

# An Improved Image Steganography Scheme Based on RDWT and QR Decomposition

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**Abstract.** This paper demonstrates an improved image steganography that hides grayscale secret image into grayscale cover image using RDWT and QR decomposition. The proposed scheme made use of the human visual system (HVS) in the embedding process. Both cover and secret image are being segmented into non-overlapping blocks with identical block size. Then, entropy values generated from every image block will be sorted from the lowest value to the highest value. The embedding process starts by embedding the secret image block with lowest entropy value into the cover image block with lowest entropy value. The process goes on until all image blocks have been embedded. Embedding secret image into cover image according to the entropy values causes differences that HVS can less likely to detect because of the small changes on image texture. The proposed scheme provides improvement in terms of imperceptibility, which gives higher values of PSNR and better image quality.

## 1. Introduction

Image steganography is the art of information hiding. The purpose of steganography is to prevent outsiders to discover the existence of hidden data so it can hardly be detected and further manipulated. Its goal is to protect the secret data. The data can be in any forms, such as text, image, audio or video files. In this paper, it focuses on hiding image into another image. In general, an image steganography scheme can be represented as below [1].

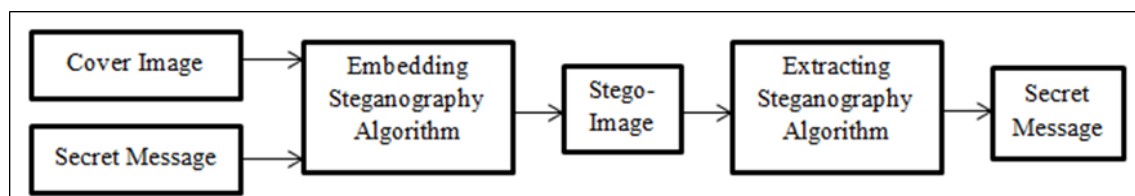


Figure 1. Basic Steganography Process

In the context of image steganography, there are two (2) domains which are spatial and transform domain. Spatial domain involves the direct bitwise manipulation [2] whereas transform domain focuses on the transformed image manipulation, which means the original cover image will be changed or transformed first before embedding secret message. Spatial domain is easier to be developed as compared to transform domain. It requires shorter computational time. However, it is more vulnerable to attacks. The reason is that it embeds secret information into cover image directly

security and robustness by testing it using loads of different cover and secret images. Robustness test will also be carried out to see how proposed scheme reacts under different attacks.

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