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Review on Modern Image Encryption Techniques using Chaos Theory

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Abstract: In present times, the protection of multimedia information is becoming very essential. The safety of this multimedia information may be performed with encryption. There are such a lot of special strategies need to be used to guard personal photo data from unauthorized access. In this paper, we survey on present work that is used extraordinary strategies for photo encryption and we also deliver popular introduction about cryptography.

Keywords: Decryption, Encryption, Image encryption, Symmetric key cryptography.

1. Introduction:

Digital multimedia data are rapidly spreading everywhere. On the other hand, this situation has brought about the possibility of duplicating and/or manipulating the data. To keep on with the transmission of data over the Internet the reliability and originality of thetransmitted data should be verifiable. It is necessary that multimedia data should beprotected and secured. The design of techniques for preserving the ownership of digital information is in the basic of the development of future multimedia services. One way to address this problem involves embedding an invisible data into the original data to mark ownership of them. There are many techniques for information hiding, which can be divided into different categories such as convert channels, steganography, anonymity, and watermarking [23]. Convert channels techniques were defined in the context of multilevel secure systems. Convert channels usually handle properties of the communication channels in an unexpected and unforeseen way in order to transfer data through the medium without detection by anyone other than the entities operating the covert channel. Steganography is about preventing the detection of an encrypted data, which has been protected by cryptography algorithms. Anonymity is a technique to find ways to hide the meta content of tranmitted messages such as sender and the recipients. Digital watermarking has an extra requirement of robustness compared to steganography algorithms against possible attacks. It should be also noted that watermarking is not intended for protecting of the content of a message, and hence it is different from cryptography. In this thesis we focus on the robustness of the digital watermarking algorithms in the transform domain against common attacks.

2. Related Work:

In 2005, Haojiang Gao, Yisheng Zhang, Shuyun Liang, Dequn Li presented a new nonlinear chaotic algorithm (NCA) which uses power function and tangent function instead of linear function. Its structural parameters are obtained by experimental analysis. And an image encryption algorithm in a one-time-one password system is designed. The experimental results demonstrate that the image encryption algorithm based on NCA shows advantages of large key space and high-level security, while maintaining acceptable efficiency. Compared with some general encryption algorithms such as DES, the encryption algorithm is more secure.

In 2006, N.K. Pareek a,b, Vinod Patidar a, K.K. Sud suggested a new approach for image encryption based on chaotic logistic maps in order to meet the requirements of the secure image transfer. In their proposed image encryption scheme, an external secret key of 80-bit and two chaotic logistic maps are employed. The initial conditions for the both logistic maps are derived using the external secret key by providing different weightage to all its bits. Further, in the proposed encryption process, eight different types of operations are used to encrypt the pixels of an image and which one of them will be used for a particular pixel is decided by the outcome of the logistic map. To make the cipher more robust against any attack, the secret key is modified after encrypting each block of sixteen pixels of the image. The results of several experimental, statistical analysis and key sensitivity tests show that the proposed image encryption scheme provides an efficient and secure way for real-time image encryption and transmission.

In 2009,K. Jastrzebski, Z.Kotulsk examined one of the recently proposed chaotic image encryption algorithms,based on chaotic map lattices (CML).Firstly they show certain problems with the chaotic map, as well as errors in the designed algorithm. Then they have proposed a way to improve it and present a new version of algorithm and its implementation and show the results of a security analysis and a comparison of both schemes.

In 2010,Issa A. Abed ,given a new idea ,i.e how genetic algorithm works to give the optimal keys and the influence of each key in the increasing security,He performed several experiments to prove that.His proposed algorithm is used with wavelet transform.

In 2011,Komal D Patel, Sonal Belani , given a survey on existing work which is used different techniques for image encryption and also gave general introduction about cryptography.

