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RESEARCH ARTICLE

Reserving Room Before Encryption

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ABSTRACT- Recently, more and more attention is paid to reversible data hiding (RDH) in encrypted images, since it maintains the excellent property that the original cover can be losslessly recovered after embedded data is extracted while protecting the image content's confidentiality. All previous methods embed data by reversibly vacating room from the encrypted images, which may be subject to some errors on data extract ion and/or image restoration. In this paper, we propose a novel method by reserving room before encryption with a traditional RDH algorithm, and thus it is easy for the data hider to reversibly embed data in the encrypted image. The proposed method can achieve real reversibility, that is, data extraction and image recovery are free of any error. Experiments show that this novel method can embed more than 10 times as large payloads for the same image quality as the previous methods, such as for PSNR dB.

I. INTRODUCTION

REVERSIBLE data hiding (RDH) in images is a technique, by which the original cover can be losslessly recovered after the embedded message is extracted. This important technique is widely used in medical imagery, military imagery and law forensics, where no distortion of the original cover is allowed. Since first introduced, RDH has attracted considerable research interest. In theoretical aspect, Kalker and Willems established a rate-distortion model for RDH, through which they proved the rate-distortion bounds of RDH for memory less covers and proposed a recursive code construction which, however, does not approach the bound improved the recursive code construction for binary covers and proved that this construction can achieve the rate-distortion bound as long as the compression algorithm reaches entropy, which establishes the equivalence between data compression and RDH for binary covers. In practical aspect, many RDH techniques have emerged I N recent years. a general framework for RDH. By first extracting compressible features of original cover and then compressing them losslessly, s pare space can be saved for embedding auxiliary data. A more popular method is based on difference expansion (DE), in which the difference of each pixel group is expanded, e.g., multi plied by 2, and thus the least significant bits (LSBs) of the difference are all-zero and can be used for embedding message s. Another promising strategy for RDH is histogram shift (HS), in which space is saved for data embedding by shifting the bins of histogram of gray values. The state-of-art methods

usually combined DE or HS to residuals of the Image, e.g., the predicted errors, to achieve better performance. With regard to providing confidentiality for images, encryption is an effective and popular means as it converts the original and meaningful con tent to incomprehensible one. Although few RDH techniques I n encrypted images have been published yet, there are some promising applications if RDH can be applied to encrypt images advocated a reputation-based trust-management scheme enhanced with data coloring (a w ay of embedding data into covers) and software watermarking, in which data encryption and coloring offer possibilities for upholding the content owner's privacy and data integrity. Obviously, the cloud service provider has no right to introduce permanent distortion during data coloring into encrypted data. Thus , a reversible data coloring technique based on encrypted data is preferred. Suppose a medical image database is stored I n a data center, and a server in the data center can embed notations into an encrypted version of a medical image through a RDH technique. With the notations, the server can manage the image or verify its integrity without having the knowledge of the original content, and thus the patient's privacy is protected. On the other hand, a doctor, having the cryptographic key, can decrypt and restore the image in a reversible manner for the purpose of further diagnosing. Some attempts on RDH in encrypted images have been made. In [16], Z hang divided the encrypted image into several blocks. By flipping 3 LSBs of the half of pixels in each block, room can be vacated for the embedded bit. The data extraction and image recovery proceed by finding which part has been flipped in one b lock. This process can be realized with the help of spatial corre lation in decrypted image. Hong *et al.* [17] ameliorated Zhang 's method at the decoder side by further exploiting the Spat ial correlation using a different estimation equation and side mat ch technique to achieve much lower error rate. These two methods mentioned above rely on spatial correlation of original image to extract data. That is, the encrypted image should be decrypted first before data extraction. To separate the data extraction from image decryption, Zhang [18] emptied out space for data embedding following the idea of compressing encrypted images [14], [15]. Compression of encrypted data can be formulated as source coding with side information at the decoder [14], in which the typical method is to generate the compressed data in lossless manner by exploiting the syndromes of parity-check matrix of channel codes. The method in [18] compressed the encrypted LSBs to vacate room for additional data by finding syndromes of a parity-check matrix, and the side information used at the receiver side is also the spatial correlation of decrypted images. All the three methods try to vacate room from the encrypted images directly. However, since the entropy of encrypted images has been maximized, these techniques can only achieve small payloads [16], [17] or generate marked image with poor quality for large payload [18] and all of them are subject to some error rates on data extraction and/or image restoration. Although the methods in [16], [17] can eliminate errors by error correcting codes, the pure payloads will be further consumed. In the present paper, we propose a novel method for RDH in encrypted images, for which we do not "vacate room after encryption" as done in [16]–[18], but "reserve room before encryption". In the proposed method, we first empty out room by embedding LSBs of some pixels into other pixels with a traditional RDH method and then encrypt the image, so the positions of these LSBs in the encrypted image can be used to embed data.

II. LITERATURE SURVEY

Literature survey is the most important step in software development process. Before developing the tool it is necessary to determine the time factor, economy n company strength. Once these things r satisfied, ten next steps is to determine which operating system and language can be used for developing the tool. Once the programmers start building the tool the programmers need lot of external support. This support can be obtained from senior programmers, from book or from websites. Before building the system the above consideration r taken into account for developing the proposed system.

