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SECURE DATA TRANSMISSION USING IMAGE INTERPRETATION

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Abstract: Image interpretations the art of hiding the fact that communication is taking place, by hiding information in other information. Many different carrier file formats can be used, but digital images are the most popular because of their frequency on the Internet. In the proposed system, the novel channel-dependent payload partition strategy based on amplifying channel modification probabilities is proposed, so as to adaptively assign the embedding capacity among RGB channels. This incorporates the content in the selected image pixels which is used to hold the encrypted message. The delivery system for encrypting messages into ciphertext using a shared key then sends to the receiver device using the server as intermediate devices. Here the multi level security is applied to secure the communication channel. In this first level security layer is created using the end to end encryption system. The next levels are created between sender and server as well as server as receiver device. Additionally, the data security is applied in the server while holding the data when the receiver device connectivity is unavailable.

Keywords: communication, RGB channels, multi level security, device connectivity, different carrier file formats

I. INTRODUCTION

Information security is a most concerned factor in a communication system. Especially confidential information being exchanged should be much safer from hackers and cyber-attacks. Interpretation is the art of hiding data in a seemingly innocuous cover medium. Interpretation is going to gain its importance due to the exponential growth and secret communication of potential computer users over the internet. It can also be defined as the study of invisible communication that usually deals with the ways of hiding the existence of the communicated message. Generally data embedding is achieved in communication, image, text, voice or multimedia content for copyright, military communication, authentication and many other purposes. In image Interpretation, secret communication is achieved to embed a message into cover image (used as the carrier to embed message into) and generate a InterImage (generated image which is carrying a hidden message).

Interpretation, a type of data hiding techniques, aims at hiding secret messages into an innocent-looking host media. Interpretation has no specific fragileness or robustness requirements and the capacity, visual quality and statistical security are taken into consideration instead. With the rapid development of digital multimedia, digital images play an important role as carriers for covert communication. One kind of the host media, binary images, including ordinary binary images and halftone images, require only 1 bit per pixel compared with 8 bits per gray pixel or 24 bits per color pixel. The small storage requirement makes the binary image still a practical format for digitizing, processing and transmitting. In image expression, ordinary binary images usually exhibit their contents by edge lines while halftone images are perceived as continuous-tone images when viewed at distance due to the low-pass filtering effect of human visual perception. Because of the common and different aspects of ordinary binary images and halftone images, the data hiding schemes of them have similarities and differences in their model constructions. In this paper, a secure halftone Interpretation scheme is proposed based on halftone images' characteristics. This work aims for an advanced Interpretation approach which can maintain high imperceptibility value of stego-image to cover image with marginally high payload 2 capacity. The main contribution is an adaptive embedding procedure over optimal regions in the cover image based on a machine learning based region selection.

II. RELATED WORK

"Image-based Steganography: Concepts and Techniques" by Neil F. Johnson et al. (IEEE Transactions on Image Processing, 1998): This paper provides a foundational overview of image-based steganography techniques, which involve hiding secret data within digital images. It discusses various methods, including LSB (Least Significant Bit) embedding and spatial domain techniques.

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III. PROPOSED METHODOLOGY

In the proposed system, An efficient Interpretation method is proposed for the transfer of secret data in digital images using enhanced key model. The embedding process is not directly executed to the original color space of the cover image which is the RGB but rather in YCbCr color space. The embedding also improved to the various media file formats. The multilevel shared key is generated between sender and receiver for particular session. The session is determined based on the time at which communication is created. Once the session is expired then the data cannot retrieved using the old key. And also it can be encrypted based on the levels.

However, images transmitted through such channels will usually be JPEG compressed, which fails most of the existing Interpretation schemes. In this paper, we propose a novel image Interpretation framework that is robust for such channels. In particular, we first obtain the channel compressed version (i.e., the channel output) of the original image. Secret data is embedded into the channel compressed original image by using any of the existing JPEG Interpretation schemes, which produces the stego-image after the channel transmission. To generate the corresponding image before the channel transmission (termed the intermediate image), we propose a coefficient adjustment scheme to slightly modify the original image based on the stego-image. The adjustment is done such that the channel compressed version of the intermediate image is exactly the same as the stego-image. Therefore, after the channel transmission, secret data can be extracted from the stego-image with 100% accuracy.