In 2011, Rasul Enayatifar a and Abdul Hanan Abdullah said ,Proposed a new method based on a hybrid model composed of a genetic algorithm and a chaotic function for image encryption. In the proposed method, first a number of encrypted images are constructed using the original image with the help of the chaotic function. In the next stage, these encrypted images are employed as the initial population for starting the operation of the genetic algorithm. In each stages of the genetic algorithm, the answer obtained from previous iteration is optimized so that the best encrypted image with the highest entropy and the lowest correlation coefficient among adjacent pixels is produced.

In 2012 ,Aarti Soni, Suyash Agrawal suggested a method based on Genetic Algorithm which is used to generate key by the help of pseudo random number generator. Random number will be generated on the basis of current time of the system. Acoording to the,Using Genetic Algorithm we can keep the strength of the key to be good, still make the whole algorithm good enough. Symmetric key algorithm AES has been proposed for encrypting the image as it is very secure method for symmetric key encryption.

In 2012 ,Seema,Sheetal Sharma presented a new embedding and extracting method with DWT-SVD,in order to improve the robustness and imperceptibleness of the algorithm. The approximation matrix of the third level of image in DWT domain is modified with SVD to embed the singular value of watermark to the singular value of DWT coefficient. The proposed embedding and extracting method was employed to accelerate the hybrid DWT-SVD watermarking and to avoid the leak of watermark. This hybrid technique leads to optimize both the fundamentally conflicting requirements. The experimental results show both the good robustness under numerous attacks and the high fidelity.

In 2012 ,Sonia Goyat work explored the different techniques of cryptography in order to prove that the natural selection based techniques are as good as the rigorous mathematical techniques. 12 papers and thesis have been studied by her in order to reach the conclusion.

In 2012,V.Srikanth, Udit Asati, Viswajit Natarajan, T.Pavan Kumar, Teja Mullapudi, N.Ch.S.N.Iyengar proposed a technique where the image encryption is done using breaking and merging of bits. As followed in other encryption techniques the image is first broken down into blocks also known as a grid. Then the initial transformation steps are performed and then functions similar to Vernon cipher are used to locate the pixels and further genetic algorithm is used to encrypt the images using one point cross-over.

In 2012,Ankita Agarwal suggested a new method based on Genetic Algorithm (GA) which is used to produce a new encryption method by exploitation the powerful features of the Crossover and Mutation operations of (GA).

In 2013, Shubhangini P.Nichat, Prof.Mrs.S.S.Sikchi, introduced a hybrid model for image encryption composed of genetic algorithm and chaotic function. In the first stage of proposed method number of encrypted images is constructed using secret key and chaotic function. In the next stage, these encrypted images are used as initial population for genetic algorithm. In this proposed method genetic algorithm is used to obtain optimum result and in the last stage best cipher image is selected based on calculation of correlation coefficient and entropy. The image having lowest correlation coefficient and highest entropy is selected as best cipher image. In this paper first time we are using genetic algorithm for encryption of images. Entropy and correlation coefficient obtained by using this method are 7.9978 and -0.0009 respectively.

In 2009 Lijing Zhang and Aihua Li suggested that using the characteristics of discrete wavelet transform (DWT) and singular value decomposition (SVD) an effective watermarking algorithm will be produced for copyright protection. First of all the cover image is transformed by using DWT and SVD and the watermark image is processed by Arnold transform and SVD.Then the processed watermark image is embedded into the cover image. The embedded watermark image is gained through the corresponding transform.the algorithm he proposed shows high feasibility, and has a good robustness.

In 2010,B.Jagadeesh,S.Srinivas Kumar and K.Raja Rajeswari proposed a modified digital image watermarking scheme based on Singular Value Decomposition using Genetic Algorithm (GA). Their proposed scheme is based on quantization step size optimization using the Genetic Algorithm to improve the quality of watermarked image and robustness of the watermark. Their method is secure and robust to attacks, viz., Low Pass Filtering, Median Filtering, JPEG Compression, Resizing, Row-Column blanking, Row-Column Copying etc. Superior experimental results are observed with the proposed scheme over an algorithm proposed by Sun et al. in terms of Normalized Cross correlation (NC) and Peak Signal to Noise Ratio (PSNR).

