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Few Articles Related To Image Compression

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***Abstract**--In this overview of different strategies for lossless pressure of source picture information are broke down and talked about. The fundamental concentration in this work is lossless pressure calculations dependent on setting demonstrating utilizing tree structure. The focal angle in setting displaying is diverse setting layouts, which depend on discrete wavelet change coefficients, nearby inclinations and power of tests in the picture. This work incorporates examine on the most proficient method to utilize Neural Net Architecture setting tree structure, expectation demonstrating and likelihood task in lossless picture pressure dependent on setting displaying procedure. The principal advantage over current techniques is expanding the adequacy of picture pressure and growing new lossless pressure strategies dependent on setting demonstrating for various kind grayscale pictures: medicinal, cosmic, uproarious normal pictures.*

Keywords: -- Wavelet transforms, MATLAB, DWT, and Denoising.

I. INTRODUCTION

The expansion of advanced innovation has not just quickened the pace of improvement of many pictures handling programming and mixed media applications, yet besides, roused the requirement for better pressure calculations. Picture pressure assumes a basic job in telemetric applications. It is wanted that either single pictures or groupings of pictures be transmitted over PC organizes everywhere removes so that they could be utilized for a huge number of purposes. For example, medicinal pictures must be transmitted so that solid, improved and quick restorative analysis performed by numerous focuses could be encouraged. To this end, picture pressure is a significant research issue. The trouble, notwithstanding, in a few applications lies on the way that, while high-pressure rates are wanted, the pertinence of the reproduced pictures relies upon whether some huge attributes of the first pictures are safeguarded after the pressure procedure has been done. In wavelet picture pressure, portions of a picture are depicted concerning different pieces of a similar picture and thusly, the repetition of piecewise self comparability is abused. There are various issues to be explained in picture pressure to make the procedure suitable and increasingly productive. A great deal of work has been done in the territory of wavelet-based lossy picture pressure. Be that as it may, next to no work has been done in lossless picture pressure utilizing wavelets to improve picture quality. So the Proposed technique of this paper is to accomplish high-pressure proportion in pictures utilizing 2D haar Wavelet Transform by applying distinctive pressure limits for the wavelet coefficients. That is, diverse pressure proportions are applied to the wavelet coefficients having a place in the various districts of enthusiasm, whereof either every wavelet space band of the changed image [1-4].

II. IMAGE COMPRESSION DISCRETE COSINE TRANSFORM

JPEG represents the Joint Photographic Experts Group, a model board of trustees that included its starting points inside the Inter-national Standard Organization (ISO).JPEG gives a pressure strategy that is equipped for packing con-questionable tone picture information with a pixel profundity of 6 to 24 bits with sensible speed and efficiency.JPEG might be advertisement quipped to create little, compacted pictures that are of generally low quality in appearance yet appropriate for some applications. Then again, JPEG is equipped for creating great compacted pictures that are still far littler than the first uncompressed information. We present some basic pressure calculations, which incorporate both lossless and lossy techniques. Since numerous pressure calculations are applied to graphical pictures, the fundamental ideas of graphical picture stockpiling (shading space) are additionally talked about. Shading Space and Human Perception A computerized shading picture can be seen as a three esteemed (channels) positive capacity I=I(x, y) characterized onto a plane. Its mathematical portrayal is acquired through N by M by 3 framework A. Along these lines, every section of A will be a three-part whole number vector (pixel shading) communicating a force an incentive at a discrete area (x, y) with an exactness p (for example, one piece for each channel). Every segment or layer of the picture can be seen as a solitary channel picture, which, under specific conditions, can be examined freely from the others. This isn't the situation for RGB space, for instance, because, if two channels are fixed, human visual recognition is delicate to little changes in the estimation of the rest of the channel. In this manner, even though RGB is the most widely recognized capacity design for pictures, different organizations might be better for pressure. The key advance in lossy information pressure in which information can't be recouped precisely is the quantization stage, which endeavors an information decrease dependent on their uninformed substance. This isn't ideal for RGB pictures. By and by, for three layers, this can prompt the disposal of some low coefficients in a

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direction in a specific spatial area, although the comparing coefficients in different layers are not wiped out because they convey high data content. When reproducing the picture in that area, a high visual contortion is presented. The supposition of breaking down the three layers independently is legitimate just on the off chance that they are not connected with deference the visual appearance. [5, 6].

