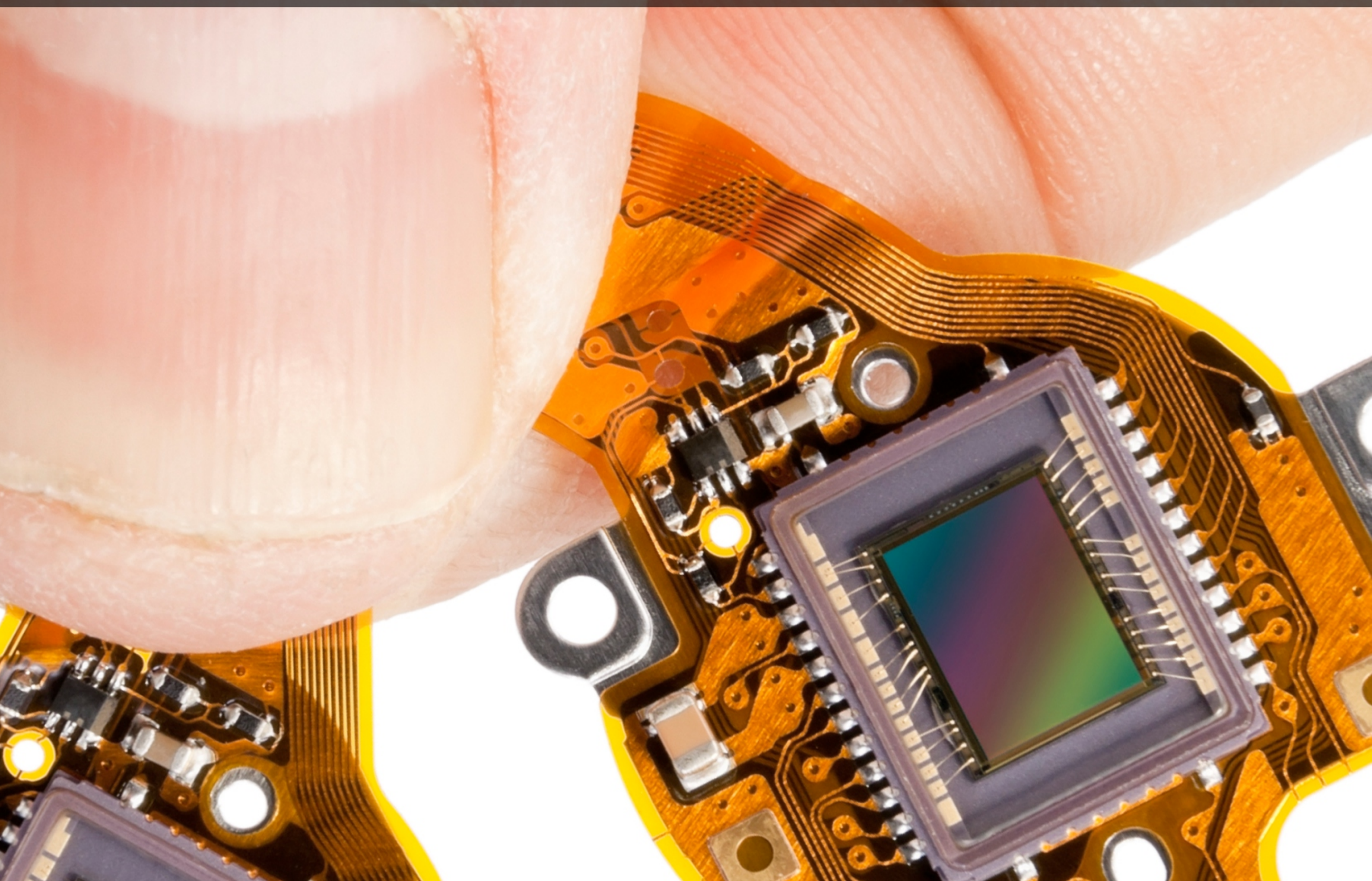

A Nobel Approach

A Study on Preprocessing

Highlights

Dequantisation Technique

Text Attribute Noise Variation

Discovering Thoughts, Inventing Future

VOLUME 15 ISSUE 2 VERSION 1.0

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A Nobel Approach to Retrieveactual Image Froma Compressed one by using Dequantisation Technique

By H Sunil & Dr. Sharanabasaweshwar G Hiremath

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H Sunil [α] & Dr. Sharanabasaweshwar G Hiremath [σ]

Abstract- Image Compression addresses the problem of reducing the amount of data required to represent the digital image. Image compression and decompression are very popular processes in image processing. Image compression is a way in which the data to be transmitted are compressed into a smaller version and then transmitted. Compression is achieved by the removal of one or more of three basic data redundancies: (1) Coding redundancy, which is present when less than optimal (i.e. the smallest length) code words are used; (2) Interpixel redundancy, which results from correlations between the pixels of an image & (3) psycho visual redundancy which is due to data that is ignored by the human visual system. In order to be useful, a compression algorithm has a corresponding decompression algorithm that reproduces the original file once the compressed file is given. Image decompression is the reconstruction of the compressed data into its original form. As the image compression may suffer loss, the decompression also needs to be taken cared so that even if loss occurs, the reconstruction of the compressed image to its original form is possible. In this paper we present two algorithms which can be applied for compressed image reconstruction. The 1st algorithm splits the problem into smaller sub problems and then each sub problem is solved together by the 2nd algorithm.

I. Introduction

Image compression is an important issue in digital image processing and finds extensive applications in many fields. This is the basic operation performed frequently by any digital photography technique to capture an image. For longer use of the portable photography device it should consume less power so that battery life will be more. To improve the Conventional techniques of image compressions using the DCT have already been reported and sufficient literatures are available on this. The JPEG is a lossy compression scheme, which employs the DCT as a tool and used mainly in digital cameras for compression of images. In the recent past the demand for low power image compression is growing. As a result various research workers are actively engaged to evolve efficient methods of image compression using latest digital signal processing techniques. The objective is to achieve a reasonable compression ratio as well as better quality of reproduction of image with a low power consumption. Keeping these objectives in mind the research work in the present paper has been undertaken. In sequel the following problems have been investigated.

Image processing is a very significant necessity in medical applications. The images keep the records of different tests conducted on the body of the patient .Storage of. Medical records of the patients is always in the form of images. The storage time should be minimum and also the accessing time should be minimum. During the image transmission and reception, the storage space and the storage time is desired to be minimum. But this condition needs to be obtained with a high information quality in the data. For reducing the storage time, the data needs to be compressed. With time many different compression methods, algorithms and file formats were developed. In still images compression there are many different approaches and each one of them produces many compression methods. However all techniques prove to be useful only in a limited usage area. Of course, image compression methods are also much desired or even necessary in medicine. The data and information are two different things .The information is the content and the data is the representation of the information. The compression of the data should not effect the information content of the data. Reducing the accessing time and storage time by means of data compression should not cause loss to the information content.

Compression is generally divided into compression and decompression. Compression is the technique for compressing the data for reducing the storage time and area. Decompression on the other hand is the reconstruction of the original image from the compressed image.

There can be distinguished two types of compression: lossless and lossy. In lossless compression methods, the data set reconstructed during decompression is identical as the original data set. In lossy methods, the compression is irreversible – the reconstructed data set is only an approximation of the original image. At the cost of lower conformity between reconstructed and original data, better effectiveness of compression can be achieved. A lossy

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compression method is called "visually lossless" when the loss of information caused by compression-decompression is invisible for an observer. Image analysis, noise elimination, may reveal that the compression actually was not lossless. There are many ways to calculate the effectiveness of the compression. The most often used factor for this purpose is compression ratio (CR), which expresses the ability of the compression method to reduce the amount of disk space needed to store the data. Compression on any digital and analog images will be of two types.

(1) Lossless compression

(2) Lossy compression

(3) Fractal Compression

a) Lossless compression

Lossless compression method comprises of two phases – modeling and coding. Creation of a method boils down to specification how those two phases should be realized. The modeling phase builds a model for the data to be encoded, which best describes information contained in this data.

The coding phase is based on a statistical analysis and strives after the shortest binary code for a sequence of symbols obtained from the modeling phase.

Three groups are distinguished in lossless compression methods:

- Entropy-coding,
- Dictionary-based,
- Prediction methods.

The entropy coding includes Shannon-Fao coding, Huffman coding, Golomb coding, Unary coding, Truncated binary coding, Elias coding .The dictionary-based includes Lempel-Ziv-Welch (LZW) coding, LZ77 and LZ78, Lempel-Ziv-Oberhumer algorithm. The prediction methods includes JPEG-LS and Lossless JPEG2000 algorithms.

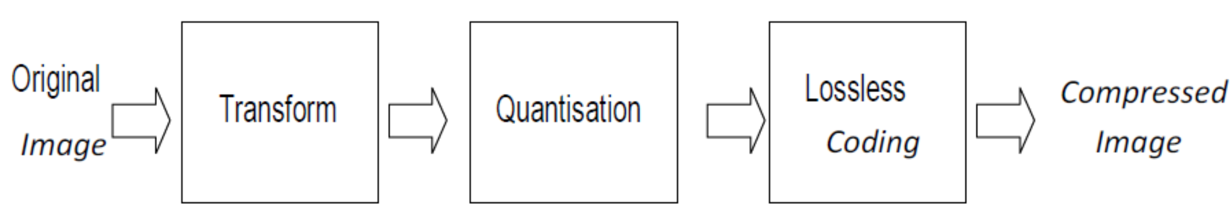
b) Lossy compression

The lossy compression methods reduce the information of the image to be encoded up to some level that is acceptable by a particular application field. In lossy compression algorithms, two obligatory phases can be distinguished: quantization and lossless compression. This means that the quantization is the key issue for lossy methods. Before the quantization, one more phase can be found -– decomposition, which is optional, but very frequently used because it allows one to create more effective quantization algorithms. The goal of the decomposition is to build a representation of the original data that will enable more effective quantization and encoding phases.

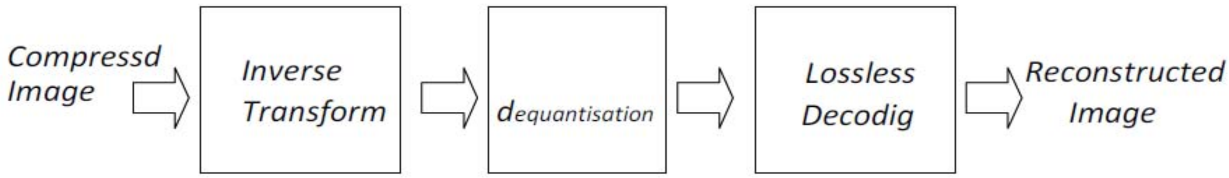
c) Fractal Compression

It is another type of lossy compression. Thus compression may be lossy or lossless. The principle of image compression algorithms are (i) reducing the redundancy in the image data and (or) (ii) producing a reconstructed image from the original image with the introduction of error that is insignificant to the intended applications. The aim here is to obtain an acceptable representation of digital image while preserving the essential information contained in that particular data set.

First the original digital image is usually transformed into another domain, where it is highly de-correlated by using some transform. This de correlation concentrates the important image information into a more compact form. The compressor then removes the redundancy in the transformed image and stores it into a compressed file or data stream. In the second stage, the quantization block reduces the accuracy of the transformed output in accordance with some pre-established fidelity criterion. Also this stage reduces the psycho-visual redundancy of the input image. Quantization operation is a reversible process and thus may be omitted when there is a need of error free or lossless compression. In the final stage of the data compression model the symbol coder creates a fixed or variable-length code to represent the quantizer output and maps the output in accordance with the code. Generally a variable-length code is used to represent the mapped and quantized data set. It assigns the shortest code words to the most frequently occurring output values and thus reduces coding redundancy. The operation in fact is a reversible one.



The decompression reverses the compression process to produce the recovered image as shown in figure above. The recovered image may have lost some information due to the compression, and may have an error or distortion compared to the original image.



But the same compressed image should also be reconstructed back to its original image. In this paper we have proposed two algorithms that will be used in image reconstruction problem. The two algorithms are named as:

(1) Repetitive Loss-Thresholding algorithm *(RLTA)* and

(2) Modified RLTA*(MRLTA)*

II. Litereture Survey

In 1994, S. Martucea, in the paper "Symmetric convolution and the discrete sine and cosinetransform", addresses the problem of reducing the amount of data required to represent the digital image. Compression is achieved by the removal of one or more of three basic data redundancies Coding redundancy, which is present when less than optimal code words are used; Inter pixel redundancy, which results from correlations between the pixels of an image & psycho visual redundancy which is due to data that is ignored by the human visual system. Huffman codes contain the smallest possible number of code symbols per source symbol) subject to the constraint that the source symbols are coded one at a time. So, Huffman coding when combined with technique of reducing the image redundancies using Discrete Cosine Transform helps in compressing the image data to a very good extent. The Discrete Cosine Transform is an example of transform coding. The current JPEG standard uses the DCT as its basis. The DC relocates the highest energies to the upper left corner of the image. The lesser energy or information is relocated into other areas. The DCT is fast. It can be quickly calculated and is best for images with smooth edges like photos with human subjects. The DCT coefficients are all real numbers unlike the Fourier Transform. The Inverse Discrete Cosine Transform can be used to retrieve the image from its transform representation.

In 1989 N. Ahmed, T. Natarajan, and K. R. Rao, in the paper, "Discrete Cosine Transform" discussed about DCT.A discrete cosine transform (DCT) is defined and an algorithm to compute it using the fast Fourier transform is developed. It is shown that the discrete cosine transform can be used in the area of digital processing for the purposes of pattern recognition and Wiener filtering. Its performance is compared with that of a class of orthogonal transforms and is found to compare closely to that of the Karhunen-Loève transform, which is known to be optimal. The performances of the Karhunen-Loève and discrete cosine transforms are also found to compare closely with respect to the rate-distortion criterion.

