Neural Graphics Texture Compression
Supporting Random Access
Supplementary Material

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A   Network architecture

A.1   Global transformation

Figure 1 shows the details of global transformation architecture. As mentioned in Section 4.1 the global transformer in our setup has the same architecture as [1] except that we removed the attention layers and reduced the number of downsampling blocks (Conv k5s2, representing a convolution with the kernel size 5 and the stride 2) from 4 blocks to 3 blocks. We also added $\frac{1}{2}$ tanh to bound the output of encoder between $[-0.5, 0.5]$.
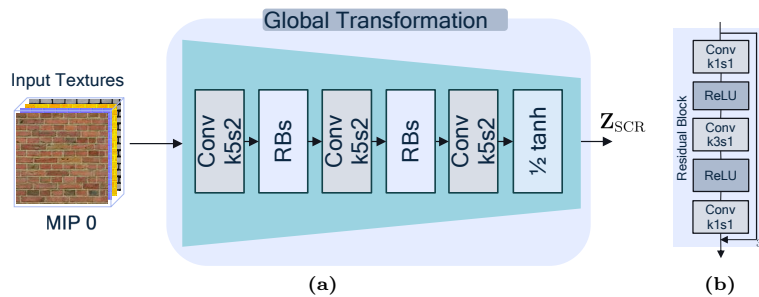

Fig. 1: Overview of Global Transformation architecture. Conv kxsy indicates a convolution with the kernel size x and the stride y.

A.2   Texture synthesizer

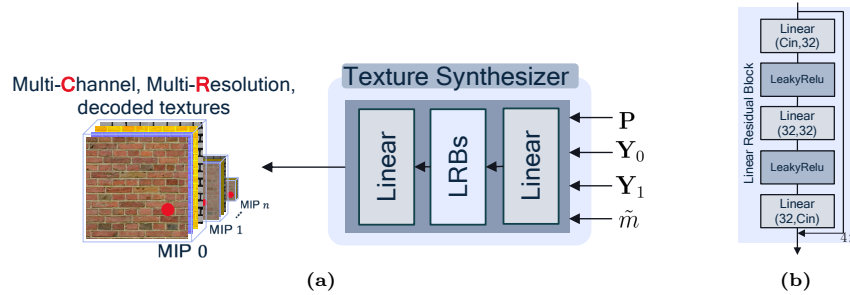Figure 2 shows the architecture of texture synthesize in our compression setup.

Fig. 2: Overview of decoder architecture. We use convention (c_{in}, c_{out}) for linear layers.

B   More results

B.1   Channel wise performance

Table 1 and Table 2 present the performance results in terms of PSNR (dB) and BPPC. These results are linked to the diffuse and the normal maps, respectively, of all textures utilized in our evaluation. We compare our method, referred to as CNTC, with NTC [2]. As demonstrated, in most cases, our method outperforms NTC.

B.2   Performance through all mip levels

The performance of a compression technique can vary based on the frequency spectrum of the texture, resulting in different outcomes across mip levels [2]. In Table 3 and Table 4, we demonstrate the PSNR (dB) for the complete range of mip levels $(m = 0, \ldots, 9)$ associated with texture sets 'Ceramic roof 01'[1] and 'Paving stones 131'[2], respectively. The tables present the results of all the channels in the texture sets separately, with the second column showing the reconstructed mip level. These results are evaluated based on our method with the lowest BPPC=0.18 referred to as CNTC 16.

References

1. He, D., Yang, Z., Peng, W., Ma, R., Qin, H., Wang, Y.: Elic: Efficient learned image compression with unevenly grouped space-channel contextual adaptive coding. 2022 IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) (Jun 2022) 1
2. Vaidyanathan, K., Salvi, M., Wronski, B., Akenine-Möller, T., Ebelin, P., Lefohn, A.: Random-Access Neural Compression of Material Textures. In: Proceedings of SIGGRAPH (2023) 2, 3, 4

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[1] retrieved from https://polyhaven.com/
[2] retrieved from https://ambientcg.com/

