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Low Complexity Intra Prediction Mode Decision for 3D-HEVC Depth Coding

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Abstract

The 3D High Efficiency Video Coding (3D-HEVC) is the latest 3D extension of the HEVC video coding standard. It supports multi-view videos plus depth (MVD), which is a sophisticated format for enhanced 3D content. Depth modeling modes (DMM) are adopted in the 3D-HEVC for better sharp edge encoding. However, employing DMM causes important increase of computational complexity. In this paper, we propose a three steps scheme for fast intra depth coding in 3D-HEVC. Based on the kirsch edge detection algorithm, a fast angular mode decision algorithm is performed. In order to avoid unnecessary evaluation of the DMMs, a new early termination approach (ET) based on the smoothness of the processed block is adopted. Besides, based on the enhanced shuffled frog leaping algorithm (E-SFLA), a new heuristic method to search the optimal wedgelet pattern for DMM1 Depth mode is introduced. The proposed algorithm is implemented on the top of four different versions of HTM. It outperforms HTM-16.0, the latest used version, and four different work from the literature, in terms of encoding time with similar coding and quality efficiency.

Keywords: 3D high-efficiency video coding (3D-HEVC), Intra prediction, Heuristic, Wedgelet, low complexity

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