In 2008 in the paper "Context based medical image compression with application to ultrasound images" the authors Ansari, M.A.; and Anand, R.S., in their paper discussed about compression on context based medical image. Compression is very much essential for medical images that need to reduce the transmission as well as storage time and cost. In this paper a context based coding is done where the rate of compression is better than other JPEG compression methods. The input image is encoded with low rate and the background with high compression rate. The results showed that very high high compression rate with better quality is obtained compared to the previous results.

In October 2013, Bhavani, S. and Thanushkodi, K.G., in their paper "Comparison of fractal coding methods for medical image compression," developed a novel quasi-lossless fractal coding scheme. Hay have used the fractal compression scheme for compression of the medical images. In their work they have considered good quality portion of the picture as the domain part and the remaining parts of the image are obtained from it. Thus they mostly gave importance on the education of the time required for encoding. The experimental results showed the better compression rate and also reduced encoding time.

In the 2014, in the paper "Medical Image Compression Using Ripplet Transform," the author Dhaarani, C. discussed the new compression called ripplet transform to represent the medical images so that the obtained compression ratio will be far better and error will be reduced as compared to the previous systems. The experimental results has shown that the SNR and compression ratio obtained are better than the existing ones.

III. Existing Model

There are many image compression techniques previously developed such as Discrete Cosine transform (DCT), Discrete Wavelet transform (DWT) and Discrete Kekre transform (DKT) playing very important role in image compression process generally for medical images. In the image compression technique named DCT i.e. Discrete Cosine transform, the image is divided into different parts according to their rates and then all the parts are applied for quantization in order to compress the image parts. But in this technique the image parts which has spatial correlation are given more importance for compression while the other neighboring pixels are neglected. In comparison with the DCT the DWT i.e. Discrete Wavelet Transform gives better and higher compression ratio. DWT is a better process for compression in case of higher compression ratio but it is a very slow process. Here the input image is taken and filtered for obtaining sub band coding and compresses each code separately. An algorithm called as the EBCOT uses the same technique fir compressing images. Here the image is taken and divided into a number of sub bands which are distributed into many code blocks and each of these code blocks are applied for compression separately. Another algorithm named as QUAD Tree checks all the minimum and maximum pixels and performs compression. When all the techniques such as the DCT, DWT, DKT are used together that technique is called as the Hybrid Wavelet Transform i.e. HWT. Thus for better compression, both ratio and speed of compression needs to be obtained that too with a high quality of the image. So reconstruction of the compressed lossless image is easier than that of the compressed image that has suffered loss. So reconstruction of the compressed image will be studied in this paper.

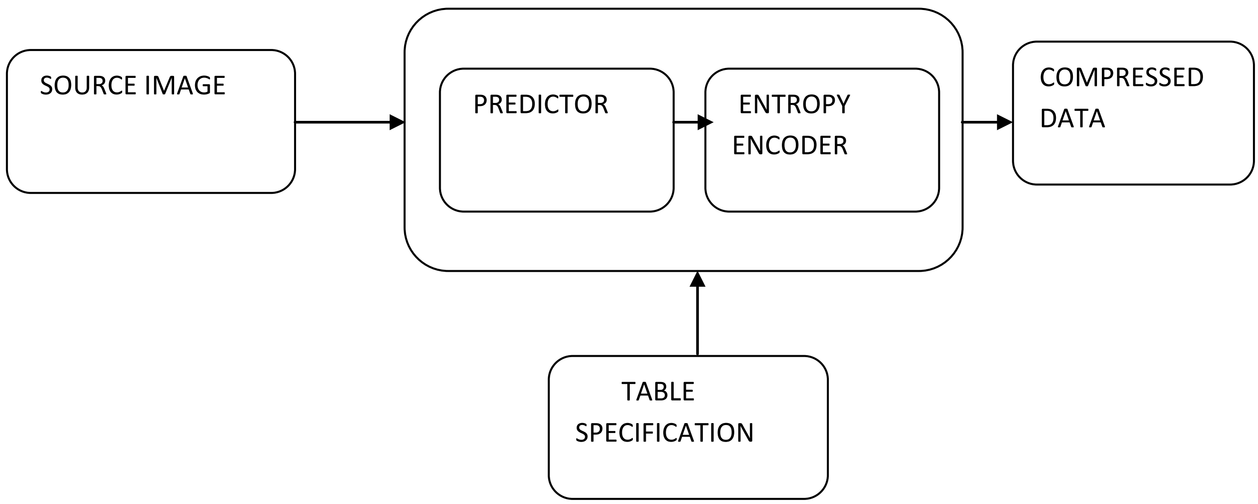


Figure : Lossless Compression

IV. Proposed Model

Decompression leads to reconstruction of the compressed image into its original form or at least approximately to its original format. Ones the compressed image is transferred and it reaches the destination, it needs to be decompressed. Here, we are developing an Image Reconstruction model for compressed medical images without losing critical information for removing redundancy data from biomedical images or signals. In order to solve the problem of reconstruction of the compressed medical image, we have proposed two splitting algorithms to solve the problem. The problem of reconstruction is defined as follows:

$$\min_{a \in S^q} Z(a) = z(a) + \sum_{b=1}^{c} d_b\,(J_b a) \qquad (1)$$

where z the lost is function and d_b are convex functions; J_b are orthogonal matrices.

The two algorithms used for solving this problem are:

(3) Repetitive Loss-Thresholding algorithm *(RLTA)* and

(4) Modified RLTA*(MRLTA)*

The modified version, $(MRLTA)$ have complexity bounds $Y(1/\sqrt{M})$ where M represents optimal solutions.Thus we are proposing the two algorithms both based on variable as well as splitting techniques. Firstly the Compressed big image is splitted into smaller m sub images by:

a) Splitting the function $z(a)$ into c number of smaller sub functions $z_b(a)$.

i.e. $z_b(a) = z(a)/b$.

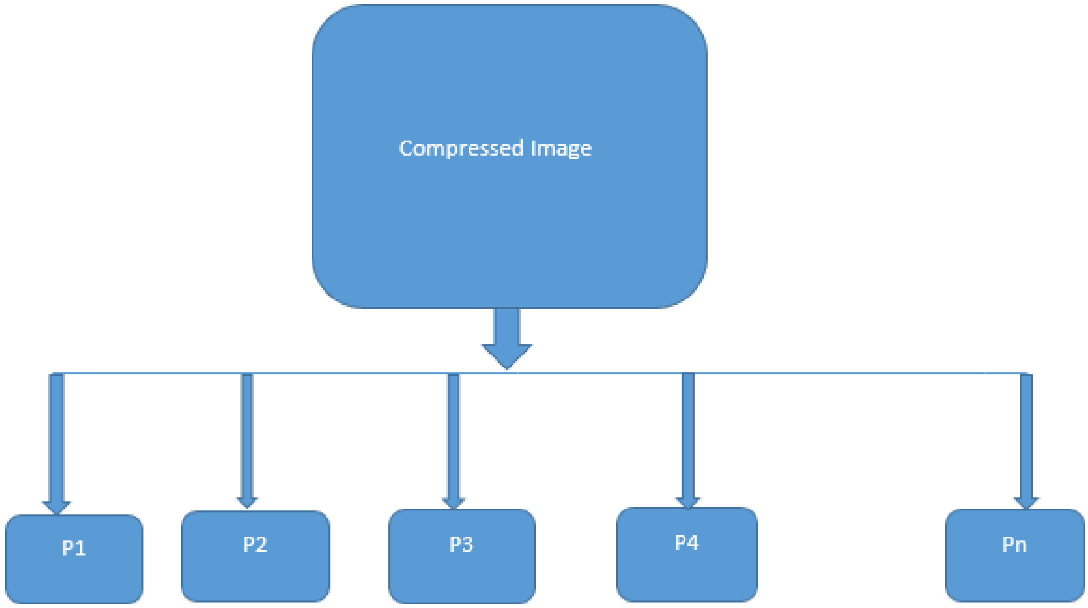
b) Splitting a variable into c number of smaller variables,

c) i.e.$\{a_b\}$, $b = 1,2, \ldots .c$.

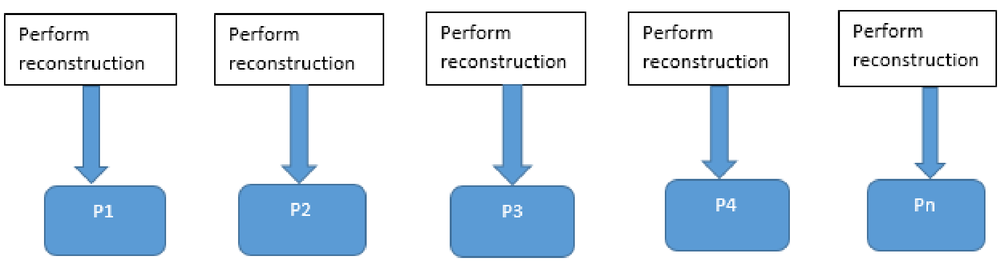
d) Split each operators to reduce the $U = z(a) + \sum_{b=1}^{c} d_b\,(J_b a)$independently.

e) Thus finally solving to find the value of a.

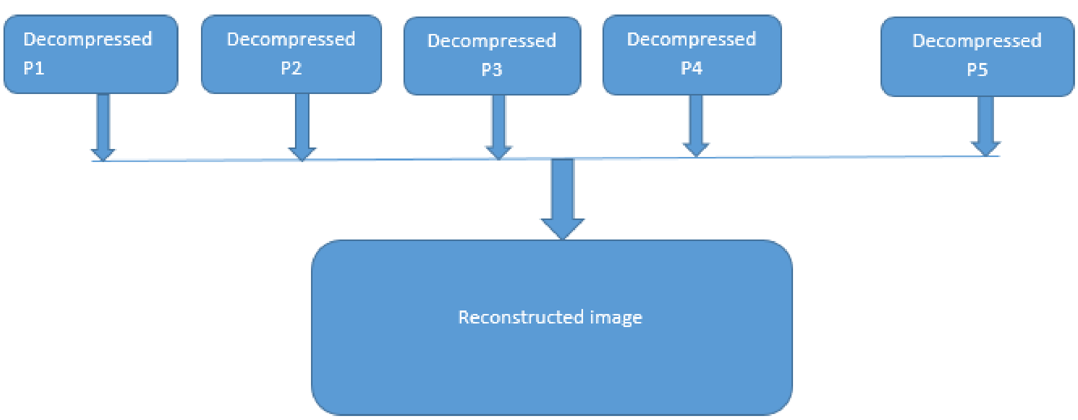
First the original compressed image is taken and then divided into a large number of smaller images.



Then for each splitted smaller part, the reconstruction algorithms are applied separately.



Ones the reconstruction of each smaller parts of the compressed image is done separately, they are combined to form the decompressed original image.



Finally these algorithms are applied to reconstruction of the compressed image. Thus the two algorithms need to solve the problem given as:

$$\min\{Z(a) \equiv z(a) + d(a)\}\ ,\ a \in S^q \qquad (2)$$

Where for $d, S^q \rightarrow S$ is a non-smooth function. And for z it is a smooth function.
The proximal map of $d(a)$is

$$proxmal_v(d)(a) := arg \overset{min}{r} \{d(r) + \frac{1}{2v}\|r - a\|^2\} \qquad (3)$$

The algorithms used for the reconstruction technique are discussed below:

(1) *RLTA*

Input: $v = 1/l_c$ where l_c is the Lipschitz constant

In mathematical analysis, Lipschitz continuity, is a strong form of uniform continuity for functions. Intuitively, a Lipschitz continuous function is limited in how fast it can change: there exists a definite real number such that, for every pair of points on the graph of this function, the absolute value of the slope of the line connecting them is not greater than this real number; this bound is called the function's "Lipschitz constant".

Repeat

For $w = 1$ to W do

$$a^w = proxmal_v(d)(a^{w-1} - v\nabla f(a^{v-1})) \quad (4)$$

Thus the compressed image which is considered as the problem of our issue is taken and splitting of the images is done resulting in minimization of the problem.

End for

Until Stop

The algorithm $RLTA$ continues till $Y(1/\sqrt{M})$ iterations. Ones it reaches $Y(1/\sqrt{M})th$ iteration the splitting of the images is stopped. Thus now we have obtained a large number of smaller sized splitted compressed images.

Thus applying $RLTA$ we obtain have reduced the problem function as follows:/

$$Z(a^w) - Z(a^*) \leq \frac{lc\|a^0 - a^*\|^2}{2w}, \forall a^* \in A_* \quad (5)$$

(2) *MRLTA*

After $Y(1/\sqrt{M})$ iterations for the first algorithm, the second algorithm starts i.e. the first algorithm the RLTA is on from the first iteration to the $Y(1/\sqrt{M})$ iteration. Ones it reaches the $(Y(1/\sqrt{M}) + 1)th$ iteration, the second algorithm i.e. the MRLTA (ModifiedRepetitive Loss-Thresholding algorithm) begins. The MRLTA is a modified face of the same first algorithm RLTA. This modified algorithm MRLTA works much faster than the first algorithm MRLTA.

Input: $v = 1/l_c$, $s^1 = a^0$, $i^1 = 1$ where l_c is the Lipschitz constant

Repeat

For $w = 1$ to W do

$$a^w = proxmal_v(d)(s^w - v\nabla z(a^w)) \quad (6)$$

$$i^{w+1} = \frac{1 + \sqrt{1 + 4(i^w)^2}}{2} \quad (7)$$

$$i^{w+1} = a^w + \frac{i^w - 1}{i^{w+1}}(a^w - a^{w-1}) \quad (8)$$

End for

Until Stop

MRLTA Algorithm results in reduction of the problem function, and thus the problem function becomes

$$Z(a^w) - Z(a^*) \leq \frac{2lc\|a^0 - a^*\|^2}{(w+1)^2}, \forall a^* \in A_* \quad (9)$$

Thus MRLTA mostly depends on the reduction of the variable a^w . Ones both the reconstruction algorithms are applied to the splitted smaller images, the compression problem of the splitted smaller images are reconstructed .These reconstructed smaller images are then added up to form the original decompressed image.