Table 1: PSNR scores of our re-implementation of [2] versus ours (CNTC) for the diffuse, numbers are indicating: PSNR [↑] (BPPC [↓]), where PSNR is calculated for MIP 0 of the diffuse map. The texture sets at the first three rows are retrieved from PolyHaven (https://polyhaven.com/) and the rest from ambientCG (https://ambientcg.com/).
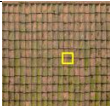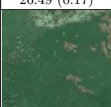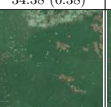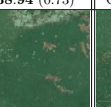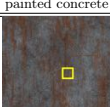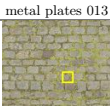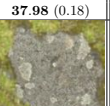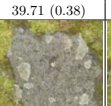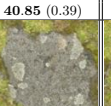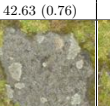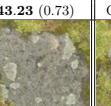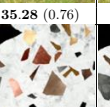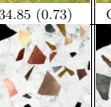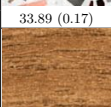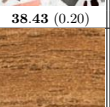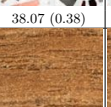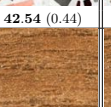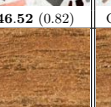
Texture set	NTC 0.2	CNTC 16	NTC 0.5	CNTC 32	NTC 1.0	CNTC 64	Reference
ceramic roof 01	35.81 (0.17)	**36.82** (0.18)	38.78 (0.38)	**40.53** (0.39)	41.29 (0.76)	**44.04** (0.73)	Ground Truth
denim fabric	26.49 (0.17)	**27.23** (0.18)	34.38 (0.38)	**35.30** (0.39)	35.14 (0.76)	**38.94** (0.73)	Ground Truth
painted concrete	28.62 (0.17)	**29.69** (0.18)	31.55 (0.38)	**32.54** (0.39)	36.48 (0.76)	**37.34** (0.73)	Ground Truth
metal plates 013	37.77 (0.17)	**37.98** (0.18)	39.71 (0.38)	**40.85** (0.39)	42.63 (0.76)	**43.23** (0.73)	Ground Truth
paving stones 131	28.40 (0.17)	**28.54** (0.18)	30.63 (0.38)	**31.28** (0.39)	**35.28** (0.76)	34.85 (0.73)	Ground Truth
terrazzo 018	33.89 (0.17)	**38.43** (0.20)	38.07 (0.38)	**42.54** (0.44)	41.77 (0.76)	**46.52** (0.82)	Ground Truth
wood 063	27.28 (0.17)	**27.77** (0.18)	30.37 (0.38)	**31.98** (0.39)	35.08 (0.76)	**37.23** (0.73)	Ground Truth

Table 2: PSNR scores of our re-implementation of [2] vresus ours (CNTC) for the normal map, numbers are presenting: PSNR [↑] (BPPC [↓]), where PSNR is calculated for MIP 0 of the normal map. The texture sets at the first three rows are retrieved from PolyHaven https://polyhaven.com/) and the rest from ambientCG (https://ambientcg.com/).
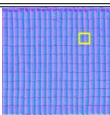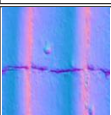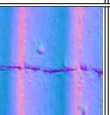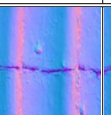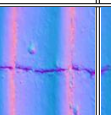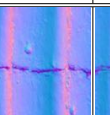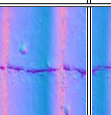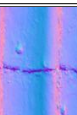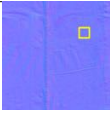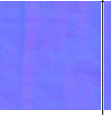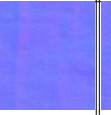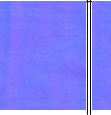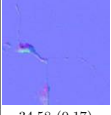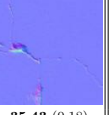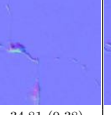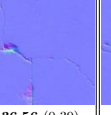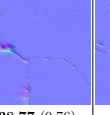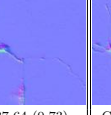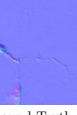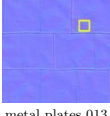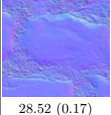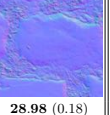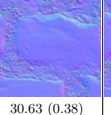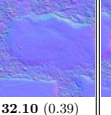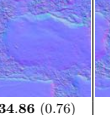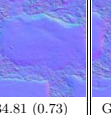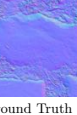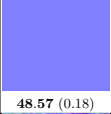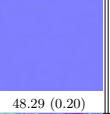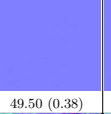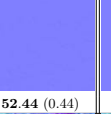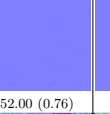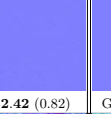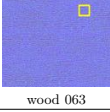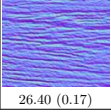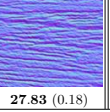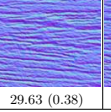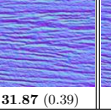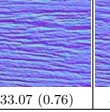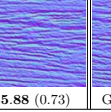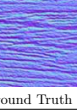
Texture set	NTC 0.2	CNTC 16	NTC 0.5	CNTC 32	NTC 1.0	CNTC 64	Reference
ceramic roof 01	33.64 (0.17)	**35.15** (0.18)	36.242 (0.38)	**39.85** (0.39)	39.32 (0.76)	**42.66** (0.73)	Ground Truth
denim fabric	**34.51** (0.17)	34.23 (0.18)	35.20 (0.38)	**36.53** (0.39)	39.49 (0.76)	**39.51** (0.73)	Ground Truth
painted concrete	34.58 (0.17)	**35.43** (0.18)	34.81 (0.38)	**36.56** (0.39)	**38.77** (0.76)	37.64 (0.73)	Ground Truth
metal plates 013	36.68 (0.17)	**37.88** (0.18)	38.78 (0.38)	**41.07** (0.39)	41.29 (0.76)	**42.19** (0.73)	Ground Truth
paving stones 131	28.52 (0.17)	**28.98** (0.18)	30.63 (0.38)	**32.10** (0.39)	**34.86** (0.76)	34.81 (0.73)	Ground Truth
terrazzo 018	**48.57** (0.18)	48.29 (0.20)	49.50 (0.38)	**52.44** (0.44)	52.00 (0.76)	**52.42** (0.82)	Ground Truth
wood 063	26.40 (0.17)	**27.83** (0.18)	29.63 (0.38)	**31.87** (0.39)	33.07 (0.76)	**35.88** (0.73)	Ground Truth

