Enhancing Data Security using Video Steganography, RSA and Huffman Code Algorithms with LSB Insertion

Volume 143
Number 4

Year of Publication: 2016

Authors:
Richard Apau, J. B. Hayfron-Acquah, Frimpong Twum

Abstract

Security (i.e. Confidentiality, Integrity, Authentication, Non-Repudiation, and Availability) in the field of data communication have remained a subject matter of discussion over the years. The internet as well as computer technology have made significant strive in data communication existence. Transferring data securely and safely amidst vulnerabilities of computer networks remain a source of worry to many in the field of data communication. Without security there is no need for data communication. The main objective of this study was to ensure security of data transmitted over the internet. The study proposed a novel approach of data security using video steganography, Huffman Code compression and asymmetric cryptography. In the proposed system, messages are encrypted with RSA and encrypted messages are compressed using Huffman code algorithm. The compressed encrypted messages are hidden using Least Significant Bit (LSB) algorithms. This research brings to light the concept of effectively combining steganography, compression and asymmetric cryptographic algorithm. The preference of RSA over any other cryptographic algorithm is due to its ability to provide better security for large file size thereby reducing computational complexity. The use LSB for video
embedding is also good for larger file sizes due to its low computational complexity. Huffman code compression is a lossless compression algorithm which allows reduction in size of data without loss of data. From the results obtained in this research, it was observed that when video steganography is combined with Huffman code compression and asymmetric cryptography, a higher level of security, robustness and capacity are achieved. The distortion experienced in this study is negligible; therefore the study achieved increased security by the high PSNR values and low MSE and BER values.

References


Index Terms
Computer Science  Algorithms

Keywords
Video Steganography, Asymmetric Cryptography, Huffman Code, LSB, RSA, PSNR, MSE, BER.