A Psychophysical Evaluation of Texture Compression Masking Effects Supplementary materials

1 Experiment interface

Each subject was first verbally given instructions and made familiar with the tasks and concepts of texture mapping and compression. The two tests were then conducted using a web-based interface shown in Figures 1 and 2. Instructions were first recalled (Fig. 1), then three stimuli of training were presented (using compressed texture maps not subsequently used in the dataset). Right after, the test was launched (Fig. 2), exposing 200 stimuli for the Normal Masking experiment and 120 stimuli for the Diffuse Masking experiment.

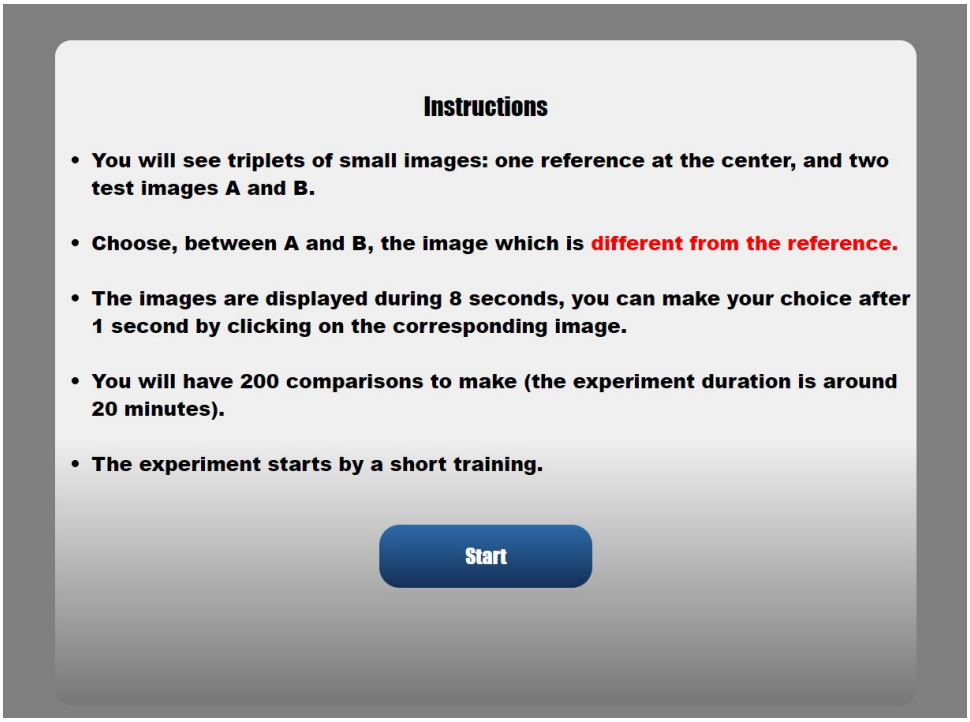


Fig. 1: Our web-based interface (instructions).