III. ISSUES OF OLD ARTICLES

Ch. Sathi Raju, D. V. Rama Koti Reddy, "On Compression Characteristics of White Band and Narrow Band Images Using Hybrid DCT and DWT": Pressure is a major issue in container endoscopy applications. It directs the power utilization attributes and the case of life. In this paper, a crossbreed DCT and DWT pressure strategy are utilized to underwrite the upsides of both the strategies. The strategy includes generating shading information of the white band and restricted band pictures in the middle of the road arrangement and after that creating the decompressed picture. The nature of the decompressed picture is assessed as far as to mean square blunder (MSE), sign to clamor proportion (SNR) and pinnacle sign to commotion proportion (PSNR). The hybridized DWT and DCT systems are actualized and applied to WBI and NBI pictures. The comparing picture quality estimations are arranged. Basic similitude record estimation based investigation would be a superior advance ahead to consider the picture quality estimations.

A.H.M. Jaffar Iqbal Barbhuiya, Tahera Akhtar Laskar," An Approach for Color Image Compression of JPEG and PNG Images using DCT and DWT": Presently a day's picture pressure has turned out to be is an imperative piece of digitized picture stockpiling and transmission. The pressure of a picture is essential before putting away and transmitting it because of its restriction of capacity and transfer speed limit. Wavelet change disintegrates the appearance of pictures into its basic structures. In this paper, a similar report has been done on picture pressure utilizing DCT (Discrete Cosine Transform) and DWT (Discrete Wavelet Transform). A correlation is delineated to accentuate the aftereffects of this pressure framework among DCT and DWT utilizing JPEG (Joint Photographic Experts Group) and PNG (Portable Network Graphics) shading pictures. We have done the transformation of shading pictures into the dark scale and the pressure of the dim scale picture has appeared after change utilizing the DWT technique. DWT calculation performs much superior to DCT calculations as far as Compression, Mean Square Error (MSE) and Peak Signal to Noise Ratio (PNSR). In this examination plan, an endeavor has been made to study and think about the picture pressure strategies utilizing DCT and DWT. From the above trial investigation, it is seen that in contrast with different tests our analysis shows better execution with the deference of pressure size and level of picture pressure. Another calculation has been proposed on Image Compression utilizing DWT and Inverse DWT. An exploratory outcome has appeared in the wake of packing any shading picture of various picture positions lastly transformation of shading pictures into a dark scale has appeared. The most distinctive component of utilizing DWT and Inverse DWT is that it won't just empower to pack a picture yet, besides will keep up the nature of the picture as it was in its unique structure, which was not conceivable before in other picture pressure systems. The future bearing of this examination is to grow such a calculation where any irregular picture of any goals or size could be packed at a uniform rate without corrupting the nature of the picture [7].

Ahmed A. Nashat, N. M. Hussain Hassan, "Image Compression Based upon Wavelet Transform and a Statistical Threshold": Discrete Wavelet Transform, (DWT), is known to be a standout amongst other pressure methods. It gives a scientific method for encoding data so that it is layered by the level of detail. In this paper, we utilized Haar wavelets as the premise of change capacities. Haar wavelet change is made out of a grouping of low pass and high passes channels, known as channel bank. The repetition of the DWT detail coefficients is diminished through threshold value and further through Huffman encoding. The proposed limit calculation depends on the insights of the DWT coefficients. The nature of the packed pictures has been assessed utilizing a few elements like Compression Ratio, (CR), and Peak Signal to Noise Ratio, (PSNR). Trial results show that the proposed strategy gives adequate higher pressure proportion contrasted with other pressure threshold methods. From the trial results, it is apparent that the proposed pressure system gives better execution contrasted with other customary strategies. The primary bit of leeway of the proposed calculation is that the limit level isn't determined by experimentation for every wavelet sub-band as the hard, the delicate, and the general calculations do. Its computation depends on the mean and the standard deviation of the DWT coefficients. Furthermore, we don't need to apply the calculation to the most elevated deterioration level, which is one estimation coefficient. It is adequate to stop at the center DWT sub-band, which is five for the 512x512 picture, but then get an incorporated

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picture with high goals and a high CR. Be that as it may, the DWT coefficients for levels lower than the center sub-band are huge which utmost the utilization of the calculation and the other pressure threshold methods. The histogram of the deteriorated picture, for this situation, has less little subtleties coefficients and all the more huge guess coefficients.