V. Experimental Result

We have implemented the paper practically using matlab 2013b. We have done the experiment taking different MRI images as the input. Both the reconstruction processes showed same output. The only difference was that the 2nd algorithm was faster and consumed less iteration time.The results for the work for different images are given as below:

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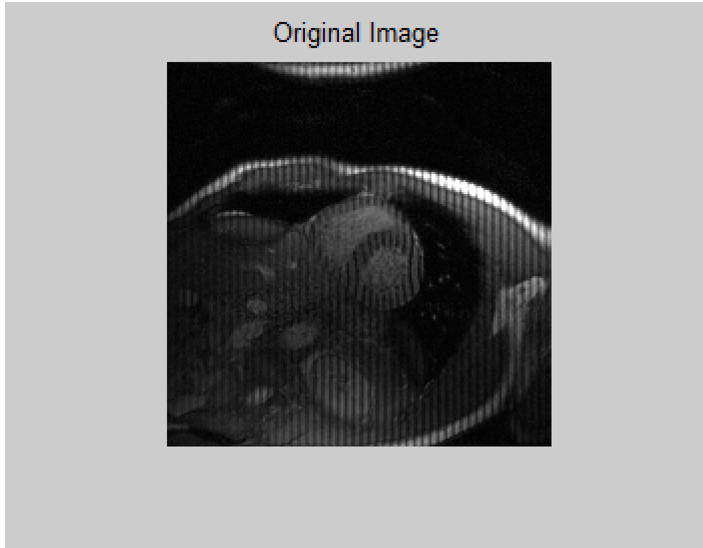

Figure 1 : Original heart image

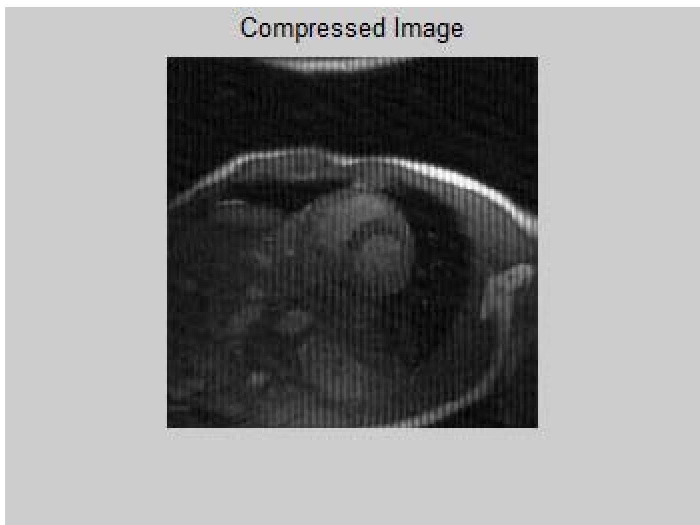

Figure 2 : Heart image after compression

Figure 3 : Heart image during reconstruction process

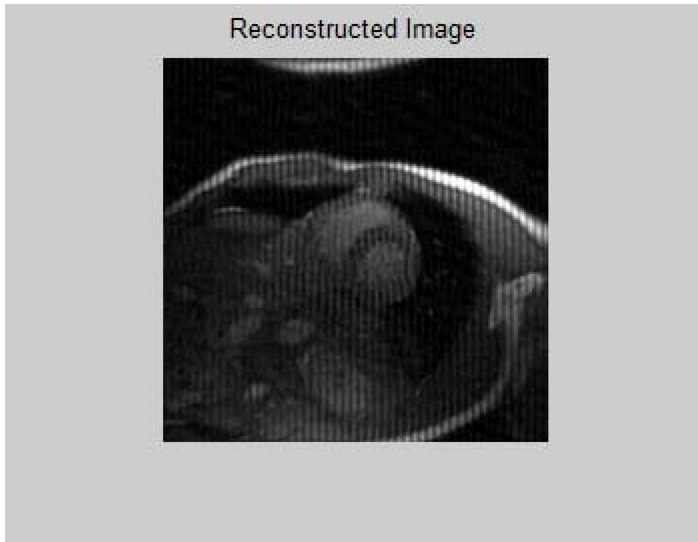

Figure 4 : Heart image after reconstruction

RLTA
Iter_time = 1.84sec, Iteration Num = 50
k = 9154, rec_err = 1.242852e-01, samp.ratio = 0.248318, func. value = 11848.883181

MRLTA
Iter_time = 1.31sec, Iteration Num = 50
k = 9154, rec_err = 1.180128e-01, samp.ratio = 0.248318, func.value = 15614.962537
ans =PSNR of the Reconstructed Image = 57.4055

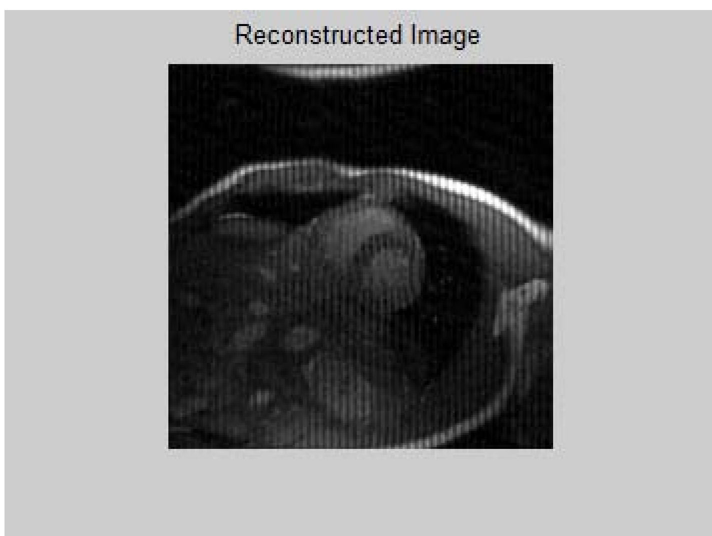

Figure 5 : Heart image after reconstruction process

Figure 6 : Original MR Chest image

Figure 7 : MR chest image after compression

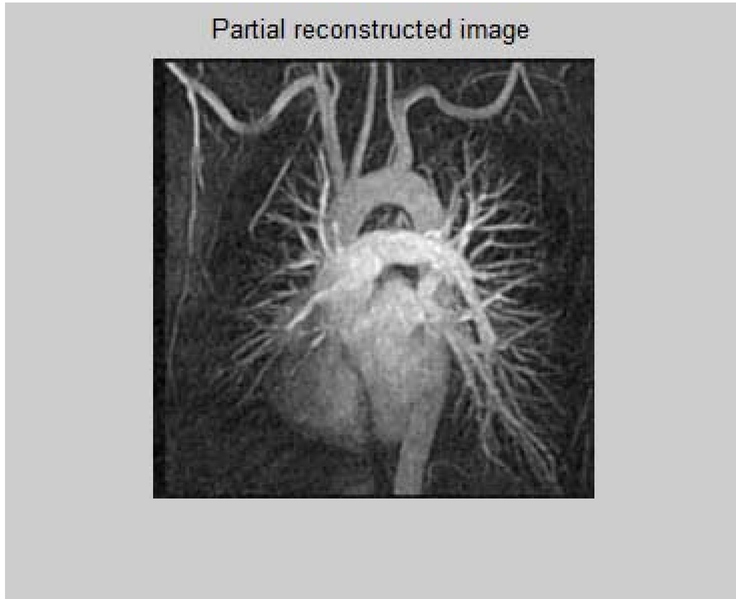

Figure 8 : MR chest image during reconstruction process

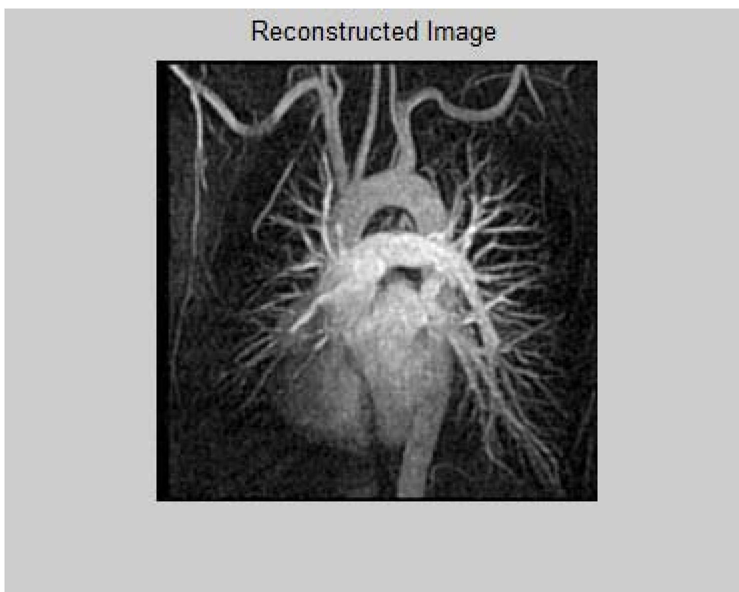

Figure 9 : MR chest image after reconstruction

RLTA
Iter_time = 2.25sec, Iteration Num = 50
k = 12152, rec_err = 1.073534e-01, samp.ratio = 0.251074, func.value = 58621.871883
MRLTA
Iter_time = 1.92sec, Iteration Num = 50
k = 12152, rec_err = 1.024063e-01, samp.ratio = 0.251074, func. value = 48455.171021
ans =PSNR of the Reconstructed Image = 53.1627

VI. Conclusion

The reconstruction of a compressed image is very important which can be processed by the destination user. Here we had proposed a theoretical and computational investigation to compress an image and get back the original image. Dequantization technique had been implemented on decompressed image. In the first part we had obtained fairly good compression result. In this paper, we present two algorithms to answer complexity of reconstructing the compressed image to its original format. Initially the compressed image is treated as a big problem, which is given for splitting into smaller problems carried out by splitting algorithm RLTA and then each sub problem is averaged in different iterations to obtain the original image by the MRLTA. The proposed splitting algorithms are applied to the reconstruction of the compressed medical image and low-rank tensor completion and the experimental results have shown that it has performed better. Further on, the decompression algorithm can also be used to enlarge any grayscale image. And then decompression could be done for future course of action.

References Références Referencias

1. D.D.M. Lusting, J. Pauly, and Sparse MRI: the application of compressed sensing for rapid MR imaging, in: Magnetic Resonance in Medicine, 2007.
2. S. Ma, W. Yin, Y. Zhang, A. Chakra borty, An efficient algorithm for compressed MR imaging using total variation and wavelets, in: Proceedings of CVPR, 2008.
3. J. Yang, Y. Zhang, W. Yin, A fast alternating direction method for TVL1-L2 signal reconstruction from partial Fourier data, IEEE J. Sel. Top. Signal Process. 4 (2) (2010) 288–297.
4. D. GA bay, Applications of the method of multipliers to variation inequalities, in: Augmented Lagrange Methods: Applications to the Solution of Boundary-Valued Problems, North Holland, Amsterdam, 1983, pp. 299–331.
5. P.L. Combettes, V.R. Wajs, Signal recovery by proximal forward-backward splitting, SIAM J. Multiscale Model. Simul. 19 (2008) 1107–1130.
6. Baharav, Z., Malah, D., Karnin, E. Hierarchical interpretation of fractal image coding and its applications to fast decoding. W Intl. Conf. on Digital Signal Processing, Cyprus, 1993
7. Suapang, P.; Dejhan, K.; Yimmun, S., "A web-based DICOM-format image archive, medical image compression and DICOM viewer system for teleradiology application," SICE Annual Conference 2010, Proceedings of, vol., no., pp.3005, 3011, 18-21 Aug. 2010
8. Ansari, M.A.; Anand, R.S., "Context based medical image compression with application to ultrasound images," India Conference, 2008. INDICON 2008. Annual IEEE, vol.1, no., pp.28, 33, 11-13 Dec. 2008 doi: 10.1109/INDCON.2008.4768796
9. Rufai, A.M.; Anbarjafari, G.; Demirel, H., "Lossy medical image compression using Huffman coding and singular value decomposition," Signal Processing and Communications Applications Conference (SIU), 2013 21st , vol., no., pp.1,4, 24-26 April 2013
10. Bhavani, S.; Thanushkodi, K.G., "Comparison of fractal coding methods for medical image compression," Image Processing, IET, vol.7, no.7, pp.686,693, October 2013
11. Dhaarani, C.; Venugopal, D.; Raja, A.S., "Medical Image Compression Using Ripplet Transform," Intelligent Computing Applications (ICICA), 2014 International Conference on , vol., no., pp.233,238, 6-7 March 2014
12. Chandra, S.; Hsu, W.W., "Lossless Medical Image Compression in a Block-Based Storage System," Data Compression Conference (DCC), 2014, vol., no., pp.400, 400, 26-28 March 2014
13. Ukrit, M.F.; Suresh, G.R., "Effective lossless compression for medical image sequences using composite algorithm," Circuits, Power and Computing Technologies (ICCPCT), 2013 International Conference on , vol., no., pp.1122,1126, 20-21 March 2013
14. Pizzolante, R.; Carpentieri, B.; Castiglione, A., "A Secure Low Complexity Approach for Compression and Transmission of 3-D Medical Images," Broadband and Wireless Computing, Communication and Applications (BWCCA), 2013 Eighth International Conference on , vol., no., pp.387,392, 28-30 Oct. 2013
15. Kumari, P.V.; Thanushkodi, K., "A secure fast 2D — Discrete fractional fourier transform based medical image compression using hybrid encoding technique," Current Trends in Engineering and Technology (ICCTET), 2013 International Conference on , vol., no., pp.1,7, 3-3 July 2013
16. Shah, R.; Sharma, P.; Shah, R., "Performance Analysis of Region of Interest Based Compression Method for Medical Images," Advanced Computing & Communication Technologies (ACCT), 2014 Fourth International Conference on , vol., no., pp.53,58, 8-9 Feb. 2014
17. Khan, R.; Talha, M.; Khattak, A.S.; Qasim, M., "Realization of Balanced Contrast Limited Adaptive Histogram Equalization (B-CLAHE) for Adaptive Dynamic Range Compression of real time medical images," Applied Sciences and Technology (IBCAST), 2013 10th International Bhurban Conference on , vol., no., pp.117,121, 15-19 Jan. 2013
18. Nagaraj, N., "A very low-complexity multi-resolution prediction-based wavelet transform method for medical image compression," TENCON 2003. Conference on Convergent Technologies for the Asia-Pacific Region , vol.2, no., pp.525,528 Vol.2, 15-17 Oct. 2003
19. Suapang, P.; Dejhan, K.; Yimmun, S., "A web-based DICOM-format image archive, medical image compression and DICOM viewer system for teleradiology application," SICE Annual Conference 2010,
20. Ansari, M.A.; Anand, R.S., "Context based medical image compression with application to ultrasound images," India Conference, 2008. INDICON 2008. Annual IEEE, vol.1, no., pp.28, 33, 11-13 Dec. 2008.
21. S. Martucea, "Symmetric convolution and the discrete sine and cosinetransform", IEEE Transaction on Signal Processing, vol. 42, p. 1038-1051, May' 1994.

