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| *Title:* | **3D-CE6.h related: Sample-based simplified depth coding** | | |
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| *Purpose:* | Proposal | | |
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# Abstract

In current 3D-HEVC, the simplified depth coding (SDC) is utilized as an alternative intra coding mode. In SDC, all the depth samples in one coding partition are represented by a same reconstructed value even when the intra coding mode is planar mode. In this proposal, it is proposed to update each prediction sample by adding a same residual instead of changing all the prediction samples to a same reconstructed value. The simulations results reportedly show that 0.2% coding gain for video over total bit-rate is achieved in both common test conditions and all-intra test conditions, and 0.2% and 0.1% coding gains can be achieved for the synthesized view in common test conditions and all-intra test conditions, respectively.

# Introduction

In 3D-HEVC, the simplified depth coding (SDC) is applied as an alternative intra coding mode [1]. For SDC, the initial prediction samples () of current depth block are generated by the conventional intra prediction or DMM intra prediction. The possible intra modes used in SDC are listed as the follows:

1. DC mode (1 partition)
2. DMM mode 1 (2 partitions)
3. Planar mode (1 partition)

Instead of transmitting the quantized transform coefficients to encode the residual signal, the residual of each partition in current depth block is coded by transmitting a constant residual value to the decoder.

In current design of SDC, the input are the mean of the original depth value () and the predicting depth value () which is the mean of the initial prediction samples of current depth block generated by intra prediction with mode DC, DMM mode 1, or Planar mode. A depth lookup table (DLT) is used to map the and to index values. The residual index to be transmitted to the decoder is given by

where denotes the depth lookup table. At the decoder side, the reconstructed depth value () is derived as

where denotes the inverse depth lookup table. The residual signal is then reconstructed as

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# Sample-based SDC

For SDC in current design, each sample () in a partition will be represented by a same reconstructed depth value which is the mean of the initial prediction samples of current depth block () plus a reconstructed residual signal even when the intra prediction mode is planar mode, i.e.,

Instead of using a same reconstructed value to represent all the prediction samples in one partition, we propose to keep the smooth surface generated by the prediction sample by adding the residual signal on each prediction sample, i.e.,

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# Experimental results

The proposed method is integrated into HTM-6.0 [2], and all tests are conducted under the common test conditions [3] and all-intra test conditions [4]. The experimental results of the proposed method under the common test conditions and under the all-intra test conditions are shown in Table 1 and Table 2, respectively. As shown in the tables, the proposed sample-based SDC can achieve 0.2% BD-rate saving for video over total bit-rate in both common test conditions and all-intra test conditions, and 0.2% and 0.1% BD-rate savings for the synthesized view in common test conditions and all-intra test conditions, respectively.

**Table 1. The results of sample-based SDC (CTC)**



**Table 2. The results of sample-based SDC (All-intra)**



# Conclusion

This contribution proposed a sample-based SDC to add the residual on each prediction sample instead of using a same reconstructed value to represent all depth samples in a coding partition in order to keep the smooth surface generated by the intra prediction. The results show that the proposed method can achieve 0.2% BD-rate saving for overall in both common test conditions and all-intra test conditions, and 0.2% and 0.1% BD-rate savings for the synthesized view in common test conditions and all-intra test conditions, respectively.

# Patent rights declaration(s)

**MediaTek Inc** **may have current or pending patent rights relating to the technology described in this contribution and, conditioned on reciprocity, is prepared to grant licenses under reasonable and non-discriminatory terms as necessary for implementation of the resulting ITU-T Recommendation | ISO/IEC International Standard (per box 2 of the ITU-T/ITU-R/ISO/IEC patent statement and licensing declaration form).**

# References

[1] G. Tech, K. Wegner, Y. Chen, and S. Yea, “Draft of 3D-HEVC test model description,” Document of Joint Collaborative Team on 3D Video Coding Extension Development, JCT3V-C1005, January, 2013.

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