|  |  |
| --- | --- |
| **Joint Collaborative Team on 3D Video Coding Extension Development**  **of ITU-T SG 16 WP 3 and ISO/IEC JTC 1/SC 29/WG 11**  2nd Meeting: Shanghai, CN, 13–19 Oct. 2012 | Document: JCT3V-B0057 |

|  |  |  |  |
| --- | --- | --- | --- |
| *Title:* | **3D-CE3.a related: On inside-view motion prediction for 3D-AVC** | | |
| *Status:* | Input Document | | |
| *Purpose:* | Proposal | | |
| *Author(s) or Contact(s):* | Li Zhang Ying Chen Liu He  5775 Morehouse Drive San Diego, CA 92121 USA | Tel: Email: | +1-858-651-6660 [lizhang@qti.qualcomm.com](mailto:lizhang@qti.qualcomm.com)  1-858-845-6589  [cheny@qti.qualcomm.com](mailto:cheny@qti.qualcomm.com) |
| *Source:* | Qualcomm Incorporated | | |

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

# Abstract

In the current 3D-AVC, inside-view motion prediction (IVMP) is employed for depth coding. A flag to signal the IVMP mode is conditionally transmitted based on the coding modes and reference picture type of co-located macroblock(s) in the associated texture view component. Although such a conditional signalling could save some unnecessary bits for the IVMP mode, it introduces additional parsing dependency to the texture at the macroblock level. Therefore, it is proposed to remove the conditional signalling of the IVMP mode and the IVMP flag is always transmitted with no need to check the mode information of co-located texture. Experimental results show that the coding loss is minor, i.e., 0.05% for synthesized views.

# Introduction

In the current 3D-AVC, inside-view motion prediction (IVMP) is enabled for depth view coding. When IVMP is enabled, the corresponding motion information from the texture view could be inherited. For symmetric coding between texture and depth views, the motion information of co-located macroblock in the texture view is inherited. While for the asymmetric coding, one macroblock in the depth view corresponds to four macroblocks in the associated texture view since both width and height of depth views are reduced by half compared to those of texture views. To signal the IVMP mode, one flag may be signaled in the macroblock level. However, if one of the following conditions is true, the IVMP flag is not transmitted and inferred to be 0.

– For symmetric coding, the co-located macroblock in the texture view is intra coded, or view synthesis prediction is used for any partition in current macroblock.

– For asymmetric coding, if any of the four co-located macroblocks in the texture view is intra coded, or its mb\_type equal to equal to P\_8x8, P\_8x8ref0, or B\_8x8, or view synthesis prediction is included.

With the conditional signalling of the IVMP mode, coding bits regarding to unnecessary IVMP signalling could be saved. However, it also leads to the parsing dependency problem where the parsing process of the flag relies on the coding mode and reference picture type of co-located macroblock(s).

# Proposal

It is proposed that the conditional signalling of the flag in the IVMP mode is removed. However, when the above conditions are satisfied, the flag is always set equal to 0 at the encoder side. The context modeling method for coding the flag in IVMP mode remains unchanged.

# Experimental results

This section provides the simulation results of the proposed method in comparison with the 3D-ATM anchor. The proposed method is implemented on top of 3D-ATM 5.1 [2]. All the simulation tests are performed under the common test conditions [3].

The simulation results are tabulated in Table 1. As shown in Table 1, the overall average bitrate increase is 0.02%, 0.05% for coded views and synthesized views, respectively.

Table 1: Coding gain with respect to anchor for 3-view case

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Texture Coding | | Depth Coding | | Total (Coded PSNR) | | Total (Synthesized PSNR) | | Complexity estimate | |
|  | dBR % | dPSNRdB | dBR % | dPSNR dB | dBR % | dPSNRdB | dBR % | dPSNR dB | Enc. Time  % | Dec. Time  % |
| S01 | 0.03 | 0.00 | 0.60 | -0.04 | 0.05 | 0.00 | 0.11 | 0.00 | 98.24 | 96.44 |
| S02 | -0.01 | 0.00 | 0.42 | -0.02 | 0.02 | 0.00 | 0.04 | 0.00 | 98.76 | 96.24 |
| S03 | 0.01 | 0.00 | 0.96 | -0.08 | 0.05 | 0.00 | 0.08 | 0.00 | 100.53 | 97.00 |
| S04 | -0.02 | 0.00 | 0.17 | -0.01 | -0.04 | 0.00 | -0.02 | 0.00 | 100.45 | 97.65 |
| S05 | 0.01 | 0.00 | 0.21 | -0.01 | 0.02 | 0.00 | 0.03 | 0.00 | 104.46 | 98.67 |
| S06 | 0.00 | 0.00 | 0.37 | -0.02 | 0.02 | 0.00 | 0.04 | 0.00 | 101.67 | 99.35 |
| S08 | 0.00 | 0.00 | 0.13 | -0.01 | 0.02 | 0.00 | 0.07 | 0.00 | 100.03 | 98.78 |
| Average | 0.00 | 0.00 | 0.41 | -0.03 | 0.02 | 0.00 | 0.05 | 0.00 | 100.59 | 97.73 |

# References

1. M. M. Hannuksela, Y. Chen, “Working Draft 2 of AVC compatible video with depth”, ISO/IEC/JTC1/SC29/WG11/N12732, 100th Meeting: Geneva, CH, 16–20 May 2012.
2. 3D-ATM version 5.1: <http://mpeg3dv.research.nokia.com/svn/mpeg3dv/tags/3DV-ATMv5.1/>
3. D. Rusanovskyy, K. Müller, A. Vetro, “Common Test Conditions of 3DV Core Experiments,” ITU-T SG 16 WP 3 and ISO/IEC JTC 1/SC 29/WG 11, JCT3V-A1100, 1st Meeting: Stockholm, SE, 16–20 July 2012.

# Patent rights declaration(s)

**Qualcomm Incorporated 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).**