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| **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**  1st Meeting: Stockholm, SE, 16–20 July 2012 | Document: JCT2-A0093 |

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| *Title:* | **3D-CE8.h results on view synthesis optimization by Samsung, HHI and LG-PKU** | | |
| *Status:* | Input document | | |
| *Purpose:* | Proposal | | |
| *Author(s) or Contact(s):* | Byung Tae Oh,  Jaejoon Lee,  Du Sik Park,  Gerhard Tech,  Karsten Müller,  Thomas Wiegand  Shiqi Wang  Siwei Ma  Hongbin Liu  Jie Jia  Jiwook Jung | Email: | byung.oh@samsung.com  jaejoon1.lee@samsung.com  dusikpark@samsung.com  gerhard.tech@hhi.frauhofer.de  karsten.mueller@hhi.frauhofer.de  thomas.wiegand@hhi.frauhofer.de  sqwang@jdl.ac.cn  swma@jdl.ac.cn  hongbin.liu@lge.com  jie.jia@lge.com  jiwook.jung@lge.com |
| *Source:* | Samsung Electronics Co., Ltd and Fraunhofer HHI, LG Electronics, Peking University | | |

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# Abstract

Modifications of VSO (View Synthesis Optimization, M22570) as reported in M24830, M24865 and M24765 are proposed to reduce encoder runtime and increase coding gains. Coding experiments for CE8.h (Modified Distortion Measure) as defined in N12745 and N12746 using a version of HTM-3.1 including proposed modifications have been conducted and are reported in this document. Additionally an alternative VSO configuration using further modification to decrease runtime is presented. However, results for this configuration have not been cross evaluated.

# Proposed modifications

The following modifications are suggested for configuration A:

1. Run-time optimization of VSO algorithm implementation.
2. Increase of number of views regarded for error computation by a factor of three.
3. Model-based view synthesis distortion estimation. This means the synthesis view distortion is computed without view rendering.
4. Skip rendering process for lines where distortion of disparity vector is zero. This means that if distorted depth and original depth are mapped to the same disparity vector for all pixels in a line of the depth block, rendering process is skipped for the line.

For the additional configuration B also following modifications are proposed:

1. Distortion computation in luma plains only.
2. No renderer model update for already coded blocks. This means that the synthesized view distortion change is computed assuming uncoded depth data in all blocks apart from the depth block to be tested (Compare to M22570, sec. 3.4.1.1).

Whereas modification 1 results in an encoder speed-up without an impact on coding efficiency, modifications 4, 5 and 6 lead to a speed-up and changed rate-distortion performance. Modification 2 causes further coding gains but an increase of encoding time. Modification 3 partially replaces the VSO function to reduce the encoding complexity.

# Coding experiments (configuration A)

Results of the coding experiment using a 3D-HTM version 3.1 including the proposed modifications 1-4 for the three view case are given in . It can be seen that encoder run time is reduced by 23% moreover a rate reduction of 2.6% for the synthesized views can be achieved. Additional results can be found in the attached excel sheet.

Table : coding results for proposed modifications 1–4 (propsal A)

|  |  |  |  |
| --- | --- | --- | --- |
|  | synthesized only | coded & synthesized | enc time |
| Balloons | -2.2% | -1.9% | 77.3% |
| Kendo | -1.5% | -1.5% | 79.0% |
| Newspapercc | -4.5% | -3.7% | 75.6% |
| GhostTownFly | -2.8% | -2.2% | 78.1% |
| PoznanHall2 | -1.6% | -1.6% | 77.3% |
| PoznanStreet | -1.5% | -1.4% | 75.0% |
| UndoDancer | -4.3% | -3.1% | 76.8% |
| **average** | **-2.6%** | **-2.2%** | **77%** |

# Alternative configuration (configuration B) (not cross checked)

The alternative configuration only adopts modifications 1-6. Results obtained with this configuration for the three view case are given in . It can be seen that encoder runtime is reduced by about xx% moreover rate decreases in average about xx% for the synthesized views. Additional results can be found in the attached excel sheet.

Table : coding results for alternative configuration (modifications 1-6)

|  |  |  |  |
| --- | --- | --- | --- |
|  | synthesized only | coded & synthesized | enc time |
| Balloons |  |  |  |
| Kendo |  |  |  |
| Newspapercc |  |  |  |
| GhostTownFly |  |  |  |
| PoznanHall2 |  |  |  |
| PoznanStreet |  |  |  |
| UndoDancer |  |  |  |
| **average** |  |  |  |

# Conclusion

Modifications of VSO have been suggested. Coding results for two different configurations adopting these modifications have been presented. For high gains it is suggested to adopt modifications 1-4. For low computational complexity modifications 1-6 can be adopted.

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