In 2010, Chih-Chin Lai and Cheng-Chih Tsai develop an algorithm that satisfies both imperceptibility and robustness requirements. They suggested, a hybrid image-watermarking scheme based on discrete wavelet transform (DWT) and singular value decomposition (SVD). In their approach, the

watermark is not embedded directly on the wavelet coefficients but rather than on the elements of singular values of the cover image's DWT sub bands.

In 2010,Mehul S Raval Priti P Rege S K Parulkar said, that digital image-watermarking can be casted as an optimization problem with solution satisfying fidelity, robustness and security constraints and most of discrete wavelet transform (DWT) and singular value decomposition (SVD) based approaches highlights tradeoff between fidelity and robustness with lesser discussion on security. So they suggested a novel watermarking approach based on DWT and SVD to satisfy all the three constraints. According to their approach a watermark image is customized using singular values (SV) computed on DWT subband of cover image. Unlike other algorithms, watermark is not inserted into SV's of DWT sub-band. While doing singular value decomposition on cover image, SV's of watermark replaces the SV's of the DWT sub-band. Signatures of orthogonal matrices associated with SV's of watermark are then computed and inserted into third level LL and HH band of cover image. Before watermark extraction these signatures can be used for authentication of the orthogonal matrices. Signature authentication improves security of the algorithm.

In 2011,Feng Shi,Yongge Shi,Lin Lai said that a traditional digital watermarking algorithm based on DWT generally embedded in high frequency watermarks; these bands of wavelet coefficients are generally lower and they are vulnerable when attacked by different kinds of pictures so that they are difficult to deal with some strong attacks against algorithms such as damage to compression, filtering and so on. It results in that the robustness of algorithm always can't satisfy the requirements of practical application. The part of low-frequency after using Wavelet Transformation embeds in watermark information can improve the robustness of digital watermarking preferable by analysis. Under the condition that the amount of information in digital watermarking getting smaller, optimizing the image of Arnold scrambling algorithm, using it in to encrypts digital watermarking images , combining with the characteristics of singular value decomposition and processing the singular decomposition of wavelet transform image can enhance the digital watermark invisibility and robustness effectively.

In 2011,Rakhi Dubolia , Roop Singh,Sarita Singh Bhadoria , Rekha Gupta, said that the watermarking can be done by using least significant bit (LSB), Discrete Fourier Transform (DFT), singular value decomposition (SVD), Discrete wavelet transform (DWT) and Discrete cosine transform (DCT) techniques. According to their approach Discrete wavelet transform (DWT) and Discrete cosine transform (DCT) are used for embedding and extraction of watermark image. DWT and DCT are compared with respect to peak signal to noise ratio (PSNR) at a different threshold values. DWT gives better Image quality then DCT.

In 2011,S.Ramakrishnan1, T.Gopalakrishnan2, K.Balasamy, aims at developing a hybrid image watermarking algorithm which satisfies both imperceptibility and robustness requirements. In order to achieve their objectives they used singular values of Wavelet Transformation's HL and LH sub bands to embed watermark. Further to increase and control the strength of the watermark, they use a scale factor. An optimal watermark embedding method is developed to achieve minimum watermarking distortion. A secret embedding key is designed to securely embed the fragile watermarks so that the new method is robust to counterfeiting, even when the malicious attackers are fully aware of the watermark embedding algorithm. Experimental results are provided in terms of Peak signal to noise ratio (PSNR), Normalized cross correlation (NCC) and gain factor to demonstrate the effectiveness of the proposed algorithm. Image operations such as JPEG compression from malicious image attacks and, thus, can be used for semi-fragile watermarking.

In 2011,U. M. Gokhale, Y. V. Joshi suggested, A new watermarking algorithm which is based on image scrambling and SVD in the wavelet domain. In their proposed algorithm, chaotic signals are generated using logistic mapping and are used for scrambling the original watermark. The initial values of logistic mapping are taken as private keys. The covert image is decomposed into four bands using integer wavelet transform; they apply SVD to each band and embed the scrambled watermark data by modifying the singular values.

