

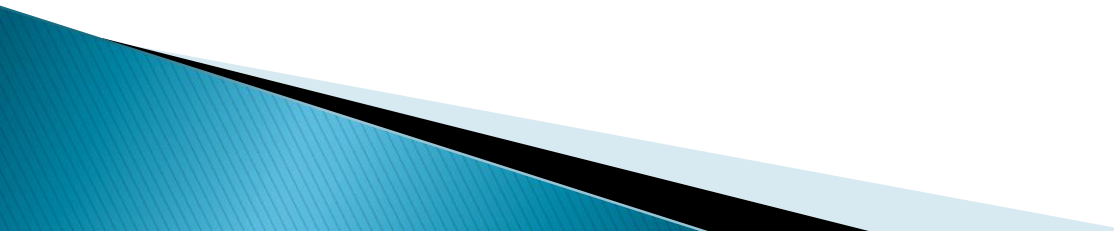
Performance Evaluation of MV-HEVC

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Objective

- ▶ Verification test for the HEVC-based coding of multi-view video as compared to Simulcast HEVC and AVC multi-view coding.

Used Encoders

- ▶ MVC: AVC-based multiview video coding (non-base view is coded using inter-view prediction)
 - ▶ Simulcast HEVC: each view is coded independently
 - ▶ MV-HEVC: HEVC-based multiview video coding (non-base view is coded using inter-view prediction)
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Common Conditions for Encoding

- ▶ Inter-view coding structure
 - 2 view case: left-right (in coding order)
 - I-P inter-view prediction for MVC and MV-HEVC
- ▶ Temporal prediction structure: GOP 8, intra every 24 frames (random access at ~1 sec)
- ▶ Full resolution texture coding
- ▶ Codec software: JM v1 8.6 for MVC, and 3D-HTM v1 4.1 for Simulcast HEVC and MV-HEVC

Test Sequences

Seq. ID	Name of Test Sequence	View number (left-right)
S03	Undo_Dancer	3-5
S04	GT_Fly	5-3
S13	Band06	0-1
S14	BMX	0-1

Encoder Configurations

Test Sequence	QP values (Independent view/dependent view)											
	MVC				Simulcast HEVC				MV-HEVC			
	R1	R2	R3	R4	R1	R2	R3	R4	R1	R2	R3	R4
S03:Undo_Dancer	23/25	28/29	32/35	37/39	25	30	35	40	24/27	30/33	35/38	40/43
S04:GT_Fly	23/24	27/30	32/33	36/37	25	30	35	40	24/27	29/32	35/38	39/42
S13:Band06	23/25	28/29	32/34	36/39	25	30	35	40	24/27	29/32	34/37	39/42
S14:BMX	22/24	26/28	30/32	34/37	25	30	35	40	24/27	29/32	34/37	39/42

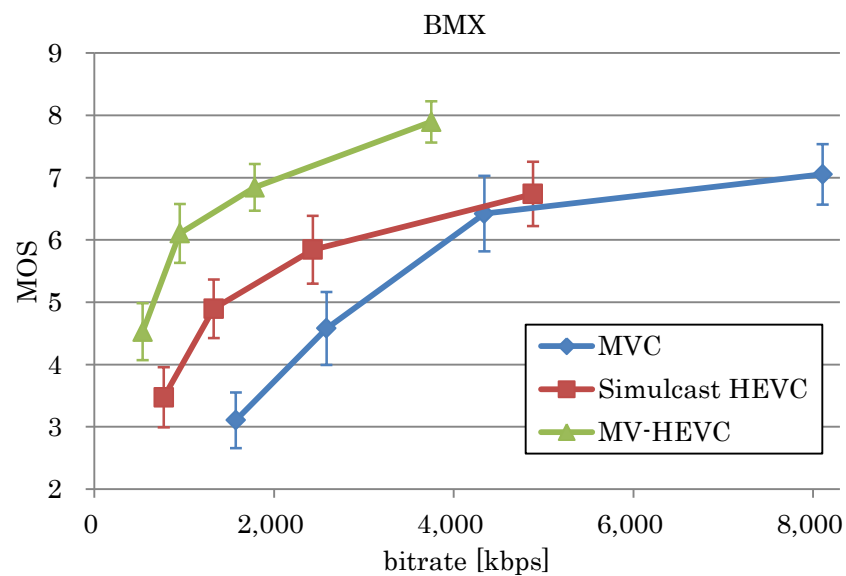
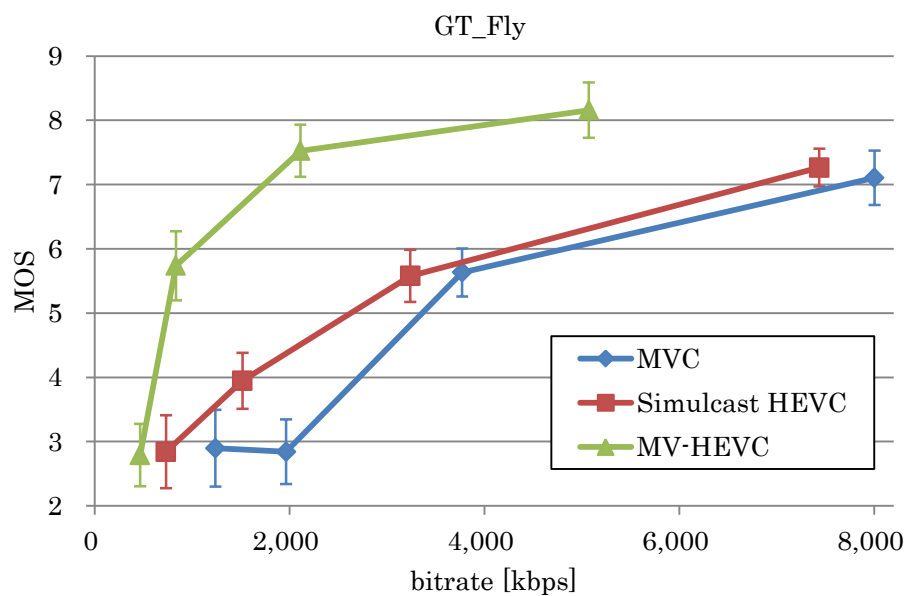
Results

