

Title [MIV] Basic tiles 2

Source PUT, ETRI

Authors Adrian Dziembowski, Dawid Mieloch, Gwangsoon Lee, Jun Young Jeong

Abstract

The document presents a proposal of splitting basic views into basic and non-basic tiles. Only basic tiles are packed to the atlas without pruning, while non-basic tiles are treated as additional views (are pruned, split, and packed as a mosaic of patches). Proposed approach is adapted for class B and C sequences (ERP, non-full 360 cameras) and allows for packing non-pruned information from more directions. The recommendation is to further study the approach.

1 Proposal

We propose to modify a TMIV encoder (MIV Main anchor) by splitting input views into two tiles: basic (central part of the view, dark blue in Fig. 1B) and non-basic (pale blue, Fig. 1B). The splitting is performed before view labeling. All the non-basic tiles are being pruned (orange patches in Fig. 1A). Basic/additional labeling is performed only on basic tiles. The most distant ones (the view labeling algorithm was not modified) are packed without pruning (dark blue, Fig. 1A). The rest is labeled as additional (thus pruned, split, and packed – pale blue in Fig. 1A).

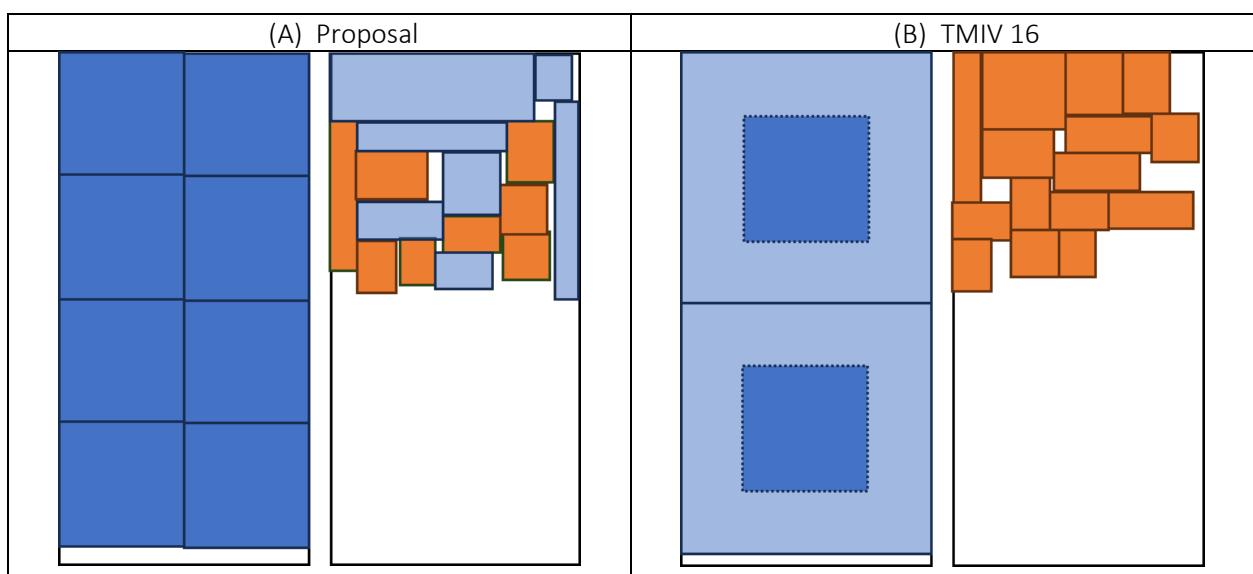
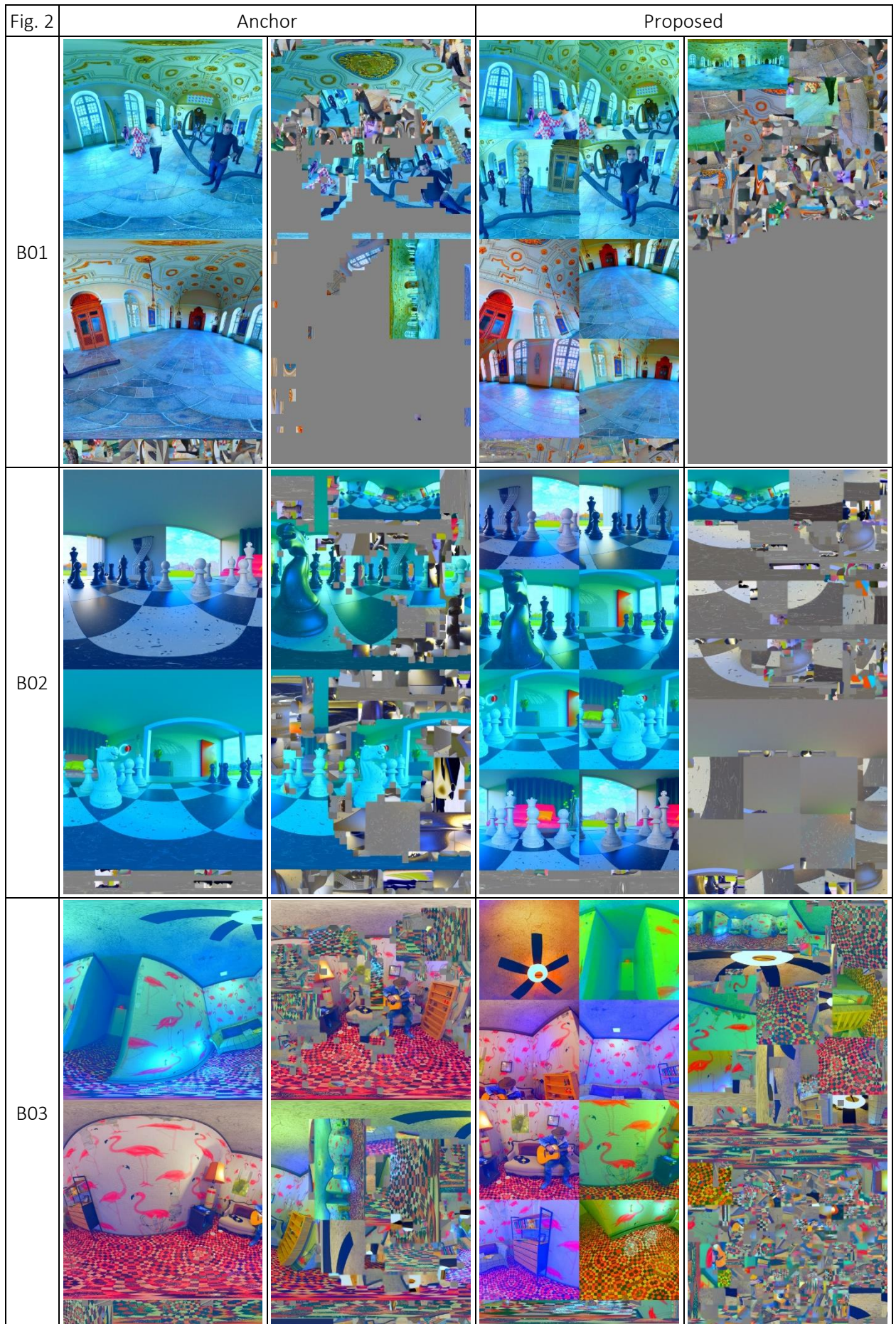
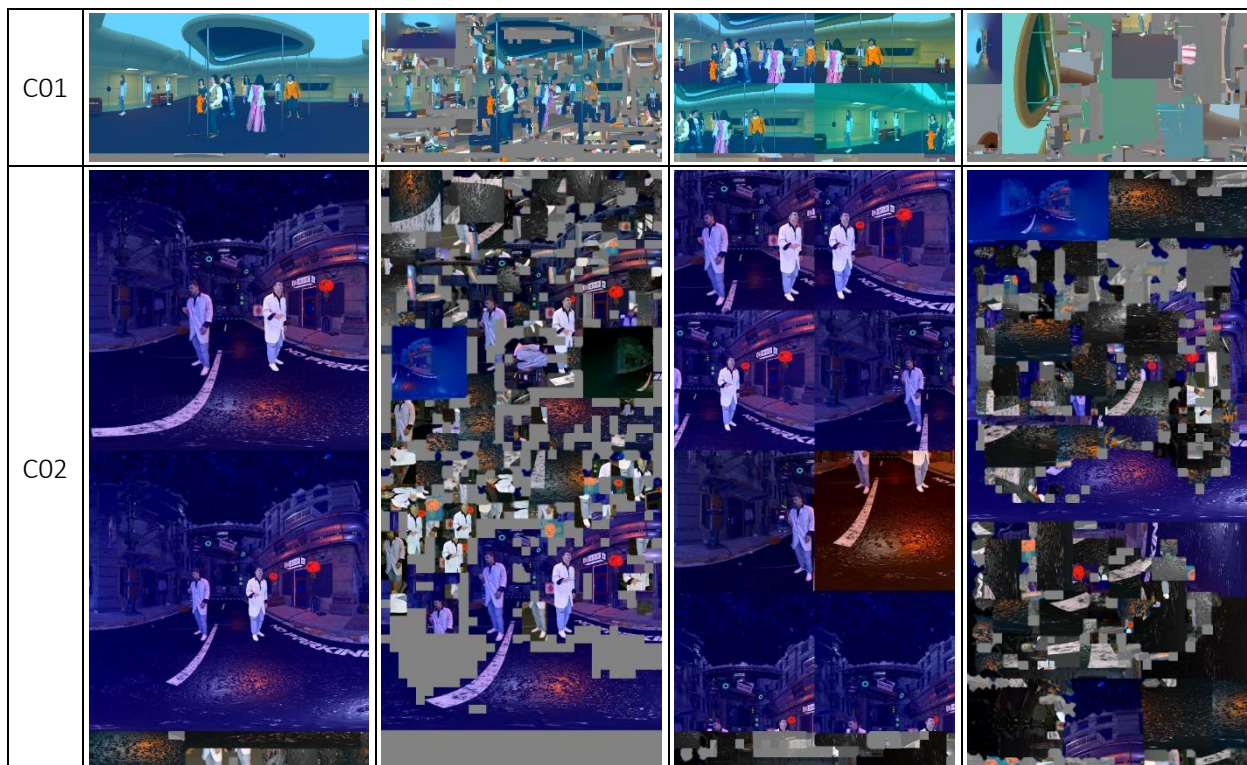