There are mainly three essential properties of any Interpretation systems, namely imperceptibility, security and capacity of hiding information. These are the most effective parameters that test the effectiveness of a Interpretation system. For some Interpretation systems, there are particular requirements for handling it, as per its application. Watermarking and Interpretation have all the properties of data embedding. There is a trade off among the properties; when it increases the amount of secret data in the stego-image, the artifacts effect increases and immunity to- wards modification of stego-file decreases. The highest priority requirement for any data embedding is imperceptibility as the key feature and strength of any Interpretation technique is in hiding the secret data in the digital image such that, it could not be comprehended by naked human eye or with the use of statistics. An efficient Interpretation system always aims at sending maximum information using minimum cover media. This will help to reduce the chance of interception while sending through an unsecure network and therefore usually demands high embedding capacity.

In simple words, if the statistical data for the stego-file and the original data file are similar, then the security is better for data communication. Though embedding secret data in the cover image adds some amount of noise to it, the quality of cover image should not be diminished during sharing via unsecured channels.

1. ESTABLISHING COMMUNICATION BETWEEN THE USERS.

Before initiating data access group user registration is performed to provide authorization. During registration process an unique id is generated from system to every registered user. And the user entry is created in data base to establish authorized access to data. Once the user is registered then the unique pseudonym is generated in the form of 17 random number. The random input is stored in the each machine. Based on their unique identity the communication between the users is created.

2. BLOWFISH ENCRYPTION AND DECRYPTION DURING THE DATA SHARING

Any user is registered in private cloud, key is shared between cloud system and user. This shared key is generated from user own key and system key. This shared key contain domain parameters, group id, encryption key, hash code (MD5 hash) of key for key verification . Blowfish has a 64-bit block size and a key length of anywhere from 32 bits to 448 bits. It is a 16-round Feistel cipher and uses large key-dependent S-boxes. It is similar in structure to CAST-128, which uses fixed S-boxes.

The algorithm keeps two subkey arrays: the 18-entry P-array and four 256-entry S-boxes. The S-boxes accept 8-bit input and produce 32-bit output. One entry of the P-array is used every round, and after the final round, each half of the data block is XORed with one of the two remaining unused P-entries. The diagram to the right shows Blowfish's F-function. The function splits the 32-bit input into four eight-bit quarters, and uses the quarters as input to the S-boxes. The outputs are added modulo 232 and XORed to produce the final 32-bit output. Since Blowfish is a Feistel network, it can be inverted simply by XORing P17 and P18 to the ciphertext block, then using the P-entries in reverse order.

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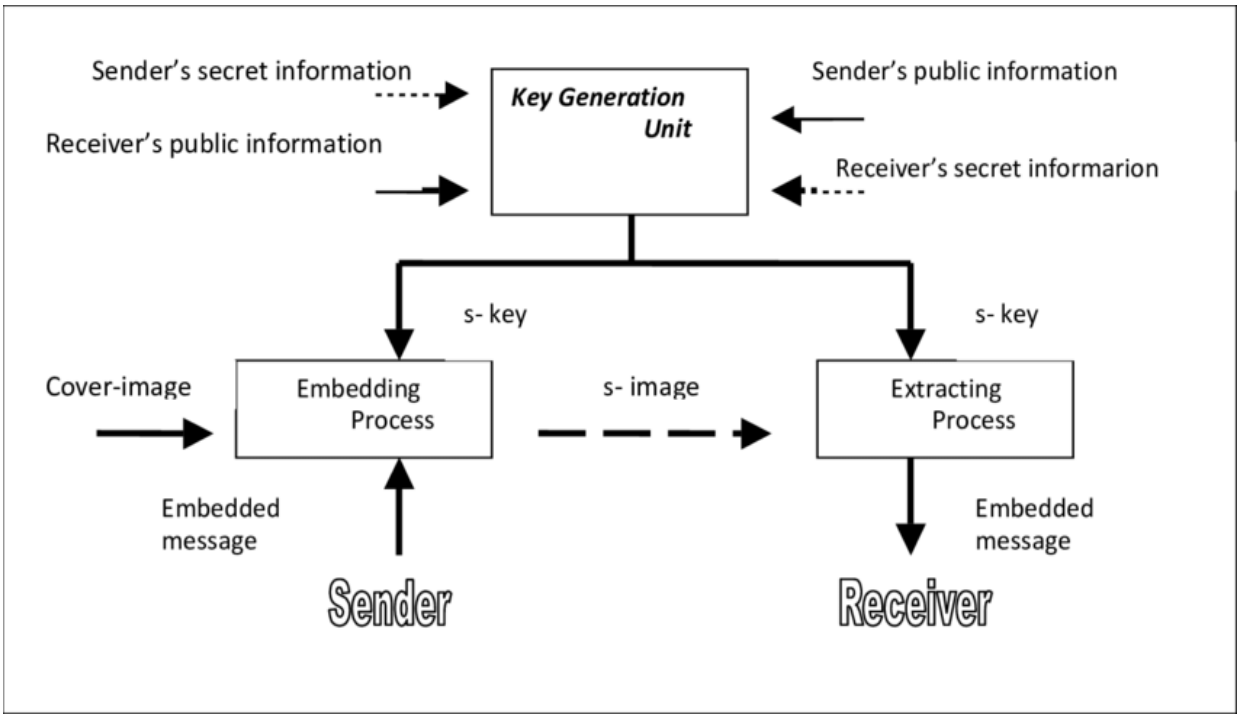

