

## ABSTRACT

Reversible Data Hiding (RDH) is a kind of data hiding technique that allows the embedded data can be retrieved as needed and can restore the stego image exactly as the original image after the extraction of embedded data. Recently, RDH has been applied for medical record management, where any distortion of digital images is not allowed. Many new RDH techniques have been developed such as Pixel Value Ordering (PVO). This method is very popular because it has the advantage of reducing the number of pixels shifted, such that it can improve the stego image quality. However, existing method has a low embedding capacity (31%). To overcome this problem, this paper proposed a modified Pixel Value Ordering where the difference value is expanded after sorting the pixel values resulting from the embedding process based on different values of 0 and 1. In this case, the difference values of -2, 0, 1, and 3 are used to embed the data, instead of only using the difference values 0 and 1. The proposed method also uses the frequency of bit 0 and 1 in the message to determine the pixels mapping that can be used to embed the message. The experiments results show that the proposed method achieved an average embedding capacity (37%) and obtained a higher PSNR value of 61 dB.

**Keywords:** Reversible Data Hiding (RDH), medical record, medical images, Pixel Value Ordering (PVO).