Fig. 1. Atlases in the proposed approach and TMIV 17.





For B sequences, the central part of the view is selected to be a basic tile. For C sequences, the basic tile selection depends on camera position (see Fig. below). For example, for the camera placed at the top of the camera rig, the top part of the view will be selected as a basic tile.

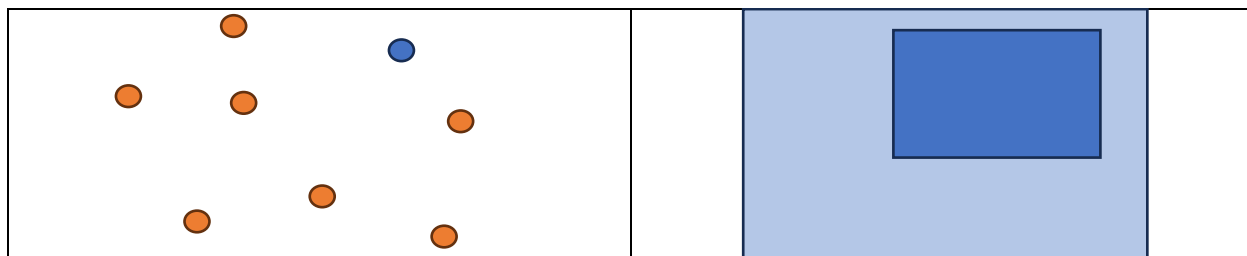
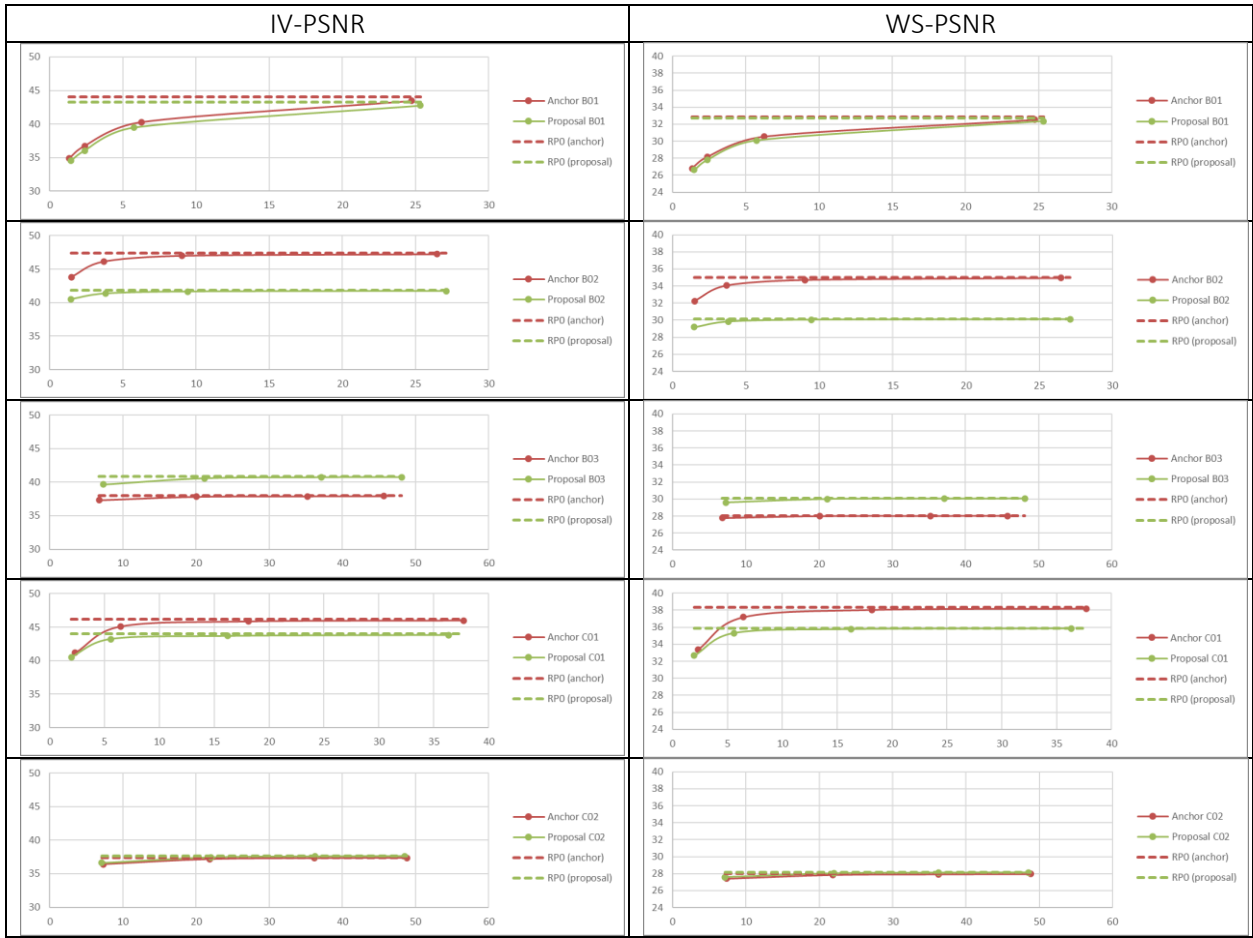


