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# Permutation Modification of Reversible Data Hiding Using Difference Histogram Shifting in Encrypted Medical Image

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## Abstract

Recently, preserving the integrity of medical record, especially image medical record is important. One method for preserving the integrity is reversible data hiding (RDH) proposed by Huang et al. Reversible data hiding algorithm can recover the original image from marked image. In this paper, we implement reversible data hiding (RDH) on medical image because the correlation between the neighboring pixel can be preserved in encrypted image. In RDH, plain image is encrypted using specific encryption algorithm that consists of two processes (stream encryption algorithm and block permutation). However, since RDH used fixed block permutation, the security is weak against known plain text attack. To overcome this problem, dynamic permutation was proposed, such that the permutation would be specific for one session. In other session, different permutation would be used. Based on the experiment's result, it was shown that the security of the proposed method against known plain text attack is stronger than the previous method's one.

*Keywords:* Reversible Data Hiding; Difference Histogram Shifting; Encrypted Image;

## 1. Introduction

Due to the increasing use of internet, data security is getting important especially for preserving the integrity and the confidentiality of medical image (such as X-ray image, MRI etc.). One method for preserving the data integrity is steganography. There are several steganography methods that has been proposed, and one of them is reversible data hiding (RDH) proposed by Ni[1]. RDH is one of the data hiding technique, where the original image can be completely recovered after the embedded data have been extracted out[2]. Reversible data hiding will have benefits when true fidelity is needed, in the case of medical images. True fidelity is needed for medical image, because modifying on medical image can be deliberately dangerous or inadvertently affect the content interpretation. For example, uninten-