In 2012 IJCST,B.Hari Krishna,D.Raju, K.Anjaneyulu suggested a modified approach based on DWT and SVD. Their approach satisfies the imperceptibility and robustness and some common attacks very well. And the algorithm is robust to the common image process such as JPEG compression,, rotating, cutting, and contrast enhance. Compared with the SVD, their proposed algorithm is DWT+SVD has stronger robustness and faster speed in embedding and extracting.

In 2012,Anjul Singh,Akash TayalSeveral proposed a watermarking schemes with the purpose to satisfy both imperceptibility and robustness requirements. In their approach, various watermarking scheme as Discrete Wavelet Transform (DWT), Singular value decomposition (SVD), an optimal Discrete Wavelet Transform-Singular Value Decomposition (DWT-SVD) based image watermarking scheme, and a hybrid watermarking scheme based on Discrete Wavelet Transform – Discrete Cosine Transform –Singular Value Decomposition (DWT-DCT-SVD) are discussed. Experimental results show improvement both in imperceptibility and robustness requirements under certain attacks and also provide the comparative results in between

these algorithms in terms of peak signal to noise ratio (PSNR) and normalized correlation (NC).

In 2012, Manie Kansal, Gursharanjeet Singh V Kranthi said that to conceal data in transmitting message for preventing the illegal copying or to protect the secret is very important. Data encryption and information hiding schemes are developed to protect the secret data. They suggested an approach in which digital image watermarking algorithm based on DWT, DCT and SVD has been used. In their method Arnold transform has been applied to watermark image in order to ensure the watermark robustness. Experimental results show the algorithm is robust to the common image process such as JPEG compression and other attacks like noise and filters.

In 2012, Parthiban V,Ganesan R, proposed an approach in which robustness is improved through combination of Singular Value Decomposition and Discrete Wavelet Transform method. DWT is used for decomposition of images into sub bands which gives linear flexibility of images in terms of scalability, resolution and distortion. By adding SVD along with DWT, Peak Signal to Noise Ratio can be improved.

In 2012, Poonam, Shakti Kundu, Sanyam Kumar, Kailash Chander presented a new method to improve the robustness and imperceptibleness in watermarking. In their approach, the singular value of watermark is embedded to singular value of 3rd-level DWT approximation matrix of original image. The genetic algorithm is used to optimize the scaling factor with which the watermark is embedded to host image. The algorithm makes use of fitness function that takes two values PSNR and correlation. They also find the transparency and robustness of watermark under various attacks.

In 2012, Sneha Jose, Rajesh Cherian Roy, Sreenesh Shashidharan proposed a hybrid Image watermarking scheme based on Discrete Wavelet Transform (DWT)- Discrete Cosine Transform (DCT) and Singular Value Decomposition (SVD). The cover image is reordered before DCT is applied. The DCT coefficients of the reordered image are decomposed into sub bands using DWT. The singular values of the middle sub bands are found and watermark is embedded. Their simulation results shows that this method can survive attacks like rotation, cropping, JPEG compression and noising attacks and also can be used for copyright protection of multimedia objects.

In 2007, Chin-Chen Chang et. Al. presented there work related to an SVD oriented watermark embedding scheme with high qualities for the restored images. In this work, they stated that SVD-based watermarking scheme, which successfully embeds watermarks into images, and its hidden watermarks can resist various attacks. In this work, we further extended their idea so that the hidden watermarks can be removed to provide authorized users better image quality for later usage after the ownership of purchased images has been verified. To achieve our objective, we modified their embedding strategy, and the extra information required for later restoration is embedded into the least important non-zero coefficients of the S matrices in the image. Experimental results confirmed that our scheme not only provided good image quality of watermarked images but also successfully restored images with high restoration quality.
In this work, they extended Chang et al.'s concept to provide a removable watermarking scheme for binary logos. To make sure the watermarked images can be restored with high image quality to support different application requirements by authorized users; the proposed scheme not only modified the embedding strategy of Chang et al.'s scheme but also hided extra information in the fourth non-zero coefficients of the S matrices in the image during the watermark embedding procedure. Because the proposed scheme improved on Chang et al.'s scheme, it inherited the robustness of their scheme. Furthermore, according to the experimental results, our proposed scheme has been proved to maintain acceptable image quality in watermarked images and good bcrs in extracted watermarks. Even for the compressed images under parameter 70, the average psnrs of watermarked images and restored images were still up to 30 db and 32 db, respectively. The average BCR was also up to 89%. In other words, authorized users can always restore images with high image quality for later usage after they verify ownership of their purchased images. Therefore, the proposed watermarking scheme is very suitable for the protection of rightful ownership of digital images and for on-line image purchasing[6].