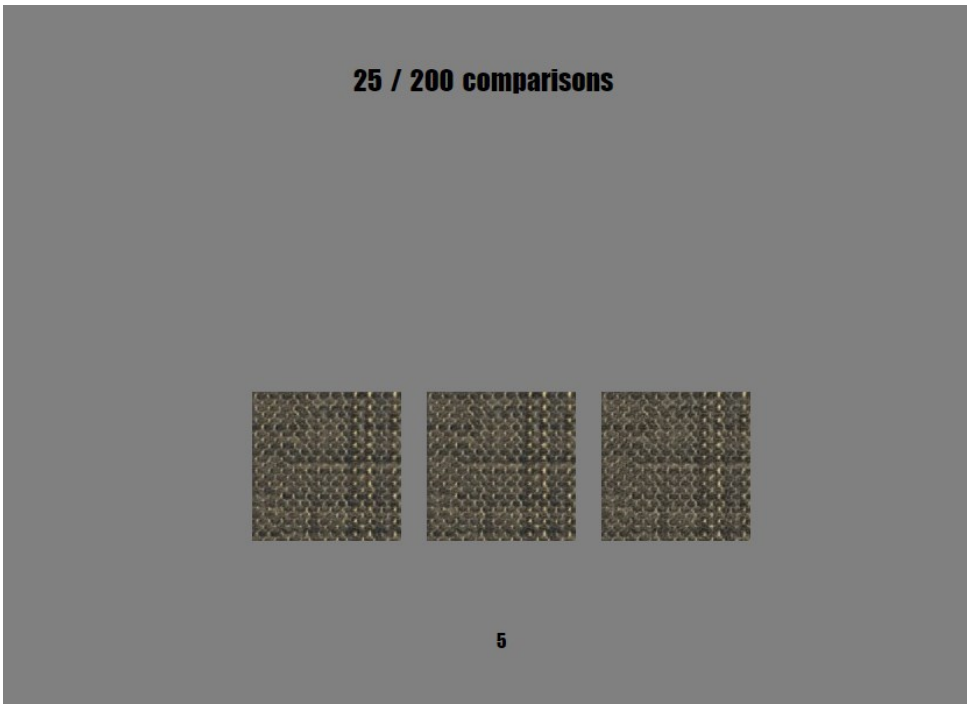
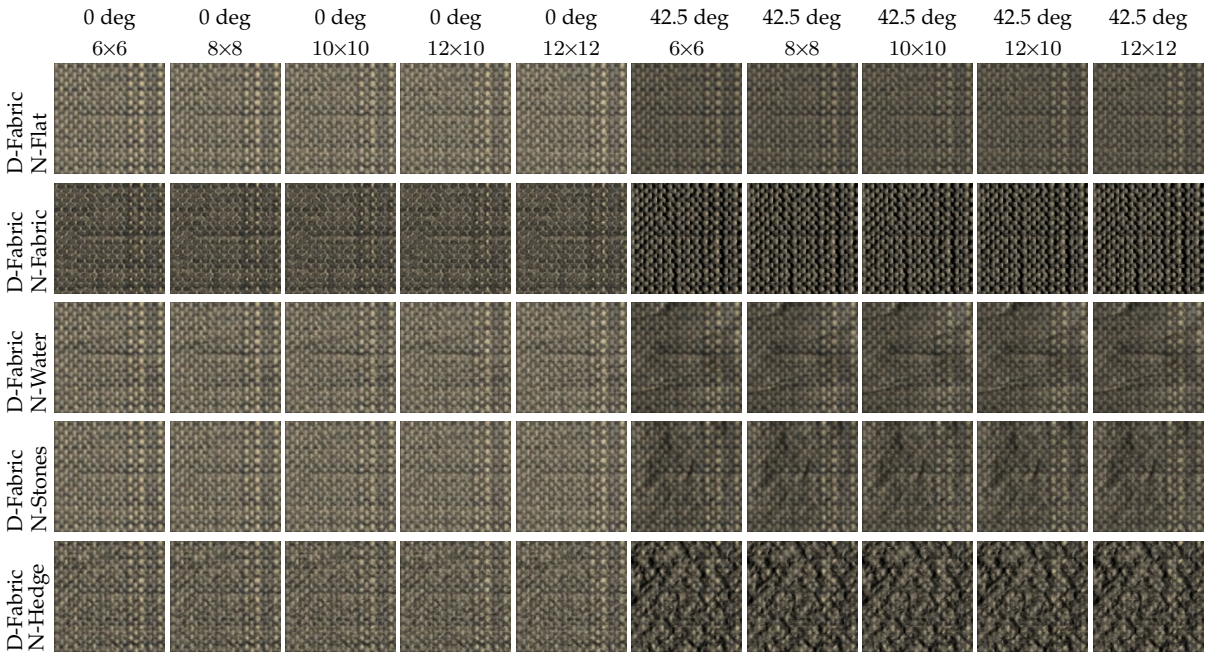


Fig. 2: Our web-based interface (test). The rank and number of remaining stimuli are presented at the top, and a timer in seconds is displayed at the bottom.

2 OUR DATASET

2.1 Normal Masking Experiment

Figure 3 presents the 200 stimuli (rendered using compressed diffuse texture maps) used in the Normal Masking experiment. Their actual size of rendered images is 128×128. Note that the 40 reference images (rendered using uncompressed texture maps) are not shown.