Med Karim Abdmouleh, Ali Khalfallah, and Med Salim Bouhlel, "A Novel Selective Encryption DWT-based Algorithm for Medical Images": The amazing improvement of the medicinal symbolism is due to the huge utilization of broadcast communications and data advances in the restorative area. In any case, since the telemedicine is a medicinal demonstration that must respond to stern guidelines, and pursue the ease that is offered by the informatics sciences to abuse the classification and credibility of restorative information. To determine this issue, plenty of techniques joining pressure and encryption have been created in the writing to verify the transmission and the capacity of medicinal pictures. In this paper, we propose another methodology of halfway encryption dependent on the Discrete Wavelet Transform (DWT) and good with the standard JPEG2000 to guarantee an ideal and a protected transmission and capacity of medicinal pictures. This methodology is, on one hand, quicker since it allows a very important gain in the encryption-decoding preparing time (just 6.25% of the DWT grid coefficients will be encoded), and then again progressively productive because it licenses to get a scrambled restorative picture.

Uthayakumar J, Vengattaraman T, "Performance Evaluation of Lossless Compression Techniques: An Application of Satellite Images": Satellite pictures are bigger and it needs a high measure of extra room and transmission time. There is a more noteworthy test to store or transmit the satellite pictures from the satellite to the earth station. Picture pressure procedures have advanced to adequately process the pictures with a middle of the road or no misfortune in quality. The satellite pictures can be compacted to deal with the extra room and correspondence transfer speed. Even though few examine have been done on the pressure of common pictures, just a few have focused on satellite pictures. The idea of satellite pictures represents a more prominent test to pack satellite pictures. To do this work, we have utilized a satellite picture dataset that comprises 2800 pictures of boats in satellite symbolism with a ship or no-transport arrangement. The current picture pressure methods, for example, Lempel Ziv Markov chain Algorithm (LZMA), Burrows-Wheeler Transform (BWT), and Lempel Ziv Welch (LZW) coding Deflate and LZ77 are contrasted with each other. The examination results suggest that LZMA accomplish preferable pressure over different techniques with the pressure proportion, pressure factor and pressure time of 0.5666, 1.765 and 53 seconds individually. All aspects of a satellite picture hold noteworthy data of the caught condition. The idea of the satellite pictures has exceptionally fluctuated from normal pictures. In this way, the pressure strategies accessible for normal pictures are not material for DT pictures. To confirm the way that the pressure methods of standard pictures are not valuable for satellite pictures, the current pressure procedures are applied to the satellite picture dataset and they got outcomes that are contrasted with one other. The outcomes demonstrate that none of the accessible pressure strategies accomplishes better outcomes to pack satellite pictures. From the acquired outcomes, a few systems accomplish negative pressure and some different methods accomplish just lesser pressure. Various calculations were proposed and tried against customary pictures like regular or photographic pictures. In any case, there is a more prominent need to create pressure systems for satellite pictures.

Fakhrul Ahsan, Md. Ashraful Alam, F. M. Fahmid Hossain " Faster Image Compression Technique Based on LZW Algorithm Using GPU Parallel Processing": As web, portable, work area and every single other application use picture for various purposes, picture pressure method has turned out to be one of the most significant applications in picture examination just as in software engineering. Although picture pressure is an old idea, it is as yet a very tedious procedure which has opened another field of research in picture pressure. In this paper, we feature our broad research works performed on LZW (Lempel-Ziv-Welch) calculation, a lossless picture pressure calculation that yields quicker calculation time when it is prepared with parallel calculation, because of the result of our exploration. The improved time proficiency got from our test result can be seen with regards to the millisecond scale instead of in the large scale level of estimation alongside keeping the decoded picture in the lossless configuration. In this paper, we have exhibited a quicker calculation strategy for LZW picture pressure utilizing GPU parallel preparing for restorative pictures. The proposed technique enables us to get the picture-packed without having to misfortune any information in quicker calculation time. All in all, this paper reveals that a quicker calculation time can be accomplished with the assistance

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of GPU parallel handling than the ordinary strategy. As we have up to 25% quicker calculation time for the picture pressure, we accept that if we utilize more strings, the calculation time will be a lot quicker than this.

