# HINDUSTHAN COLLEGE OF ENGINEERING AND TECHNOLOGY

**BACHELOR OF ENGINEERING**

***in***

**ELECTRONICS AND COMMUNICATION ENGINEERING**


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# PROJECT TITLE

IMAGE STEGANOGRAPHY USING CRYPTOGRAPHIC ENCRYPTION

# OUTLINE

- Introduction
- Abstract
- Objective
- Cryptography and block diagram
- Steganography and block diagram
- Existing techniques and system
- Proposed system
- Algorithms
- Methodology
- Advantages
- Literature survey
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# INTRODUCTION

- Encryption is a method of securing data by converting it into a code that can only be deciphered with the proper key.

- Cryptography is the study of encryption and decryption methods.

- Steganography is the practice of hiding information within other information, such as hiding a message within an image. In the context of image steganography, this would involve hiding a message within the binary data of an image file.

- The goal is to make the hidden message difficult to detect, so that it can be transmitted secretly

# ABSTRACT


- In today's era due to the growth of multimedia applications, security has become an important issue for communication and storage of images.

- Proper watermarking, encryption and compression should be applied to transmit the data from one place to another place across the internet in order to prevent unauthorized access

- This proposal is about watermarking of the image using 2D 3-level discrete wavelet transform, encryption and decryption of images using a secret-key block cipher called 64-bits Blowfish algorithm and compression of the encrypted image using SPIHT algorithm.

- In this project, we design a highly efficient image watermarking encryption then lossless compression (WETLC) system.

