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**Title** [MPEG-I Visual] New depth maps for PoznanFencing sequence

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## **1 Introduction**

In this document we propose new depth maps for PoznanFencing sequence. We also include the results of coding the anchor using TMIV when proposed depth maps are used.

## **2 Overview of the proposal**

The proposed depth maps were calculated using the method based on [1] and [2]. The estimation is performed for segments and thus their size can be used to control a trade-off between the quality of depth maps and the processing time. The method uses also parallelization and temporal consistency enhancement methods that reduce the processing time of depth estimation. In the end, the depth maps were enhanced using the bilateral filter.

Fig. 1 shows the comparison of previously used depth maps and the proposed ones. As it can be seen, new depth maps are much more temporally consistent.

## **3 Experimental results**

In order to test the proposed depth maps we encoded the sequence using the TMIV using the Common Test Conditions [3]. The results, presented in Tables 1-3, show that proposed depth maps provide much better quality of the final view synthesis – for all metrics the BD-rate shows significant reduction of bitstream.

The number of atlases is the same, however, the number of patches was reduced, what can be seen in the reduction of the bitrate of metadata (from 163 to 136 kbps).

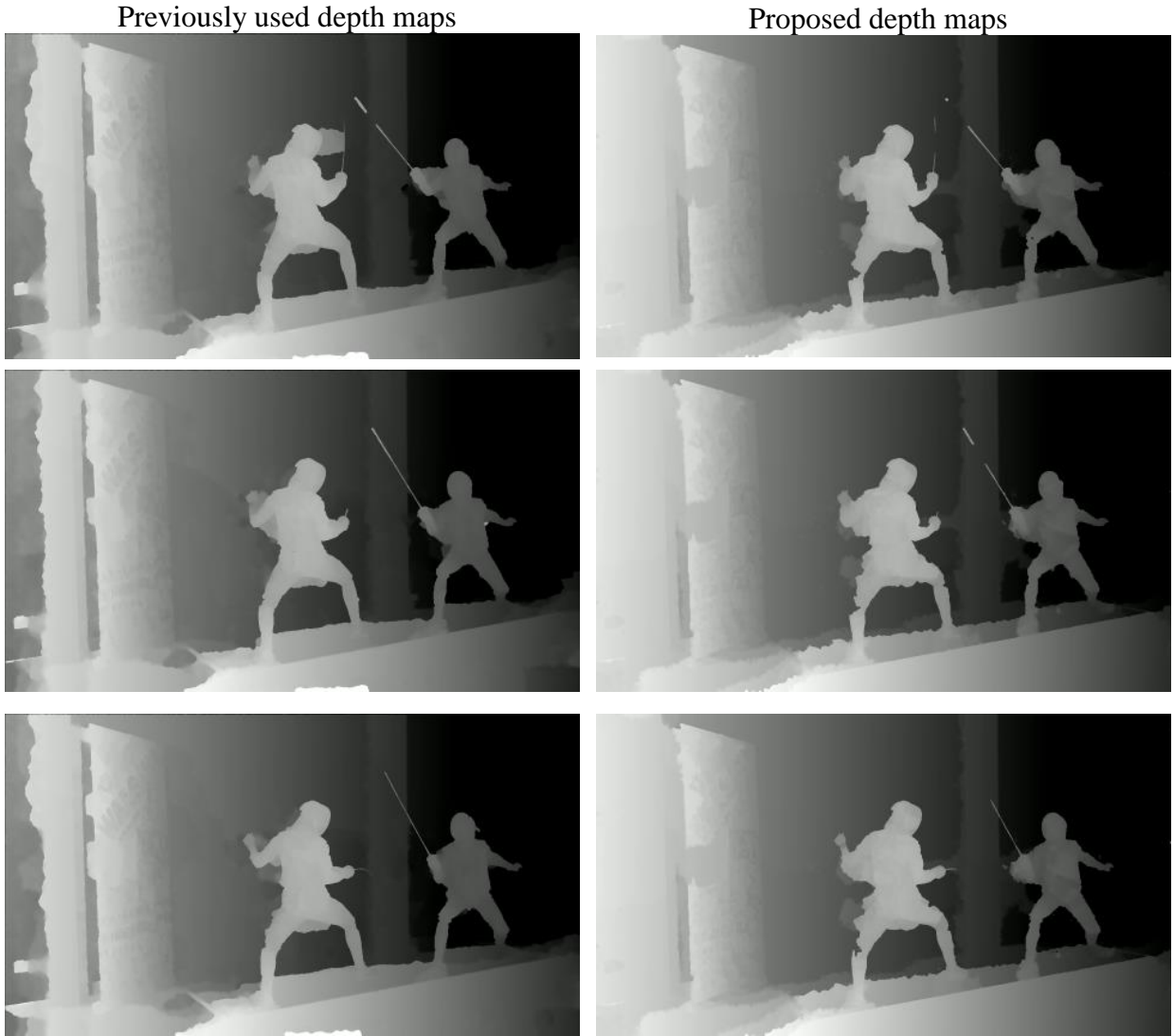


Fig. 1. The comparison of previously used and proposed depth maps.

Table 1. The results of encoding for the previously used depth maps.

L1	Texture	Total	Avg.	Avg.	Avg.	Avg.	Avg.	Avg.	Delta	Total	
	Rate	QPISlice	kbps	Y-PSNR	U-PSNR	V-PSNR	VMAF	MS-SSIM	IV-PSNR	Y-PSNR	Ren T [s]
