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A SURVEY ON DIGITAL IMAGE WATERMARKING DIFFERENT FEATURES AND TECHNIQUES

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Abstract: As the internet users are increasing day by day, so privacy of their data is highly required for different kind of information. One of important digital data is image as it maintains proprietorship of owner. So digital watermarking came in existence, for providing security of the watermark. This paper provides brief survey of different techniques of watermarking with features required. Paper has also described various attacks of watermark including geometrical and spatial category.

Index Terms— Color Format, *Digital Watermarking*, *Frequency domain*, *LSB*.

I INTRODUCTION

As digital world is growing drastically people are moving towards different services provide by it. Some of these services are social network, online market. But this technology gives rise to new problem of piracy or in other words proprietary get easily stolen. So to overcome these different techniques are used for preserving the proprietary of the owner. One of such digital approach is watermarking which is a subsection of hiding information that is used to put some information in the original image which will specify the originality of the digital data like photographs, digital music, or digital video [1, 2, 4]. One of the basic causes of the copyright issue is the ease available of the internet and some software that can modify the content as per the user requirement.

Watermark is broadly divide into two categories first is visible watermarking and other is invisible watermarking. Here watermark information seen by naked eyes is considered as visible watermarking as shown in fig. 1. While in case of invisible watermark data is not visible by naked eyes as shown in fig. 2, although watermark data is present in the original data. Data may be of any digital information like text file, image, video file, etc.



Fig. 1 Visible watermark in image data.



Fig. 2 Visible watermark in image data.

First is embedding Algorithm here the watermark is embedded on the original content which may be image, video, etc. and watermark is any data or image, sometime key is required for embedding.

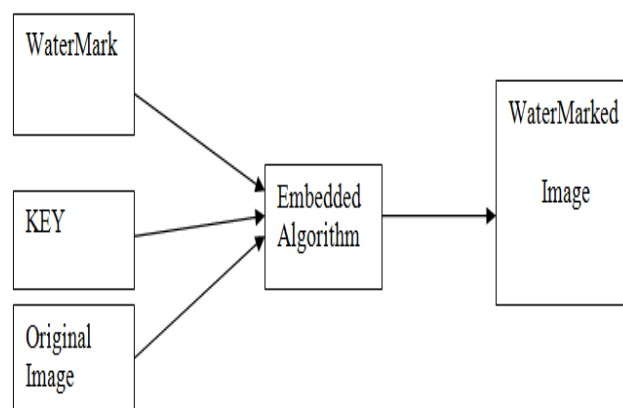


Fig.1. Embedding of watermark

Other step is the Extraction of watermark from the received data, now if the receiver extracts water mark and that is same as the original one then received data is authentic otherwise it is unauthentic.

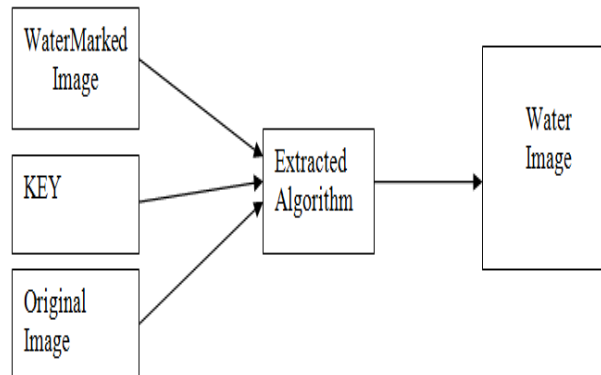


Fig.2 Extraction process.

II. Different Techniques

In [1] privacy of image and watermark is concern by inclusion of third party where a Compressive sensing matrix is developed. In this matrix some pixel positions are selected. Now selected pixels are analyzed for watermark information carrier. If fit then embedded otherwise reject. Now at extraction side image is evaluate under a calculation where it simply accept or reject image base on the obtain values. Here work has not taken measures for attacks.

