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SPIHT AND ODD-EVEN ESTIMATION BASED MDC ALGORITHM

Fa-Xin Yu[1], Linlin Tang[2] and Zheming Lu[1,2]

[1]School of Aeronautics and Astronautics
Zhejiang University
Hangzhou 310012, P. R. China
zhemingl@yahoo.com

[2]Electronic and Communication Department
Harbin Institute of Technology Shenzhen Graduate School
Shenzhen 518055, P. R. China
hittang@126.com

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Abstract. *Based on the SPIHT compression method, this paper proposes a new Multiple Description Coding (MDC) algorithm with the simple odd-even estimation idea. We divide the original image into two parts called the odd and even parts, and then compute the difference between them as the residual part. Based on these three parts, we construct a multiple description encoder with three channels. The successful application of the reshaped redundancy gets high compression efficiency and keeps the structure character of the original image. To evaluate the performance, we apply our method to image communication. We compare our algorithm with several traditional methods under the assumption that there is at least one channel that can always be trusted. Experimental results demonstrate the effectiveness of the proposed method.*
Keywords: Robust transmission, Set partitioning in hierarchical trees (SPIHT) algorithm, Multiple description coding (MDC), Odd-even estimation method

1. **Introduction.** With the rapid development of Internet and wireless communication in the past decade, more and more attention has been paid to the robust transmission over the congested or fading channels. Under this situation, packet loss is unavoidable, which brings a great impact on the reconstructed quality of the multimedia signals. For example, if some of the transmitted data of ATM were lost, it would cause great loss to the bank and the customers. And if the retransmission failed again, the whole network might slip into a state of paralysis. Therefore, it is important to enhance the robustness of the transmission.

The Multiple Description Coding (MDC) has received more and more attention for its good performance in the congested network. The main idea of MDC is to generate multiple descriptions of the source such that each description describes the source with a certain desired fidelity. If more than one description is available, then they can be combined to enhance the quality. MDC is robust due to the redundancy in multiple descriptions of the same source. Secondly, MDC may be scalable as each correctly received description improves the decoder performance. Furthermore, MDC does not require prioritized transmission, as each description is independently decodable. MDC can be viewed as a joint source and channel coding technique since it can be used to provide error resilience to media streams with a relatively small reduction in compression ratio. In addition, MDC simplifies the network design without feedback or retransmission of any lost packet, which meets the requirement in real-time interactive applications [1]. The basic block diagram of MDC is shown in Figure 1, where $\{X_K\}$ denotes the original multimedia sequence, it