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Text Attribute Noise Variation based Multi-Scale Image Analysis

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Abstract- For image reconstruction, the particular constant quantity of the received image should be same as original image with the given analysis. This paper implements an analysis algorithm, where the particular constant quantity are analysed via image texture leaning with an appropriate variable variation's. In this paper, a three level decomposed multi-wavelet (3LMW)-based multi-scale image noise variation analysis scheme for image text attribute noise variation (TANV) and image analysis algorithm is proposed and the determination of the optimal 3LMW basis with respect to the proposed scheme is also discussed. The proposed method is applied to image noise variation analysis, and the experimental results validated its generality and effectiveness in multi-style image noise variation analysis.

Keyward: quantity; TANV; 3LMW; resolution; multi-style.

GJCST-F Classification: *I.3.3*

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Strictly as per the compliance and regulations of:

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Dr. M. Ashok [α], Dr. T. Bhaskara Reddy [σ] & S. Bhargav Kumar [ρ]

Abstract- For image reconstruction, the particular constant quantity of the received image should be same as original image with the given analysis. This paper implements an analysis algorithm, where the particular constant quantity are analysed via image texture leaning with an appropriate variable variation's. In this paper, a three level decomposed multi-wavelet (3LMW)-based multi-scale image noise variation analysis scheme for image text attribute noise variation (TANV) and image analysis algorithm is proposed and the determination of the optimal 3LMW basis with respect to the proposed scheme is also discussed. The proposed method is applied to image noise variation analysis, and the experimental results validated its generality and effectiveness in multi-style image noise variation analysis.

Keywords: quantity; TANV; 3LMW; resolution; multi-style.

I. Introduction

In many image recognition applications, people often send images from different sources and consequently they were received at different destinations. In addition, low resolution obtained at multiple receivers should be up-converted to a higher level of resolution for better interpretation at end user. Research works on such image analysis problems should benefit the practical applications under image interpretation and image human visual distinctive information analysis [1][2].

In this paper, a generic model to solve these multi-style[7] image TANV analysis problems has been proposed. The pair of book keeping aim to characterize the two domains, multi-scale[3] and semi-quad[6], the mapping functions is to reveal the relation between two variable variation's [4][5] for noise variation analysis. The proposed model is called as auto-coupled image noise variation analysis and apply it to image noise variation analysis to validate its performance.

The rest of the paper is organized as follows. Section 2 discusses about Multi-Scale Image Text Attribute Noise Variation (MSTANV) scheme. Analysis Model is presented in section 3. Section 4 presents the proposed model Multi-Scale Image Analysis method. Section 5 discuss the results and Section 6 concludes the paper.

II. MSTANV

The MSTANV scheme presented in this work adopts partitioned and relevant (P&R) 3LMW stretch (P&R3L) and two-stage decomposition structure is implemented. Here w^H_{jx}, w^V_{jy} and w^D_{jz} are the 3LMW particular constant quantity at horizontal, vertical and diagonal particular constant quantity.

Let S_{xyz} denote input image to analyse. Filters H_{jx} , H_{jy} and H_{jz} used in P&R3L are replaced with (2^{j-xyz} - xyz) zeros of the variable quantity of original filter $H_{o:xyz}$, so does for $H_{o:xyz}$ $||V_{jxyz}$. The analysed signal by proposed 3LMW, is an average of several MSTANV signal by P&R3L. Noise variations of s_j at scale j in a direction is

$$\sigma_{jxyz}= |L_{jxyz-xyz}|\sigma_{:xyz} \qquad (1)$$

where $|L_{jxyz-1}|$ is the corresponding filter ($|L^D_{jx-1}|$), ($|L^H_{jy-1}|$ and ($|L^V_{jz-1}|$).

The orientation vector are represented as,

$$\hat{R}_{jxy}(mx,ny)=[R_{jxy}(mx,ny)\ R_{jxy+xy}(mx,ny)]^{Txy}=\dot{x}_{jxy}+\dot{y}_{jxy} \pm\sqrt{}|L_{jxy-xy}|\sigma_{:xy} \qquad (2)$$

$$\hat{R}_{jyz}(mx,ny)=[R_{jyz}(mx,ny)\ R_{jyz+yz}(mx,ny)]^{Tyz}=\dot{x}_{jyz}+\dot{y}_{jyz} \pm\sqrt{}|L_{jyz-yz}\sigma_{:yz} \qquad (3)$$

$$\hat{R}_{jxz}(mx,ny)=[R_{jxz}(mx,ny)\ R_{jxz+xz}(mx,ny)]^{Txz}=\dot{x}_{jxz}+\dot{y}_{jxz} \pm\sqrt{}|L_{jxz-xz}|\sigma_{:xz} \qquad (4)$$

where

$$\dot{x}_{jxyz}(mx,ny)=[\ x_{jxyz}(mx,ny) \qquad x_{jxyz+1}(mx,ny)]^{Txyz} \text{ and } \dot{y}_{jxyz}=[\ y_{jxyz}(mx,ny)\ \ y_{jxyz+1}(mx,ny)]^{Txyz}.$$

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III. Analysis Model

Let $\hat{R}_{xyz}$ denote MSTANV image to analyse and set of variants $h_{xyz} = \{\check{h}_{xyz}\}$. Let $\hat{R}_{ixyz}$ denote a path of $\hat{R}_{xyz}$ at image text location i_{xyz}, then,

$$\hat{R}_{ixyz} = \hat{R}_{xyz}\, D_{ixyz} \quad (5)$$

where D_{ixyz} denotes a P&R operator,

$$\hat{R}_{xyz}=(\sum D_{ixyz}^{Txyz}\, D_{ixyz})^{-xyz}\, (\sum D_{ixyz}^{Txyz}\, \hat{R}_{ixyz}) \quad (6)$$

For mapping $\hat{H}_{xyz}$,

$$\hat{R}_{ixyz} = \hat{H}_{xyz}\check{h}_{ixyz} \quad (7)$$

Substituting (6) into (7),

$$\hat{R}_{xyz}=F_{xyz}\check{h}_{xyz}=(\sum D_{ixyz}^{Txyz}\, D_{ixyz})^{-xyz}\, (\sum D_{ixyz}^{Txyz}\, \hat{H}_{xyz}\check{h}_{ixyz}) \quad (8)$$

where F_{xyz} is used to reconstruct image D_{xyz}. variant particular constant quantity are represented by

$$\check{h}_{xyz}=\arg_{\check{h}xyz}\min[1/xyz\; |X_{xyz}- F_{xyz}\check{h}_{xyz}|^{xyz}_{xyz} +\lambda_{xyz}|\check{h}_{xyz}|_{xyz} \quad (9)$$

where $X_{xyz}=\hat{R}_{xyz}+\acute{\eta}_{xyz}$ and λ_{xyz} is the deviation variable,

$$(\check{h}_{xyz},\breve{a}_{xyz})=\arg_{\check{h}xyz,\breve{a}k}\min\, [1/xyz|X_{xyz}-F_{xyz}\check{h}_{xyz}|^{xyz}_{xyz} + \lambda_{xyz}^{1}\, |\check{h}_{xyz}|_{xyz}]+\lambda_{xyz}^{2}\sum^{K}_{k=xyz} \sum_{i\epsilon Ck:xyz}|\hat{H}_{xyz}\check{h}_{ixyz}-\breve{a}_{k}|^{xyz}_{xyz} \quad (10)$$

where $\breve{a}_k$ stands for k_{xyz}-th $C_{k:xyz}$ of particular constant quantity $\check{h}_{xyz}$. By rewriting the (10) as,

$$(\check{h}_{xyz},\breve{g}_{xyz})=\arg_{\check{h}xyz,\breve{a}k}\min\, [1/xyz|X_{xyz}-F_{xyz}\check{h}_{xyz}|^{xyz}_{xyz} + \lambda_{xyz}^{1}\, |\check{h}_{xyz}|_{xyz}]+\lambda_{xyz}^{2}\sum^{K}_{k=xyz} \sum_{i\epsilon Ck:xyz}|\hat{H}_{xyz}\check{h}_{ixyz}-\hat{H}_{xyz}\breve{g}_{kxyz}|^{xyz}_{xyz} \quad (11)$$

resulting $|\hat{H}_{xyz}\check{h}_{ixyz}-\hat{H}_{xyz}\breve{g}_{kxyz}|^{xyz}_{xyz} = |\check{h}_{ixyz}-\breve{g}_{kxyz}|^{xyz}_{xyz}$. From these, by re-writing the (11) as,

$$(\check{h}_{xyz},\breve{g}_{xyz})=\arg_{\check{h}xyz,\breve{a}k}\min\, [1/xyz|X_{xyz}-F_{xyz}\check{h}_{xyz}|^{xyz}_{xyz} + \lambda_{xyz}^{1}\, |\check{h}_{xyz}|_{xyz}]+\lambda_{xyz}^{2}\sum^{K}_{k=xyz} \sum_{i\epsilon Ck:xyz}|\check{h}_{ixyz}-\breve{g}_{kxyz}|^{xyz}_{xyz} \quad (12)$$

By substituting norm in (12), resulting in

$$(\check{h}_{xyz},\breve{g}_{xyz})=\mathrm{norm}(\arg_{\check{h}xyz,\breve{a}k}\sum\min\, [1/xyz|X_{xyz}-F_{xyz}\check{h}_{xyz}|^{xyz}_{xyz}) + \mathrm{norm}(\lambda_{xyz}^{n1}\, |\check{h}_{xyz}|^{xyz}])+\mathrm{norm}(\lambda_{xyz}^{n2}\sum^{K}_{k=xyz} \sum_{i\epsilon Ck:xyz}|\check{h}_{ixyz}-\breve{g}_{kxyz}|^{xyz}_{xyz}) \quad (13)$$

Classify $\hat{R}_{xyz}$ in to P_{xyz} and Q_{xyz}, as in to N_{xyz} and M_{xyz} respectively. Having a set of N_{xyz} $\{\Gamma^{P}_{k:xyz}, 1\leq k{:}xyz\leq N\}$ for P_{xyz} and a set of M_{xyz} $\{\Gamma^{Q}_{l:xyz}, 1\leq l{:}xyz\leq M\}$ for Q_{xyz}, where $\Gamma^{p}_{k:xyz}$ denotes the index of k in P_{xyz} and $\Gamma^{Q}_{l:xyz}$ denotes the index of l in Q_{xyz}. The QC Model corresponding to above projection is given by,

$$J(\bar{E}_{k:xy,l:xy}, \breve{a}_{k:xy}, \breve{g}_{l:xy}, \acute{\alpha}_{k:xy,l:xy})= \sum^{N}_{k=1:xy}\sum^{M}_{l=1:xy} |\Gamma^{P}_{k:xy}||\Gamma^{Q}_{l:xy}|(\bar{E}_{k,l:xy}-\breve{E}_{k,l:xy})^{xy} + \sum^{N}_{k:xy=1} \breve{a}_{k:xy} (\sum^{M}_{l=1:xy} |\Gamma^{Q}_{l:xy}|\bar{E}_{k:xy,l:xy}-xy)+ \sum^{M}_{l=1:xy} \breve{g}_{l:xy} (\sum^{N}_{k=1:xy}|\Gamma^{P}_{K:xy}|\bar{E}_{k:xy,l:xy}-xy)- \sum^{N}_{k:xy=1:xy}\sum^{M}_{l=1:xy} \acute{\alpha}_{k:xy,l:xy}\, \bar{E}_{k:xy,l:xy} \quad (14),$$

$$J(\bar{E}_{k:yz,l:yz}, \breve{a}_{k:yz}, \breve{g}_{l:yz}, \acute{\alpha}_{k:yz,l:yz})= \sum^{N}_{k=1:yz}\sum^{M}_{l=1:yz} |\Gamma^{P}_{k:yz}||\Gamma^{Q}_{l:yz}|(\bar{E}_{k,l:yz}-\breve{E}_{k,l:yz})^{yz} + \sum^{N}_{k:yz=1} \breve{a}_{k:yz} (\sum^{M}_{l=1:yz} |\Gamma^{Q}_{l:yz}|\bar{E}_{k:yz,l:yz}-yz)+ \sum^{M}_{l=1:yz} \breve{g}_{l:yz} (\sum^{N}_{k=1:yz}|\Gamma^{P}_{K:yz}|\bar{E}_{k:yz,l:yz}-yz)- \sum^{N}_{k:yz=1:yz}\sum^{M}_{l=1:yz} \acute{\alpha}_{k:yz,l:yz}\, \bar{E}_{k:yz,l:yz} \quad (15),$$ and

