

COMBINING STEGANOGRAPHY AND CRYPTOGRAPHY TECHNIQUES FOR SECURING PATIENT INFORMATION

Amrita Bhatnagar

*Assistant Professor, Ajay Kumar Garg Engineering College, Ghaziabad, U.P., India
bhatnagaramrita@akgec.ac.in*

Abstract— Steganography is a process which can be used for concealing information within images in such a way that viewer cannot see hidden information within the object. Simply, it is hiding information in plain sight, such that the intended recipient would get to see it. In cryptography, the objective is to modify the original message in such a fashion it becomes difficult to get to the original message from the modified message. In this paper, both techniques are combined and proposed a new technique for information security. This technique is used to secure information of Patient.

Keywords— LSB insertion technique, RSA Algorithm, Bit Plane Slicing.

I. INTRODUCTION

In new era steganography is a very useful techniques It is used to send confidential information within a cover image. In medical field Patient Information is very critical and confidential information. If anybody tempered this information it leads to delay in treatment of patient. In this paper, a new technique is proposed. By using this technique, Patient ‘s data (medical images, doctors diagnose) can be hidden in cover images. Proposed technique is divided into two parts first one is a technique for text hiding and second one is for image hiding under a cover image.

II. METHODS OF STEGANOGRAPHY

There are many methods in steganography to hide the secret data in cover image like MSB and LSB. In this technique we are using LSB technique where secret data embedded in cover image LSB bit. LSB bit of cover image of each pixel is replaced by the secret data bit and at the receiver site it is extracted from the cover image.

LSB technique is very easy to implement and it is used for text hiding. For image hiding, Bit plane slicing technique is used. In Bit plane slicing image pixels of secret image is divided in to 8 planes (LSB to MSB plane). Then Bit planes are embedded in cover image.

III. PROPOSED TECHNIQUE

In the proposed method, combination of Steganography and

cryptography is used to send the secret data of a patient So that its confidentiality and secrecy can be maintained. Patient data can be comprise of his profile, prescription and some medical image like XRAY, Sonography .In the proposed algorithm there are two algorithm one for text hiding for patient profile and prescription and another for image hiding for medical images.

A. Text Hiding

For text hiding LSB steganography is used and for cryptography RSA algorithm is used.

1. Start
2. Input: Secret Patient data (prescription for medicine), Cover Image
3. Apply RSA algorithm on Secret data and convert it in cipher data
4. Extract LSB bit of each pixel of cover image.
5. Replace LSB of the cover image with each bit of cipher data one by one.
6. Cover image is known as stego image

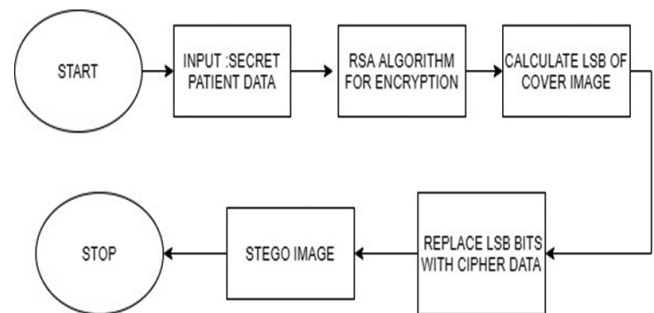


Figure 1

B.Text Unhiding

- 1: Read the stego image.
- 2: Find out LSB of each pixel of stego image.
- 3: Retrieve bits and find out secret Text.
4. Apply decryption Algorithm and get original message

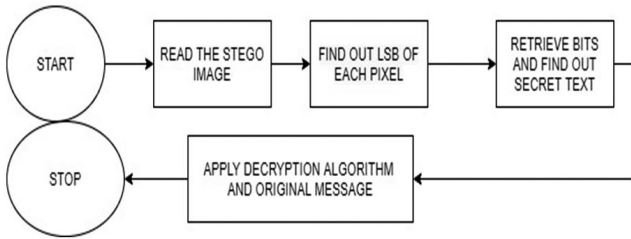


Figure. 2

B. Image Hiding

The steps for hiding the confidential image inside the cover image is shown below:

1. Read the Secret image, Cover image;
2. Resize the images;
3. Apply RSA technique for encryption of secret image.
4. Find out 8 planes of secret image by Bit plane slicing method;
5. Hide the bit planes into the Cover image to find out stego image;



Cover Image



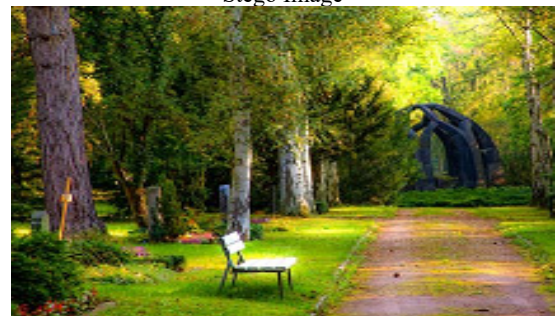
Secret Image



Stego Image
Fig.3



Stego Image



Cover Image



Secret Image
Figure 4

C. Image Unhiding

1. Read stego image
2. Extract the LSB's of the cover image pixels to form the corresponding bit planes by re-shifting the bit position.
3. Adding respective bytes of all bit planes comprise the pixels of the original secret image.
4. Resizing the decoded image to its original size so that the image clarity retains.
5. Apply image decryption techniques;

IV. CONCLUSION

A secured cryptography and image steganography-based system has been proposed for patient secret data. In this work, a new way of hiding text as well as a secret image in a cover image have been proposed, make. This technique also uses Bit plane slicing of image hiding and LSB technique for text hiding. This method hides image and text in this way that quality of cover image will not be decrease and hidden message is not

visible to anyone. It will be helpful for Doctors and Patients for making treatment easy and fast.

REFERENCES

- [1] Sultana, S., Khanam, A., Islam, M.R., Nitu, A.M., Uddin, M.P., Afjal, M.I., Rabbi, M.F.: A Modified Filtering Approach of LSB Image Steganography Using Stream Builder along with AES Encryption, HBRP Recent Trends in Information Technology and its Applications, Volume 1 Issue 2, pp. 1-10 (2018).
- [2] G. Swain and S. K. Lenka, "A novel steganography technique by mapping words with LSB array," International Journal of Signal and Imaging Systems Engineering, vol. 8, pp. 115-122, 2015.
- [3] A. Sharif, M. Mollaefar, and M. Nazari, "A novel method for digital image steganography based on a new three-dimensional chaotic map," Multimedia Tools and Applications, vol. 76, pp. 7849-7867, 2017.
- [4] S. Mishra, P. Pandey, "A Review on Steganography Techniques Using Cryptography", International Journal of Advance Research in Science And Engineering, Volume 4, Special Issue (01), 2015.
- [5] N. Singh, "Survey Paper on Steganography", International Refereed Journal of Engineering and Science (IRJES), Volume 6, Issue 1, 2017.
- [6] A. Rashid and M. Rahim, "Critical Analysis of Steganography "An Art of Hidden Writing"", International Journal of Security and Its Applications, Volume 10, No. 3, 2016.
- [6] S. Swathi, P. Lahari and B. Thomas, "Encryption Algorithms: A Survey", International Journal of Advanced Research in Computer Science & Technology (IJARCST), Volume 4, Issue 2, 2016.
- [7] S. Asbeh, H. Al-Sewadi, S. Hammoudeh and A. Hammoudeh, "Hex Symbols Algorithm for AntiForensic Artifacts on Android Devices", International Journal of Advanced Computer Science and Applications (IJACSA), Volume 7, No. 4, 2016.
- [8] K. Rahmani, K. Arora and N. Pal, "A CryptoSteganography: A Survey", International Journal of Advanced Computer Science and Applications (IJACSA), Volume 5, No. 7, 2014.
- [9] P. Joseph and S. Vishnukumar, "A Study on Steganographic Techniques", Proceedings of Global Conference on Communication Technologies (GCCT), IEEE, 2015.

ABOUT THE AUTHORS



Amrita Bhatnagar is an Assistant Professor in Akgec Engineering college GZB. She is BE from SRMSCET Bareilly and MTech from BIT Mesra Rachi. Her research area includes Digital Image Processing, cyber security, information security and Python. She has published many papers on information security in reputed Journals.