We have to analysis the **Wireless Communication**:

Wireless Communication

Wireless telecommunications, is the transfer of information between two or more points that are physically not connected. Distances can be short, as a few meters as in television remote control; or long ranging from thousands to millions of kilometers for deep-space radio communications. It encompasses various types of fixed, mobile, and portable two-way radios, cellular telephones, personal digital assistants (PDAs), and wireless networking.

Other examples of *wireless technology* include GPS units, garage door openers and or garage doors, wireless computer mice, keyboards and headsets, satellite television and cordless telephones.

Wireless networking (i.e. the various types of unlicensed 2.4 GHz WiFi devices) is used to meet many needs. Perhaps the most common use is to connect laptop users who travel from location to location. Another common use is for mobile networks that connect via satellite. A wireless transmission method is a logical choice to network a LAN segment that must frequently change locations. The following situations justify the use of wireless technology:

- To span a distance beyond the capabilities of typical cabling,
- To provide a backup communications link in case of normal network failure,
- To link portable or temporary workstations,
- To overcome situations where normal cabling is difficult or financially impractical, or
- To remotely connect mobile users or networks.

Benefits of Wireless Communication:

Wireless LANs offer the following productivity, convenience, and cost advantages over wired networks:

- Mobility: Wireless LAN systems can provide LAN users with access to real-time information anywhere in their organization. This mobility supports productivity and service opportunities not possible with wired networks.
  There are now thousands of universities, hotels and public places with public wireless connection. These free you from having to be at home or at work to access the Internet.
- Installation Speed and Simplicity: Installing a wireless LAN system can be fast and easy and can eliminate the need to pull cable through walls and ceilings.
- Reduced Cost-of-Ownership: While the initial investment required for wireless LAN hardware can be higher than the cost of wired LAN hardware, overall installation expenses and life-cycle costs can be significantly lower. Long-term cost benefits are greatest in dynamic environments requiring frequent moves and changes.

Scalability: Wireless LAN systems can be configured in a variety of topologies to meet the needs of specific applications and installations. Configurations are easily changed and range from peer-to-peer networks suitable for a small number of users to full infrastructure networks of thousands of users that enable roaming over a broad area

III. EXISTING SYSTEM

In this Existing System, since losslessly vacating room from the encrypted images is relatively difficult and sometimes inefficient, why are we still so obsessed to find novel RDH techniques working directly for Encrypted Images? The method in compressed the encrypted LSBs to vacate room for additional data by finding syndromes of a parity-check matrix, and the side information used at the receiver side is also the spatial correlation of decrypted images. All the three methods try to vacate room from the encrypted images directly. However, since the entropy of encrypted images has been maximized, these techniques can only achieve small payloads generate marked image with poor quality for large payload and all of them are subject to some error rates on data extraction and/or image restoration.

Disadvantage

X. Low error rate

X. Data extraction and image restoration problem

IV. OBJECTIVES

1. In this paper, we study Real reversibility is realized, that is, data extraction and image recovery are free of any error.

For given embedding rates, the PSNRs of decrypted image containing the embedded data are significantly improved; and for the acceptable PSNR, the range of embedding rates is greatly enlarge.

2. Encrypted Image Generation
   a) IMAGE PARTITION
   b) SELF REVERSIBLE EMBEDDING
3. Data Hiding In Encrypted Image
4. Data Extraction and Image Recovery
5. Data Extraction and Image Restoration

- The common goal of these works is to enable the handshake between two encountered users if both users satisfy each other's requirement while eliminating the unnecessary information disclosure if they are not.
- We analyze the communication overhead and the anonymity strength of the protocols

V. PROPOSED SYSTEM

In proposed method can achieve real reversibility, that is, data extraction and image recovery are free of any error. If we reverse the order of encryption and vacating room, i.e., reserving room prior to image encryption at content owner side, the RDH tasks in encrypted images would be more natural and much easier which leads us to the novel framework, "reserving room before encryption (RRBE)"

Advantage

Not only does the proposed method separate data extraction from image decryption but also achieves excellent performance in two different prospects:

- ✓ Real reversibility is realized, that is, data extraction and image recovery are free of any error.

For given embedding rates, the PSNRs of decrypted image containing the embedded data are significantly improved; and for the acceptable PSNR, the range of embedding rates is greatly enlarged

VI. SYSTEM ANALYSIS

6.1 Feasibility study

Feasibility Study is a high level capsule version of the entire process intended to answer a number of questions like: What is the problem? Is there any feasible solution to the given problem? Is the problem even worth solving? Feasibility study is conducted once the problem clearly understood. Feasibility study is necessary to determine that the proposed system is Feasible by considering the technical, Operational, and Economical factors. By having a detailed feasibility study the management will have a clear-cut view of the proposed system.

The following feasibilities are considered for the project in order to ensure that the project is variable and it does not have any major obstructions. Feasibility study encompasses the following things:

- Technical Feasibility
- Economical Feasibility
- Operational Feasibility

In this phase, we study the feasibility of all proposed systems, and pick the best feasible solution for the problem. The feasibility is studied based on three main factors as follows.

