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**Title: Core Experiment on View Interpolation Prediction (CE3)**

**Source: GIST**

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**Status: CE Report**

## **1. Introduction**

At the 75<sup>th</sup> MPEG meeting in Bangkok, Thailand, a description of core experiments on MVC was released and this document [1] was updated at the 76<sup>th</sup> and 77<sup>th</sup> MPEG meeting. According to the document, we conducted a core experiment on view interpolation prediction of CE3. This document describes the procedure and results of the core experiment.

## **2. View Interpolation Prediction**

The purpose of core experiment 3 is to evaluate the benefits of view synthesis tools in addition to the tools in the reference software. Nagoya/NTT and MERL proposed the CE3 algorithm. Both proposals require a number of subparts. MERL require method to compute depth in a way that yields good compression performance, methods to do the view synthesis from a depth map, and methods to predict from synthesized pictures in addition to pictures in the sequence to be coded. Nagoya/NTT requires subparts such as methods to generate depth map from decoded images, how to derive and encode disparity correction values, how to synthesize from the corrected depth map [2].

## **3. Cross Check**

We participated in cross checking MERL and Nagoya/NTT results on “Breakdancers” sequence. Originally, source codes for implementation, encoded and decoded bitstream, and documents for description should be provided to cross check participants. However, we lately received these materials. In addition, we did not receive any materials from MERL unfortunately. Due to some unforeseen setbacks, their CE is delayed again and again. So, this document only includes experimental results for Nagoya/NTT. We verified the results and implementation.

## **4. Implementation**

To verify the Nagoya/NTT’s implementation, we check their source codes and configuration files. We check coding options and view-temporal structure of MVC reference software and Nagoya/NTT. Nagoya/NTT employ the same view-temporal structure as that of

the reference software, and they add the view interpolation prediction (VIP) tool to previous prediction tools, such as List 0 prediction, List 1 prediction, Bi-prediction, and Direct mode. VIP encodes the residual data between original and view interpolated image using Hadamard transform. However, we did not find the Hadamard transform for chrominance component. We also indicate that Nagoya/NTT use the QP=30 for low bit-rate instead of 31.

## 5. Experimental Results

Table 1, 2, 3 show the experimental results for low, middle, and high bit rate. Figure 1 shows the rate-distortion curve for “breakdancers”.

Table 1. Experimental results for low bit rate (Basis QP=30)

View	JSVM		Proposed	
	Bit Rate (kbps)	PSNR (dB)	Bit Rate (kbps)	PSNR (dB)
0	246.45	37.30	371.38	37.77
1	246.45	37.01	200.73	37.35
2	246.45	37.50	267.77	37.88
3	246.45	36.88	212.73	37.30
4	246.45	37.80	251.83	38.26
5	246.45	36.92	194.29	37.45
6	246.45	37.57	290.32	37.97
7	246.45	37.51	277.31	38.10
Avg.	246.45	37.31	258.29	37.76

Table 2. Experimental results for middle bit rate (Basis QP=26)

View	JSVM		Proposed	
	Bit Rate (kbps)	PSNR (dB)	Bit Rate (kbps)	PSNR (dB)
0	489.10	38.53	652.54	38.75
1	489.10	38.56	336.27	38.62
2	489.10	38.86	485.46	38.97
3	489.10	38.56	358.95	38.64
4	489.10	39.14	445.90	39.30
5	489.10	38.41	332.42	38.65
6	489.10	38.95	513.83	39.05
7	489.10	38.93	504.42	39.14
Avg.	489.10	38.74	453.72	38.89

Table 3. Experimental results for high bit rate (Basis QP=22)

View	JSVM		Proposed	
	Bit Rate (kbps)	PSNR (dB)	Bit Rate (kbps)	PSNR (dB)
0	1040.54	39.48	1380.75	39.63
1	1040.54	39.58	670.79	39.68
2	1040.54	39.82	1085.14	39.88
3	1040.54	39.64	697.45	39.73
4	1040.54	40.05	997.20	40.15
5	1040.54	39.43	687.13	39.64
6	1040.54	39.88	1108.06	39.94
7	1040.54	39.88	1127.27	40.00
Avg.	1040.54	39.72	969.22	39.83

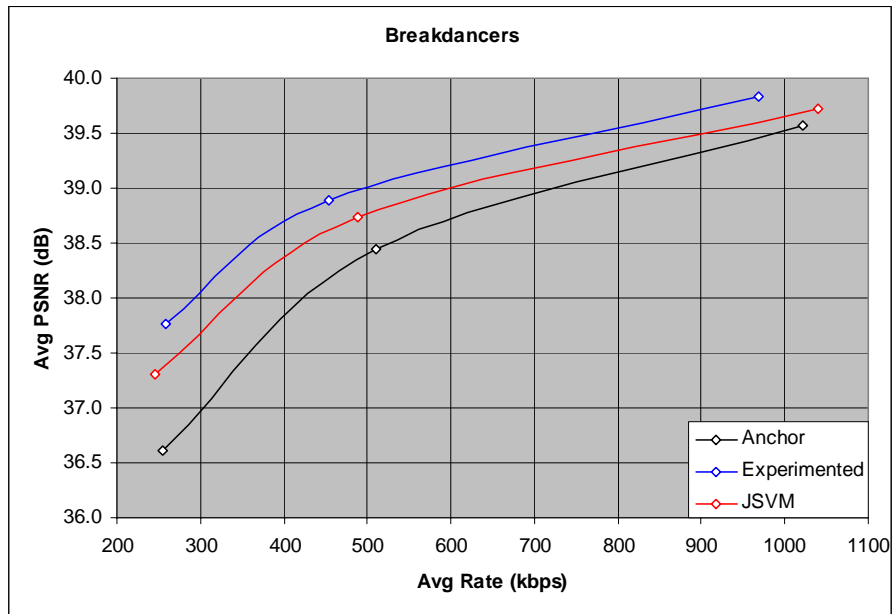


Fig. 1. Rate-distortion Curve for "Breakdancers"

## 5. Conclusion

We participated in CE3 cross checking for "Breakdancers" sequence. Unfortunately, we could not contact MERL. So, we only verified Nagoya/NTT's algorithm. We confirmed the experimental results for "Breakdancers" sequence.

## 6. References

- [1] ISO/IEC JTC1/SC29/WG11 w8019, "Description of Core Experiment in MVC," April 2006.
- [2] ISO/IEC JTC1/SC29/WG11 m12969/KDDI/KDDIfor3DAV.doc, "Multiview Video Coding by Disparity Prediction from Center Sequence," January 2006.