In 2007 Ali Al-Haj et. Al proposed there work related to combined dwt-dct digital image watermarking .In this work, they stated that the proliferation of digitized media due to the rapid growth of networked multimedia systems has created an urgent need for copyright enforcement technologies that can protect copyright ownership of multimedia objects. Digital image watermarking is one such technology that has been developed to protect digital images from illegal manipulations. In particular, digital image watermarking algorithms which are based on the discrete wavelet transform have been widely recognized to be more prevalent than others. This is due to the wavelets' excellent spatial localization,frequency spread, and multi-resolution characteristics, which are similar to the theoretical models of the human visual system. In this work, we described an imperceptible and a robust combined DWT-DCT digital image watermarking algorithm. The algorithm watermarks a given digital image using a combination of the Discrete Wavelet Transform (DWT) and the Discrete Cosine Transform (DCT). Performance evaluation results showed that combining the two transforms improved the performance of the watermarking algorithms that are based solely on the DWT transform [7].

In 2008 B.Chandra Mohan et. Al. Proposed there work related to robust image watermarking scheme using singular value decomposition. In there work, they presented a robust image watermarking scheme for multimedia copyright protection. In this work, host image is partitioned into four sub images. Watermark image such as 'logo' was embedded in the two of these sub images, in both D (singular and diagonal matrix) and U (left singular and orthogonal matrix) components of Singular Value Decomposition (SVD) of two sub images. Watermark image was embedded in the D component using Dither quantization. A copy of the watermark was embedded in the columns of U matrix using comparison of the coefficients of U matrix with respect to the watermark image. If extraction of watermark from D matrix was not complete, there was a fair amount of probability that it can be extracted from U matrix. The proposed algorithm is more securde and robust to various attacks, viz., JPEG2000 compression, JPEG compression, rotation, scaling, cropping, row-column blanking, row-column copying, salt and pepper noise, filtering and gamma correction. Superior experimental results were observed with the proposed algorithm over a recent scheme proposed by Chung et al. In terms of Bit Error Rate (BER), Normalized Cross correlation (NC) and Peak Signal to Noise Ratio (PSNR)[8].

In 2009, Mei Jiansheng et. al proposed there work related to digital watermarking algorithm based on Dct and dwt This work introduced an algorithm of digital watermarking based on Discrete Cosine Transform (DCT) and Discrete Wavelet Transform (DWT). According to the characters of human vision, in this algorithm, the information of digital watermarking which has been discrete Cosine transformed, was put into the high frequency band of the image which has been wavelet transformed. Then distilled the digital watermarking with the help of the original image and the watermarking image. The simulation results showed that this algorithm was invisible and has good robustness for some common image processing operations [9].

In 2009, A MANSOURI proposed that, there work related to SVD-based digital image watermarking using complex wavelet transform. In this work ,they stated a new robust method of non-blind image watermarking . The suggested method was performed by modification on singular value decomposition (SVD) of images in Complex Wavelet Transform (CWT) domain while CWT provided higher capacity than the real wavelet domain. Modification of the appropriate sub-bands leads to a watermarking scheme which favourably preserved the quality. The additional advantage of the proposed technique was its robustness against the most of common attacks. Analysis and experimental results showed much improved performance of the proposed method in comparison with the pure SVD-based as well as hybrid methods (e.g. DWT-SVD as the recent best SVD-based scheme) were more robust against all mentioned attacks. The additional privilege of suggested algorithm was its compatibility with human visual system characteristics to embed the watermark by selecting the best sub-bands in CWT domain. In this way, high capacity of CWT domain was applied to embed the watermark information along with preserving the quality of the watermarked image[10].