▶ PSNR analysis

Test Sequence	Rate point	MVC		Simulcast HEVC		MV-HEVC	
		Bitrate [kbps]	PSNR [dB]	Bitrate [kbps]	PSNR [dB]	Bitrate [kbps]	PSNR [dB]
S03:Undo_Dancer	R1	9330.47	38.82	9276.81	38.79	6547.42	39.09
	R2	4175.72	35.82	4018.01	35.90	2316.68	35.70
	R3	2216.05	33.39	1836.04	33.36	1058.98	33.22
	R4	1189.35	31.05	850.69	31.06	497.01	30.94
S04:GT_Fly	R1	8003.76	40.22	7437.65	40.25	5071.39	40.50
	R2	3771.89	37.83	3239.10	37.82	2110.64	38.07
	R3	1964.56	35.46	1517.04	35.62	833.49	35.48
	R4	1239.31	33.45	732.18	33.46	465.55	33.77
S13:Band06	R1	9540.44	40.09	8599.87	40.14	6477.06	40.10
	R2	4451.53	38.07	4059.04	38.15	2832.68	38.21
	R3	2482.01	35.95	2023.38	35.96	1394.22	36.07
	R4	1531.70	33.75	1036.08	33.75	716.55	33.88
S14:BMX	R1	8106.66	40.68	4882.07	40.68	3750.15	40.60
	R2	4340.45	39.19	2430.42	39.20	1784.74	39.10
	R3	2583.66	37.29	1328.58	37.28	950.88	37.20
	R4	1574.70	35.00	772.22	35.09	537.46	35.03

Results

▶ Subjective test

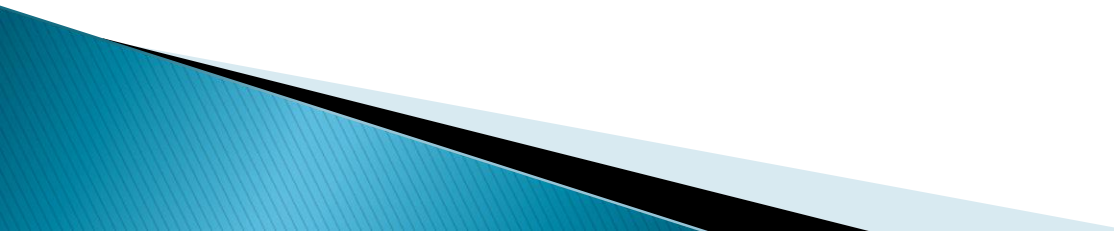


Results

▶ Bitrate Savings

Test Sequence	Bit rate difference [%]									
	(MV-HEVC - MVC) / MVC					(MV-HEVC - Simulcast) / Simulcast				
	R1	R2	R3	R4	Average	R1	R2	R3	R4	Average
S03: Undo_Dancer	-29.8	-44.5	-52.2	-58.2	-46.2	-29.4	-42.3	-42.3	-41.6	-38.9
S04: GT_Fly	-36.6	-44.0	-57.6	-62.4	-50.2	-31.8	-34.8	-45.1	-36.4	-37.0
S13: Band06	-32.1	-36.4	-43.8	-53.2	-41.4	-24.7	-30.2	-31.1	-30.8	-29.2
S14: BMX	-53.7	-58.9	-63.2	-65.9	-60.4	-23.2	-26.6	-28.4	-30.4	-27.1
Average	-38.1	-46.0	-54.2	-59.9	-49.5	-27.3	-33.5	-36.7	-34.8	-33.1

Conclusions

- ▶ MV-HEVC codec achieves comparable quality relative to the Simulcast HEVC codec with approximately 30% less bitrate or the MVC codec with approximately 50% less bitrate, on average
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Reference

Vittorio Baroncini, Naeem Ramzan, Karsten Müller, Shinya Shimizu, “**MV-HEVC Verification Test Report**”, ISO/IEC JTC 1/SC 29/WG 11, San Diego, USA, 22-26 Feb. 2016