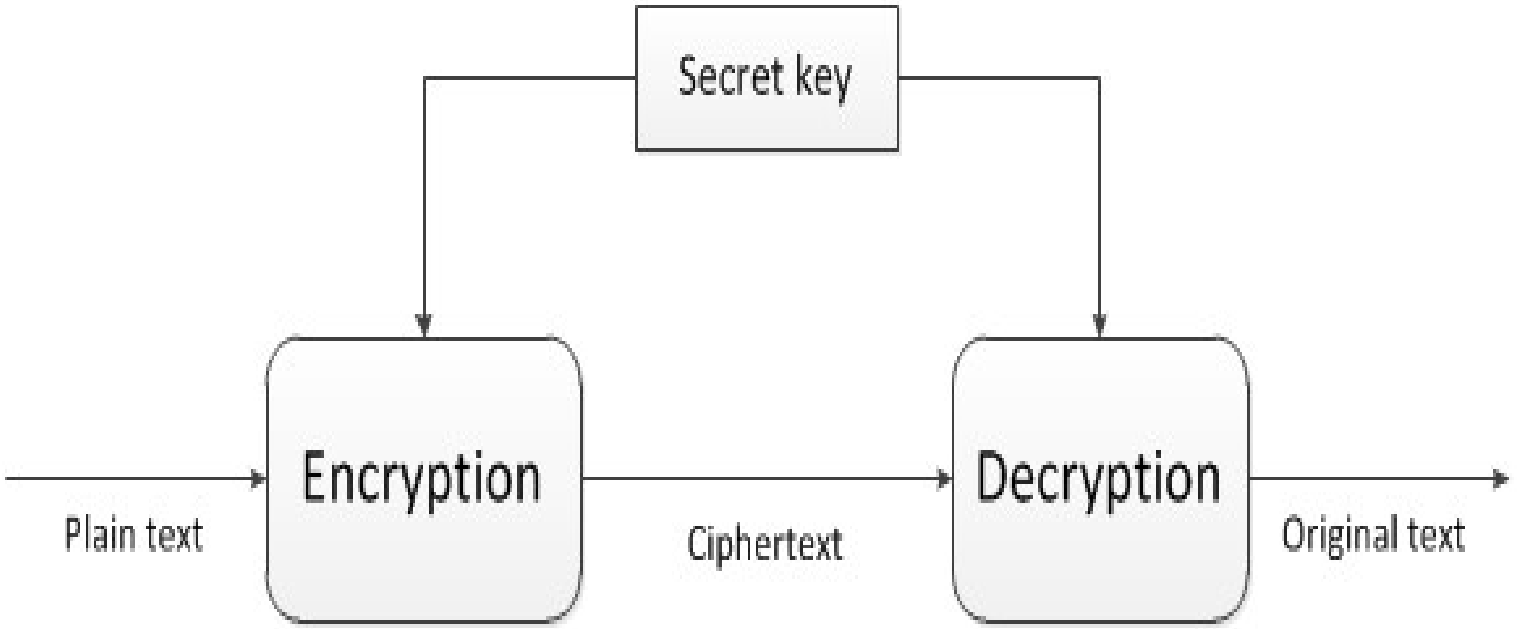
# OBJECTIVE

- To propose an enhanced system to secure the information.
- To provide a reasonably high level of security.
- Using combination of both techniques
  - Cryptography
  - Steganography

# CRYPTOGRAPHY

- Encryption and Decryption process is known as Cryptography.
- Cryptography provides security to ensure the privacy of data, non-alternation of data.
- Visual cryptography is a cryptographic technique which allows visual information to be encrypted in such a way that the decrypted information appears as a visual image.

# BLOCK DIAGRAM IN CRYPTOGRAPHY



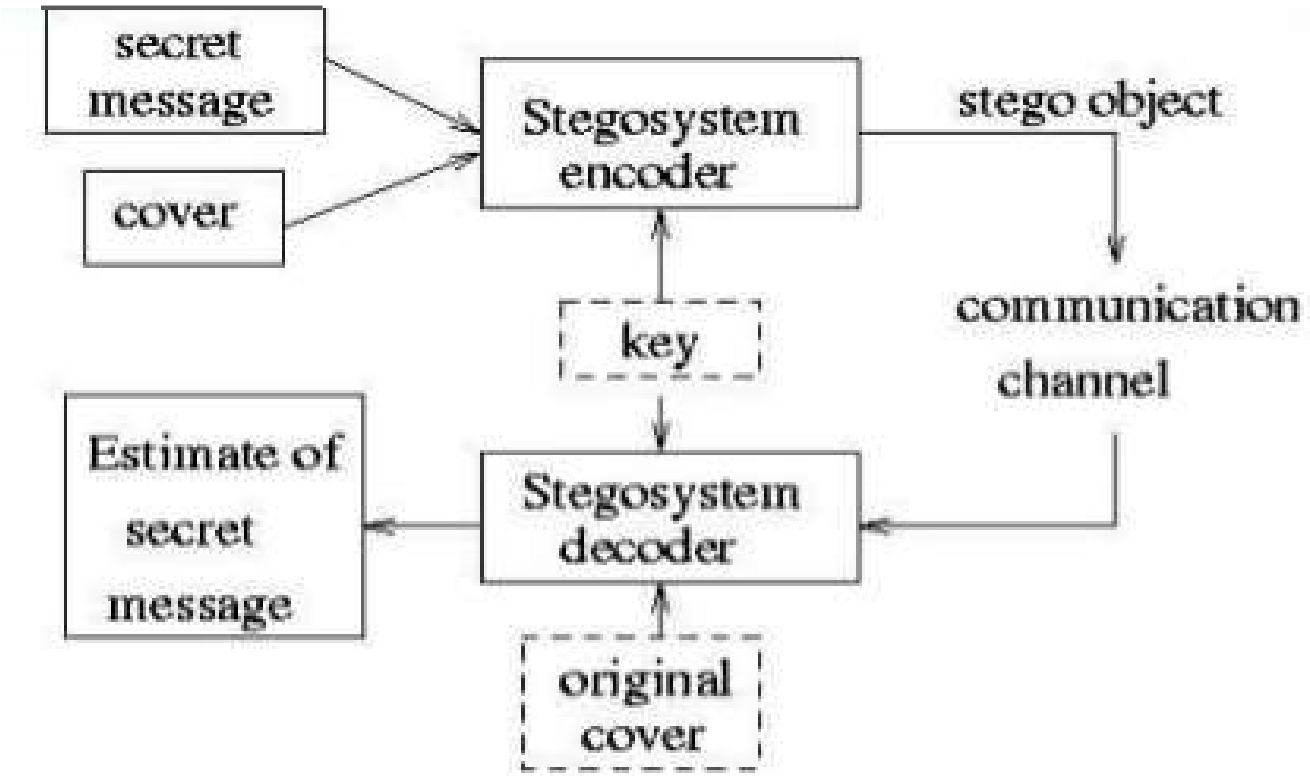
# STEGANOGRAPHY

- Steganography is the process of hiding information which can be text, image or video inside a cover image. The secret information is hidden in a way that it not visible to the human eyes.