In 2010, ms. kapre bhagyashri et. Al proposed there work related to robust image watermarking based on singular value decomposition and discrete wavelet transform .In there work ,they stated the robustness against geometric distortions one of the crucial important issues in watermarking. In thiswork, a new singular value decomposition-discrete wavelet transform (SVD-DWT) composite image watermarking algorithm that is robust against watermarking processing was presented. We used DWT and IDWT transform to obtain four different frequency images. A point that assumed watermarking should be embedded watermarking in low or middle frequency to have good robustness. Experimental evaluation demonstrated that the proposed algorithm was able to withstand a variety of attacks including common geometric attacks [11].

In 2010, Say Wei Say Foo proposed there work related to normalization-based robust image Watermarking scheme using svd and dct. In this work, they stated that digital watermarking is one of the techniques for copyright protection. In this work, a normalization-based robust image watermarking scheme which encompassed singular value decomposition (SVD) and discrete cosine transform (DCT) techniques was proposed. For the proposed scheme, the host image was first normalized to a standard form and divided into non-overlapping image blocks. SVD was applied to each block. By concatenating the first singular values (SV) of adjacent blocks of the normalized image, a SV block is obtained. DCT was then carried out on the SV blocks to produce SVD-DCT blocks. A watermark bit was embedded in the high frequency band of a SVD-DCT block by imposing a particular relationship between two pseudo-randomly selected DCT coefficients. An adaptive frequency mask was used to adjust local watermark embedding strength. Watermark extraction involved mainly the inverse process. [12].

In 2010, Jamal A. Hussein proposed there work related to spatial domain watermarking scheme for colored images based on log-average luminance. In this work ,a new watermarking scheme was presented based on log-average luminance. A colored-image was divided into blocks after converting the RGB colored image to ycbcr color space. A monochrome image of 1024 bytes was used as the watermark. To embed the watermark, 16 blocks of size 8X8 are selected and used to embed the watermark image into the original image. The selected blocks were chosen spirally (beginning form the centre of the image) among the blocks that have log-average luminance higher than or equal the log-average luminance of

the entire image. Each byte of the monochrome watermark was added by updating a luminance value of a pixel of the image. If the byte of the watermark image represented white color (255) a value α is added to the image pixel luminance value, if it is black (0) the α is subtracted from the luminance value. To extract the watermark, the selected blocks are chosen as the above, if the difference between the luminance value of the watermarked image pixel and the original image pixel is greater than 0, the watermark pixel was supposed to be white, otherwise it supposed to be black. Experimental results showed that the proposed scheme was efficient against changing the watermarked image to grayscale, image cropping, and JPEG compression [13].

In 2011, Manjit Thapa et. Al presented there work related to secure digital image watermarking techniques. In this work, they stated that digital watermarking was used to hide the information inside a signal, which can not be easily extracted by the third party. Its widely used application was copyright protection of digital information. It was different from the encryption in the sense that it allowed the user to access, view and interpret the signal but protect the owner-ship of the content. One of the current research areas was to protect digital watermark inside the information so that ownership of the information cannot be claimed by third party. With a lot of information available on various search engines, to protect the ownership of information is was a crucial area of research. In latest years, several digital watermarking techniques were presented based on discrete cosine transform (DCT), discrete wavelets transform (DWT) and discrete fourier transforms (DFT). In this work, we proposed an algorithm for digital image watermarking technique based on singular value decomposition; both of the L and U compo-nents are explored for watermarking algorithm. This technique refered to the watermark embedding algorithm and watermark extracting algorithm. The experimental results proved that the quality of the watermarked image was excellent and there was strong resistant against many geometrical attacks.

