

GLCM Algorithm for Image Watermarking in Image Processing

Jyoti Juneja¹, Avani chopra²

^{1,2}*DAV Institute of Engineering & Technology Jalandhar India*

Abstract- Security of the sensitive image can be given by the scheme called watermarking. Visible and non-visible watermarking consists of two types. On the basis of non-visible watermarking the research work can be completed. Generation of watermarked image is done in the existing scheme of watermarking technique that can be applied such as DCT and DWT. For the calculation of scale factor dynamically the GLCM algorithm is applied in this study. Implementation in MATLAB is done by this proposed algorithm. In terms of several parameters the outcome of the presented scheme was compared with the existence of the scheme. In terms of all parameters the proposed scheme performed well which was analyzed.

Keywords- DWT, DCT, GLCM, Scaling factor

I. INTRODUCTION

At a particular place a process of producing input images is called an image processing. For the creation of structures between the pixels of images for crack in the edges and in order to analyze it includes metric and topological edges. From small neighboring pixel boundary the intensity of the captured is valued [1]. In image processing the pixel boundary is major important term. On the basis of knowledge and execution complete processing of image can be made by using sinkhole the view of an image can be done. According to the information provided using human cognition method the decisions are made. Calculation of the percentage of the degradation can be done by analyzing the image quality. From the required database due to the assistance of the retrieval of images, the same kind of images is of major importance. Through the background noises degradation and ruin of the captured or original is done. During the capturing of images and transmission of contents it occurs. By studying the properties of electromagnetic radiations another important layer for the perception of human face color which is next important layer for the discussion of physical look of human beings. Between the client and server the transmission lays. Representation of the processing parameter of each node of graph is there and in graphical form it also stores the data. Hard copies of the information like Photostat and printout an image processing utilizes analog techniques [2]. Using visual techniques large amount of information for an interpretation of the relevant information is used by the users. For the knowledge analysis motive of an image processing is not

confined to a particular field widely spread for a study. One of the most important tools is association for using visual techniques utilized in the image processing. For image processing the mixture personal information and collection is applied. Therefore, with the computational and graphical visions image processing is very strongly related. In order to make an assertion related to the objects digital watermarking embeds the information known as watermark into a multimedia objects for an identification of watermarked. Visible or invisible are the two types. Example: Identification and detection through authorized user is done of the invisible watermark is hidden inside the objects on the other side at the corner of the television picture the logo of television channel is exactly visible. For unauthorized copies, making authentication and detection these types of watermarks are suitable [3]. Extraction and transmission is done of watermarked images by the receiver before holding the embedded images with the data. Detection types in watermarking are of two different types. Blind watermarking is known as in, the first type the original cover of an image is not required by the detector for the detection of watermark. Non-blind watermark is the second type where the original cover of the image is required by the detector for the identification of watermark. It needs protection from such threats there are various types of threats of which the degradation of watermarking can be done. Introduction of new techniques to ruin the watermarking process the researchers have developed new techniques for watermarking.

Therefore, Robust, effective and impermeable is required for the algorithm. Pixels are the digital images comprising of discrete picture elements and donated by DN are associated with a digital number. With the scene the digital number depicts the average relative area. The manipulation of digital images through computers is the collection of methods is called digital image processing [4]. Natural tendency of storing experiential knowledge and makes it available for all is the ANN which is hugely distributed process. Non-linear high dimensionality noisy, complex, imprecise, imperfect or error prone sensor data, and lack of a clearly stated mathematical [5] solution or algorithm are correct solutions provided by the ANN to the problems. Using the information model of the system or subject can be built as ANN is most beneficial. In the surroundings Textual characteristics are categorized by the spatial distribution of the gray levels. For the classification of the texture there are various textures and

both pixel co-ordinates and pixel values can show the characteristics. One of the most famous techniques utilized for the feature extraction is the gray level co-occurrence matrix. To one of the set of known images the main aim is to assign an unknown sample image of the texture. It can be scalar numbers, discrete histograms or empirical distributions. Correlation with the desired output and some characterized textual features as spatial features contrast, roughness, orientation, etc. are in this. Fourteen textual features are present out of the total. Angular second moment (ASM), contrast, correlation, and variance are its four features. One of the well-established statistical devices of the extraction of second order texture data is Gray Level Co-occurrence Matrix Feature [6]. The number of different gray levels or values of pixels in that image and the number of rows are equal to each other. Within the investigation area the frequency of one gray level that appears in particular spatial linear relationship with other gray level is explained. The number of runs with pixels of gray level I and run length j for a given direction is known as the Gray Level Run Length Matrix Features. The sample of image fragment is generated. Gray level run is the cluster of consecutive pixels with the same gray level.