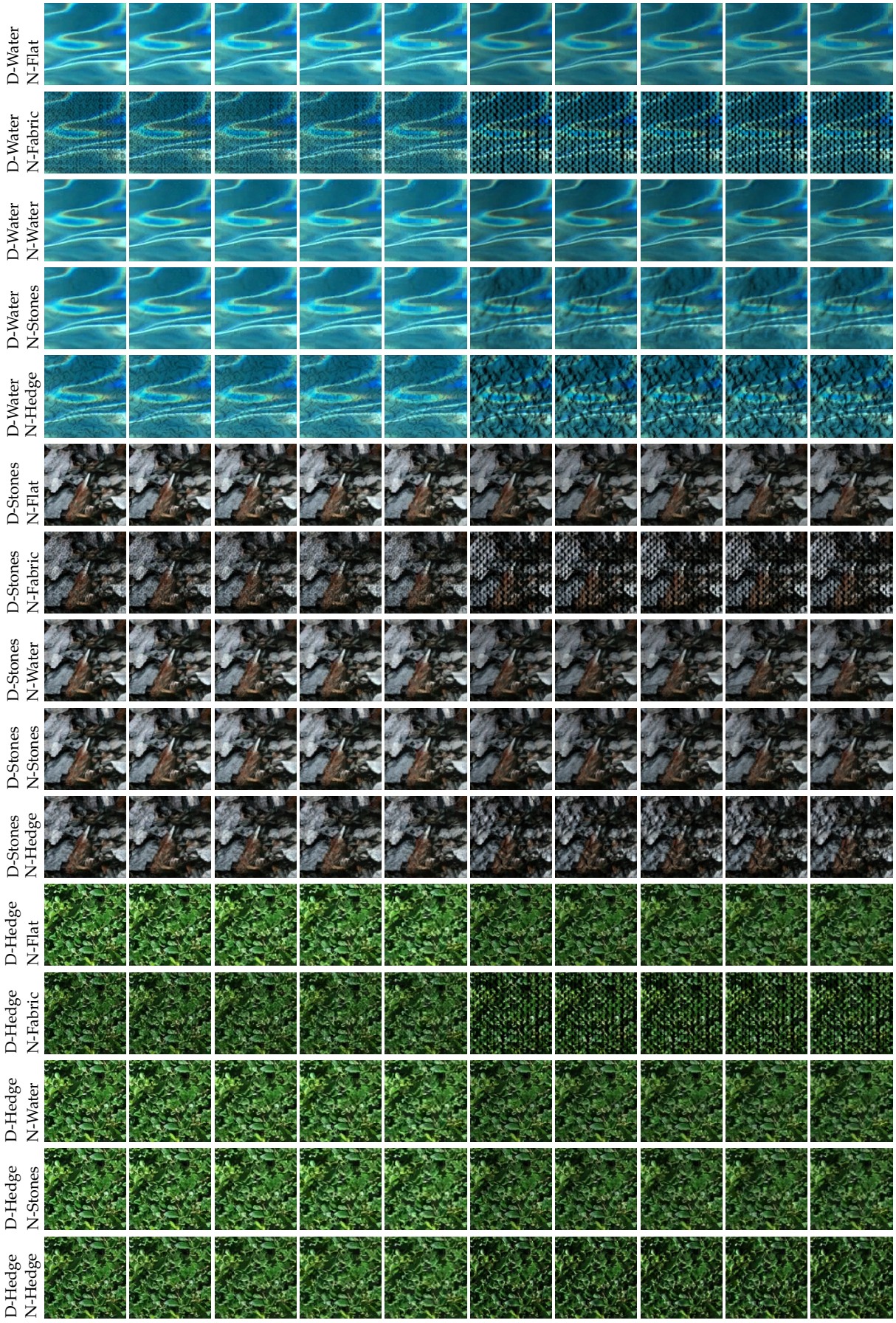


Fig. 3: Our Normal Masking experiment dataset (200 rendered images).

2.2 Diffuse Masking Experiment

Figure 4 presents the 120 stimuli (rendered using compressed normal texture maps) used in the Diffuse Masking experiment. Their actual size of rendered images is 128×128. Note that the 24 reference images (rendered using uncompressed texture maps) are not shown.