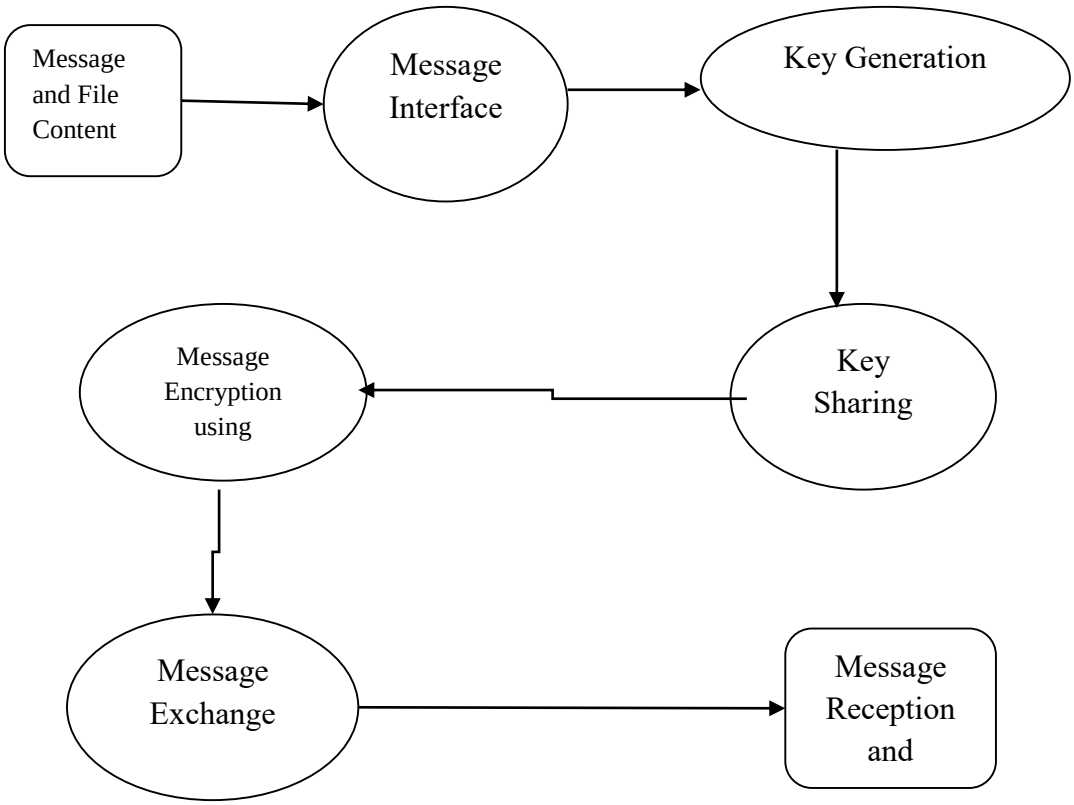

IV. RESULTS AND DISCUSSION

Interpretation is one of the methods used for the hidden exchange of information and it can be defined as the study of invisible communication that usually deals with the ways of hiding the existence of the communicated message. In this way, if successfully it is achieved, the message does not attract attention from eavesdroppers and attackers. Using