$$J(\bar{E}_{k:xz,l:xz}, \breve{a}_{k:xz}, \breve{g}_{l:xz}, \acute{\alpha}_{k:xz,l:xz})= \sum^{N}_{k=1:xz}\sum^{M}_{l=1:xz} |\Gamma^{P}_{k:xz}||\Gamma^{Q}_{l:xz}|(\bar{E}_{k,l:xz}-\breve{E}_{k,l:xz})^{xz} + \sum^{N}_{k:xz=1} \breve{a}_{k:xz} (\sum^{M}_{l=1:xz} |\Gamma^{Q}_{l:xz}|\bar{E}_{k:xz,l:xz}-xz)+ \sum^{M}_{l=1:xz} \breve{g}_{l:xz} (\sum^{N}_{k=1:xz}|\Gamma^{P}_{K:xz}|\bar{E}_{k:xz,l:xz}-xz)- \sum^{N}_{k:xz=1:xz}\sum^{M}_{l=1:xz} \acute{\alpha}_{k:xz,l:xz}\, \bar{E}_{k:xz,l:xz} \quad (16)$$

where $\bar{E}_{k:xyz,l:xyz}$,$\breve{a}_{k:xyz}$, $\breve{g}_{l:xyz}$ and $\acute{\alpha}_{k:xyz,l:xyz}$ are the index constraints. In the scenario of image analysis, re-writing the (13), we get by considering ϕ initial values,

$$(\check{h}_{xyz},\breve{g}_{xyz})=\arg_{\check{h}xyz,\breve{a}k}\min\, [1/xyz|X_{xyz}-F_{xyz}\check{h}|^{xyz}_{xyz} + \lambda_{xyz}^{1}\, |\check{h}_{xyz}|_{xyz}]+\lambda_{xyz}^{2}\sum^{K}_{k=1:\,xyz} \sum_{i\epsilon Ck:\,xyz}|\hat{H}_{xyz}\check{h}_{i:\,xyz}-\hat{H}_{xyz}\breve{g}_{k:\,xyz}|_{1:\,xyz} \quad (17)$$

and $\acute{\alpha}_{y:\,xyz}=\arg_{\acute{\alpha}:\,xyz}\min\, |\acute{\alpha}_{xyz}|_{1:\,xyz}$, by stating

$$|S_{xyz}-n_{xyz}\phi_{xy:yz:zx}\acute{\alpha}_{xyz}|_{xyz}<\varepsilon_{xyz} \quad (18)$$

and then the reconstructed S is obtained as $S_{j:\,xyz}=\phi_{xy:yz:zx}\acute{\alpha}_{y:\,xyz}$ which is very close to the true image S_{xyz}.

IV. Multi-Scale Image Analysis Algorithm

The proposed analysis approach shown in fig 1; involves multi-scale image TANV analysis algorithm :

Algorithm : Multi-scale Image Analysis Algorithm

Input : Book keeping pairs B_{xy} , B_{yz} and B_{zx} and 3LMW pairs $3L_{xy}$,$3L_{yz}$ and $3L_{zx}$.

1. Update S_{xyz} in 3L as $X_{j:x}$, $X_{j:y}$, $X_{j:z}$ and $Y_{j:x}$, $Y_{j:y}$, $Y_{j:z}$.
2. Update B_{xy} , B_{yz} and B_{zx}.
3. Update $3L_{xy}$,$3L_{yz}$ and $3L_{zx}$.
4. Update k_{xyz}.
5. Update J by multi-style TANV analysis.
6. Update k_{xyx}

Output: Analysed image.

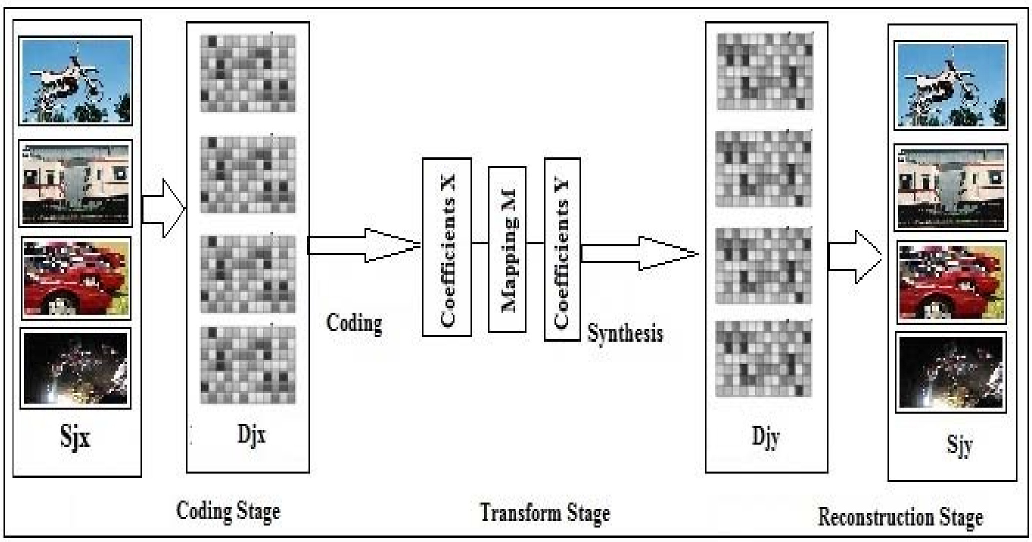


Figure 1 : Flowchart of the proposed analysis based multi-scale image TANV analysis

In the above fig 1, at coding stage, input images with styles were defined at initial. Dictionary or book keeping matrix is defined with the randomness in the image style selected, based on these coding is done. At tranform stage, coding coefficeints X are mapped in to relevnat coefficients Y image analysis values.

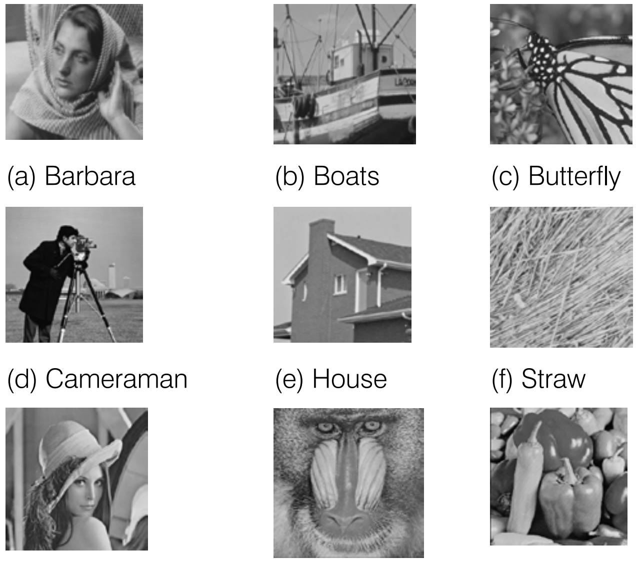
At reconstruction stage, the coefficients are analysed in to their original styles by the same dictionary mapping or book keeping.

V. Experiment Results and Discussions

As stated in above chapters, the TANV performance increases in variable variation's-information $CI_{i:xyz}$ of original signal $S_{i:xyz}$ and noisy quantity $w_{i:xyz}$, related as $CI_{i:xyz} = I(S_{i:xyz} + w_{i:xyz} \pm \sigma_{:xyz})$, but decreases in noise error criteria $CN_{i:xyz}$. Therefore, good 3LMW basis for TANV should aim at maximizing $CI_{i:xyz}$ and minimizing $CN_{i:xyz}$ is implemented in this research work. Denoting P&R 3LMW as P&R3L ($n_{:xyz}$),where n=1,2,3,....,N and bi-P&R 3LMW is denoted by CDF($n_{:xyz}$,$n'_{:xyz}$), where n is analytic 3LMW and n' is analyzed 3LMW.

Proposed method has been implemented on nine 256 X 256 images Barbara, Boats, Butterfly, Cameraman, House, Straw, Lena, Baboon and Peppers as shown in fig 2, to compute their $CI_{i:xyz}$ and $CN_{i:xyz}$ values with respect to wavelets CDF(3,3) and P&R3L (4). In table 2 and table 3, listed the values of $CI_{i:xyz}$ and $CN_{i:xyz}$ when $j_{:xyz} = 2^{N-1}-1$ and $j_{:xyz} = j_{:xyz} = 2^{N-1}-2$. These results represent the information of the first three 3LMW scales indication H, V and D as horizontal, vertical and diagonal subbands respectively.

From the experimental results tabulated in table 1, table 2 and table 3, it can be observed that CDF(3,3) and P&R3L (4) are best of other 3LMW's under different TANV schemes available. From the experimental results shown in table 4, it is clear that proposed method generally outperforms reconstruction scheme. In table 4, Gaussian White Noise with standard deviation $\sigma_{:xyz}$ is added to nine test images. $\sigma_{xy,}$ σ_{yz} and σ_{yz} are the estimation by our scheme.



(a) Barbara (b) Boats (c) Butterfly

(d) Cameraman (e) House (f) Straw

(g) Lena (h) Baboon (i) Peppers

Figure 2 : Nine 256 X 256 images (a) Barbara, (b) Boats, (c) Butterfly, (d) Cameraman, (e) House, (f) Straw, (g) Lena, (h) Baboon and (i) Peppers

Table I . Text Attribute Noise Variation R Taken In Fig.2

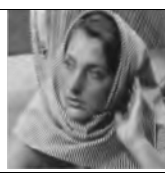
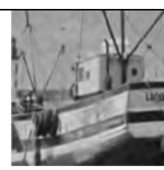
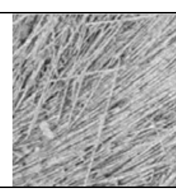
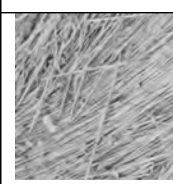
(a) Barbara		(b) Boats		(c) Butterfly	
CDF(3,3)	P&R3L (4)	CDF(3,3)	P&R3L (4)	CDF(3,3)	P&R3L (4)
					
(d) Cameraman		(e) House		(f) Straw	
CDF(3,3)	P&R3L (4)	CDF(3,3)	P&R3L (4)	CDF(3,3)	P&R3L (4)
					
(g) Lena		(h) Baboon		(i) Peppers	
CDF(3,3)	P&R3L (4)	CDF(3,3)	P&R3L (4)	CDF(3,3)	P&R3L (4)
					

Table II : Values of Ci And Cn for Nine Images As Shown In Fig 2

		(a) Barbara		(b) Boats		(c) Butterfly		(d) Cameraman		(e) House	
		CDF(3,3)	P&R3L (4)	CDF(3,3)	P&R3L (4)	CDF(3,3)	P&R3L (4)	CDF(3,3)	P&R3L (4)	CDF(3,3)	P&R3L (4)
$CIj_{:xyz}=2^{N-1}-1$, N=3	xy	0.3456	0.8125	0.8125	1.1010	0.3250	0.7522	0.6525	1.1526	0.8526	0.8152
	yz	0.2256	0.3251	1.1256	1.4521	0.3010	0.5261	0.4456	0.7522	1.1256	0.3956
	zx	0.1859	0.3125	0.7852	0.8521	0.1215	0.2121	0.1526	0.2901	0.7256	0.2615
$CIj_{:xyz}=2^{N-1}-2$, N=5	xy	1.4256	2.6521	1.3689	2.0562	1.2568	2.4512	1.7582	2.2561	1.3156	2.6952
	yz	0.7612	1.4589	1.5164	2.3215	1.0785	2.0658	1.2156	2.1325	1.5262	1.4256
	zx	0.7528	1.2156	1.2001	1.3596	0.5261	1.1026	0.7262	1.1952	1.1062	1.2935
$CNj_{:xyz}=2^{N-1}-1$, N=3	xy	0.1305	0.1256	0.0123	0.0156	0.0852	0.1023	0.2012	0.2859	0.0126	0.1212
	yz	0.1459	0.2121	0.0126	0.0326	0.0758	0.1256	0.1652	0.1900	0.0159	0.1956
	zx	0.2356	0.2456	0.0356	0.0358	0.1102	0.1126	0.2650	0.2156	0.0356	0.1822
$CNj_{:xyz}=2^{N-1}-2$, N=5	xy	0.0212	0.0415	0.0070	0.0121	0.0162	0.0325	0.0725	0.1521	0.0069	0.0485
	yz	0.0380	0.1001	0.0108	0.0182	0.0251	0.0568	0.0548	0.0698	0.0025	0.0910
	zx	0.0592	0.1011	0.0123	0.0121	0.0261	0.0589	0.1025	0.1985	0.0056	0.1023

Table III : Values of Ci And Cn for Nine Images As Shown In Fig 2

		(f) Straw		(g) Lena		(h) Baboon		(i) Peppers	
		CDF(3,3)	P&R3L (4)	CDF(3,3)	P&R3L (4)	CDF(3,3)	P&R3L (4)	CDF(3,3)	P&R3L (4)
$CIj_{:xyz}=2^{N-1}-1$, N=3	xy	0.8952	1.1123	0.3592	0.8215	0.6528	1.2356	0.3056	0.7584
	yz	1.1256	1.4859	0.2012	0.3056	0.4582	0.7856	0.3025	0.5892
	zx	0.7819	0.8125	0.1856	0.2589	0.2458	0.2985	0.1265	0.2010
$CIj_{:xyz}=2^{N-1}-2$, N=5	xy	1.3826	2.0589	1.4002	2.6589	1.7515	2.8596	1.2689	2.4586
	yz	1.5246	2.3596	0.7852	1.4512	1.2659	2.1256	1.0789	2.0456
	zx	1.1256	1.3589	0.7528	1.2659	0.7526	1.2689	0.5286	1.1564
$CNj_{:xyz}=2^{N-1}-1$, N=3	xy	0.0125	0.0185	0.1165	0.1456	0.1205	0.2456	0.0826	0.1025
	yz	0.0192	0.0356	0.1489	0.2158	0.1658	0.1986	0.0784	0.1035
	zx	0.0356	0.0356	0.2121	0.1589	0.3256	0.2256	0.1156	0.1029
$CNj_{:xyz}=2^{N-1}-2$, N=5	xy	0.0072	0.0125	0.0256	0.0452	0.0756	0.1456	0.0125	0.0356
	yz	0.0105	0.0182	0.0356	0.0956	0.0456	0.0956	0.0256	0.0589
	zx	0.0123	0.0201	0.0589	0.1105	0.1005	0.1986	0.0214	0.0592

