International Journal of Engineering &Technology, 7 (1.7) (2018) 68-70

International Journal of Engineering & Technology

Website: www.sciencepubco.com/index.php/IJET

Research paper

A flexible data hiding scheme using differential dual mapping

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Abstract

Steganography is the approach with invisible communication. In our proposed system maximum of 3000 characters can be embedded in the image which is chosen from a video and a different type of frame work for hiding and extracting are provided at both nodes. As an extension of this work, the same algorithm can be implemented in three channels of the colour image. A lossless data hiding technique based on the differential pair mapping algorithm by embedding data bits in an image is proposed, then a generated image is embedded with large amount of data in the form of bits in the mean-removed via the proposed algorithm. Experimental outputs shows that stego-image in our method has high capacity and security with certain robustness and the PSNR value is higher than the other techniques.

Keywords: *PSNR; Steganography.*

1. Introduction

Data security is basic for secret information exchange .For the transmission of private data, one of the ways utilized is steganography. It contains two principle branches: advanced watermarking and steganography. The advanced watermarking is for the most part utilized for copyright assurance of electronic items and the other is a method for secretive correspondence. Correspondence through surely understood channels has extraordinarily diminished the danger of information being spilled by keeping away from it [1]. Concealing information in a picture of the organization excursion is less suspicious than imparting a scrambled document. Information stowing away is a strategy that installs information into a transporter for passing on mystery messages secretly. Information covering up has expanded broad consideration as of late. Computerized pictures are generally transmitted over the Internet; in this way, filling in as a bearer for undercover correspondence. Cover pictures are pictures in which information are inserted and pictures with information installed are named as stegno pictures. In the wake of installing, pixels of cover pictures will be changed and along these lines mutilation may happen [4]. The contortion caused by information inserting is known as the installing mutilation. A decent information concealing technique must be fit for evading visual and measurable location while giving movable payload. This paper proposes a reversible information concealing strategy utilizing differential match mapping procedure.

1.1. Differential dual mapping

A straightforward lossless information concealing strategy in view of the differential dual mapping calculation by implanting bits in picture is proposed. In this space, every pixel in a host picture is first subtracted from the mean estimation of the picture framework. Consequently, a picture can be produced by implanting a lot of bits (or the essential message) in the mean-evacuated pieces by means of the proposed calculation.

2. Related work

2.1. A changeable watermark using the difference expansion of a common integer transform

A reversible watermarking calculation with high data concealing limit has been utilized for shading pictures. This calculation permits the watermarking procedure to be turned around, that reestablishes the first picture. This calculation conceals various bits in the distinction extension of vectors of coterminous pixels. The required reversible whole number change and the essential conditions for evading undercurrent and flood are determined for any vector of subjective length [1]. Additionally, the potential payload measure which can be inserted into a host picture is appeared, and an input framework for controlling this size is produced. Likewise, to grow the measure of information that can be covered into a picture, the inserting calculation can be connected recursively crosswise over to the shading segments [6].Recreation comes about utilizing spatial triplets, cross-shading triplets, spatial and cross-shading quads are given and looked at the available reversible watermarking calculations. These result demonstrate that the spatial, quad-based calculation permits to shroud the biggest payload at the most astounding sign to-clamor proportion.

2.2. A lossless data embedding using general statistical measure histogram

Histogram-based lossless data embedding (LDE) strategy has been acknowledged as a viable and effective path for the copyright fortress of sight and sound. As of late, a LDE technique utilizing the factual sum histogram has accomplished great execution, which makes utilization of the likeness of the number juggling normal of arithmetic average of difference histogram (AADH) to trim the assorted variety of pictures and certification the steady execution of LDE. Be that as it may, this strategy is firmly reliant on a few capacities, which constrains its applications practically

speaking. Likewise, the span of the pictures with the level AADH, e.g., surface pictures, is somewhat less [2]. Consequently, a novel system for LDE by including the ideals from the generalized statistical quantity histogram (GSQH) and the histogram-based inserting strategies has been produced.

2.3. Reversible data hiding scheme based on maximum histogram gap

In this paper reversible information concealing plan in light of moving the histogram of host pictures is reachable. This technique tries to utilize most extreme accessible limit of information implanting by isolating the picture into non-covering squares. Applying histogram moving to each square required that additional data to be spared as overhead information for each piece [3]. This extra data (overhead data) is utilized to take out payload and recoup the square to the first state. A system to dispense with the requirement for this additional data is displayed in this paper. This technique makes utilization of the most extreme hole that exists between histogram canisters to discover the estimation of pixels that were utilized for demonstrates that while this strategy had the most astounding installing limit than the past histogram strategy and their enhanced plans, it kept up the nature of watermark picture at a worthy level.

