

**COMPARATIVE STUDY OF LEAST SIGNIFICANT BIT AND HAAR
WAVELET TRANSFORM STEGANOGRAPHY USING OPTIMIZATION
COMBINATION**

UNDERGRADUATE THESIS



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**INFORMATICS STUDY PROGRAM
FACULTY OF ENGINEERING & COMPUTER SCIENCE
UNIVERSITAS BAKRIE
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STATEMENT OF APPROVAL

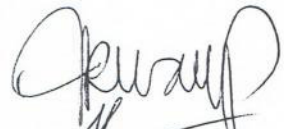
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This thesis is still have a lot of imperfections. Therefore, constructive criticism and suggestion from readers are really needed for the sake of this thesis perfection. The author really hope that this research would bring benefits in academic society, especially for all readers.

Jakarta, September 15th 2016



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List of Abbreviations

2D DWT	Two Dimensional Discrete Wavelet Transform
BMP	Bitmap Image File
DWT	Discrete Wavelet Transform
GA	Genetic Algorithm
JPEG	Joint Photographic Experts Group
LSB	Least Significant Bit
MATLAB	MATrix LABORatory
MSE	Mean Square Error
OPAP	Optimal Pixel Adjustment Process
PSNR	Peak Signal Noise Ratio
RGB	Red-Green-Blue
SSIM	Structural Similarity

Abstract

Steganography is a technique which enables sending and displaying the hidden information in public places, lately has received more attention and faced many challenges. Encryption is known to secure channels for hiding data. However, due to lack of covertness on these channels, an eavesdropper can identify encrypted streams through statistical tests and capture them for further cryptanalysis. A combination of simple Least Significant Bit substitution and the applicants of wavelet transform and genetic algorithm(GA) to make a secure steganographic encoding on JPEG image then applying an optimal pixel adjustment process (OPAP) to improve the quality of the stego-image. The wavelet transform implement GA to obtain an optimal mapping function to reduce the difference error between the cover and the stego-image. The hiding capacity will have a low distortion and Peak Signal to Noise Ratio(PSNR).

Keywords : data hiding, LSB substitution, steganography, discrete wavelet transform, genetic algorithm, optimal pixel adjustment process, image processing, cover image.