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**ISO/IEC JTC1/SC29/WG11 MPEG2020/M54755**
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**Source** **Poznań University of Technology (PUT), Poznań, Poland**
**Status** **Input**
**Title** **[MPEG-I Visual] MIV Geometry Absent for perspective content**
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## Abstract

This document presents the results of MIV View with decoder-derived depth presented in m54492. Results for sequences E, L and P were generated for m54492 crosscheck purposes, while results for remaining sequences show, that idea described in m54492 works also for any perspective natural content.

## 1 Introduction

Presented results were obtained as in m54492 with two exceptions:

- IVDE was using 2 threads instead of 16,
- conversions yuv420p10le => yuv420p and yuv420p10le <=> yuv420p16le were done using PUT's internal software instead of HDRTools.

## 2 Full results

Table 1. MIV View with decoder-derived depth vs. V17 anchor.

**Mandatory content - Proposal vs. Low/High-bitrate Anchors**

| Sequence | | High-BR BD rate Y-PSNR | Low-BR BD rate Y-PSNR | Max delta Y-PSNR | High-BR BD rate VMAF | Low-BR BD rate VMAF | High-BR BD rate IV-PSNR | Low-BR BD rate IV-PSNR | Pixel rate ratio |
|---|---|---|---|---|---|---|---|---|---|
| OrangeKitchen | SJ | 0.0% | 0.0% | 12.75 | 158.4% | 35.6% | 0.0% | 0.0% | 0.52 |
| TechnicolorPainter | SD | -30.6% | -64.8% | 11.21 | -53.2% | -74.9% | -32.4% | -63.0% | 0.50 |
| IntelFrog | SE | -37.7% | -48.7% | 12.55 | -53.7% | -57.6% | -36.1% | -47.0% | 0.41 |
| PoznanFencing | SL | -66.5% | -77.4% | 13.74 | -63.5% | -77.8% | -69.5% | -78.5% | 0.24 |

**Optional content - Proposal vs. Low/High-bitrate Anchors**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| PoznanCarpark | SP | -59.5% | -70.7% | 11.05 | -53.7% | -70.5% | -68.5% | -74.8% | 0.24 |
| PoznanHall | ST | -91.6% | -91.8% | 17.76 | -91.0% | -91.9% | -89.3% | -90.4% | 0.24 |
| PoznanStreet | SU | -51.4% | -64.5% | 8.86 | -54.0% | -66.9% | -61.6% | -68.3% | 0.24 |

Table 2. MIV View with decoder-derived depth vs. A17 anchor.

**Mandatory content - Proposal vs. Low/High-bitrate Anchors**

| Sequence | | High-BR BD rate Y-PSNR | Low-BR BD rate Y-PSNR | Max delta Y-PSNR | High-BR BD rate VMAF | Low-BR BD rate VMAF | High-BR BD rate IV-PSNR | Low-BR BD rate IV-PSNR | Pixel rate ratio |
|---|---|---|---|---|---|---|---|---|---|
| OrangeKitchen | SJ | 626.6% | 343.5% | 12.75 | 195.0% | 87.5% | 0.0% | 431.8% | 0.52 |
| TechnicolorPainter | SD | -35.5% | -58.5% | 11.21 | -63.9% | -72.1% | -15.0% | -50.1% | 0.50 |
| IntelFrog | SE | 0.0% | -70.4% | 12.55 | 0.0% | -64.9% | -68.4% | -51.4% | 0.41 |
| PoznanFencing | SL | 0.0% | 0.0% | 13.74 | 0.0% | 0.0% | 0.0% | -91.7% | 0.24 |

**Optional content - Proposal vs. Low/High-bitrate Anchors**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| PoznanCarpark | SP | -84.5% | -80.8% | 11.05 | -78.3% | -77.8% | -63.7% | -69.4% | 0.24 |
| PoznanHall | ST | 0.0% | -94.7% | 17.76 | -89.2% | -90.6% | -93.8% | -93.4% | 0.24 |
| PoznanStreet | SU | 0.0% | -85.2% | 8.86 | -81.5% | -75.0% | -60.3% | -63.1% | 0.24 |