Table 3: "Ceramic roof 01" reconstructed mips using our method with lowest BPPC corresponding to CNTC 16.
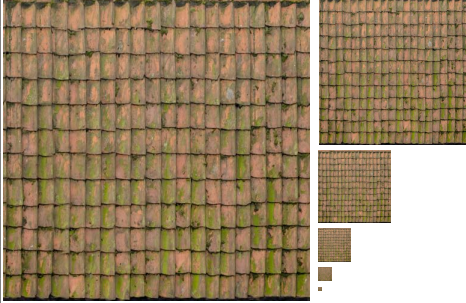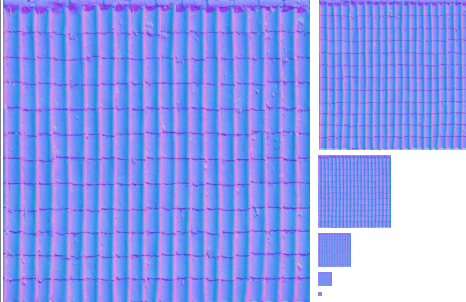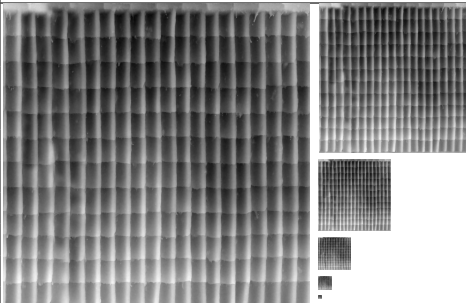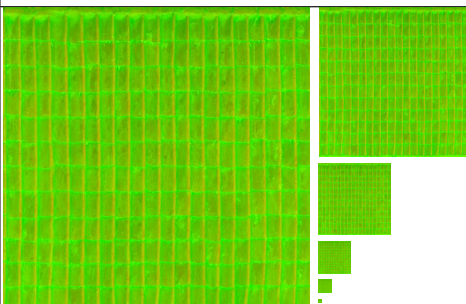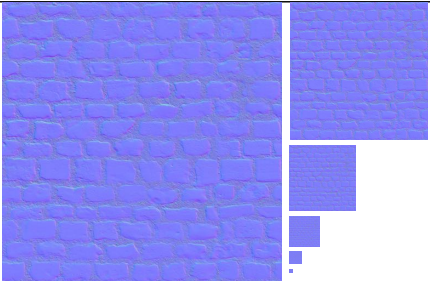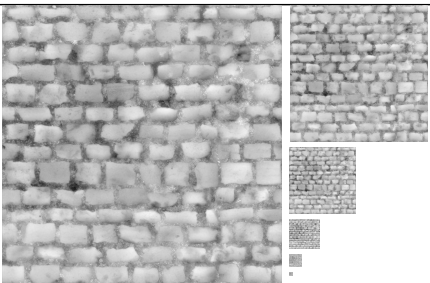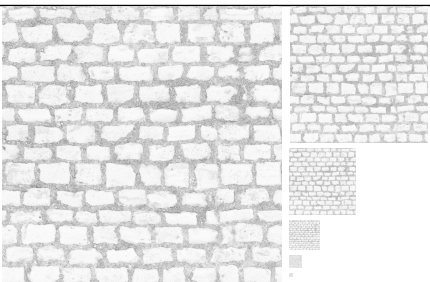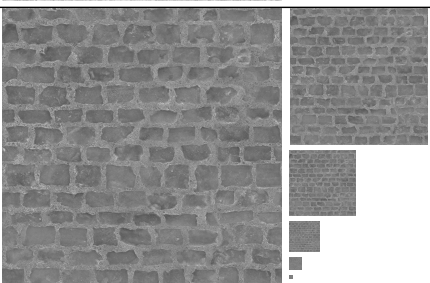
Reconstruction mips $0, \ldots, 5$	mip level	resolution	PSNR (dB)
diffuse	0	2048×2048	36.82
	1	1024×1024	39.82
	2	512×512	39.75
	3	256×256	35.40
	4	128×128	34.98
	5	64×64	36.47
	6	32×32	39.06
	7	16×16	43.45
	8	8×8	45.53
	9	4×4	42.46
normal	0	2048×2048	35.15
	1	1024×1024	39.08
	2	512×512	39.47
	3	256×256	36.18
	4	128×128	34.07
	5	64×64	36.18
	6	32×32	40.16
	7	16×16	42.93
	8	8×8	42.78
	9	4×4	39.64
displacement	0	2048×2048	41.97
	1	1024×1024	42.82
	2	512×512	42.53
	3	256×256	39.57
	4	128×128	34.90
	5	64×64	35.35
	6	32×32	37.40
	7	16×16	41.16
	8	8×8	41.38
	9	4×4	36.72
ao & roughness	0	2048×2048	37.31
	1	1024×1024	40.72
	2	512×512	40.99
	3	256×256	37.51
	4	128×128	36.18
	5	64×64	37.89
	6	32×32	40.74
	7	16×16	45.61
	8	16×16	46.24
	9	4×4	45.12