II. LITERATURE REVIEW

ArezouSoltaniPanah et.al (2018) proposed [7] non-media applications in the latest development and emerged highly from so many years. Restriction was not there to multimedia or any other persistent behavior by using this model. The discovery of knowledge based methods and the format of data mining is affected by the complex format of the information. Performance of the digital watermarking methods are done in the manner that in data mining process there should not be any kind of interference. Hence, the problem of ownership of network of collaboration with cloud computing are resolved and suitable watermarking is done by conclusion made by the researchers.

Wen Zhang et.al (2018) presented [8] such technology which is hard to copy, easy to detect, less expensive and less polluted and the research program for the applying of watermarking technology. During the process of watermarking the division of three stages such as generation of the watermarks, print, scans extracts and identifies watermarks described by the author. Prevention of developing any kind of relationship between the watermarking algorithm and printing process parameters and the digital watermarking methods made the research fragile while implementing on the digital images. There is an involvement of color space transformation in the process of printing and scanning.

David-Octavio Muñoz-Ramirez et.al (2018) proposed [9] for the representation of color watermarks a strong watermarking

framework. To make sure about the strongest of the watermark the coded network is converted into mid frequency coefficients of DCT. In terms of Peak-Signal-to Noise Ratio (PSNR) comparison of the most common attacks efficiency such as JPEG compression, impulsive and Gaussian noises, scaling etc. with the proposed technique was done. High imperceptibility with average values of PSNR and SSIM of 40 db and 0.994 are achieved that the conclusion drawn from the results. In comparison with the JPEG compression, impulsive and Gaussian noise, up to certain limit even the watermark could be recovered there is high robust.

AnirbanPatra et.al (2018) proposed [10] using alpha blending presented a new technique for an invisible watermarking of images. Displaying bitmap and alpha bitmap concludes transparent and semitransparent pixels are the motive of alpha blending. Using distinct values of alpha in alpha blending, watermarking is worked in gray scale as on color image and gray scale image the researchers have worked on color image. On each plane of the image the performance of the process is done. Hence the result is the original images are invisible and the image has information of the color image and gray scale image. Therefore, after its post process work, this technique can be utilized as image stenography was the conclusion made by the researcher

Irshad Ahmad Ansari et.al (2018) proposed [11] the title "Block-based SVD image watermarking in spatial and transform domains" presented an image watermarking algorithm in the paper. Protection of the digital images from unauthorized users is presented in this technique. Strong image watermarking technique is used for an identification of the original power of host image. Faults are studied in this approach as the robust watermarking scheme is recognized faulty by the researchers. On the basis of SVD approach there is an improvement in robustness and imperceptibility. Due to the presence of false position there is an improvement in the strongest and imperceptibility when block based SVD approach is used. Hence, due to the security flaw (positive error is false) in their scheme remains untouched has no meaning in the improvement.

Alexander S. Komaroveta.l (2018) proposed [12] Ice and open water from RADARSAT-2 is detected presented by the author an adaptive probability thresh holding technique. When 0.95 threshold static probabilities were applied in a ways of misclassified ice and water samples in analyzed manner was identified through the threshold probability which should be modified. On the basis of the study the researcher at last finalize that the actual probability threshold can be increased, identified and improved, when the ice and water detection algorithm formulation.

III. RESEARCH METHODOLOGY

An efficient technique known as watermarking is applied for providing security to the image data. The two broader classifications of various watermarking techniques presented are Blind and semi-blind watermarking techniques. For the introduction of semi-blind watermarked image in the base paper the OS-ELM approach that is basically a machine learning approach is used. The four levels DWT technique is applied for the extraction of features from images. The training image that is analyzed using DWT algorithm is given as input such that the final training sets can be created for the introduction of semi-blind watermarks. Less complex proposed technique replaces DWT with GLCM algorithm. The training sets and blind watermarks are created by providing simple mechanism. The alpha is the factor which can select the bit on which you want to embed the image to generate watermark image. In the existing system, the bit value is given statically. In the proposed methodology, the GLCM algorithm will calculate the textural features and select the output of GLCM algorithm will be the final alpha value.