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Table IV : Noise Level Estimation Results

	$\sigma_{:xyz}$	5	10	15	20	25	30	35	40
(a) Barbara	σ_{xy}	5.45	10.2	14.56	19.56	24.56	29.56	34.56	40.41
	σ_{yz}	2015	6.89	12.56	17.25	23.25	28.26	33.25	40.11
	σ_{zx}	2.10	7.56	13.56	18.56	23.26	29.21	34.56	40.46
(b) Boats	σ_{xy}	5.68	9.56	13.25	19.25	23.56	27.89	33.25	40.11
	σ_{yz}	6.58	11.26	15.96	20.25	25.26	30.25	34.56	40.74
	σ_{zx}	3.96	7.85	13.58	18.69	24.56	29.86	34.58	40.70
(c) Butterfly	σ_{xy}	3.12	7.25	12.25	18.25	23.56	28.26	33.25	40.02
	σ_{yz}	6.58	10.25	14.58	20.15	24.58	28.69	34.25	40.51
	σ_{zx}	3.56	8.25	13.58	19.58	24.56	29.56	34.56	40.65
(d) Cameraman	σ_{xy}	6.58	10.25	14.15	19.25	23.15	29.25	33.25	39.56
	σ_{yz}	7.59	11.58	15.15	20.25	24.56	30.25	34.25	40.15
	σ_{zx}	3.58	8.59	14.56	19.58	24.56	29.58	34.58	40.85
(e) House	σ_{xy}	6.01	7.89	11.25	16.25	22.12	27.56	33.15	40.12
	σ_{yz}	13.25	17.25	21.26	25.25	29.58	34.38	38.59	43.25
	σ_{zx}	6.25	8.96	12.65	17.22	23.26	28.56	34.56	40.25
(f) Straw	σ_{xy}	3.22	6.25	12.56	17.25	23.15	28.15	33.56	40.12
	σ_{yz}	6.89	11.25	15.56	20.14	25.26	30.22	34.25	40.68
	σ_{zx}	3.25	7.85	13.56	18.25	24.56	29.56	34.89	40.52
(g) Lena	σ_{xy}	6.25	10.25	15.24	20.25	24.56	29.25	34.59	40.12
	σ_{yz}	3.26	6.59	12.56	17.56	23.45	28.56	33.56	40.52
	σ_{zx}	3.22	8.59	13.58	19.28	24.62	29.52	34.56	39.25
(h) Baboon	σ_{xy}	7.59	11.25	16.59	20.26	25.25	30.26	35.49	40.12
	σ_{yz}	3.22	6.56	12.25	17.25	23.56	28.25	33.26	40.12
	σ_{zx}	3.56	8.59	14.25	19.56	24.56	29.58	34.56	40.12
(i) Peppers	σ_{xy}	3.22	6.25	12.15	17.25	23.26	28.22	33.26	40.33
	σ_{yz}	13.59	17.16	21.25	25.65	29.25	34.25	38.59	43.25
	σ_{zx}	6.59	8.96	12.56	17.56	23.65	28.65	34.56	40.25

The PSNR results on a set of 9 images are reported in Table 5. From Table 5, clearly shows the proposed TANV method significantly outperforms for both uniform blurring and Gaussian blurring.

VI. Conclusions

In this paper, an image analysis algorithm has been introduced to improve the effectiveness of quality for images. In this paper, also presented a MSTANV scheme with a P&R3L 3LMW interscale model, which improved the signal estimation under noisy environment. Experimental results on image analysis demonstrated that the analysis approach can significantly outperform other leading image analysis methods. Finally, image analysis modelling techniques were employed to separate 3LMW particular constant quantity. The spatial classification of 3LMW pixels reduces the analysis estimation error and subsequently improving the TANV performance.

References Références Referencias

1. Xuejie Qin and Yee-Hong Yang, "Similarity Measure and Learning with Gray Level Aura Matrices (GLAM) for Texture Image Retrieval", Proceedings of the 2004 IEEE Computer Society Conference on Computer Vision and Pattern Recognition (CVPR'04), 1063-6919/04 ,© 2004 IEEE.
2. Eric J. Balster, Yuan F. Zheng, and Robert L. Ewing, "Feature-Based Wavelet Shrinkage Algorithm for Image Denoising ", IEEE Transactions On Image Processing, VOL. 14, NO. 12, December 2005, pp.2024-2039.
3. Andrea Baraldi, Lorenzo Bruzzone, and Palma Blonda, "A Multiscale Expectation-Maximization Semisupervised Classifier Suitable for Badly Posed Image Classification ", IEEE Transactions On Image Processing, VOL. 15, NO. 8, August 2006, pp-2208-2225.
4. Jose A. Guerrero-Col´on, Luis Mancera and Javier Portilla, " Image Restoration Using pace-Variant Gaussian Scale Mixtures in Overcomplete Pyramids ", IEEE Transactions on Image Processing, 15th August 2007, pp-1-15.
5. Manya V. Afonso, Jos´e M. Bioucas-Dias, M´ario A. T. Figueiredo, " Fast Image Recovery Using Variable Splitting and Constrained Optimization ", IEEE Transactions On Image Processing, 2010, pp-1-11.

6. Ran He, Wei-Shi Zheng, Tieniu Tan and Zhenan Sun, " Half-quadratic based Iterative Minimization for Robust Sparse Representation ", Journal Of Latex Class Files, VOL. 1, NO. 8, APRIL 2011, pp-1-18.
7. Shifeng Chen, Ming Liu, Wei Zhang and Jianzhuang Liu, " Edge preserving image denoising with a closed form solution ", 2 September 2012, Pattern Recognition 46 (2013), pp-976–988.

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A Study on Preprocessing and Feature Extraction in offline Handwritten Signatures

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Abstract- In offline handwritten signature verification process, preprocessing of the signature is the very fast and most essential part. In some cases the raw signature can include extra pixel known as noises or may not be in proper form where preprocessing is mandatory. If a signature is preprocessed correctly, it leads to a better result for both signature matching and forgery detection. Pre-processing includes binarization, noise removal, thinning, orientation etc. Many experiments and techniques have already been proposed for implementing these processes and some of them have shown exclusive and spectacular results. Regarding to this situation we have studied several pre-processing steps, signature features, feature detectors and also implemented some of them using MATLAB software. We have studied several image processing algorithms, and proposed an algorithm to correct the alignment of the input signature which can be used at the preprocessing stage to achieve better results in the signature detection process. We have tried to find a baseline of the handwritten signature and align it with respect to the baseline.

Keywords: image preprocessing, edge detection, feature extraction, orientation.

GJCST-F Classification: I.3.2

ASTUDYONPREPROCESSINGANDFEATUREEXTRACTIONINOFFLINEHANDWRITTENSIGNATURES

Strictly as per the compliance and regulations of:

A Study on Preprocessing and Feature Extraction in offline Handwritten Signatures

Tansin Jahan [α], Md. Shahriar Anwar [σ] & S. M. Abdullah Al-Mamun[ρ]

Abstract- In offline handwritten signature verification process, preprocessing of the signature is the very fast and most essential part. In some cases the raw signature can include extra pixel known as noises or may not be in proper form where preprocessing is mandatory. If a signature is preprocessed correctly, it leads to a better result for both signature matching and forgery detection. Pre-processing includes binarization, noise removal, thinning, orientation etc. Many experiments and techniques have already been proposed for implementing these processes and some of them have shown exclusive and spectacular results. Regarding to this situation we have studied several pre-processing steps, signature features, feature detectors and also implemented some of them using MATLAB software. We have studied several image processing algorithms, and proposed an algorithm to correct the alignment of the input signature which can be used at the preprocessing stage to achieve better results in the signature detection process. We have tried to find a baseline of the handwritten signature and align it with respect to the baseline. Though there are some limitations involved but the experimentations have shown very promising results.

Keywords: image preprocessing, edge detection, feature extraction, orientation.

I. Introduction

An offline signature consists of some specific characteristics of any individuals which need to be verified for forgery detection. But before that the signature must have gone through some preliminary steps like simplification of the signature, feature extraction, classification etc.

Authenticating an individual using his or her handwritten signature is a biometric process [1], [2] because signature could differ on the basis of movement, position and behavioral state of that person. So it is necessary to look upon these facts while performing forgery detection of any signature.

Matching signature is complicated and time consuming process. So we would like to propose a way to narrow down the possible number of sample input signatures that can probably match with the reference signature present in database.

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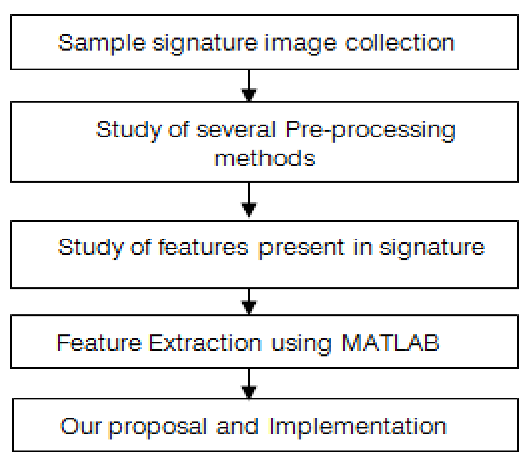
In order to perform similarity checking between the test signature and the reference signature present in database, some procedures needs to be followed-

a. Collect sample signatures
b. Pre-processing
c. Feature extraction
d. Matching and Verification

Pre-processing is the first step for signature matching process where the input signature is simplified to match with referenced one. After the simplification of signature, it is necessary to find which features are present inside the signature. Then extract those features using proper method and classifiers for verification. Features can be divided broadly into three categories - a) Global features b) Local features c) Geometric features [1].

In our study we have focused on pre-processing part of offline handwritten signature verification process. We observed that if the test input signature is not oriented properly then sometimes expected result cannot be achieved. So we tried to find the baseline of the test signature as a part of pre-processing step and proposed an algorithm to make it horizontally aligned before further processing. So the whole study can be expressed by the following flowchart –



II. Preprocessing

Preprocessing is necessary to remove background noises and to achieve better result [3]. Some common operations of pre-processing is known as binarization, thinning, smoothing, noise removal, slant normalization, skeletonization, orientation, size normalization [1][3][4] etc.

a) Thresholding

In MATLAB , the input signature must be in gray scale or binary otherwise there will not be any output. A binary image has only two possible values 1 and 0 (respectively black and white) [1].To get the binary image of any signature, a threshold must be declared. Depending on various method, threshold value can be between 0 and 1 [4]. For our experiment we assumed that the threshold point is at 0.5 level and converted the following RGB signature image into binary image.

Figure 1 : RGB signature

Figure 2 : Binary signature using threshold 0.5

b) Edge Thinning

Here morphological operators which are connected to the set theory of mathematics [4][5] are useful to thin edges of any binary pre processed signature. So we applied morphological operator where operation can be 'thin', 'branchpoint', 'endpoint', 'bridge' etc. Now binary image of Fig-2 can be thinned using 'thin' morphological operation [5] , which removes pixels so that an object without holes shrinks to a minimally connected stroke.

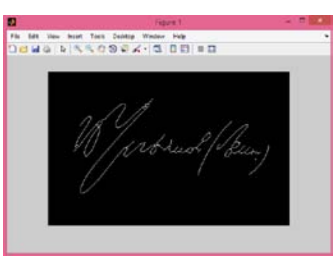


Figure 3 : Thinned signature

c) Noise Removal

Noise is another important factor of offline handwritten signature pre-processing which can be removed using different filtering like median filtering, adaptive filtering and so on. Our signature can have luminance noise or color noise which must be removed before feature extraction and further processing to avoid unwanted result [6]. Image restoration therefore tries to recover an image by removing unnecessary pixels and noises [7]. Several types of noises can be - i) Gaussian noise ii) Sault and pepper noise etc.[5][7].

d) Noise Removal with adaptive filtering

We used wiener2 function to remove noises. wiener2 lowpass filters an intense image that has been degraded by constant power additive noise.

As we can see Gaussian noise can be detected in Fig-4 which is later removed using wiener2 (varargin) function.

Figure 4 : Signature with Gaussian noise

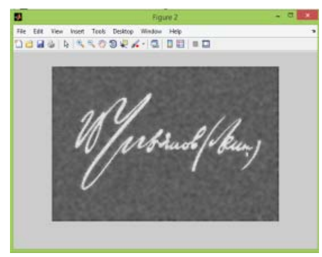


Figure 5 : Signature without noise

III. Feature Extraction

a) Loops present in signature

Loops which is known as a writing pattern of any handwritten signature presents 'holes' and can be classified as natural loop or artificial loop[8]. bwboundaries() function in MATLAB, traces the exterior boundaries of objects, as well as boundaries of holes inside these objects, in the binary image. We can also specify an optional value ('holes' or 'no holes') where 'holes' represents searching of both object (parent and child) and hole boundaries and it is default. On the other hand 'no holes' can search only for object boundaries.

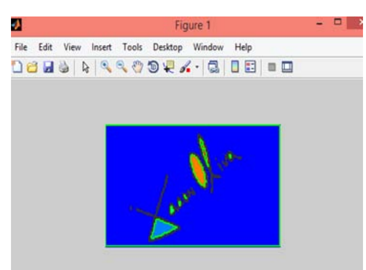


Figure 6 : loops in signature is highlighted

b) Pixel transformation of signature into binary values

As we know, a binary image can be represented by black and white pixel. So to transform a binary image into a text file we specified white pixel as 1 and black pixel as 0. This kind of pixel transformation is needed to create a 2D array of signature from which expected mean [9] of an average data set can be calculated using formula.

