ABSTRACT

Advancement in digital communication and networking has posed serious threats to secure data transmission. The techniques involved in the actual implementation of security goals are Cryptography and Steganography. Modifying existing methods to efficient and effective communication is done using Steganography where the messages such as images, videos, sound files, text and other computer files can be hidden inside or other digital objects which remains invisible to an ordinary observer. A detailed study and analysis and improvement over the existing technology are the central concept of research.

Cryptography makes the message unintelligible by applying various transformations on the message. This work has proposed data hiding by embedding the message of interest using geometric style of cryptographic algorithm, thus providing high security. Wavelet and Curvelet transform algorithms are used to perform pre-processing of images. Even if the image carrying embedded data i.e., Stego images undergoes a reverse operation and data cannot be extracted if the receiver is unaware of the exact coordinates of the geometric shape. Hence retrieving secret image for an attacker becomes a hard task. Experimental results are verified for both the properties of Cryptography and Steganography.

Steganography is a method of data hiding from its existence to another transmission medium for secret data communication. This thesis has proposed an algorithm based on the skin tone region of the images. Here, hiding of the data is done in skin tone region of the image that will provide an excellence in data hiding. This skin tone detection is performed using HSV (Hue, Saturation and Value) colour space. The embedding of secret data is done by using frequency domain approach of Discrete Wavelet Transform (DWT). The DWT has four sub bands of frequency in which high frequency sub band is used for secret data hiding by tracking skin pixels in that sub band.

The challenge of using steganography in cover images is to hide as much data as possible with the least noticeable difference in the stego-image. Steganographic algorithms operate on basically three types of images: Raw images (i.e., bmp format), Palette based images (i.e., GIF images) and JPEG images. JPEG images are routinely used in steganographic algorithms due to the most popular lossy image compression method. Here, another feature used in data hiding i.e.
cropping of image. The cropped image is used in different steps of data hiding. This cropping feature increases the security than the use of whole image. So, this cropped region used as the key at decoding side. This shows that the mechanism of hiding the information in skin tone region of images gives higher security.

The research work has resulted in 9 international journals and 4 international conferences.