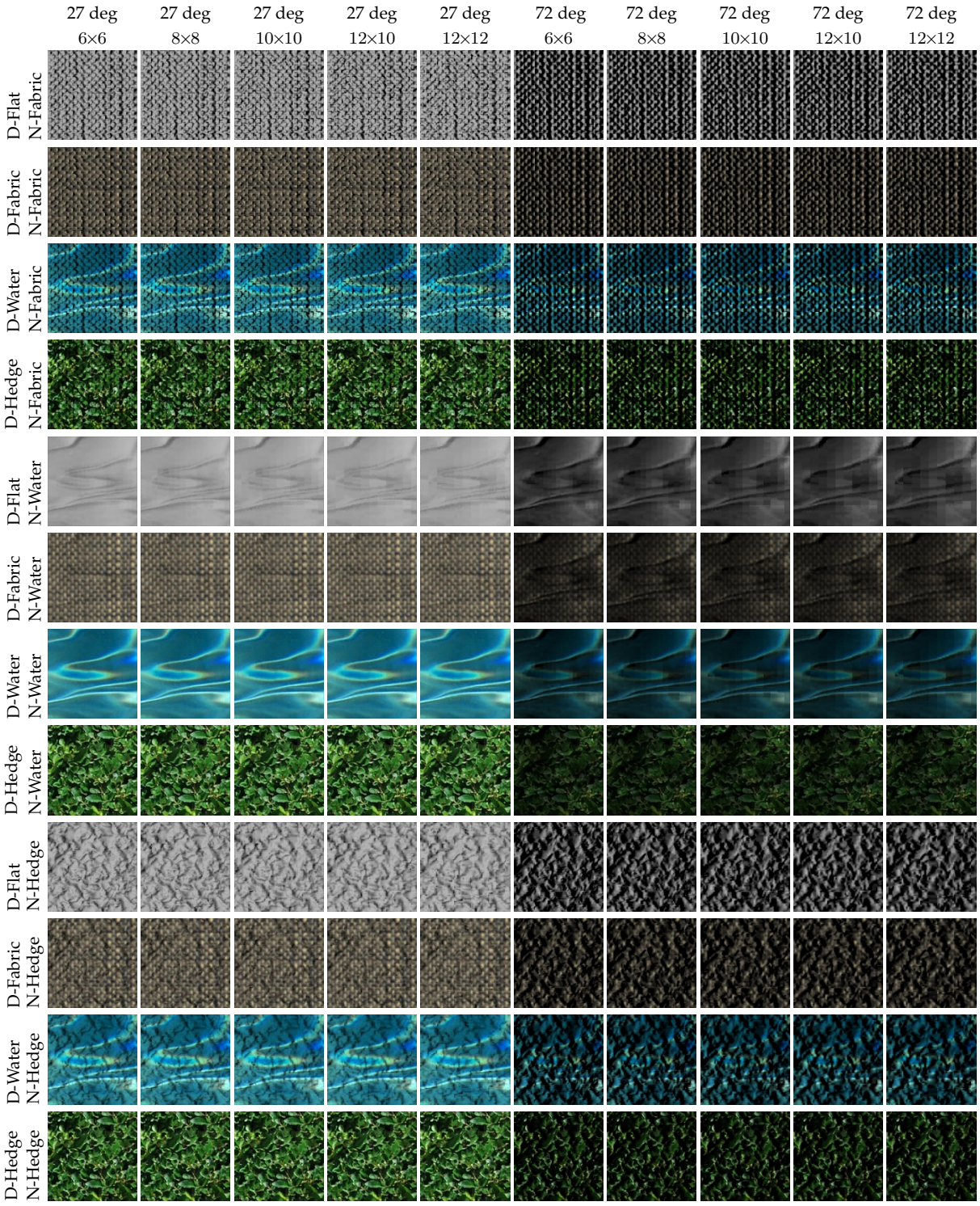


Fig. 4: Our Diffuse Masking Experiment dataset (120 rendered images).

3 Supplementary results related to Section 5.3.2 *Analysis of Metric Failures*

Fig. 5: Classification obtained for different metrics at the maximum value of Youden's index, for the Normal Masking experiment.