Fig. 2.5. Left: camera arrangement (from behind); right: view from blue camera with basic tile selected.

2 Results (A65)

Class B					Max delta Y-PSNR [dB]			Max delta IV-PSNR [dB]			
Sequence	BD-rate Y-PSNR	BD-rate IV-PSNR	BD-PSNR Y-PSNR	BD-PSNR IV-PSNR	MIV Main	m65213	Difference [%]	MIV Main	m65213	Difference [%]	
Museum	B01	15.1%	24.1%	-0.8%	-1.6%	19.03	3.76	-80.2%	19.40	2.84	-85.3%
Chess	B02	---	---	-13.4%	-11.3%	10.35	13.11	26.7%	13.45	13.27	-1.3%
Guitarist	B03	---	---	7.2%	7.2%	21.86	10.10	-53.8%	20.12	10.99	-45.4%
Average		---	---	-2.3%	-1.9%	17.08	8.99	-35.8%	17.66	9.04	-44.0%

Class C					Max delta Y-PSNR [dB]			Max delta IV-PSNR [dB]			
Sequence	BD-rate Y-PSNR	BD-rate IV-PSNR	BD-PSNR Y-PSNR	BD-PSNR IV-PSNR	MIV Main	m65213	Difference [%]	MIV Main	m65213	Difference [%]	
Hijack	C01	45.8%	49.9%	-5.5%	-4.3%	10.10	3.76	-62.8%	11.88	3.94	-66.8%
Cyberpunk	C02	-43.9%	-36.4%	0.6%	0.7%	3.89	2.33	-40.0%	3.41	2.09	-38.7%
Average		0.9%	6.7%	-2.5%	-1.8%	7.00	3.05	-51.4%	7.65	3.02	-52.7%



Why is there an objective quality loss?

