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| *Title:* | **VSD bugfix and improvement** | | | |
| *Status:* | Input Document | | | |
| *Purpose:* | Proposal | | | |
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# Abstract

Bugfix of VSD (View Synthesis Distortion) calculation is proposed to correct the bitDepth value assignment for VSD calculation. After bugfix, 0.1% BD-bitrate saving is achieved on synthesized view under CTC. Additionally a modification of VSD calculation is proposed and 0.1% BD-bitrate saving on view 1 and view 2, and 0.3% BD-bitrate saving on synthesized view are achieved under CTC.

# Introduction

**Part 1 HTM9.0r1 VSD bugfix**

Currently, for VSD (View Synthesis Distortion) calculation in HTM9.0r1, bitDepth is always assigned with 0. To fix this bug, we assign the “bitDepth” parameter with “g\_bitDepthY”. After bugfix, 0.1% BD-bitrate saving is achieved on synthesized view under CTC as shown in Table 1.

**Part 2 VSD bugfix and improvement**

Moreover, since the same distortion on depth map may have different impacts according to different depth map values (e.g. larger impact when the object is close, small impact when the object is far away), for the VSD calculation equation in Eqn. (1), we take the original depth value as one of the evaluation factor and design the new VSD calculation equation in (3)

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|  |  | (1) |

where and indicate the original and reconstructed depth map, respectively, and means the sample position in a (macro-) block B. indicates the reconstructed texture, and is proportional coefficient determined by

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|  |  | | (2) | |
|  | | (3) | |

where the *g(sD(x,y))* is a piecewise linear function as shown in Eqn. (4) below

*g(sD(x,y))*  = 4, if *sD(x,y) ≥* 96

*g(sD(x,y))*  = (*sD(x,y) –* 16)/32+1, if 16 <*sD(x,y) <*96 (4)

*g(sD(x,y))*  = 1, if *sD(x,y) ≤* 16

The curve of *g(sD(x,y))* is plotted in Figure 1.

With bugfix and this improvement, the performance under CTC is shown in Table 2.

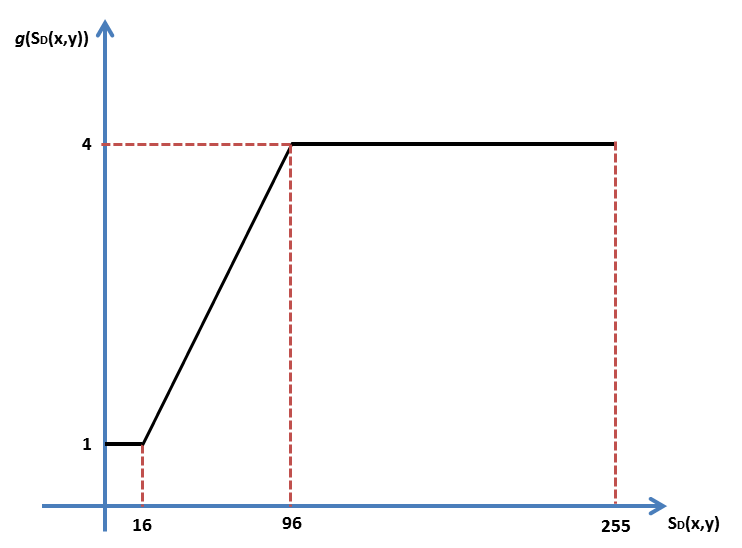


Figure 1. Function of *g(sD(x,y))*

# Experimental results

The proposed method is implemented on top of HTM-9.0r1, and simulations were performed under “common test condition” [1] configuration.

Table 1 VSD bugfix result under CTC



Table 2 VSD bugfix and improvement result under CTC



The results are summarized in Table 1 and Table 2. As it is reported, the proposed bugfix and improvement achieve -0.1% and -0.3% BD-rate coding gain on synthesized views respectively under CTC.

# References

1. D. Rusanovskyy, K. Müller, A. Vetro, “Common Test Conditions of 3DV Core Experiments,” JCT3V-F1100, Geneva, Switzerland, 25 Oct –1 Nov. 2013

# Patent rights declaration(s)

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