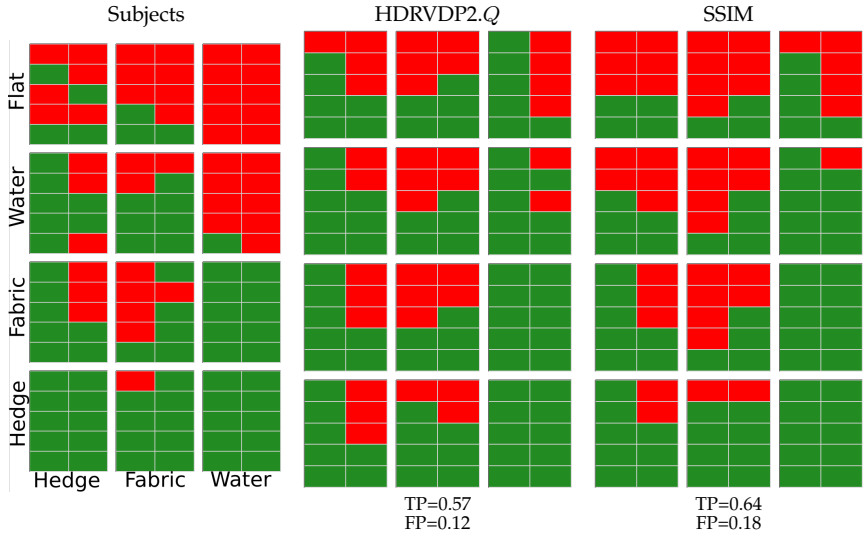


Fig. 6: Classification obtained for different metrics at the maximum value of Youden's index, for the Diffuse Masking experiment.

4 SUPPLEMENTARY RESULTS RELATED TO SECTION 7 *Practical applicability*

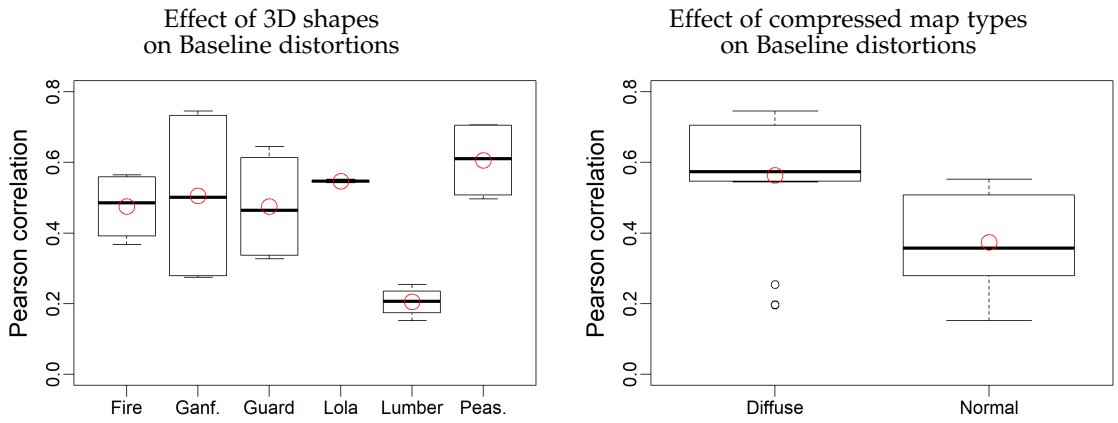


Fig. 7: Boxplots of Pearson correlations obtained when comparing distortion maps **computed on compressed textures alone** (i.e. Baseline) with ground-truth distortion maps. Mean values are displayed as red circles.