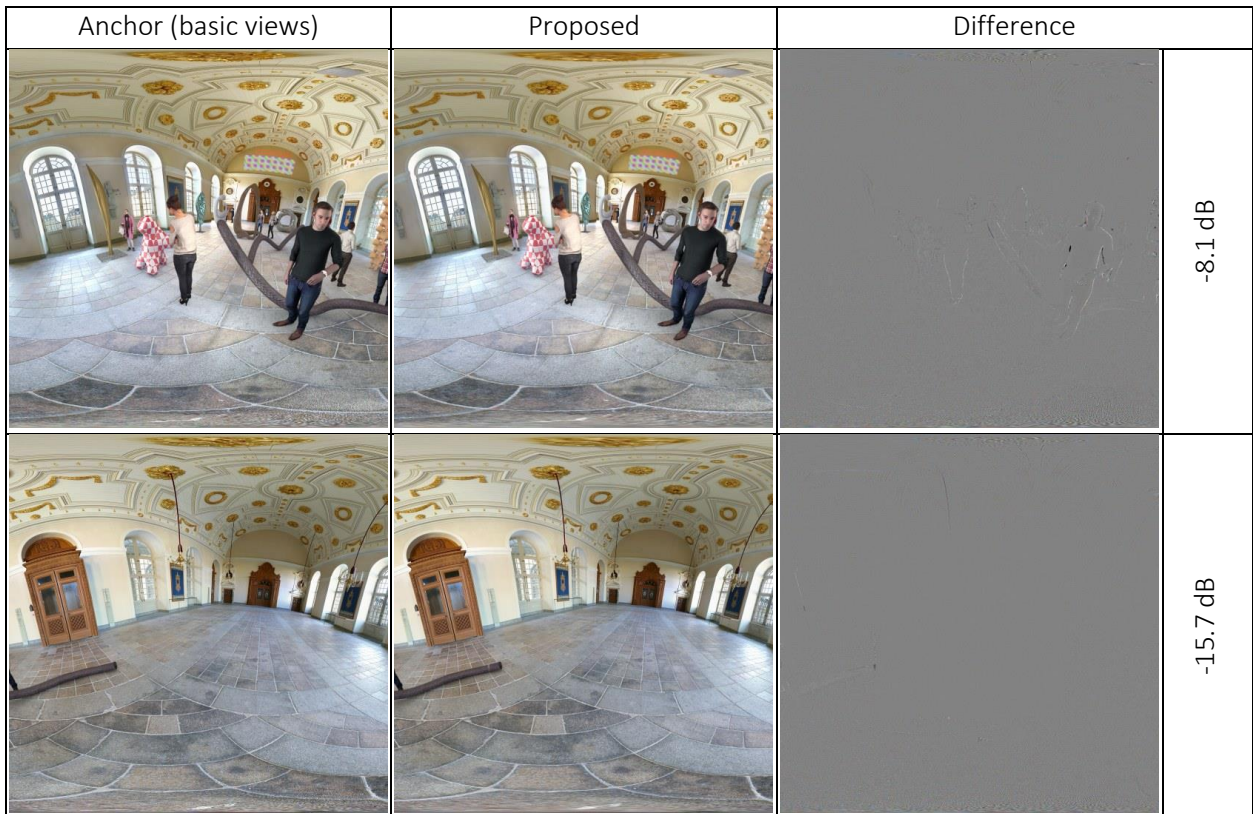


Fig. 3. Views with highest quality loss, B01.







Anchor (basic views)	Proposed	Difference	
			-9.4 dB
			-7.4 dB

Fig. 4. Views with highest quality loss, B02.


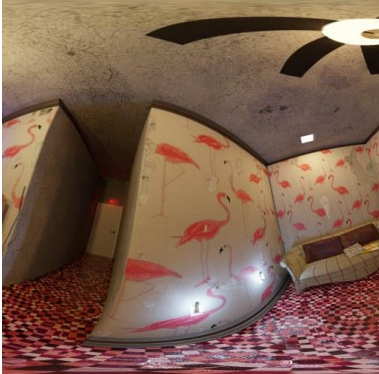



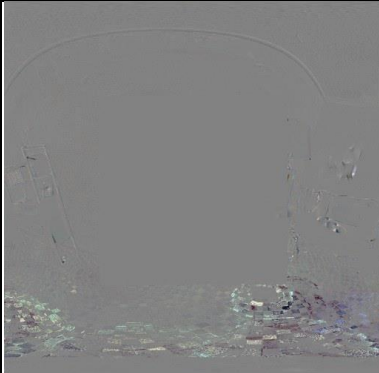
Anchor (basic views)	Proposed	Difference	
			-14.6 dB
			-16.3 dB

Fig. 5. Views with highest quality loss, B03.

