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Reversible data hiding based on flexible block-partition and adaptive block-modification strategy

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Abstract

A novel reversible data hiding (RDH) method based on flexible block-partition and adaptive pixel-modification strategy is proposed in this paper, which is implemented from the following two aspects. One aims at partitioning flexibly a smooth block into non-overlapped sub-blocks of arbitrary size according to a local complexity measurement. After partition, since each resulting sub-block can be treated as an independent embedding unit, this block can be embedded with more data bits. The other is that the different pixel modification method is utilized for blocks (or sub-blocks) of different levels. Specifically, for a block, if it is not suitable for further division, only the maximum and minimum are modified at the same time so as to keep the distortion as low as possible. If it is divided into smaller sub-blocks, two pixel-modification schemes are designed for sub-blocks of size 1×3 and other sizes, respectively. One is that a 1×3 block can be embedded with 2 data bits by only modifying the maximum of this block. In this way, the embedding distortion is further decreased. The other is that in order to exploit better redundancy, two largest and two smallest pixels are modified simultaneously so that at most 4 data bits are embedded into a sub-block. Extensive experiments verify that the proposed method outperforms Peng *et al.*'s, Wang *et al.*'s, Li *et al.*'s, Sachnev *et al.*'s and Hong *et al.*'s works.

Keywords: Reversible data hiding, flexible block-partition, adaptive pixel-modification strategy, two-layer embedding,

1. Introduction

As the essential of steganography and watermarking, data hiding is a technique that hides secret message into a multimedia carrier, e.g., image, audio, or video for various applications including copyright protection, content authentication, and media asset management. In fact, steganography focuses on undetectability of hidden data, and its

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