The Genetic Programming Technique

The hereditary programming (GP) procedure is a particular hereditary calculation (GA) created by John Koza [9]. In GP, every one of the arrangements or chromosomes in the populace is a PC program or capacity. Each program of the populace is run and the outcomes created are assessed and allocated a wellness incentive as per how well the program played out the ideal assignment. For instance, a chromosome for GP that is attempting to recreate a picture may be relegated wellness esteem that is the converse of the contrast between the first and reproduced picture. A chromosome that reproduces a picture with less distinction from the first (fewer mistakes) is given higher wellness esteem. The emblematic portrayals (qualities) of a chromosome in GP are the individual guidelines that make up a program or capacity Genetic programming has great potential and appropriateness to the remaking and pressure of pictures. As Koza calls attention to, the issue space for GP might be exceptionally nonlinear [9]. This component is significant for working with pictures since a gathering of pixel esteems in a picture to be recreated by GP might not have a direct relationship. The nonlinear issue space of GP is considerably progressively significant in the recurrence area. Improving Existing Methods Improving a key pressure wellspring of a current calculation should prompt generally speaking improved pressure or potentially quality. Along these lines, a few GP-based picture pressure methods attempt to advance a part of a current, demonstrated picture pressure framework to improve the effectiveness of the entire framework. One model is Wu's methodology [13], wherein the streamlines a solitary part of the demonstrated and all around utilized JPEG pressure calculation. Wu calls attention to that the quantization table is in charge of a noteworthy segment of JPEG's pressure abilities and commands over quality. Therefore, he built up a GP calculation to locate an ideal quantization table for a particular picture. In particular, his proposed procedure replaces the conventional JPEG quantization table with the ideal one found by the GP and runs the generally immaculate JPEG pressure calculation.

Jiang and Butler [11] present comparative work in finding an ideal quantization table. Their examination centered around the vector quantization all in all. Their objective was to apply GP to meet on an ideal codebook speaking to the objective picture. They began with a little populace of five arbitrarily created codebooks and afterward estimated how well each codebook spoke to the objective picture. The codebook with the littlest mistake was resolved as the fittest. Their outcomes demonstrate that the thought holds guarantee: it created a 15% improvement over a large number of the basic pressure strategies at the time the trials were performed.

Fukanaga and Stechert likewise apply GP to a part of a created pressure strategy [4]. Their work upgrades a prescient coding pressure calculation. Working from a nonlinear prescient model, the estimation of every pixel is anticipated dependent on the estimations of its eight neighbors. The mistake picture (the picture shaped from the distinction between the first picture and the anticipated picture) is Huffman encoded and put away. The pixel esteems around the edges of the picture are likewise put away so that there are some underlying "neighbors" to work with. This calculation loans itself to GP, as it finds an ideal indicator to such an extent that the blunder picture contains insignificant entropy and can be exceptionally packed. These techniques represent how the use and thought of high performing pressure strategies increment potential for accomplishing great pressure results. Every one of these strategies accomplishes promising outcomes by a consolidating current pressure innovation with hereditary programming.

IV. EXISTING RESEARCH

Proficient commotion concealment in a picture is a significant issue. De-noising finds wide applications in numerous fields of picture handling. Picture De-noising is a significant assignment of pre-preparing before further handling, for example, picture division, highlight extraction, surface investigation and so forth. The motivation behind De-noising is expelled clamor while holding the edges and different highlights point by point much as could be allowed. Traditional systems of picture de-noising utilizing straight and nonlinear strategies have just been read and broke down for productive plan denoising [8-11]. Various methodologies are essentially concerned de-noise picture information, for example, normal channel, middle channel, and fractional methodology Gauss Differential Equations (PDE). On the off chance that we break down the properties of good pictures, at that point, it will be with less commotion and obscure or limit obscure decrease is the significant factor. PDE approach is much compelling and is applied in a few examinations as [2-3]. Be that as it may, it is increasingly viable whenever applied the fourth request incomplete differential condition. Uses of PDE models can be broadly found in a wide scope of picture rebuilding undertakings, for example, expelling clamor and improves [4] shading