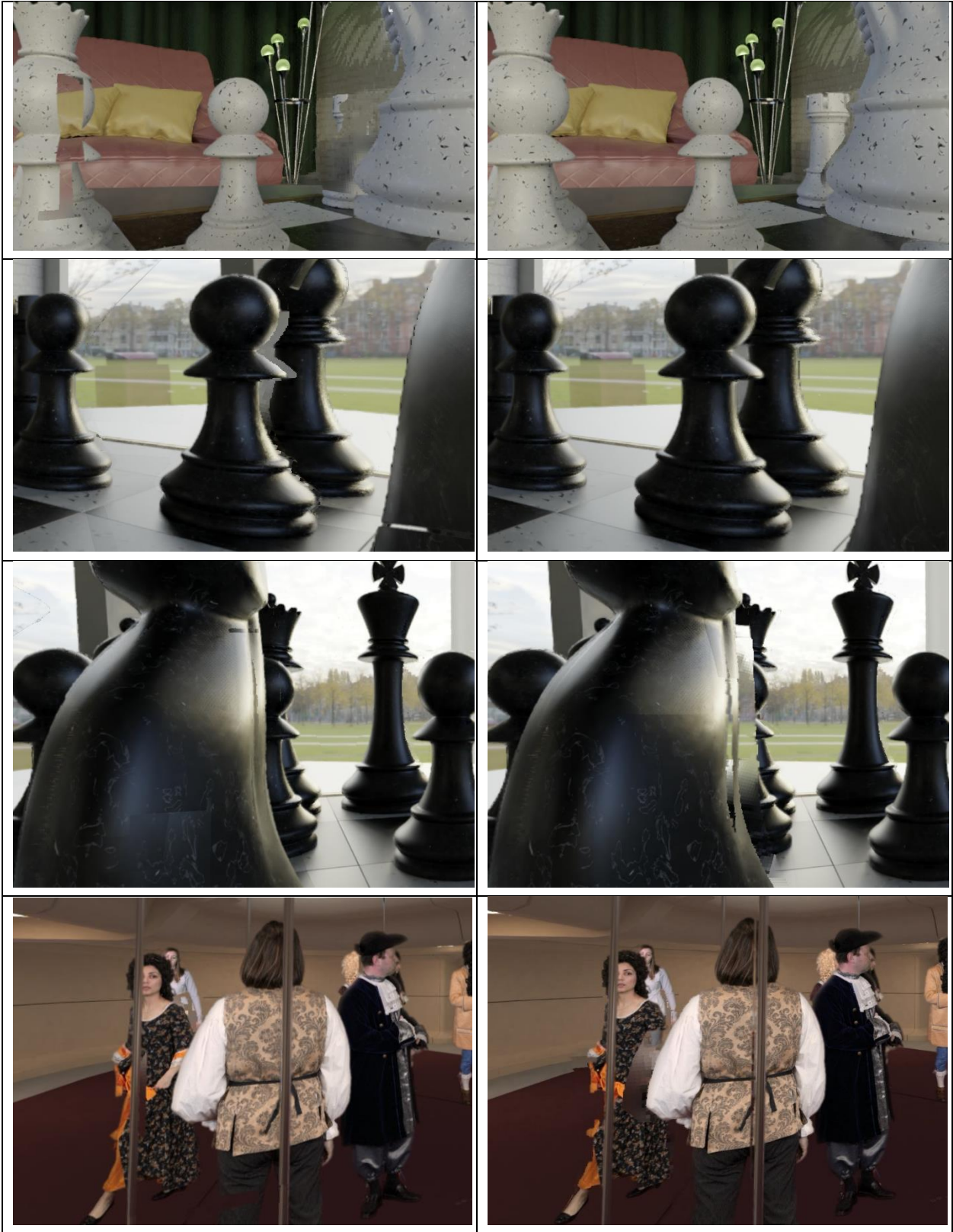
The proposal significantly decreases Δ PSNR for both objective metrics for all sequences except for B02. Reason: full basic views are not transmitted anymore.

For B02 sequence Δ IV-PSNR is slightly higher and Δ WS-PSNR is higher than for TMIV16, because the quality of v0 (top) and v9 (bottom) views dropped by ~ 7 dB for RPO. Reason: parts of these views were transmitted within basic views, and are not transmitted in basic tiles.

Subjectively, we believe that the quality of posetraces is:

- significantly higher for B03 (e.g., no missing parts of guitarist's head),
- similar for B01 and C02 (slightly different artifacts in various parts of the scene),
- different for B02 and C01 (different parts of the scene are missing because of overfilled atlases).





3 Recommendation

We recommend further study.

4 Acknowledgement

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