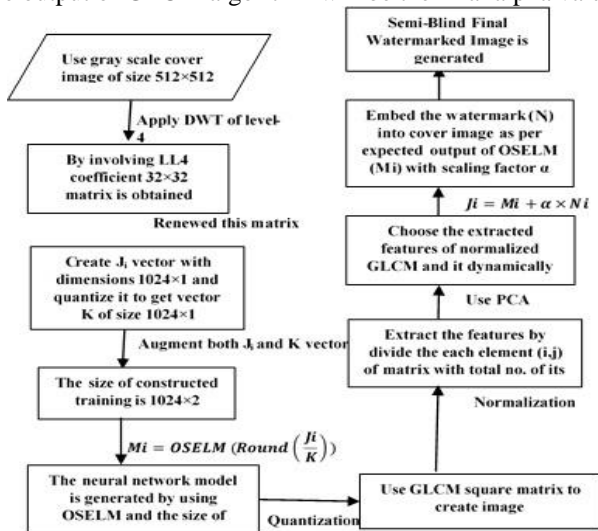


Fig.2: Proposed Flowchart for insertion

applied in the third phase, which is utilized for the extraction of essential features from an image. Various techniques have been utilized so far for the extraction of features such as Linear Discriminate Analysis (LDA), Independent Component Analysis and PCA. Among all these methods, PCA algorithm is widely used method for the image formation, for example, data, as the identification of similarities and differences between them can be done effectively. By maintaining a strategic distance from redundant information, dimensions of an image can be reduced without suffering much loss which is another advantage of PCA algorithm. With the help of statistics and mathematical techniques such as Eigen esteems, Eigen vectors principal component analysis can be easily understand. In the field of image recognition and compression, various applications have been provided by this valuable statistical PCA method. For the mapping of high dimensional space to low dimensional space, it utilizes linear Transformations which are a mathematical methodology of the Principal Component Analysis (PCA). The Eigen vectors of the covariance matrix controls the low dimensional space

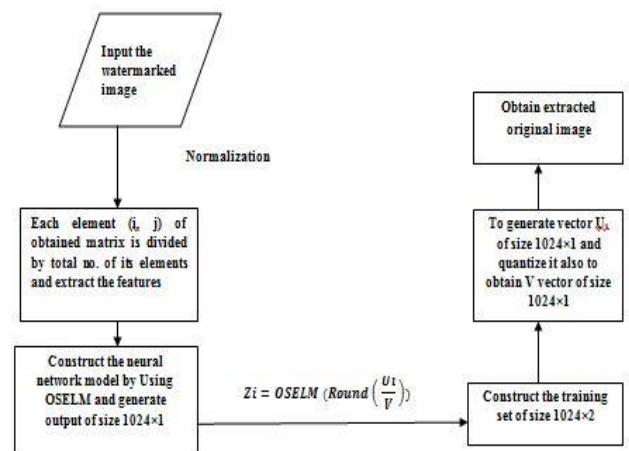


Fig.3: Proposed Flowchart for extraction

The proposed algorithm is as follows:

1. Input image: in the last phase various sensitive and non-sensitive images are extracted as input. It is possible within the non-sensitive image to hide the sensitive image for increasing the security o the information. Using the non-sensitive image the keys that encrypt the watermarking images are organized.
2. Textual Feature Analysis: for the extraction of the sensitive image are the textual features which are the GLCM algorithm applied in the secondary phase. Correlation, homogeneity is the several textual features by applying GLCM algorithm can be extracted.The PCA algorithm is

IV. EXPERIMENTAL RESULTS

In MATLAB implementation of the proposed and existing algorithms are done. Taking two original and watermark images the dataset was collected. Defining the scale of the factor dynamically the technique of GLCM was applied.In this paper, the parameters which are measure are MSSIM, BER and SSIM

| Image | DWT Algorithm | GLCM and PCA Algorithm |
|-----------|---------------|------------------------|
| Leena | 0.10 | 0.07 |
| Taj | 0.12 | 0.12 |
| Cat | 0.11 | 0.11 |
| Bear | 0.11 | 0.11 |
| Mona Lisa | 0.10 | 0.10 |

Table 1: BER Comparison

| Image | DWT Algorithm | GLCM and PCA Algorithm |
|-----------|---------------|------------------------|
| Leena | 160.08 | 10.95 |
| Taj | 35.23 | 24.77 |
| Cat | 56.06 | 3.94 |
| Bear | 61.04 | 1.04 |
| Mona Lisa | 71.91 | 11.91 |

Fig.4: MSSIM Comparison

| Image | DWT Algorithm | GLCM and PCA Algorithm |
|-----------|---------------|------------------------|
| Leena | 0.8 | 0.76 |
| Taj | 0.92 | 0.56 |
| Cat | 0.56 | 0.45 |
| Bear | 0.45 | 0.32 |
| Mona Lisa | 0.78 | 0.21 |