3. Proposed system

The motivation behind our paper is to build the inserting limit and to give a verified information exchange. Conveying touchy information on unsecured systems conveys a lot of hazard. Anybody with malevolent aims and the correct information can without much of a stretch hack into your system and catch the messages. On the off chance that secret reports containing monetary data, passwords, or other imperative information get into the wrong hands, there can be a noteworthy security issue. So as to protect yourself, you can encode your information with a key and send the way to the proposed beneficiary. Be that as it may, some propelled programmers can even break some abnormal state encryption in the event that they find the record [6]. Another strategy to send your information safely is by utilizing a Steganography system that includes mixing your information inside a picture without changing the picture itself. Steg is one such instrument that plays out the activity perfectly. Along these lines, regardless of whether your document is blocked by anybody, it will be a typical picture record according to others, and there will be no visual sign of the encoded information. In our proposed framework, input is a video. The video is changed over into outlines .The cover picture in which information must be concealed is browsed those casings. The information is implanted in a shading pictures. The shading input pictures is part into three scales to be specific the red segment ,green segment and the blue segment .Data is installed in each of these three segments therefore the picture can hold a high limit of characters in it.

3.1. Differential dual mapping

Differential Dual Mapping is created on the distinction of pixel match esteems in a picture. Every pixel esteem is displayed in a setting based approach utilizing Gradient Edge Detection Predictor. The proposed approach utilizes run length coding to pack and decompress the area guide of the predetermined picture which shows area for information installing [4]. The lossless address age and address recuperation plot is proficient utilizing run length coding. Every pixel in a host picture is first subtracted from the mean estimation of the picture framework. In this way, a picture can be produced by inserting a lot of bits (or the essential message) in the mean-evacuated pieces by means of the proposed calculation.

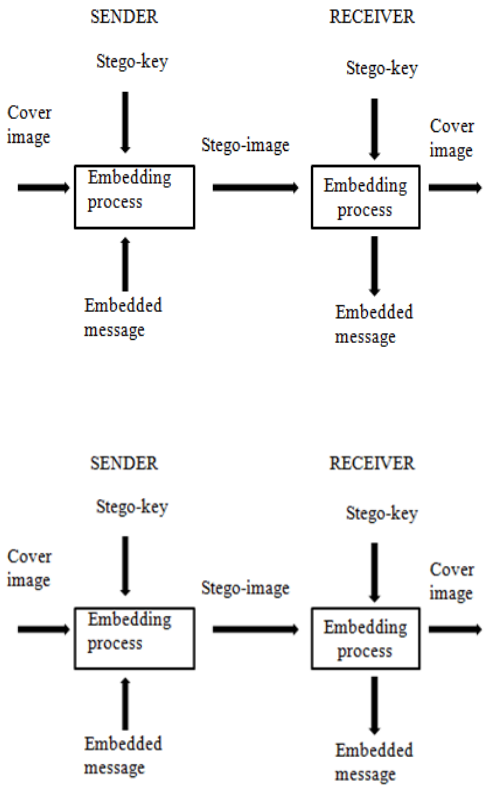

Fig. 1: Simple Block Diagram of Steganography.

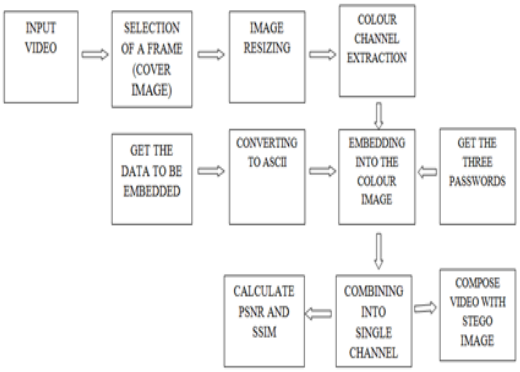

Fig. 2: Block Diagram of Data Hiding.

3.2. Embedding

The following steps are involved in embedding is

- The input video is converted into frames.
- The cover image is chosen from those frames.
- The cover image is resized to a standard image size.
- The cover image is split into three components namely the red, blue, green component.
- The data that has to be hidden in the cover image is got from the user.
- The data is converted to ASCII code.
- The data in ASCII code form is embedded into the cover image using differential pair mapping algorithm.
- Data is embedded into the three components using three different passwords.
- The three components are merged to get a single color image called the stego-image.

3.3. Recovering

- The stego-image is split into three components.

