Abstract

A huge deployment of effective steganography by several techniques with varying degrees of payload, peak signal to noise ratio (PSNR), robustness, perceptual transparency and so on has been evidenced. Steganography has been effective as an alternative to cryptography and has been projected to the forefront of digital security by the explosive growth in computational power, security awareness and through widespread intellectual pursuit. The current techniques for Steganography reviewed include substitution method such as least significant bit (LSB) and transform domain methods such as discrete cosine transform (DCT) and discrete wavelet transform (DWT). In this paper, the techniques involved with LSB, DCT and DWT are analyzed with the proper use of the performance metrics and then the techniques have been modeled by computer simulations. The results from simulation indicate that the LSB technique, although
A Comparative Analysis of Steganographic Data Hiding within Digital Images

easy to implement and encode and having good payload capacity, is easily prone to statistical
attack, since the histogram plots are revealing the data hidden within. On the other hand,
transform domain techniques are more robust to statistical attacks but at the cost of reduced
payload.

References

- Frank Y. Shih, "Digital Watermarking and Steganography- Fundamentals and
- Mehdi Kharrazi, Husrev T. Sencar, Nasir Memon, "Performance study of common
  image steganography and steganalysis techniques", Journal of Electronic Imaging 15(4),
  041104 Dec 2006.
- Mohammad Ali Bani Younes and Aman Jantan, "A New Steganography Approach
  for Image Encryption Exchange by Using the Least Significant Bit Insertion", IJCSNS
- Hany Farid, "Detecting Steganographic Messages in Digital Images", Department of
  Computer Science Dartmouth College Hanover NH 03755. Department Notes.
  http://www.cs.dartmouth.edu/farid/publications/tr01.pdf
- Ismail Avc?bas, Nasir Memon and Bülent Sankur, "Steganalysis Using Image
  2003.
- K. B. Raja, Kiran Kumar K., Satish Kumar N., Lakshmi M. S., Preeti H., Venugopal KR.
  and Lalit M. Patnaik, "Genetic Algorithm Based Steganography Using Wavelets", Lecture
  Steganography", International Journal of Computer Applications (0975-8887) Volume 2 –
  No. 3, May 2010.
- Abbas Cheddad, Joan Condell, Kevin Curran, Paul Mc Kevitt, "Digital Image
- Digital Image Steganography – A Gentle Overview, Pradeep Kumar Saraswat and RK
  Gupta, International Journal of Computer Science and Information Technology, Vol. 2 (2),
  2012, 129-136
- Ali Al-Ataby1 and Fawzi Al-Naima2, "A Modified High Capacity Image
  Steganography Technique Based on Wavelet Transform, the International Arab Journal of
  Information Technology, Vol. 7, No. 4, October 2010
- Lisa M. Marvel, Charles T. Retter, Charles G. Boncelet Jr. : Hiding Information in
  0-8186-8821-1, Volume 2
- Johnson, N. F., Jajodia, S. Steganalysis of Images Created Using Current

Index Terms

Computer Science Security

Keywords
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