We have followed some steps while performing the transformation of signatures –

1. An input of a gray scale image.
2. Detection of edges of the input image using canny algorithm.
3. Conversion of this binary image to a text file.
4. Calculation of the number of ‘1’ in every column of image matrix.

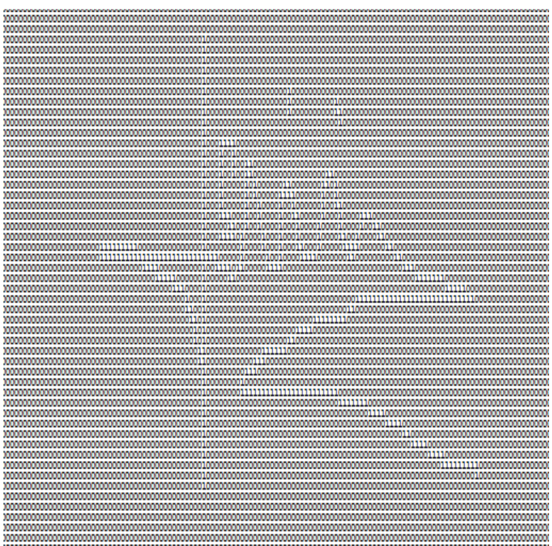


Figure 7 : Binary image normalized to 0's and 1's

```
Number of points intersected in colum 117 = 2
Number of points intersected in colum 118 = 2
Number of points intersected in colum 119 = 1
Number of points intersected in colum 120 = 2
Number of points intersected in colum 121 = 2
Number of points intersected in colum 122 = 2
Number of points intersected in colum 123 = 3
Number of points intersected in colum 124 = 2
Number of points intersected in colum 125 = 2
Number of points intersected in colum 126 = 2
Number of points intersected in colum 127 = 3
Number of points intersected in colum 128 = 2
Number of points intersected in colum 129 = 2
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Number of points intersected in colum 134 = 44
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Number of points intersected in colum 136 = 1
Number of points intersected in colum 137 = 2
Number of points intersected in colum 138 = 10
Number of points intersected in colum 139 = 4
Number of points intersected in colum 140 = 6
Number of points intersected in colum 141 = 7
Number of points intersected in colum 142 = 1
Number of points intersected in colum 143 = 6
Number of points intersected in colum 144 = 9
Number of points intersected in colum 145 = 4
Number of points intersected in colum 146 = 5
```

Figure 8 : Number of non-zero values in each column of the matrix

IV. Our Proposal

Anoise free perfectly oriented signature sample can help any signature matching algorithm to perform better. There are several function in MATLAB based on each connected component of binary image such as regionprops(), to measure orientation properties of signature region [10].

Orientation of a leaf is easy to determine, because there is a long axes in the middle of every leaf that makes a standard form of a leaf. But in context of a signature there is no standard way to know whether the signature is written vertically or horizontally or in any angle.

So, we observed many input signatures and drew number of regions vs. number of pixels graphs to find a standard which is mostly common in every signature. After a long time observation we've found a pattern that is common to the most of the input signatures. Here's the few sample images we've used to work with our algorithm:

Figure 8 : Sample signatures used in our algorithm

a) Our proposed algorithm

We are proposing a simple algorithm to make the sample signatures horizontally oriented. This algorithm can be used in the preprocessing stage of the signature.

This algorithm finds a baseline of the given signature, and then it rotates the image to set it in parallel with x- axis. We have made some assumptions to make the algorithm work correctly, which are:

1. Signature must be written from left to right or right to left manner

2. Background noises should be removed as much as possible
3. Input sample must be a gray scale image

Now the working procedure of the proposed algorithm is given below:

1. It takes an input signature as a gray scaled image.
2. It converts the input to a binary image applying canny edge detection algorithm.
3. It rotates the signature image in steps until a full 360 degree rotation occurs with a user defined angle in each step and each time does the following:

a) Finds the top, right, bottom and left boundary of the signature
b) Finds the current height of the signature
c) Divide the signature equally to a predefined number of rectangles
d) For each rectangle it counts the image pixels in the rectangle and remembers the rectangle with the highest number of pixels and current image orientation.

4. Finds the orientation with the maximum number of pixels in a rectangle.

b) Experimental result

We have experimented with a set of 100 signatures to find out a common pattern in those. After running our algorithm for the given input signature in MATLAB, we have found some interesting result. Fig.9. depicts these resulted signature and we could easily distinguish that all resulting signatures has rotated horizontally.

Figure 9 : After applying the Rotation Fix algorithm on the sample images

After cropping the resulting images, we've found some nicely cropped horizontally oriented signature samples as we can observe in the following figure –

Figure 10 : Cropped signature images after correcting the orientation

From our experiment we could say that, if our input signature image is given in any orientation then by running the algorithm mentioned above we could easily make it horizontally oriented on the basis of the maximum number of pixel could be found when the signature is horizontal.

c) Limitations of our Algorithm

Although this algorithm returns fair results in most of the cases, it has some limitations which are given below:

1. In the process finding correct rotation angle of the signature image, it may go upside down.
2. The image actually may not be fully horizontally oriented, although it may turn out to be very close to that.
3. It is sensitive to background noise.

d) Idea behind our proposal

After thorough observation over a set of 100 signatures we've found that every signature has a pattern. Precisely saying that in every signature there is a dense region or most occupied region which contains more pixels than any other region of that signature.

As a matter of fact every signature is different from the other, and so it is very hard to find a single line as a base line of a signature. That is the reason we have taken the entire region as a base line which contains the most of the pixels of the signature. We have drawn graphs for every image and reached to the above conclusion. Some of our experimental data are given below:

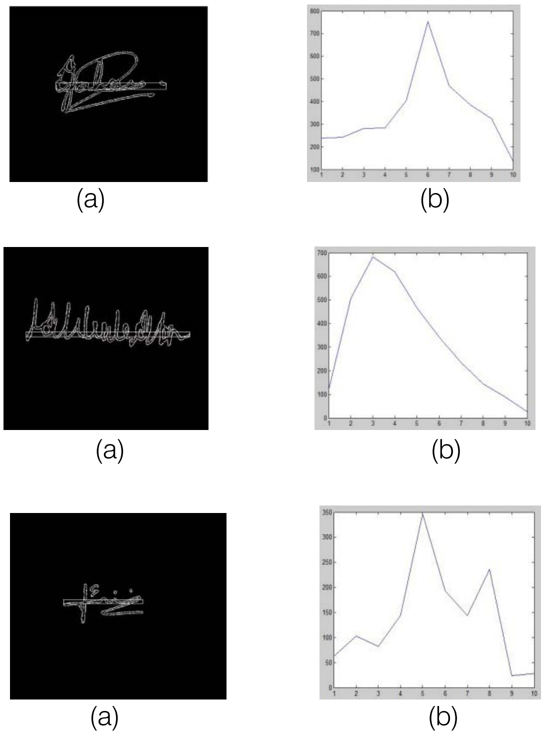

Figure 11 : (a) Most occupied region (here we've divided the image into 10 regions)

(b) Number of regions vs. number of pixels graph

V. Conclusion

We have tried to give a brief description above about our study related to offline signature pre-processing and feature extraction. We have mentioned our specific field of interest and the objectives of the study.

Offline handwritten signature includes many features and patterns that are very important for purposes like forgery detection. In our study we have tried to focus on some of these features such as loops in signatures, pixels transformations of signature into binary image etc.

Another main part of our study was the pre-processing of handwritten signatures which makes it easier to find the similarities among signatures of the same person. We have also proposed a new algorithm for orienting any signature based on its dense region and implemented it. We enjoyed our work very much and hope to have opportunity for further study and improvement for the mentioning algorithm including complexity and many other factors.

References Références Referencias

1. Madasu, Vamsi Krishna & Lovell, Brian C. (2008).An Automatic Offline Signature Verification and Forgery Detection System (chapter 4). In Brijesh Verma and Michael Blumenstein (Ed.), Pattern recognition technologies and applications: Recent advances (pp. 63-89) Hersey, PA: Information Science Reference.
2. Gulzar A. Khuwaja & Mohammad S. Laghari. Offline Handwritten Signature Recognition. World Academy of Science, Engineering and Technology,Vol:5 2011-11-25.
3. Dakshina Ranjan Kisku, Phalguni Gupta & Jamuna Kanta Sing(July,2010). Offline Signature Identification by Fusion of Multiple Classifiers using Statistical Learning Theory. International Journal of Security and Its Applications , Vol. 4, No. 3.
4. Bassam Al-Mahadeen, Mokhled S. AlTarawneh and Islam H. AlTarawneh (March, 2010).Signature Region of Interest using Auto cropping. IJCSI International Journal of Computer Science Issues, Vol. 7, Issue 2, No 4.
5. Ravneet Gill, Maninder Singh (December,2012). Statistical Features Based Off Line Signature Verification System using Image Processing Techniques. International Journal of Science and Research (IJSR), Vol.1, Issue 3.
6. Priya Metri & Ashwinder Kaur. Handwritten Signature Verification using Instance Based Learning. International Journal of Computer Trends and Technology- March to April Issue 2011. ISSN:2231-2803.
7. Dr. Philippe Cattin (April 2012). Image Restoration: Introduction to Signal and Image Processing. MIAC, University of Basel.
8. Tal Steinherz, David Doermann, Ehud Rivlin and Nathan Intrator (February 2009). Offline Loop Investigation for Handwriting Analysis. IEEE Transactions on Pattern Analysis and Machine Intelligence, Vol. 31, No. 2.
9. Debnath Bhattacharyya, Samir Kumar Bandyopadhyay, Poulami Das, Debashis Ganguly and Swarnendu Mukherjee. Statistical Approach for Offline Handwritten Signature Verification. Journal of Computer Science 4 (3): 181-185, 2008. ISSN 1549-3636.
10. Suhail Odeh and Manal Khalil. Apply Multi-Layer Perceptrons Neural Network for Off-line signature verification and recognition. IJCSI International Journal of Computer Science Issues, Vol. 8, Issue 6, No. 2, November 2011. ISSN (Online): 1694-0814.

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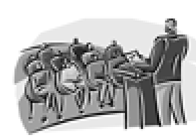

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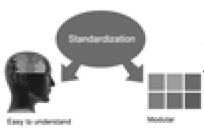

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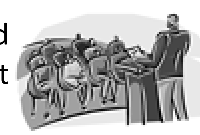

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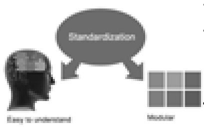

After nomination of your institution as “Institutional Fellow” and constantly functioning successfully for one year, we can consider giving recognition to your institute to function as Regional/Zonal office on our behalf.
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"

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"

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4. Manuscript’s Category,

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11. Revise what you wrote: When you write anything, always read it, summarize it and then finalize it.

12. Make all efforts: Make all efforts to mention what you are going to write in your paper. That means always have a good start. Try to mention everything in introduction, that what is the need of a particular research paper. Polish your work by good skill of writing and always give an evaluator, what he wants.

13. Have backups: When you are going to do any important thing like making research paper, you should always have backup copies of it either in your computer or in paper. This will help you to not to lose any of your important.

14. Produce good diagrams of your own: Always try to include good charts or diagrams in your paper to improve quality. Using several and unnecessary diagrams will degrade the quality of your paper by creating "hotchpotch." So always, try to make and include those diagrams, which are made by your own to improve readability and understandability of your paper.

15. Use of direct quotes: When you do research relevant to literature, history or current affairs then use of quotes become essential but if study is relevant to science then use of quotes is not preferable.

16. Use proper verb tense: Use proper verb tenses in your paper. Use past tense, to present those events that happened. Use present tense to indicate events that are going on. Use future tense to indicate future happening events. Use of improper and wrong tenses will confuse the evaluator. Avoid the sentences that are incomplete.

17. Never use online paper: If you are getting any paper on Internet, then never use it as your research paper because it might be possible that evaluator has already seen it or maybe it is outdated version.

18. Pick a good study spot: To do your research studies always try to pick a spot, which is quiet. Every spot is not for studies. Spot that suits you choose it and proceed further.

19. Know what you know: Always try to know, what you know by making objectives. Else, you will be confused and cannot achieve your target.

20. Use good quality grammar: Always use a good quality grammar and use words that will throw positive impact on evaluator. Use of good quality grammar does not mean to use tough words, that for each word the evaluator has to go through dictionary. Do not start sentence with a conjunction. Do not fragment sentences. Eliminate one-word sentences. Ignore passive voice. Do not ever use a big word when a diminutive one would suffice. Verbs have to be in agreement with their subjects. Prepositions are not expressions to finish sentences with. It is incorrect to ever divide an infinitive. Avoid clichés like the disease. Also, always shun irritating alliteration. Use language that is simple and straight forward. put together a neat summary.

21. Arrangement of information: Each section of the main body should start with an opening sentence and there should be a changeover at the end of the section. Give only valid and powerful arguments to your topic. You may also maintain your arguments with records.

22. Never start in last minute: Always start at right time and give enough time to research work. Leaving everything to the last minute will degrade your paper and spoil your work.

23. Multitasking in research is not good: Doing several things at the same time proves bad habit in case of research activity. Research is an area, where everything has a particular time slot. Divide your research work in parts and do particular part in particular time slot.

24. Never copy others' work: Never copy others' work and give it your name because if evaluator has seen it anywhere you will be in trouble.

25. Take proper rest and food: No matter how many hours you spend for your research activity, if you are not taking care of your health then all your efforts will be in vain. For a quality research, study is must, and this can be done by taking proper rest and food.

26. Go for seminars: Attend seminars if the topic is relevant to your research area. Utilize all your resources.

27. Refresh your mind after intervals: Try to give rest to your mind by listening to soft music or by sleeping in intervals. This will also improve your memory.

28. Make colleagues: Always try to make colleagues. No matter how sharper or intelligent you are, if you make colleagues you can have several ideas, which will be helpful for your research.