- In image steganography, a message is embedded into an image by altering the values of some pixels, which are chosen by an encryption algorithm (key).

- The recipient of the image must be aware of the same algorithm in order to know which pixels he or she must select to extract the message.

# BLOCK DIAGRAM IN STEGANOGRAPHY



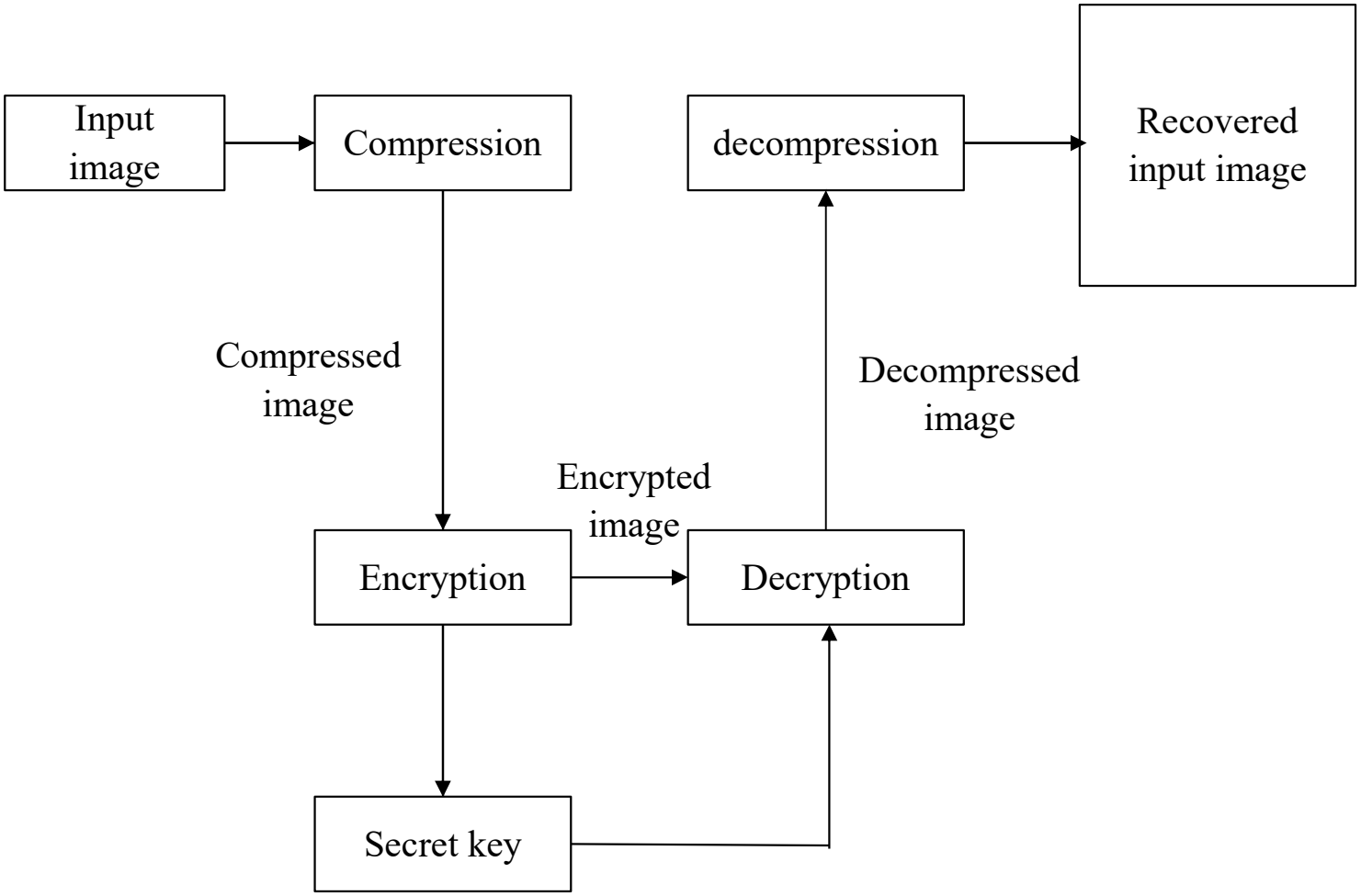
# EXISTING TECHNIQUES IN CRYPTOGRAPHY

- DES - Data Encryption Standard
- 3DES - Triple Data Encryption Standard
- AES - Advanced Encryption Standard
- Blowfish
- RSA - Rivest Shamir Adleman
- Elliptic curve
