A General Framework for Reversible Data Hiding: A Review

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ABSTRACT
Reversible data hiding use the embedding of messages in a host image without any loss of host content, which is proposed for image authentication that if the watermarked image is deemed authentic, we can revert it to the exact copy of the original image before the embedding occurred. An Histogram shifting technique used by the Reversible Data Hiding algorithm. By using this algorithm less distortion and more capacity can be achieved. With the help of shifting and embedding function, Reversible Data Hiding algorithm can be designed in the proposed framework. The overflow and underflow problems into host image prevented by Histogram shifting technique. So an improved histogram-based reversible data hiding scheme on prediction and sorting based is proposed.

Keywords— Embedding performance, histogram shifting (HS), Reversible data hiding (RDH)

1. INTRODUCTION
In the recent years, the development in multimedia technologies and internet has provided the consumers to access to multimedia data. The accessing of multimedia data by the consumers are increasing rapidly Hence the data may be tampered or attacked during transmission. So to protect the data from data losing is very much important. To protect the data loss the possible technique is the data hiding technique. Data hiding refers to hide data within a digital media. Hiding process is done in such a way that modification of pixel values should be undetectable to the viewers. Image where the hiding is done is known as the cover media. Image after data hiding is known as watermarked image. In hiding technique the original image is distorted completely and then recovered back at the receiver end .The data hiding takes place in various ways in different applications. In data hiding process, if it is essential to introduce the data hiding in such a way that it is reversible and quality degradation after embedding is lowered is called as reversible data hiding process. By this technique data will be hided completely which can be access by the authorized persons only.

For example, even small changes are not acceptable in medical images due to a potential risk of a physician giving a wrong explanation of the image. Hence, reversible data hiding techniques give a solution to the problem of how to embossed a large message in digital images in a lossless manner so that the image can be completely restored to its original state before the embedding occurred.

2. RELATED WORK
Ya-Fen Chang and Wei-Liang Tai present an efficient extension of histogram modification by considering the difference between adjacent pixels instead of simple pixel value. The distribution of pixel difference has a prominent
maximum since neighbor pixels are strongly correlated. Further, we use prediction and sorting to enhance the correlation of neighbor pixels in order to improve the embedding capacity. In addition, one common problem of virtually histogram-based techniques is that they have to transmit pairs of peak and minimum points to recipients. To solve this problem, we introduce the two-state strategy to embed the overhead information. We also use a histogram shifting technique to prevent overflow and underflow. The proposed scheme provides high capacities at small and invertible distortion. It can be easily applied for compressed image formats, such as JPEG, MPEG, and JPEG2000, since the distribution of frequency coefficients is almost Laplacian distributed due to quantization and typical characteristics of images. Thus, the proposed scheme is able to be easily performed in the transform domain to improve the hiding ability. [1]

Authors proposes a new algorithm for data hiding in which histogram modification technique is done by considering the pixel difference rather than a single pixel. One of the main drawbacks of all the histogram modification techniques is the issue of communicating the multiple peak and zero points. This drawback is overcome in this work using the binary tree structure. Number of peak points is determined by the tree level L. Number of bits that can be embedded is determined by the number of pixels associated with the peak points. Also, in this work data embedding is performed after dividing the image into blocks. This helps to distribute the message bits along the whole image and also improves the hiding capacity. [2] In this paper, by revisiting existing algorithms, a general framework to construct HS-based RDH is proposed. According to our framework, to obtain a RDH algorithm, one just needs to define the shifting and embedding functions. This work will facilitate the design of RDH. Furthermore, by incorporating our framework with the PEE and pixel selection techniques, two novel RDH algorithms are also introduced. These algorithms can achieve a better performance compared with the state-of-the-art works. So the proposed framework has a potential to provide excellent RDH algorithms. However, thought the proposed framework may design different RDH algorithms, it has also limitations.[3] Some HS-based algorithms such as the one based on adaptive embedding [4] and the location-map-free methods [5], [6] cannot be derived by the proposed framework. In future, to push forward the capacity-distortion behavior of RDH, more meaningful shifting and embedding functions are expected. Moreover, since the typical two-dimensional histogram based methods [7][8] are special cases of the proposed framework, a direct question is, based on two-dimensional histogram (i.e., by taking $n = 2$ in our framework), how to determine the optimized shifting and embedding functions such that the embedding distortion is minimized for a given EC.

### 3. PROPOSED WORK

In most hiding techniques, the host image is distorted permanently and thus it cannot be recovered back completely from the marked content. Most of the data hiding techniques are not reversible completely the proposed method is the data hiding technique using histogram shifting. In this the whole image is converted into the pixels and then process will be done. Technique based on pixel value difference expansion having more redundancy of pixel values in the images. Arithmetic operations are performed on the pixel pair’s in to explore the space for data embedding.

The proposed technique achieves the higher embedding capacity and less distortion in the image. In this data bit will decided by computing the difference between two pixels (pixel pair).The location map will embedded along with the data bits in the image which will help to restored the original image. Histogram based data hiding technique embeds the data in the cover media by shifting the histogram of the image. Histogram technique finds peak or zero points in the Histogram technique finds peak or zero points in the histogram and data embedding is done by shifting these peak and zero points. This technique yields higher data hiding capacity with low distortion.

A block diagram of the general reversible data hiding procedure is given in figure. The sender embeds the message $M$ to a host image $H$ in a lossless manner so that after the message is extracted from the watermarked image, the exact copy of the original image is obtained.
Note that even though the distortion introduced by hiding is completely reversible, we are most concerned to minimize the amount of the embedding distortion. From the application point of view, reversible data hiding technique can be used as a fragile invertible authentication watermarking that embeds an authentication code in a digital image in a reversible way. Only when the embedded authentication code matches the extracted message, the image is deemed authentic. An authenticated party could completely remove the embedding distortion and restore the image to its primitive form. By embedding an authentication code that has a close relationship to the host image, reversible data hiding provides a self-authentication scheme without any extra support.

4. ADVANTAGES

From all the reference paper, most recent work done in the field of reversible data hiding is discussed. The proposed work is reversible data hiding using histogram shifting. Histogram shifting is most effective technique for the data hiding. By using this technique the data will be hided completely with the less distortion in the resulted image. By the proposed framework the reversible data hiding algorithm is designed by which the data will be hided completely and histogram shifting technique is resolved completely.

5. CONCLUSION

A survey on various reversible data hiding technique is performed. Although a data hider does not know the original content, he can embed the secret data into the encrypted image. This paper proposes a new algorithm for data hiding in which histogram shifting is done. Also in this work data embedding is performed after dividing the image into blocks.

This helps to distribute the message bits along the whole image and also improves the hiding capacity.

REFERENCES

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