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HIDING SECRET INFORMATION IN LOSSLESS COMPRESSION CODES

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Abstract. *Hiding data in digital media is a useful technique to transmit secret data via the Internet. Most existing compressed-based methods hide secret data in lossy compression codes. In this article, we modify the difference expansion method to present a new data-hiding scheme in lossless compression codes. Utilizing the proposed scheme, the compression codes after embedding secret are the same size as original compression codes without extra information or a location map. On the receiver side, the original compression codes can be extracted reversibly. The experimental results show the performance and the feasibility of this new scheme.*
Keywords: Reversible data hiding, LZW, Difference expansion

1. **Introduction.** Due to the progress made with computer hardware and software, the Internet has become the most popular channel for transmitting various forms of digital media. Since the environment of the Internet is insecure, covert communication via the network has become an important research topic in recent years. Data hiding [11,16,24] is one useful solution to meet the security requirement.

However, to save transmission bandwidth and storage space, digital media must be compressed first. Recent researches [2,4,5,7-10,15,17] have examined hiding secret data in compression codes. By using compression codes, compressed-based data-hiding methods can be roughly classified into two main categories: lossy compression and lossless compression.

1.1. **Data hiding in lossy compression codes.** Lossy compression methods are used in media such as images, audio and video that can bear slight distortion. Each data-hiding scheme modifies the compression codes after embedding secret data; therefore, the quality of the recovered media is sometimes degraded. Due to human perceptivity, slight modification of compression codes will not cause any attention, so there is room to hide secret data in these codes [2].

Chang and Wu [8] proposed a hybrid scheme that combines vector quantization (VQ) [18] and side match vector quantization (SMVQ) compression codes to hide secret data