- TACIT encryption technique - Time Authenticated Cryptographic Identity Transmission

# EXISTING TECHNIQUES IN STEGANOGRAPHY

- Watermarking
- DCT & DWT
- Genetic algorithm
- Huffman encoding
- DWT histogram shifting
- LSB substitution method
- Spread spectrum

# EXISTING SYSTEM



# PROPOSED SYSTEM

- To combine two security techniques

1. Cryptography
   (For Encryption & Decryption)

2. Steganography
   (For Data hiding in a multimedia object)

# ALGORITHMS

- **Algorithm 1**

  Image Watermarking using 2D – 3 Level Wavelet Transform

- **Algorithm 2**

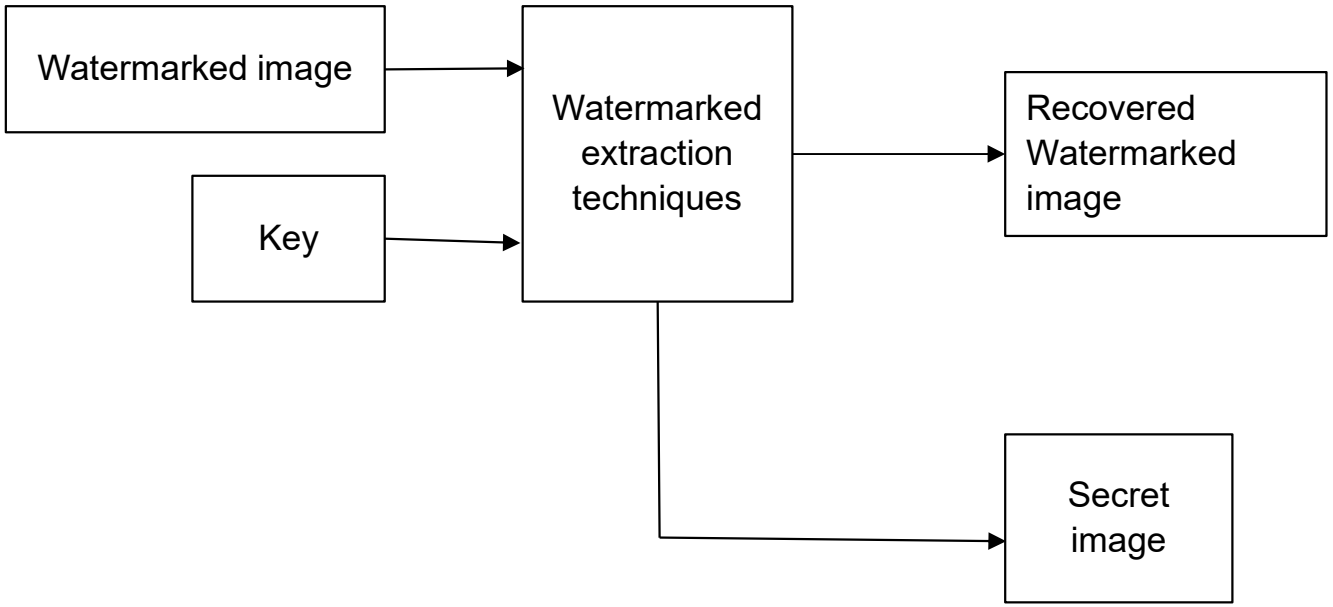
  Image Encryption using 64-bits Blowfish Algorithm