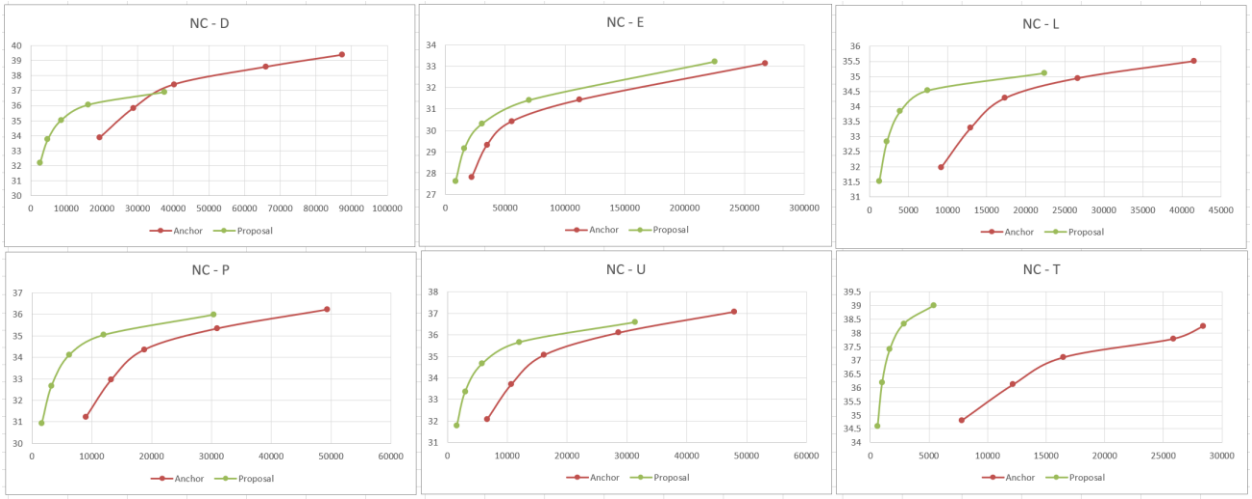


Fig. 1. MIV View with decoder-derived depth vs. V17 anchor, natural content.

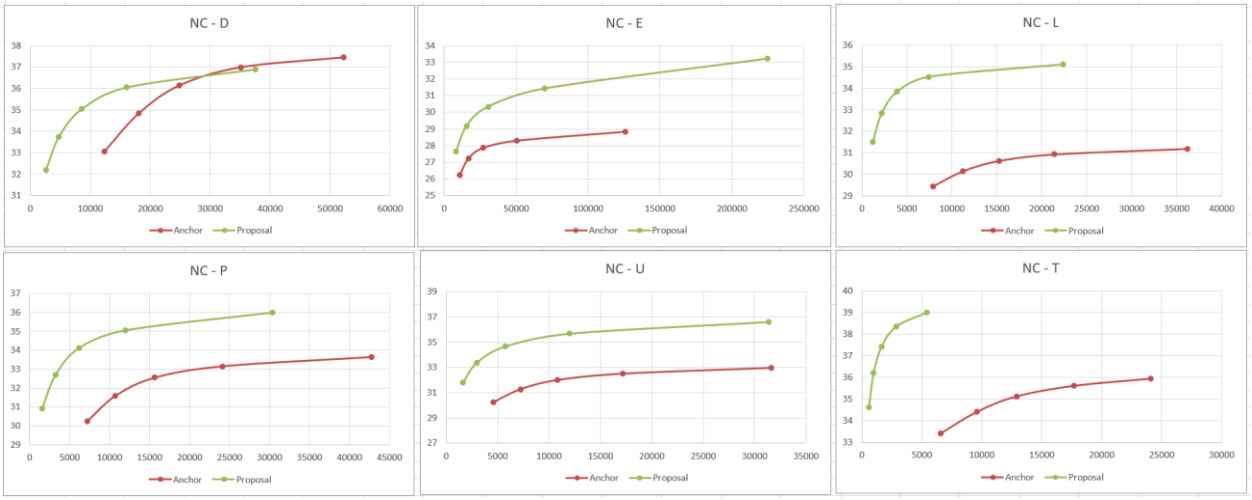


Fig. 2. MIV View with decoder-derived depth vs. A17 anchor, natural content.