In [7], reconstruction of image is done by inverse half toning with dithered binary version. With the modification in image after embedding watermark act as noise, so restoration of image is not possible.

In [4] DCT technique is use where scatter image blocks is implemented with random Gaussian matrix. Here separate reference information for single block. So whole bit stream is scattered on image. In reverse process of content reconstruction coefficient with in each group is recovered.

In [11] fifth order MSB is used for information collection. Here two different approach is applied first is constant fidelity and other is flexible rotation. With the new approach of pyramidal decomposition of image blocks is done. At last reconstruction of information is done from different scattered binary matrices.

In [6] different fidelity level is use for image reconstruction, One drawback in this paper is that image quality of image get increase by controlling reconstruction of image individually.

In [8] information spreading is done by LT code method on image. Here image fragmentation quality reduces the image reconstruction techniques.

III. Different Features

As Image is collection or sequence of pixel and each pixel is treat as single value which is a kind of cell in a matrices. In order to identify an object in that image some features need to be maintained as different object have different feature to identify them which are explain as follows:

Color feature: Image is a matrix of light intensity values; these intensity values represent different kind of color. So to identify an object colure is an important feature, one important property of this feature is low computation cost.

Different Image files available in different color formats like images have different colure format ranging from RGB which stand for red, green, and blue. This is a three dimensional representation of a single image in which two dimensional matrix represent single color and collection of those matrix tends to third dimension. In order to make intensity calculation for each pixel gray format is use, which is a two dimension values range from 0 to 255. In case

of binary format which is a black and white color matrix whose values are only 0 or 1. With the help of this color feature face has been detected efficiently in [8].

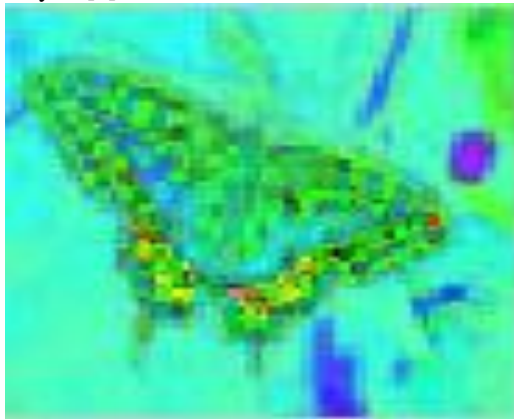


Fig. 3 Represent the HSV (Hue Saturation value) format of an image.

Edge Feature: As image is a collection of intensity values, and with the sudden change in the values of an image one important feature arises as the Edge as shown in figure 4. This feature is use for different type of image object detection such as building on a scene, roads, etc. [5]. There are many algorithm has been developed to effectively point out all the images of the image or frames which are Sobel, perwitt, canny, etc. out of these algorithms canny edge detection is one of the best algorithm to find all possible boundaries of an images.



Fig. 4 Represent Edge feature of an image.

Texture Feature: Texture is a degree of intensity difference of a surface which enumerates properties such as regularity and smoothness [1]. Compared to color space model, texture requires a processing step. The texture features on the basis of color are less sensitive to illumination changes as same as to edge features.

Corner Feature: In order to stabilize the video frames in case of moving camera it require the difference between the two frames which are point out by the corner feature in the image or frame. So by finding the corner position of the two frames one can detect resize the window in original view. This feature is also use to find the angles as well as the distance between the object of the two different frames. As they represent point in the image so it is use to track the target object.



Fig 5 Represent the corner feature of an image with green point.

IV. Different Attacks

Different kind of attacks are done on the digital watermarked video, the main effect of these attack is that extraction of watermark is quite difficult or not possible by the algorithm if proper precaution is not taken in prior steps of watermark embedding.

Noise Attack: As watermarked video is send in the channel for communication then some kind of noise normally generate by which exact water is not extract from the received data [6]. Different kinds of noise are: Salt &Pepper Noise, Gaussian Noise Attack, Speckle Noise Attack, etc.