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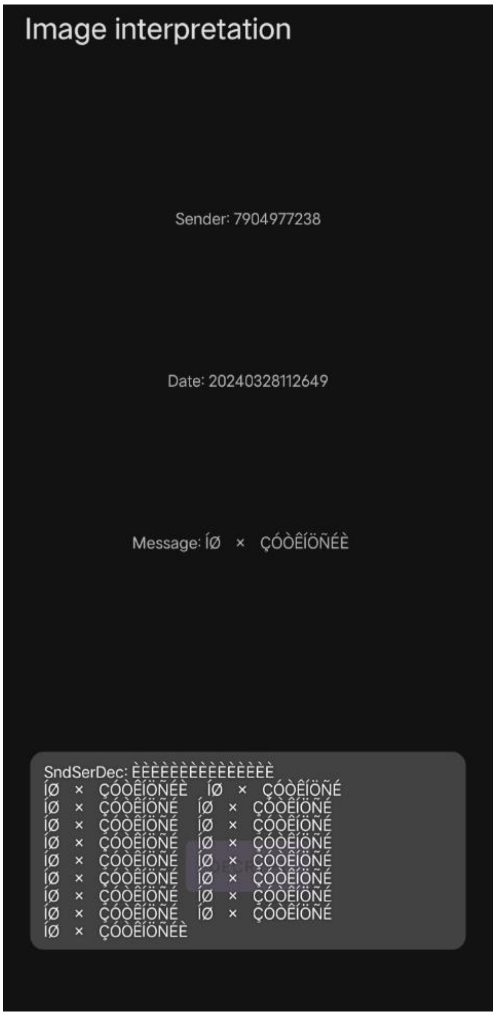
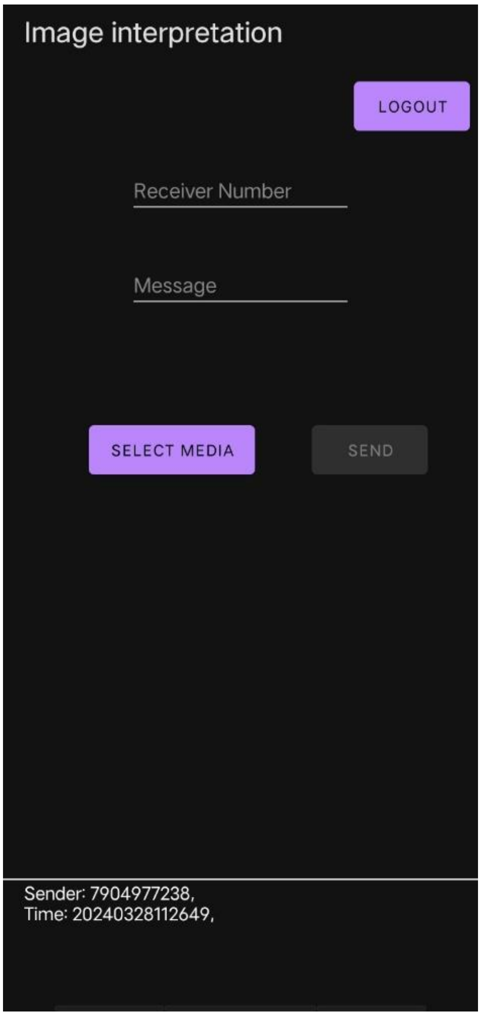
Interpretation, information can be hidden in different embedding mediums, known as carriers. These carriers can be images, audio files, video files, and text files. These techniques are analyzed and discussed not only in terms of their ability to hide information in image files but also according to how much information can be hidden, and the robustness to different image processing attacks.

The techniques for hiding confidential data in inconspicuous digital media such as video, audio, and image are collectively termed as Interpretation. Among various media types used, the popularity and availability of digital images are high and in this research work and hence, our focus is on implementing digital image Interpretation. The main challenge in designing a Interpretation system is to maintain a fair trade-off between robustness, security, imperceptibility and higher bit embedding rate.





V. CONCLUSION

For hiding secret information in images, there exist a large variety of Interpretation techniques some are more complex than others and all of them have respective strong and weak points. Pair swapping can not only preserve the local average intensity well, but also cause less visual distortion in halftone images. Therefore, pair swapping is utilized in our Interpretation scheme. To improve visual quality, the selections of two pixels in a pair will be optimized to minimize distortion at the same time and the proposed Interpretation scheme's performance depends on the selection of pixel pairs instead of slave pixels. Based on the HVS model, vertical swapping is demonstrated to be the optimal way to improve visual quality among all pair swapping strategies. Further, a distortion measurement is proposed to evaluate the embedding distortions on both vision and statistics after swapping pairs with contradictory values. The image is successfully encoded, transmitted and decoded with the original message.

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