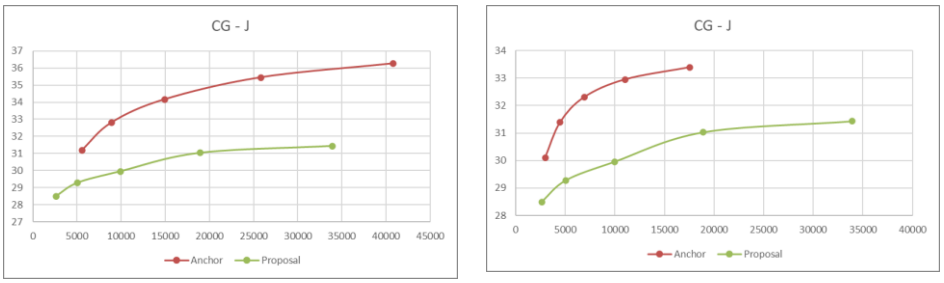

Fig. 3. MIV View with decoder-derived depth vs. anchors (left: V17, right: A17), CG content.

# 3 Crosscheck result

Table 3. Crosscheck of m54492 results.

| SE | Y-PSNR | U-PSNR | V-PSNR | VMAF | IVPSNR |
|---|---|---|---|---|---|
| min_diff | -1.0184 | -0.5393 | -1.1543 | -2.052879 | -1.6499 |
| max_diff | 0.0475 | 0.0164 | 0.137 | -0.051136 | 0.0919 |
| avg_diff | -0.17590308 | -0.06171538 | -0.15736308 | -0.54409935 | -0.24121875 |
| | | | | | |
| SL | Y-PSNR | U-PSNR | V-PSNR | VMAF | IVPSNR |
| min_diff | -0.1952 | -0.0392 | -0.027 | -1.616042 | -0.1159 |
| max_diff | 0.4467 | 0.1088 | 0.1145 | 1.319689 | 0.8604 |
| avg_diff | 0.043398 | 0.015138 | 0.016078 | 0.0471635 | 0.076458 |
| | | | | | |
| SP | Y-PSNR | U-PSNR | V-PSNR | VMAF | IVPSNR |
| min_diff | -0.6891 | -0.0913 | -0.2143 | -0.719872 | -0.6224 |
| max_diff | 0.0081 | 0.0019 | 0.1554 | 0.114924 | 0.0461 |
| avg_diff | -0.1277 | -0.01518 | -0.0258 | -0.13824436 | -0.11806444 |

Note 1: negative value means, that results presented in m54492 were worse than obtained by PUT.

Note 2: IVPSNR value for SE v10 QP1 in m54492 was wrongly calculated (20.8 dB, while Y-PSNR for that view is 27.6 dB) so this particular view was removed from the analysis above.

Note 3: Average difference between both results are negligible.

# 4 Comments

- crosscheck of m54492 was successful, although obtained results were not exact because of slight IVDE configuration difference and different data conversions,
- MIV View with decoder-derived depth approach shows improvement for all natural-content sequences,
- for CG content, the quality degradation is expected, as ground-truth rendered depth maps were used for A17 and V17.

# 5 Acknowledgement

This work was supported by the Ministry of Science and Higher Education.

# 6 References

[M54492] B. Salahieh, J. Boyce, J. Fleureau, B. Chupeau, R. Dore, “MIV View with Decoder-Derived Depth”, ISO/IEC JTC1/SC29/WG11 MPEG/M54492, June 2020, Online.