Filter Attack: Here video is passing through different filter, which is generally done after receiving signal from the network. So this attack is normally happen and for this the embedding as well as extraction algorithm of the video watermarking should be robust, so that effective method is developed. Some filtering attacks are: average filter, median filter, sharpen filter and motion filter [6, 7].

Compression Attack: Here video is pass through different compression techniques, which is generally done after receiving signal from the network [7]. So this attack is normally happen and for this the embedding as well as extraction algorithm of the video watermarking should be robust, so that effective method is developed. Some filtering attacks are: MPEG compression, Mp4 compression, etc.

Detection-disabling attacks

Sometime watermarking algorithm are based on the correlation and to make detection of the watermark so by changing this correlation make it impossible to fetch watermark from the received data. Correlation based detection and extraction fail when rotation or scaling is performed on the watermarked image because the embedded watermark and the locally generated version do not share the same spatial pattern anymore [3, 6]. Mostly, they make some geometric distortion like zooming, shift in temporal direction, rotation, cropping or pixel permutation, removal or insertion.

Ambiguity attacks

Here by introducing different watermark to confuse the detector by producing fake watermarked data to discredit the authority of the watermark by embedding several additional watermarks.

V. CONCLUSION

In this paper a deep study of different watermarking techniques is explain with their requirement area. In those techniques different features of image is utilize for developing a robust algorithm. Paper has given brief explanation of the image features such as color, texture, etc. Different attacks are also explained for the awareness of the embedding and extraction algorithm. So a robust and fast algorithm is the requirement of the field which provide invisible watermarking algorithm with all requirements.

REFERENCES

- [1] Hanieh khalilian, student member, IEEE, and ivan v. Bajic video “watermarking with empirical pca-based decoding” iee transactions on image processing, vol. 22, no. 12, December 2013.
- [2] Pawel korus and andrzej dziech efficient method for content reconstruction with self-embedding iee transactions on image processing, vol. 22, no. 3, march 2013
- [3] tamanna tabassum, s.m. mohidul islam “a digital image watermarking technique based on identical frame extraction in 3-level dwt” vol. 13, no. 7, pp. 560 –576, July 2003.
- [4] X. Zhang, z. Qian, y. Ren, and g. Feng, “watermarking with flexible self-recovery quality based on compressive sensing and compositive reconstruction,” IEEE trans. Inf. Forens. Security, vol. 6, no. 4, pp. 1223–1232, Dec. 2011.
- [5] X. Zhang and s. Wang, “fragile watermarking with error free restoration capability,” IEEE trans. Multimedia, vol. 10, no. 8, pp. 1490–1499, Dec. 2008.
- [6] P. Korus and a. Dziech, “a novel approach to adaptive image authentication,” in proc. IEEE int. Conf. Image process. Sep. 2011, pp. 2765–2768.
- [7] A. Cheddad, j. Condell, k. Curran, and p. Mc kevirt, “a secure and improved self-embedding algorithm to combat digital document forgery,” signal process., vol. 89, pp. 2324–2332, Dec. 2009.
- [8] M. Luby, “It codes,” in proc. 43rd symp. Found. Computer. Sci., Washington, dc, 2002, pp. 271–280.
- [9] z. Qian and g. Feng, “inpainting assisted self-recovery with decreased embedding data,” IEEE signal process. Lett., vol. 17, no. 11, pp. 929–932, Nov. 2010.
- [10] Z. Qian, G. Feng, X. Zhang, and s. Wang, “image self-embedding with high-quality restoration capability,” digit. Signal process. vol. 21, no. 2, pp. 278–286, mar. 2011.
- [11] X. Zhang, S. Wang, z. Qian, and g. Feng, “reference sharing mechanism for watermark self-embedding,” iee transactions. Image process., vol. 20, no. 2, pp. 485–495, Feb. 2011.

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