	QP1	22	46664.8	28.36	45.67	44.96	55.20	0.9180	37.99	15.31	0
	QP2	27	27292.3	28.22	45.21	44.59	54.52	0.9164	37.67	14.22	0
	QP3	32	18717.1	28.03	44.48	44.02	53.29	0.9130	37.30	12.83	0
	QP4	37	11919.2	27.70	43.69	43.30	50.78	0.9054	36.76	10.84	0
	QP5	42	6352.3	27.28	43.09	42.75	47.05	0.8913	36.06	8.48	0

Table 2. The results of encoding for the proposed depth maps.

L1	Texture	Total	Avg.	Avg.	Avg.	Avg.	Avg.	Avg.	Delta	Total	
	Rate	QPISlice	kbps	Y-PSNR	U-PSNR	V-PSNR	VMAF	MS-SSIM	IV-PSNR	Y-PSNR	Ren T [s]
	QP1	22	34501.9	28.51	45.28	44.57	58.03	0.9185	37.70	15.33	8013
	QP2	27	19730.4	28.34	44.81	44.22	57.38	0.9170	37.38	14.18	7992
	QP3	32	13387.3	28.15	44.10	43.65	56.17	0.9137	37.02	12.72	5325
	QP4	37	8612.2	27.85	43.46	43.00	53.94	0.9071	36.59	10.57	4210
	QP5	42	4667.4	27.45	43.08	42.68	50.21	0.8940	36.02	8.09	3481

Table 3. Synthesis BD-rate between previously used depth maps the proposed ones.

Synthesis BD-rate					
Y-PSNR	U-PSNR	V-PSNR	VMAF	MS-SSIM	IV-PSNR
-44.01%	-8.55%	-5.42%	-67.73%	-33.88%	-3.20%
-41.89%	-13.07%	-8.04%	-58.94%	-34.00%	-14.01%

## 4 Acknowledgement

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## 5 Recommendations

We recommend to use proposed depth maps for new Core Experiments and include them in the Common Test Conditions.

## 6 References

- [1] D. Mieloch, "Depth Estimation in Free-Viewpoint Television", PhD Dissertation at Poznan University of Technology, Faculty of Electronics and Telecommunications, 2018.
- [2] D. Mieloch, A. Dziembowski, A. Grzelka, O. Stankiewicz, M. Domański, "Graph-based multiview depth estimation using segmentation", IEEE International Conference on Multimedia and Expo ICME 2017, Hong Kong, 10-14 July 2017.
- [3] J. Jung, B. Kroon, J. Boyce, Common Test Conditions for Immersive Video, ISO/IEC JTC1/SC29/WG11 MPEG/N18563, July. 2019, Goeteborg, Switzerland.