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picture handling [5-6] and goals. This gives us the future or works with the fourth request incomplete differential condition with a similar request toward diminishing haze vision. Picture De-noising assumes a significant job in picture preparing task [17]. Dispose of commotion when the edges are in the state to save the picture is called clamor expulsion. In the picture preparing undertaking is a significant and basic issue. If we need an extremely high goal picture quality as the outcome, at that point we should consider the parameters decreasing commotion parameters for better. The principle reason or goal of evacuating picture clamor is to recuperate the fundamental picture of the loud picture [18].

$$\mathbf{w(i) = s(i) + n(i)}$$

Where w (i) is the watched worth, s (i) is the "genuine" esteem and n (i) is the unsettling influence of clamor in a pixel I. If the investigation underneath, there are a few different ways to show the commotion. At times the commotion is extensive. For reasons for displaying structure is correct and added substance white Gaussian clamor (AWGN) that is versatile to demonstrate commotion parameters. For that, we additionally consider obscure as the order corrupting execution. The strategy Fast Fourier Transform (FFT) is an investigative system for numerical examination. The estimated fractional differential conditions (PDE), which is commonly determined by the development as far as capacity, which is likewise called base technique is utilized for ascertaining the obscure coefficients examination is given. At that point, we can apply the FFT technique for halfway differential conditions as

$$\frac{\partial x}{\partial t} = c^2\left(\frac{\partial^2 x}{\partial m^2} + \frac{\partial^2 x}{\partial n^2}\right) + E(m, n)$$

This decreases the number of spatial factors until just a single two-point limit esteem issue or the underlying worth issue stays to be settled by standard strategies. FFT is utilized to isolate the factors so utilized in the arrangement of the halfway differential condition. The PDE of Forth request additionally helps to decrease and division because of the higher evaluation. It is substantially more adaptable with regards to utilization and partitions of factors, so distinguishing proof is additionally simple and perceptible and lessens clamor proportions.

V. PROBLEM IDENTIFICATION AND FORMULATION

The objectives of this theory can be figured as pursues:

1. Planning new setting layouts, which can be utilized for setting displaying by applying the setting tree with ideal and inadequate structure, for lossless pressure calculations;
2. To apply the setting tree structure to calculations, which acknowledge lossless pressure by setting demonstrating dependent on different formats;
3. To dissect the setting demonstrating the approach with utilizing n - array general setting tree;
4. Examination of lossless pressure strategies: JPEG2000, LOCO-I, CALIC, which depend on the worldview of demonstrating and coding. Here the strategies, which use setting displaying, the focal intrigue is spoken to.

During the examination of known lossless pressure strategies attempt to utilize its solid sides for growing new methodologies of setting demonstrating. For growing new layouts to utilize the discrete wavelet change coefficients and nearby inclinations (this term gets from LOCO-I technique). In new strategies to apply n - array setting tree with inadequate and ideal structure [AKF05] for viable preparing of factual data during the setting demonstrating dependent on various formats. The essential thought of this proposal is the estimation of the picture non-degenerate of the mutilated or boisterous picture, and is additionally called picture "de-noising". There are different strategies to help reestablish a picture of boisterous mutilations. The decision of strategy assumed a noteworthy job in the accomplishment of the ideal picture. The de-noising techniques will, in general, be a particular issue. For instance, a strategy that is utilized for the satellite pictures de-noise may not be appropriate for de-noising medicinal pictures. In this theory, an investigation has been done on the different calculations and each is de-noising executed in MATLAB 15A. Every technique is contrasted and arranged to agree with its viability. To measure the presence of different de-noising calculations, a top-notch picture is taken and some realized commotion is included. This would then be given as a contribution to the de-noising calculation, which creates a picture near the first a great picture. The presentation of every calculation is contrasted by figuring the sign with clamor proportion (SNR) notwithstanding the visual translation.

VI. RESEARCH OBJECTIVES

A definitive objective of the picture de-noising and rebuilding strategies is to improve a debased picture it could be said.

1. To build up a technique for picture information by de-noising the wavelet area utilizing the threshold strategy utilizing the VisuShrink demonstrating without utilizing the settings of the sensor.
2. To build up the division technique this improves the time intricacy of the strategy de-noising.