Fig.5: NCCComparison

As shown in figure 4, the BER value of the proposed and existing algorithms are compared. The existing algorithm is DWT and proposed algorithms are GLCM, PCA. It is analyzed that proposed algorithm has less average BER as compared to existing algorithm

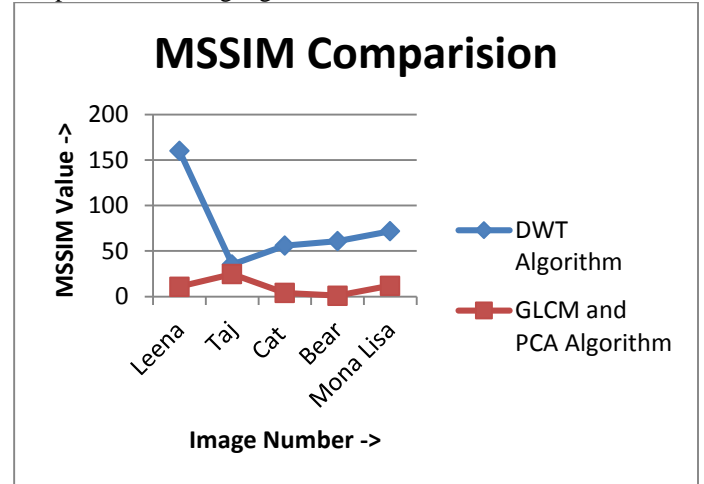


Fig.7: MSSIM Comparisons

As shown in figure 5, the MSSIM value of proposed algorithm is compared with existing algorithm. It is analyzed that MSSIM value of proposed algorithm is less as compared to existing algorithm

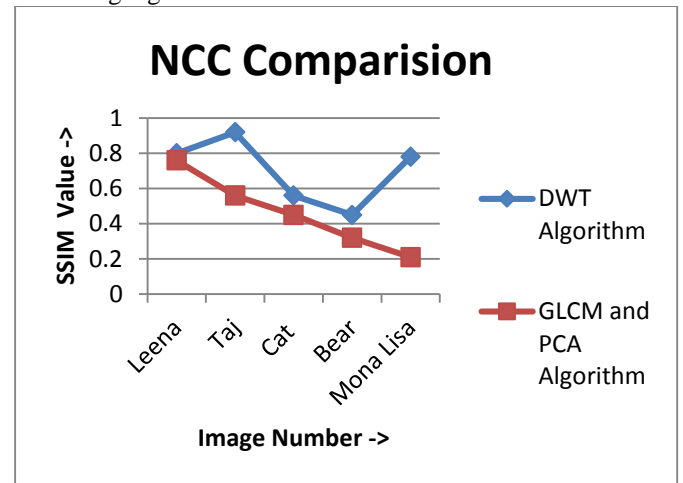


Fig.8: NCC Comparisons

As shown in figure 6, the NCC value of proposed algorithm is compared with existing algorithm. It is analyzed that NCC value of proposed algorithm is less as compared to existing algorithm

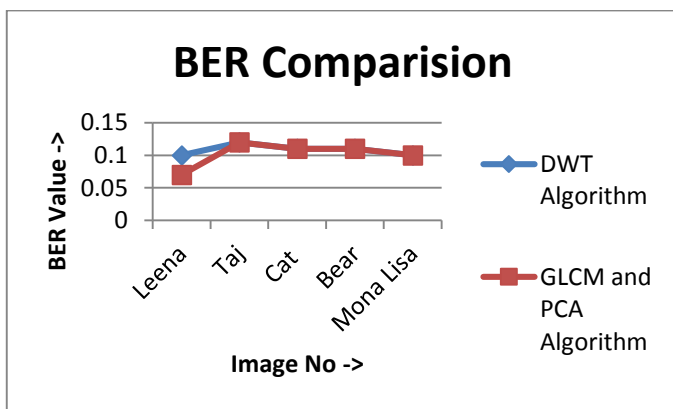


Fig.6: BER Comparisons

V. CONCLUSION

Within the digital file such as images, videos and audios are the pattern of bits inserted called digital watermark. Through messages the data of the file will be carried out. Public and private are the two categories that can be used in the digital watermarking. In order for the identification of licensed there is a requirement of the proper data. In form of images it has capacity to hide all stored sensitive data as concluded by the watermarking technique in this study. By using watermarking techniques GLCM and PCA algorithms are used for the improvement of the capability of the work of neural networks. Extraction from the actual image GLCM is utilized for selecting the features and extracted images are selected by PCA. Using scaling factor used in the implementation the output of the PCA algorithm is explained. The proposed algorithms perform well in a way of BER, MSSIM and NCC values that has been concluded by performing simulations.

VI. REFERENCES

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