

QuickETC2: Fast ETC2 Texture Compression using Luma Differences - Supplemental Document

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1 TEST IMAGE SET, IMAGE COURTESY, AND ARTIFACT ANALYSIS

This supplemental document aims to provide characteristics of the test images and to further analyze the compression quality of *QuickETC2* compared to *ETCPACK*. First, we describe the 64 textures used in our experiments. We carefully chose the image set in Figure 1 to represent different texture types as follows:

- No.1-24: 24 photographs from Kodak Lossless True Color Image Suite (*Kodim01-Kodim24*) [Franzen 1999]. Images courtesy of Kodak.
- No. 25: One photo from the PVRTC paper [Fenney 2003] (*Lorikeet*). Image courtesy of Fenney.
- No. 26-45: 20 game textures from the Crytek Sponza model. Images courtesy of Crytek.
- No. 46-50: Five game textures from the FasTC project [Krajcevski and Manocha 2014]. Images courtesy of the UNC GAMMA Lab and Spiral Graphics.
- No. 51: One 2D sprite from Vokselia Spawn. Downloaded from McGuire's Computer Graphics Archive [McGuire 2017]. Image courtesy of Vokselia.
- No. 52-54: Three GIS map data from the FasTC project. Images courtesy of the UNC GAMMA Lab and Google.
- No. 55: One GIS map data from Cesium [Bagnell 2017]. Image courtesy of Cesium.
- No. 56: One synthesized image from Google Android (*Jelly*) [Nishry 2015]. Image courtesy of Google.
- No. 57: One synthesized image from the FasTC project (*Gradient*). Image courtesy of the UNC GAMMA Lab and Spiral Graphics.
- No. 58-64: Seven images captured from the real world for 3D reconstruction (*Bedroom*). Downloaded from McGuire's Computer Graphics Archive. Images courtesy of *fhermand* at Sketchfab.

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Furthermore, we describe an artifact analysis table (Table 1) for analyzing representative artifacts shown in each image. The results in the table imply that *QuickETC2* provides sufficient compression quality, especially for game textures, except for a few corner cases.

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Fig. 1. The entire set of 64 test images. This image set represents different texture types: photographs (No. 1-25), game textures (No. 26-51), GIS map data (No. 52-55), synthesized images (No. 56-57), and images captured from the real world for 3D reconstruction (No. 58-64). ©Kodak, Fenney, Crytek, UNC GAMMA Lab, Spiral Graphics, Vokeselia, Google, Cesium, and *fhermand*.

Table 1. Our artifact analysis table. The left and right symbols in each cell indicate artifacts that appear in ours and *ETC2PACK*, respectively. Also, we express the degree of each artifact as three levels: none (—), low (○), and high (●). Low-degree artifacts are usually distinguishable in a one-to-one comparison between the uncompressed and compressed images after zooming in on the images. High-degree artifacts are easily visible without the one-to-one comparison or zooming in.

| No | Name | Block artifacts | Blurring | Banding | Color shifts | Loss of smooth AA/gradients | No | Name | Block artifacts | Blurring | Banding | Color shifts | Loss of smooth AA/gradients |
|----|-----------------------|-----------------|----------|---------|--------------|-----------------------------|----|--------------------------|-----------------|----------|---------|--------------|-----------------------------|
| 1 | Kodim01 | | | | ○/○ | ○/○ | 33 | Sponza_column_c_diff | | | | ○/○ | |
| 2 | Kodim02 | ○/— | | | | | 34 | Sponza_floor_a_diff | | | | ○/○ | |
| 3 | Kodim03 | ○/○ | | | ○/○ | | 35 | Sponza_details_diff | | | | ○/○ | ○/○ |
| 4 | Kodim04 | ○/○ | | | ○/○ | | 36 | Sponza_curtain_diff | | | | | |
| 5 | Kodim05 | ●/○ | | | ○/○ | ○/○ | 37 | Sponza_fabric_green_diff | | | | ○/○ | ○/○ |
| 6 | Kodim06 | ○/○ | | | ○/○ | | 38 | Chain_texture | | | | ○/○ | |
| 7 | Kodim07 | ○/— | | | ○/○ | | 39 | Sponza_flagpole_diff | | | | ○/○ | |
| 8 | Kodim08 | | | | ○/○ | ○/○ | 40 | Sponza_roof_diff | | | | | |
| 9 | Kodim09 | | | | ○/○ | ○/○ | 41 | Sponza_thron_diff | | | | | |
| 10 | Kodim10 | ○/○ | | | ○/○ | | 42 | Vase_plant | ●/— | | | | ○/— |
| 11 | Kodim11 | | | | ○/○ | ○/○ | 43 | Vase_diff | | | | ○/○ | |
| 12 | Kodim12 | | | | ○/○ | ○/○ | 44 | Vase_hanging | | | | ○/○ | |
| 13 | Kodim13 | | | | | | 45 | Vase_round | | | | | ○/○ |
| 14 | Kodim14 | ○/— | | | | ○/○ | 46 | Atlas | ○/— | | | ○/○ | ○/○ |
| 15 | Kodim15 | ○/○ | | | | ○/○ | 47 | Small-char | ○/○ | ○/○ | | ○/○ | |
| 16 | Kodim16 | | ○/○ | | ○/○ | | 48 | Big-char | | | | ○/○ | |
| 17 | Kodim17 | | | | ○/○ | ○/○ | 49 | Bricks | | | | ○/○ | |
| 18 | Kodim18 | | | | ○/○ | ○/○ | 50 | Un512 | | | | | |
| 19 | Kodim19 | | | | ○/○ | ○/○ | 51 | Vokselia_spawn | | | | | |
| 20 | Kodim20 | ○/○ | | | ○/○ | ○/○ | 52 | Vector-streets | | ○/— | | ○/○ | |
| 21 | Kodim21 | ○/○ | | | ○/○ | ○/○ | 53 | Mountains | | ○/— | | | |
| 22 | Kodim22 | ○/○ | | | ○/○ | ○/○ | 54 | Satellite | | | | | |
| 23 | Kodim23 | ○/— | | | | ○/○ | 55 | CesiumJS | | | | ○/○ | |
| 24 | Kodim24 | | | | ○/○ | ○/○ | 56 | Jelly | ●/○ | | | | ○/○ |
| 25 | Lorikeet | ○/— | | | ○/— | ○/— | 57 | Gradient256 | | | | | |
| 26 | Background | | | | ○/○ | | 58 | ISCV2_u1_v1 | | | ○/○ | | |
| 27 | Lion | | | | ○/○ | | 59 | ISCV2_u1_v2 | | | | | |
| 28 | Sponza_arch_diff | | | | ○/○ | | 60 | ISCV2_u2_v1 | | | | | |
| 29 | Sponza_bricks_a_diff | | | | ○/○ | | 61 | ISCV2_u2_v2 | | | ○/○ | | |
| 30 | Sponza_ceiling_a_diff | | | | ○/○ | | 62 | ISCV2_u2_v4 | | | ○/○ | ○/○ | |
| 31 | Sponza_column_a_diff | | | | ○/○ | | 63 | ISCV2_u3_v1 | | | ○/○ | | |
| 32 | Sponza_column_b_diff | | | | ○/○ | | 64 | ISCV2_u4_v1 | | | ○/○ | | |