- **Algorithm 3**

  Image Compression using Vector Scanning SPIHT (Set Partition In Hierarchy Tree) algorithm

# WATERMARK EXTRACTION

- Watermarking algorithm is a technique used to embed a digital watermark into an image that is imperceptible to the human eye but can be detected and decoded by a computer algorithm.



# 64-BIT BLOWFISH ALGORITHM

- Blowfish is a symmetric-key block cipher that can be used for encryption and decryption.
- This provides an added layer of security to prevent unauthorized access to sensitive images.
- The algorithm works by breaking the image data into blocks of 64 bits and applying the Blowfish encryption algorithm to each block.
- The resulting encrypted image can only be decrypted with the correct key.

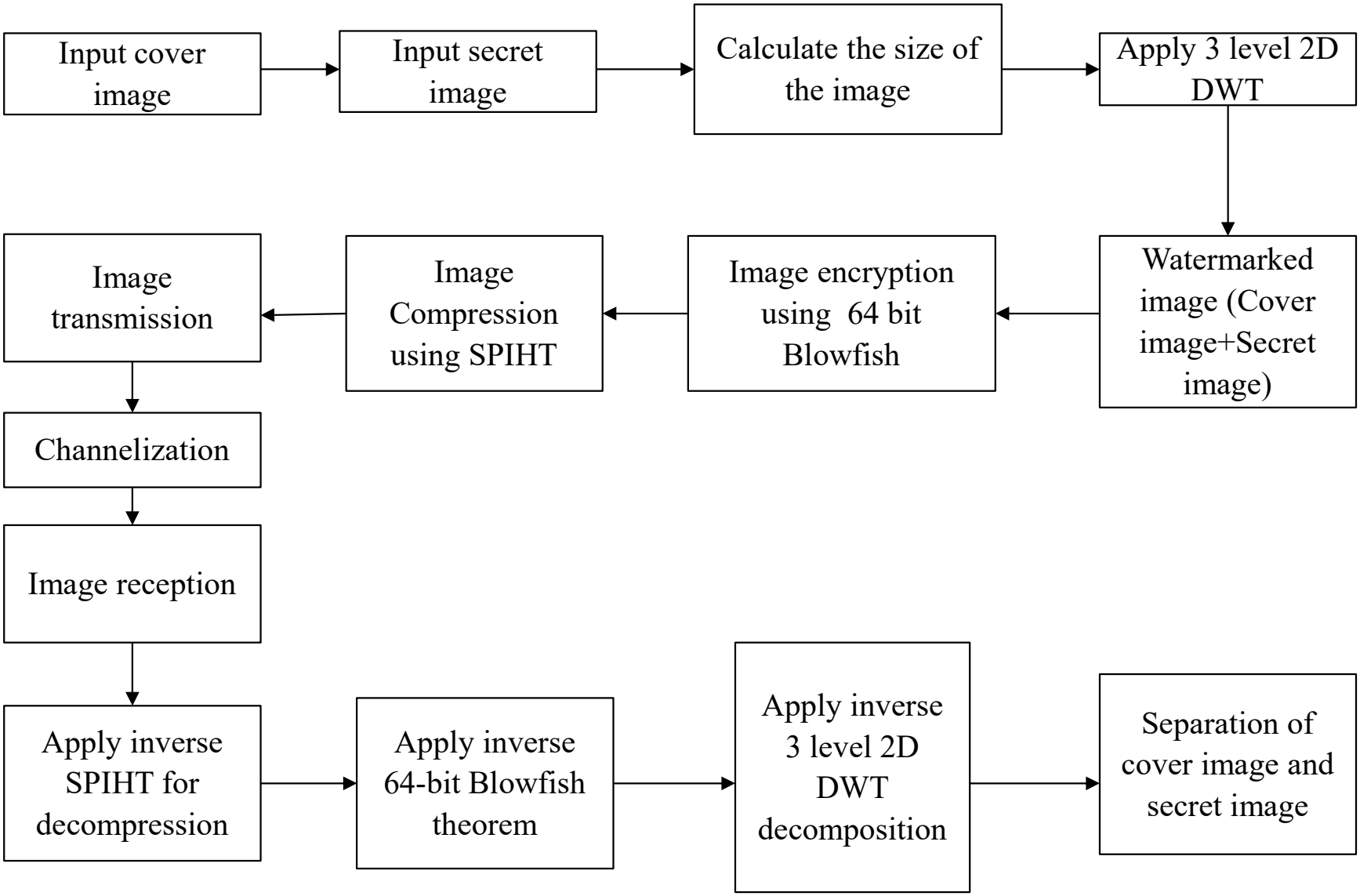
# SPIHT ALGORITHM

- SPIHT (Set Partitioning in Hierarchical Trees) is a compression algorithm for digital images.

- The algorithm works by dividing the image into small blocks and sorting them in a hierarchical tree structure.

- It achieves high compression ratios while maintaining good visual quality.

# METHODOLOGY



# ADVANTAGES OF PROPOSED SYSTEM

- Modified SPIHT algorithm is the lossless compression algorithm that reduces file size with no loss in image quality.

- When the file is saved it is compressed, when it is decompressed (opened) the original data is retrieved.

- This type of compression can be applied not just to graphics but to any kind of computer data such as spreadsheets, text documents and software applications.

# LITERATURE SURVEY

| S.no | Author | Year | Technique | Advantage | Disadvantage |
|---|---|---|---|---|---|
| 1 | Zhiguang Qin | 2020 | Genetic Algorithm | Favourable imperceptibility, improves PSNR & IF values. | Difficult to recognise between cover and stego file. |