In 2012, Kaushik Deb proposed there work related to combined dwt-dct based digital image watermarking technique for copyright protection .There work stated a combined DWT and DCT based watermarking technique with low frequency watermarking with weighted correction is proposed. DWT has excellent spatial localization, frequency spread and multi-resolution characteristics, which were similar to the theoretical models of the human visual system (HVS). DCT based watermarking techniques offer compression while DWT based watermarking techniques offer scalability. These desirable properties were used in this combined watermarking technique. In the proposed method watermark bits were embedded in the low frequency band of each DCT block of selected DWT sub-band. The weighted correction was also used to improve the imperceptibility. The extracting procedure reversed the embedding operations without the reference of the original image. Compared with the similar approach by DCT based approach and DWT based approach, the experimental results showed that the proposed algorithm apparently preserved superior image quality and robustness under various attacks such as JPEG compression, cropping, sharping, contrast adjustments and so on.

In 2012, Yusuf Perwej et. Al. Proposed there work related to an adaptive watermarking technique for the copyright of digital images and digital image protection .In this work they stated that internet as a whole does not use secure links, thus information in transit may be vulnerable to interruption as well. The important of reducing a chance of the information being detected during the transmission is being an issue in the real world now days. The Digital watermarking method provides for the quick and inexpensive distribution of digital information over the Internet. This method provides new ways of ensuring the sufficient protection of copyright holders in the intellectual property dispersion process. The property of digital watermarking images allows insertion of additional data in the image without altering the value of the image. This message is hidden in unused visual space in the image and stays below the human visible threshold for the image. Both seek to embed information inside a cover message with little or no degradation of the cover-object. In this work investigate the following relevant concepts and terminology, history of watermarks and the properties of a watermarking system as well as a type of watermarking and applications. We are proposing edge detection using Gabor Filters. In this work they proposed least significant bit (LSB) substitution method to encrypt the message in the watermark image file. The benefits of the LSB are its simplicity to embed the bits of the message directly into the LSB plane of cover-image and many techniques using these methods. The LSB does not result in a human perceptible difference because the amplitude of the change is little therefore the human eye the resulting stego image will look identical to the cover image and this allows high perceptual transparency of the LSB. The spatial domain technique LSB substitution it would be able to use a pseudo-random number generator to determine the pixels to be used for embedding based on a given key. They were using DCT transform watermark algorithms based on robustness. The watermarking robustness have been calculated by the Peak Signal to Noise Ratio (PSNR) and Normalized cross correlation (NC) is used to quantify by the Similarity between the real watermark and after extracting watermark.

In 2013 Bhupendra Ram et. Al. (IEEE) proposed there work related to digital image watermarking technique using discrete wavelet transform and discrete cosine transform. In this work they stated that digital watermarking has been proposed as a viable solution to the need of copyright protection and authentication of multimedia data in a networked environment, since it makes possible to identify the author, owner, distributor or authorized consumer of a document. In

this work a new watermarking technique to add a code to digital images is presented: the method operates in the frequency domain embedding a pseudo-random sequence of real numbers in a selected set of DCT coefficient and a new method for digital image watermarking which does not require the original image for watermark detection. The watermark is added in select coefficients with significant image energy in the transform domain in order to ensure non- erasability of the watermark. Advantages of the proposed method include: improved resistance to attacks on the watermark, implicit visual masking utilizing the time-frequency localization property of wavelet transform and a robust definition for the threshold which validates the watermark.. Experimental results demonstrated that this proposed technique was robust to most of the signal processing techniques and geometric distortions.

3. Conclusion:

In the virtual global nowadays, the safety of digital snap shots end up increasingly critical since the communications of virtual products over open community arise increasingly often. In this paper, we've surveyed existing paintings on image encryption. We additionally supply widespread guide line approximately cryptography. We finish that every one strategies are useful for real-time photo encryption. Techniques describes in this paper which could offer safety capabilities and an standard visible check, which is probably appropriate in some packages. So no one can get entry to photograph which transferring on open community.

In wellknown, a nicely-studied, rapid and comfortable traditional cryptosystem should be chosen, definitely the ones algorithms, which affords better safety

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