29. Think technically: Always think technically. If anything happens, then search its reasons, its benefits, and demerits.

30. Think and then print: When you will go to print your paper, notice that tables are not be split, headings are not detached from their descriptions, and page sequence is maintained.

31. Adding unnecessary information: Do not add unnecessary information, like, I have used MS Excel to draw graph. Do not add irrelevant and inappropriate material. These all will create superfluous. Foreign terminology and phrases are not apropos. One should NEVER take a broad view. Analogy in script is like feathers on a snake. Not at all use a large word when a very small one would be sufficient. Use words properly, regardless of how others use them. Remove quotations. Puns are for kids, not grunt readers. Amplification is a billion times of inferior quality than sarcasm.

32. Never oversimplify everything: To add material in your research paper, never go for oversimplification. This will definitely irritate the evaluator. Be more or less specific. Also too, by no means, ever use rhythmic redundancies. Contractions aren't essential and shouldn't be there used. Comparisons are as terrible as clichés. Give up ampersands and abbreviations, and so on. Remove commas, that are, not necessary. Parenthetical words however should be together with this in commas. Understatement is all the time the complete best way to put onward earth-shaking thoughts. Give a detailed literary review.

33. Report concluded results: Use concluded results. From raw data, filter the results and then conclude your studies based on measurements and observations taken. Significant figures and appropriate number of decimal places should be used. Parenthetical remarks are prohibitive. Proofread carefully at final stage. In the end give outline to your arguments. Spot out perspectives of further study of this subject. Justify your conclusion by at the bottom of them with sufficient justifications and examples.

34. After conclusion: Once you have concluded your research, the next most important step is to present your findings. Presentation is extremely important as it is the definite medium though which your research is going to be in print to the rest of the crowd. Care should be taken to categorize your thoughts well and present them in a logical and neat manner. A good quality research paper format is essential because it serves to highlight your research paper and bring to light all necessary aspects in your research.

Informal Guidelines of Research Paper Writing

Key points to remember:

- Submit all work in its final form.
- Write your paper in the form, which is presented in the guidelines using the template.
- Please note the criterion for grading the final paper by peer-reviewers.

Final Points:

A purpose of organizing a research paper is to let people to interpret your effort selectively. The journal requires the following sections, submitted in the order listed, each section to start on a new page.

The introduction will be compiled from reference matter and will reflect the design processes or outline of basis that direct you to make study. As you will carry out the process of study, the method and process section will be constructed as like that. The result segment will show related statistics in nearly sequential order and will direct the reviewers next to the similar intellectual paths throughout the data that you took to carry out your study. The discussion section will provide understanding of the data and projections as to the implication of the results. The use of good quality references all through the paper will give the effort trustworthiness by representing an alertness of prior workings.

Writing a research paper is not an easy job no matter how trouble-free the actual research or concept. Practice, excellent preparation, and controlled record keeping are the only means to make straightforward the progression.

General style:

Specific editorial column necessities for compliance of a manuscript will always take over from directions in these general guidelines.

To make a paper clear

· Adhere to recommended page limits

Mistakes to evade

- Insertion a title at the foot of a page with the subsequent text on the next page
- Separating a table/chart or figure - impound each figure/table to a single page
- Submitting a manuscript with pages out of sequence

In every sections of your document

· Use standard writing style including articles ("a", "the," etc.)

· Keep on paying attention on the research topic of the paper

· Use paragraphs to split each significant point (excluding for the abstract)

· Align the primary line of each section

· Present your points in sound order

· Use present tense to report well accepted

· Use past tense to describe specific results

· Shun familiar wording, don't address the reviewer directly, and don't use slang, slang language, or superlatives

· Shun use of extra pictures - include only those figures essential to presenting results

Title Page:

Choose a revealing title. It should be short. It should not have non-standard acronyms or abbreviations. It should not exceed two printed lines. It should include the name(s) and address (es) of all authors.

Abstract:

The summary should be two hundred words or less. It should briefly and clearly explain the key findings reported in the manuscript--must have precise statistics. It should not have abnormal acronyms or abbreviations. It should be logical in itself. Shun citing references at this point.

An abstract is a brief distinct paragraph summary of finished work or work in development. In a minute or less a reviewer can be taught the foundation behind the study, common approach to the problem, relevant results, and significant conclusions or new questions.

Write your summary when your paper is completed because how can you write the summary of anything which is not yet written? Wealth of terminology is very essential in abstract. Yet, use comprehensive sentences and do not let go readability for briefness. You can maintain it succinct by phrasing sentences so that they provide more than lone rationale. The author can at this moment go straight to shortening the outcome. Sum up the study, with the subsequent elements in any summary. Try to maintain the initial two items to no more than one ruling each.

- Reason of the study - theory, overall issue, purpose
- Fundamental goal
- To the point depiction of the research
- Consequences, including definite statistics - if the consequences are quantitative in nature, account quantitative data; results of any numerical analysis should be reported
- Significant conclusions or questions that track from the research(es)

Approach:

- Single section, and succinct
- As a outline of job done, it is always written in past tense
- A conceptual should situate on its own, and not submit to any other part of the paper such as a form or table
- Center on shortening results - bound background information to a verdict or two, if completely necessary
- What you account in an conceptual must be regular with what you reported in the manuscript
- Exact spelling, clearness of sentences and phrases, and appropriate reporting of quantities (proper units, important statistics) are just as significant in an abstract as they are anywhere else

Introduction:

The **Introduction** should "introduce" the manuscript. The reviewer should be presented with sufficient background information to be capable to comprehend and calculate the purpose of your study without having to submit to other works. The basis for the study should be offered. Give most important references but shun difficult to make a comprehensive appraisal of the topic. In the introduction, describe the problem visibly. If the problem is not acknowledged in a logical, reasonable way, the reviewer will have no attention in your result. Speak in common terms about techniques used to explain the problem, if needed, but do not present any particulars about the protocols here. Following approach can create a valuable beginning:

- Explain the value (significance) of the study
- Shield the model - why did you employ this particular system or method? What is its compensation? You strength remark on its appropriateness from a abstract point of vision as well as point out sensible reasons for using it.
- Present a justification. Status your particular theory (es) or aim(s), and describe the logic that led you to choose them.
- Very for a short time explain the tentative propose and how it skilled the declared objectives.

Approach:

- Use past tense except for when referring to recognized facts. After all, the manuscript will be submitted after the entire job is done.
- Sort out your thoughts; manufacture one key point with every section. If you make the four points listed above, you will need a least of four paragraphs.

- Present surroundings information only as desirable in order hold up a situation. The reviewer does not desire to read the whole thing you know about a topic.
- Shape the theory/purpose specifically - do not take a broad view.
- As always, give awareness to spelling, simplicity and correctness of sentences and phrases.

Procedures (Methods and Materials):

This part is supposed to be the easiest to carve if you have good skills. A sound written Procedures segment allows a capable scientist to replacement your results. Present precise information about your supplies. The suppliers and clarity of reagents can be helpful bits of information. Present methods in sequential order but linked methodologies can be grouped as a segment. Be concise when relating the protocols. Attempt for the least amount of information that would permit another capable scientist to spare your outcome but be cautious that vital information is integrated. The use of subheadings is suggested and ought to be synchronized with the results section. When a technique is used that has been well described in another object, mention the specific item describing a way but draw the basic principle while stating the situation. The purpose is to text all particular resources and broad procedures, so that another person may use some or all of the methods in one more study or referee the scientific value of your work. It is not to be a step by step report of the whole thing you did, nor is a methods section a set of orders.

Materials:

- Explain materials individually only if the study is so complex that it saves liberty this way.
- Embrace particular materials, and any tools or provisions that are not frequently found in laboratories.
- Do not take in frequently found.
- If use of a definite type of tools.
- Materials may be reported in a part section or else they may be recognized along with your measures.

Methods:

- Report the method (not particulars of each process that engaged the same methodology)
- Describe the method entirely
- To be succinct, present methods under headings dedicated to specific dealings or groups of measures
- Simplify - details how procedures were completed not how they were exclusively performed on a particular day.
- If well known procedures were used, account the procedure by name, possibly with reference, and that's all.

Approach:

- It is embarrassed or not possible to use vigorous voice when documenting methods with no using first person, which would focus the reviewer's interest on the researcher rather than the job. As a result when script up the methods most authors use third person passive voice.
- Use standard style in this and in every other part of the paper - avoid familiar lists, and use full sentences.

What to keep away from

- Resources and methods are not a set of information.
- Skip all descriptive information and surroundings - save it for the argument.
- Leave out information that is immaterial to a third party.

Results:

The principle of a results segment is to present and demonstrate your conclusion. Create this part a entirely objective details of the outcome, and save all understanding for the discussion.

The page length of this segment is set by the sum and types of data to be reported. Carry on to be to the point, by means of statistics and tables, if suitable, to present consequences most efficiently.You must obviously differentiate material that would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matter should not be submitted at all except requested by the instructor.

Content

- Sum up your conclusion in text and demonstrate them, if suitable, with figures and tables.
- In manuscript, explain each of your consequences, point the reader to remarks that are most appropriate.
- Present a background, such as by describing the question that was addressed by creation an exacting study.
- Explain results of control experiments and comprise remarks that are not accessible in a prescribed figure or table, if appropriate.
- Examine your data, then prepare the analyzed (transformed) data in the form of a figure (graph), table, or in manuscript form.

What to stay away from

- Do not discuss or infer your outcome, report surroundings information, or try to explain anything.
- Not at all, take in raw data or intermediate calculations in a research manuscript.
- Do not present the similar data more than once.
- Manuscript should complement any figures or tables, not duplicate the identical information.
- Never confuse figures with tables - there is a difference.

Approach

- As forever, use past tense when you submit to your results, and put the whole thing in a reasonable order.
- Put figures and tables, appropriately numbered, in order at the end of the report
- If you desire, you may place your figures and tables properly within the text of your results part.

Figures and tables

- If you put figures and tables at the end of the details, make certain that they are visibly distinguished from any attach appendix materials, such as raw facts
- Despite of position, each figure must be numbered one after the other and complete with subtitle
- In spite of position, each table must be titled, numbered one after the other and complete with heading
- All figure and table must be adequately complete that it could situate on its own, divide from text

Discussion:

The Discussion is expected the trickiest segment to write and describe. A lot of papers submitted for journal are discarded based on problems with the Discussion. There is no head of state for how long a argument should be. Position your understanding of the outcome visibly to lead the reviewer through your conclusions, and then finish the paper with a summing up of the implication of the study. The purpose here is to offer an understanding of your results and hold up for all of your conclusions, using facts from your research and generally accepted information, if suitable. The implication of result should be visibly described. Infer your data in the conversation in suitable depth. This means that when you clarify an observable fact you must explain mechanisms that may account for the observation. If your results vary from your prospect, make clear why that may have happened. If your results agree, then explain the theory that the proof supported. It is never suitable to just state that the data approved with prospect, and let it drop at that.

- Make a decision if each premise is supported, discarded, or if you cannot make a conclusion with assurance. Do not just dismiss a study or part of a study as "uncertain."
- Research papers are not acknowledged if the work is imperfect. Draw what conclusions you can based upon the results that you have, and take care of the study as a finished work
- You may propose future guidelines, such as how the experiment might be personalized to accomplish a new idea.
- Give details all of your remarks as much as possible, focus on mechanisms.
- Make a decision if the tentative design sufficiently addressed the theory, and whether or not it was correctly restricted.
- Try to present substitute explanations if sensible alternatives be present.
- One research will not counter an overall question, so maintain the large picture in mind, where do you go next? The best studies unlock new avenues of study. What questions remain?
- Recommendations for detailed papers will offer supplementary suggestions.

Approach:

- When you refer to information, differentiate data generated by your own studies from available information
- Submit to work done by specific persons (including you) in past tense.
- Submit to generally acknowledged facts and main beliefs in present tense.

THE ADMINISTRATION RULES

Please carefully note down following rules and regulation before submitting your Research Paper to Global Journals Inc. (US):

Segment Draft and Final Research Paper: You have to strictly follow the template of research paper. If it is not done your paper may get rejected.

- The **major constraint** is that you must independently make all content, tables, graphs, and facts that are offered in the paper. You must write each part of the paper wholly on your own. The Peer-reviewers need to identify your own perceptive of the concepts in your own terms. NEVER extract straight from any foundation, and never rephrase someone else's analysis.
- Do not give permission to anyone else to "PROOFREAD" your manuscript.
- Methods to avoid Plagiarism is applied by us on every paper, if found guilty, you will be blacklisted by all of our collaborated research groups, your institution will be informed for this and strict legal actions will be taken immediately.)
- To guard yourself and others from possible illegal use please do not permit anyone right to use to your paper and files.

Criterion for Grading a Research Paper (Compilation) by Global Journals Inc. (US)

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Topics	Grades		
	A-B	**C-D**	**E-F**
Abstract	Clear and concise with appropriate content, Correct format. 200 words or below	Unclear summary and no specific data, Incorrect form Above 200 words	No specific data with ambiguous information Above 250 words
Introduction	Containing all background details with clear goal and appropriate details, flow specification, no grammar and spelling mistake, well organized sentence and paragraph, reference cited	Unclear and confusing data, appropriate format, grammar and spelling errors with unorganized matter	Out of place depth and content, hazy format
Methods and Procedures	Clear and to the point with well arranged paragraph, precision and accuracy of facts and figures, well organized subheads	Difficult to comprehend with embarrassed text, too much explanation but completed	Incorrect and unorganized structure with hazy meaning
Result	Well organized, Clear and specific, Correct units with precision, correct data, well structuring of paragraph, no grammar and spelling mistake	Complete and embarrassed text, difficult to comprehend	Irregular format with wrong facts and figures
Discussion	Well organized, meaningful specification, sound conclusion, logical and concise explanation, highly structured paragraph reference cited	Wordy, unclear conclusion, spurious	Conclusion is not cited, unorganized, difficult to comprehend
References	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring

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