Table 4: "Paving stones 131" reconstructed mips using our method (CNTC 16).

Reconstruction mips $0, \ldots, 5$	mip level	resolution	PSNR (dB)
diffuse	0	2048×2048	28.54
	1	1024×1024	34.62
	2	512×512	36.83
	3	256×256	33.54
	4	128×128	32.19
	5	64×64	32.97
	6	32×32	36.17
	7	16×16	41.20
	8	8×8	47.92
	9	4×4	51.47
normal	0	2048×2048	28.98
	1	1024×1024	35.47
	2	512×512	39.09
	3	256×256	37.19
	4	128×128	37.72
	5	64×64	38.97
	6	32×32	41.80
	7	16×16	46.00
	8	8×8	51.25
	9	4×4	55.40
displacement	0	2048×2048	38.19
	1	1024×1024	39.88
	2	512×512	40.17
	3	256×256	36.60
	4	128×128	32.94
	5	64×64	32.50
	6	32×32	33.80
	7	16×16	37.35
	8	8×8	43.68
	9	4×4	43.94
ambient occlusion	0	2048×2048	26.68
	1	1024×1024	34.44
	2	512×512	37.20
	3	256×256	35.54
	4	128×128	33.36
	5	64×64	33.60
	6	32×32	35.83
	7	16×16	40.56
	8	8×8	46.18
	9	4×4	51.58
roughness	0	2048×2048	30.64
	1	1024×1024	36.47
	2	512×512	39.66
	3	256×256	37.69
	4	128×128	36.46
	5	64×64	36.93
	6	32×32	38.86
	7	16×16	40.91
	8	8×8	45.69
	9	4×4	51.19