6.1.1 Technical feasibility study

In this step, we verify whether the proposed systems are technically feasible or not. i.e., all the technologies required to develop the system are available readily or not.

Technical Feasibility determines whether the organization has the technology and skills necessary to carryout the project and how this should be obtained. The system can be feasible because of the following grounds.

- All necessary technology exists to develop the system.
- This system is too flexible and it can be expanded further.
- This system can give guarantees of accuracy, ease of use, reliability and the data security.
- This system can give instant response to inquire.

- Our project is technically feasible because, all the technology needed for our project is readily available.

Front End	:	ASP.Net with C#
Back End	:	MS SQL Server 2008
Web-Server	:	IIS 5.0
Host	:	Windows-XP

6.1.2 Economical feasibility study

In this step, we verify which proposal is more economical. We compare the financial benefits of the new system with the investment. The new system is economically feasible only when the financial benefits are more than the investments and expenditure. Economical Feasibility determines whether the project goal can be within the resource limits allocated to it or not. It must determine whether it is worthwhile to process with the entire project or whether the benefits obtained from the new system are not worth the costs. Financial benefits must be equal or exceed the costs. In this issue, we should consider:

- The cost to conduct a full system investigation.
- The cost of h/w and s/w for the class of application being considered.
- The development tool.
- The cost of maintenance etc.,

Our project is economically feasible because the cost of development is very minimal when compared to financial benefits of the application.

6.1.3 Operational feasibility study

In this step, we verify different operational factors of the proposed systems like man-power, time etc., whichever solution uses less operational resources, is the best operationally feasible solution. The solution should also be operationally possible to implement. Operational Feasibility determines if the proposed system satisfied user objectives could be fitted into the current system operation. The present system Enterprise Resource Information System can be justified as Operationally Feasible based on the following grounds.

- The methods of processing and presentation are completely accepted by the clients since they can meet all user requirements.
- The clients have been involved in the planning and development of the system.
- The proposed system will not cause any problem under any circumstances.

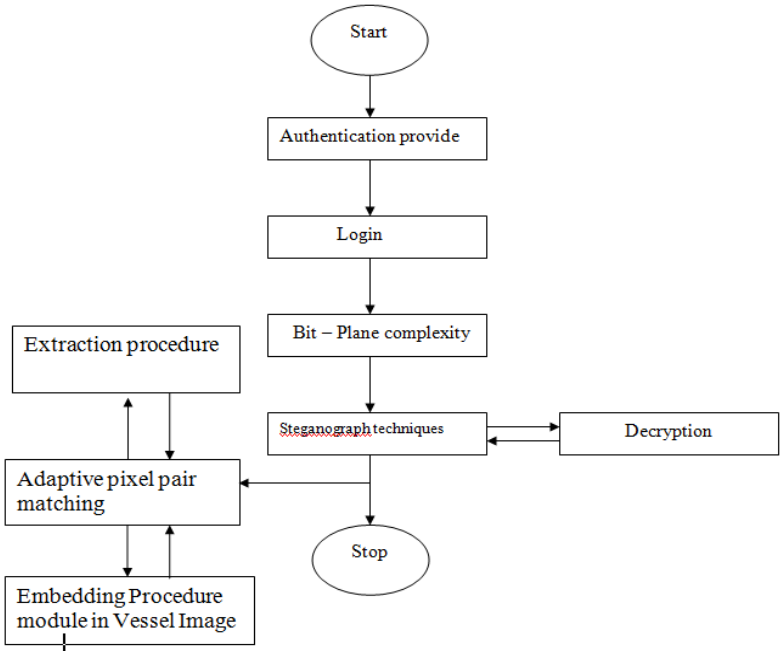
Our project is operationally feasible because the time requirements and personnel requirements are satisfied. We are a team of four members and we worked on this project for three working months.

Project Instructions:

- Based on the solution requirements, conceptualize the Solution Architecture. Depict the various architectural components, show interactions and connectedness and show internal and external elements. Discuss suitability of typical architectural types like Pipes, Filters, Event Handlers, and Layers etc.
- Identify the significant class entities and carry out class modelling.
- Carry out Detailed design of Classes, Database objects and other solution components.
- Distribute work specifications and carry out coding and testing.

VII. Data Flow Diagram (DFD's)

The DFD is also called as bubble chart. It is a simple graphical formalism that can be used to represent a system in terms of the input data to the system, various processing carried out on these data, and the output data is generated by the system.



VIII. CONCLUSION

Reversible data hiding in encrypted images is a new topic drawing attention because of the privacy-preserving requirements from cloud data management. Previous methods implement RDH in encrypted images by vacating room after encryption, as opposed to which we proposed by reserving room before encryption. Thus the data hider can benefit from the extra space emptied out in previous stage to make data hiding process effortless. The proposed method can take advantage of all traditional RDH techniques for plain images and achieve excellent performance without loss of perfect secrecy. Furthermore, this novel method can achieve real reversibility, separate data extraction and greatly improvement on the quality of marked decrypted images.

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