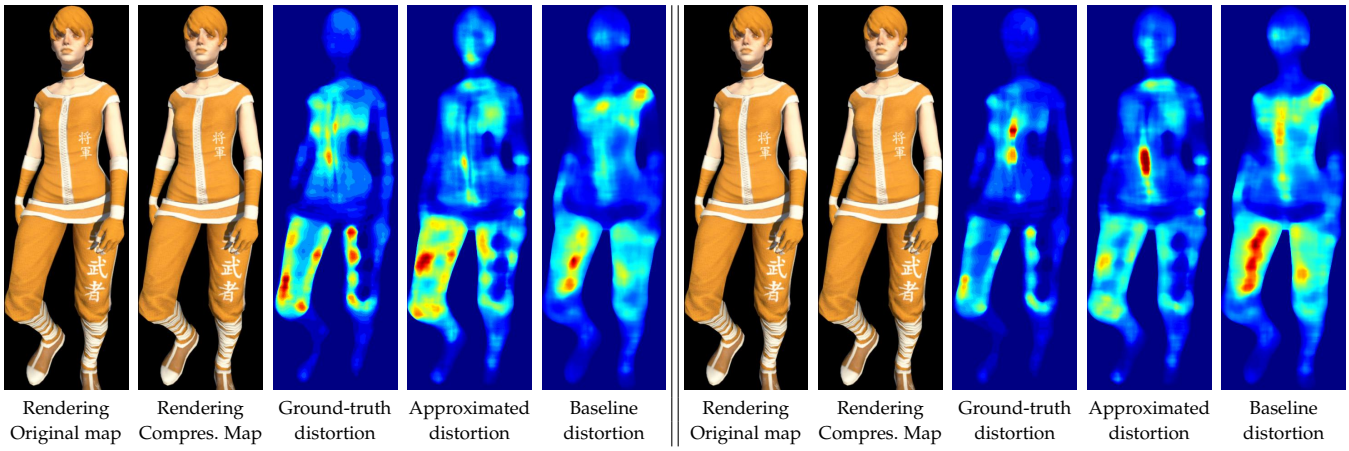


Fig. 8: Illustration of the performance of our recommended distortion (*Lola* asset). In each sub-figure, from left to right: Rendering of the 3D shape mapped with uncompressed diffuse and normal maps; rendering after compression of the normal map; ground-truth distortion obtained by computing the SSIM metric on the rendered images; our approximation obtained by computing the metric after mapping diffuse and normal maps on a geometric square and rendering under a 27° directional light; baseline distortion obtained by computing the metric directly on the compressed normal map. **The left sub-figure is for 10×10 normal map compression and the right one for 12×12 normal map compression**.

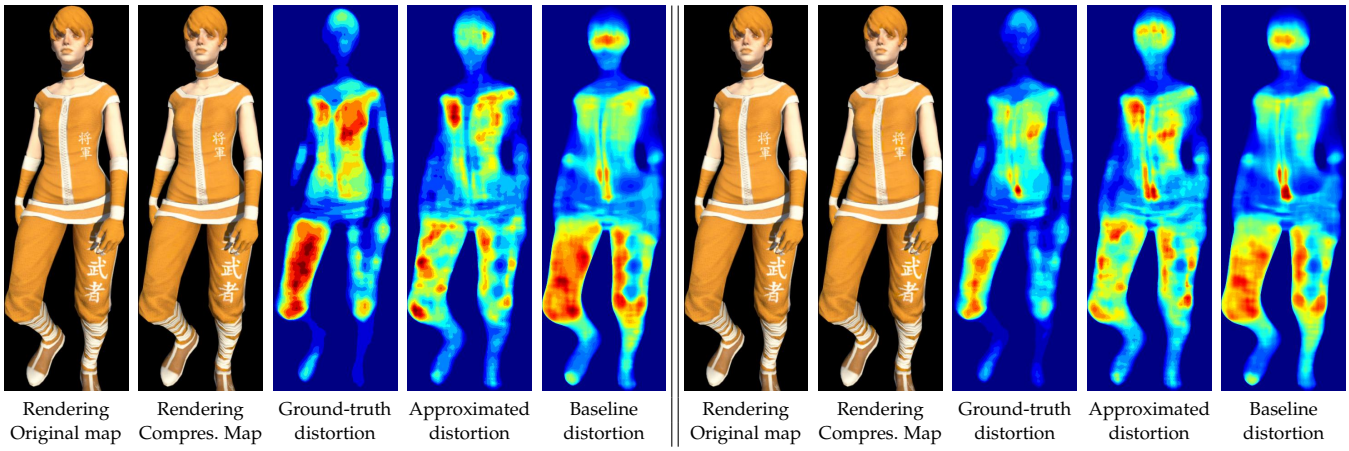


Fig. 9: Illustration of the performance of our recommended distortion (*Lola* asset). **The left sub-figure is for 10×10 diffuse map compression and the right one for 12×12 diffuse map compression**.