| 2 | Peiya Li and Kwok-Tung Lo | 2017 | DCT domain | Robust against JPEG compression | Image data can be destructed in some blocks |
| 3 | B Karthikeyan , Abhilash Kosaraju and Sudeep Gupta S | 2016 | Simple LSB method after encryption | Simple | Limited data carrying capacity |

# LITERATURE SURVEY

| Sl.no | Author | Year | Technique | Advantage | Disadvantage |
|---|---|---|---|---|---|
| 4 | M.Saritha Vishwanath.M Sushravya.M | 2016 | Image and Text Steganography with Cryptography using MATLAB | It is popularly used steganography for hiding data since it provides a secure and simple way to send the information over the internet. | For hiding secret information in images, there exists a large variety of steganographic techniques some are more complex than others. |
| 5 | Saeed Sarreshtedari and Mohammad Ali Akhaee | 2015 | LSB | High portability and high consistency | Less secure than others. |

# REFERENCES


- [1]. A. Joseph Raphael Dr. V. Sundaram, “A Survey on cryptography and steganography”, Int. J. Comp. Tech. Appl., Vol 2 (3), ISSN:2229-6093.24 September 2016.
- [2]. Dipti Kapoor Sarmah, Neha bajpai, “ Proposed System for Data Hhiding Using Steganography”, International Journal of Computer Applications (0975 – 8887), Volume 8 – No. 9, October 2017.
- [3]. Ramakrishna Mathe, Veera RaghavaRao Atukuri, Dr. Srinivasa Kumar Deviredd “Securing Information: Cryptography ”, International Journal of Computer Science and Information Technologies, Vol. 3 (3), 2017.
- [4]. Dr. Ekta Walia a , Payal Jain b , Navdeep c, “An Analysis of LSB & DCT based Steganography”, Global Journal of Computer Science and Technology Vol. 10 Issue 1 (Ver 1.0), April 2016.
- [5]. C.P.Sumathi, T.Santanam and G.Umamaheswari “A Study of Various Steganographic Techniques Used for Information Hiding” International Journal of Computer Science & Engineering Survey (IJCSES) Vol.4, No.6, December 2015.

THANK YOU