- Data is extracted with appropriate password.
- The three components are merged to get the cover image.
- PSNR (Peak Signal to Noise Ratio) and SSIM(Structural Similarity) are calculated for performance evaluation.

4. Results

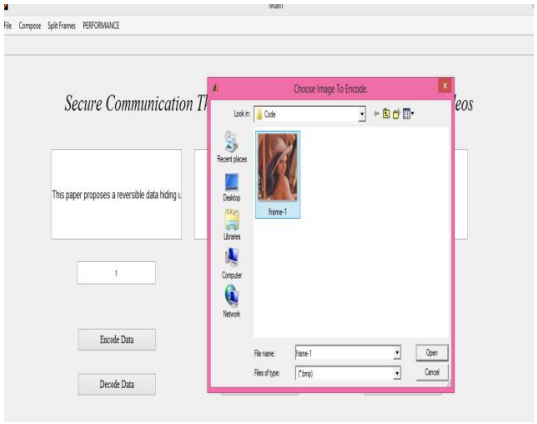

Fig. 3: Selection of Frame.

Fig. 4: Cover Image.

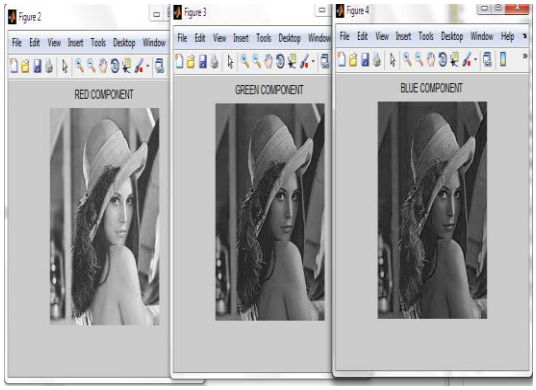

Fig. 5: Color Channel Extraction.

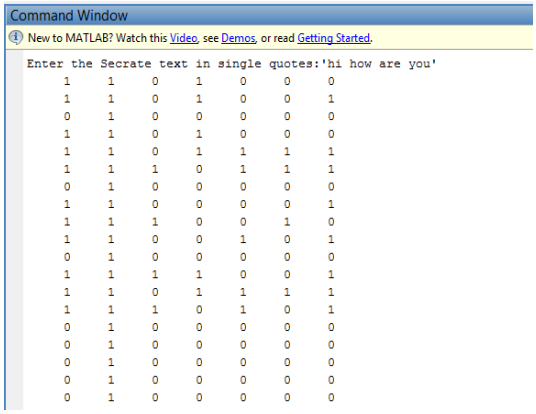

Fig. 6: Data Converted to ASCII.

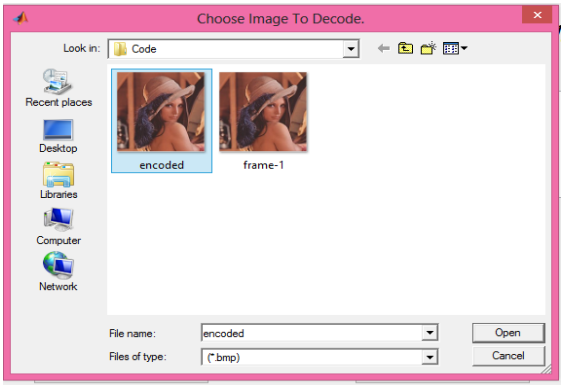

Fig. 7: Encoded Image.

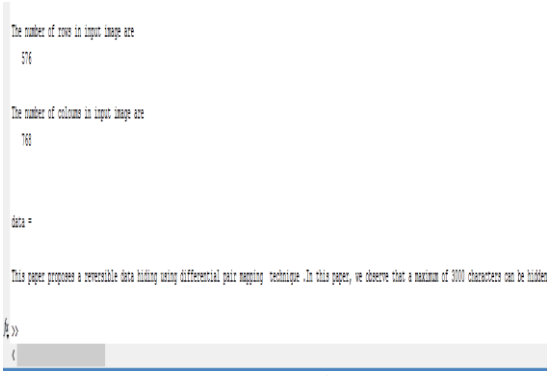

Fig. 8: Extracted Data from Image.

5. Conclusion

This paper proposes a mutable information concealing utilizing differential dual mapping system. We watch that a greatest of 3000 characters can be covered up in one shading picture by part them into three segments and they can be recovered. Three distinct passwords are utilized for implanting information into the three unique parts. In this way the security is expanded by three times the ordinary security .Another favourable position of this proposed framework is that the two characters and images can be inserted in the cover picture. This approach brings about high caliber of the stego-picture having high PSNR esteems contrasted with different strategies.

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