VII. IMAGE DENOSING LOSSLESS AND LOSSY CASES

The task of pressure is to code the picture information into a reduced structure, limiting both the number of bits in the portrayal, and the twisting brought about by the pressure. The key rule for all pressure techniques is following thought: if speak to of recurring components as shortcodes and uncommon repeating as long codes, at that point the square of information needs a little memory size than if all components were spoken to by codes of

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indistinguishable length. A pressure calculation is "lossless" (or reversible) if the decompressed picture is indistinguishable with the first. Individually, a pressure technique is "lossy" (or irreversible) if the remade picture is just a guess of the first one [Fränti00]. Some loss of data can be satisfactory for the accompanying three reasons: 1. Noteworthy misfortune can regularly be endured by the human visual framework without meddling with the view of the scene content. 2. Much of the time, computerized contribution to the pressure calculation itself is a flawed portrayal of this present reality scene. This is obvious when the picture test esteems are quantized rendition of the genuine esteemed amounts. 3. Lossless pressure is generally unequipped for accomplishing the high-pressure prerequisites of numerous capacity and conveyance applications. The term lossy is utilized in a unique sense and doesn't mean arbitrary lost pixels, yet rather implies loss of an amount, for example, a recurrence segment, or maybe the loss of clamor.

CONCLUSION

The relative investigation of different de-noising procedures for advanced pictures demonstrates that wavelet channels beat the other standard spatial area channels. Albeit all the spatial channels perform well on advanced pictures yet they have a few limitations concerning goals debasement. These channels work by smoothing over a fixed window and it produces antiques around the item and some of the time causes over smoothing in this manner causing obscuring of the picture. Wavelet change is most appropriate for execution because of its properties like sparsity, multi goals, and multi-scale nature. Threshold strategies utilized with discrete wavelets are least difficult to execute.

REFERENCES

[1]. V. Balakrishnan, Nash Borges, and Luke Parchment, “Wavelet Denoisingand Speech Enhancement.” Research paper, Johns Hopkins University, Baltimore, MD, 2001.
[2]. S. Grace Chang, Bin YU, and Martin Vetterli, “Adaptive Wavelet Threshold for Image Denoising and Compression," IEEE Transactions on Image Processing, Vol. 9, No. 9, pp. 1532-1546, Sep. 2000.
[3]. M. K. Michak, Igor Kozintsev, Kannan Ramchandran, and Pierre Moulin, "Low-Complexity Image Denoising Based on Statistical Modeling of Wavelet Coefficients,” IEEE Signal Processing Letters, Vol. 6, No. 12, pp. 300-302, Dec. 1999.
[4]. Levent Sundar, and Ivan W. Selesnick, "Bivariate Shrinkage Functions for Wavelet-Based Denoising Exploiting Interscale Dependency,” IEEE Transactions on Signal Processing, Vol. 50, No. 11, pp. 2744-2756, Nov. 2002.
[5]. Matlab 6.1, “Image Processing Toolbox,” http://www.mathworks.com/access/Help desk/ Help/toolbox/images/images.shtml.
[6]. Scott E Umbaugh, “Computer Vision and Image Processing,” Prentice Hall PTR, New Jersey, 1998.
[7]. Langis Gagnon, “Wavelet Filtering of Speckle Noise-Some Numerical Results,” Proceedings of the Conference Vision Interface, Trois-Rivieres, 1999.
[8]. 1/f noise, “Brownian Noise,” http:// classes.yale.edu/99-00/math190a/OneOverF.html, 1999.
[9]. Sachin D Ruikar and Dharmpal D Doye, "Wavelet-Based Image Denoising Technique,” International Journal of Advanced Computer Science and Applications, Vol. 2, No.3, March 2011.
[10]. Lakhwinder Kaur, Savita Gupta, and R.C. Chauhan, "Image Denoising using Wavelet Thresholding,” IJCSI International Journal of Computer Science Issues, Vol. 8, Issue 6, No 1, November 2011.
[11]. Akhilesh Bijalwan, Aditya Goyal and Nidhi Sethi, “Wavelet Transform Based Image De-noise Using Threshold Approaches,” International Journal of Engineering and Advanced Technology (IJEAT), Volume-1, Issue-5, June 2012.