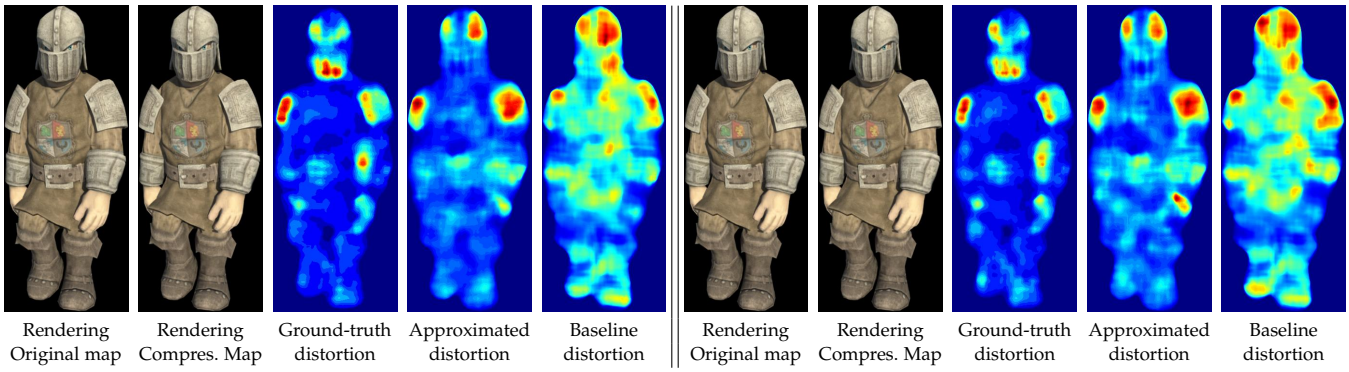


Fig. 10: Illustration of the performance of our recommended distortion (*Guard* asset). **The left sub-figure is for 10×10 normal map compression and the right one for 12×12 normal map compression**.

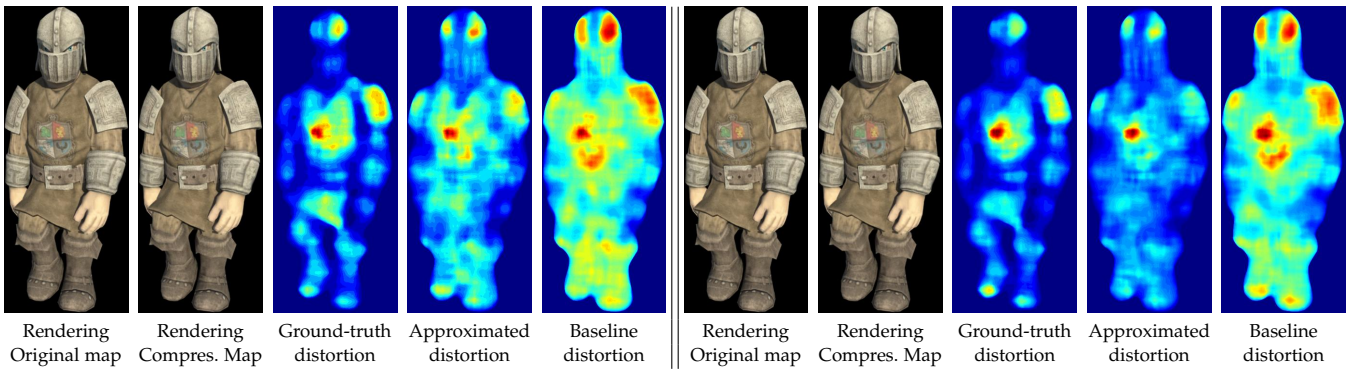


Fig. 11: Illustration of the performance of our recommended distortion (*Guard* asset). **The left sub-figure is for 10×10 diffuse map compression and the right one for 12×12 diffuse map compression**.

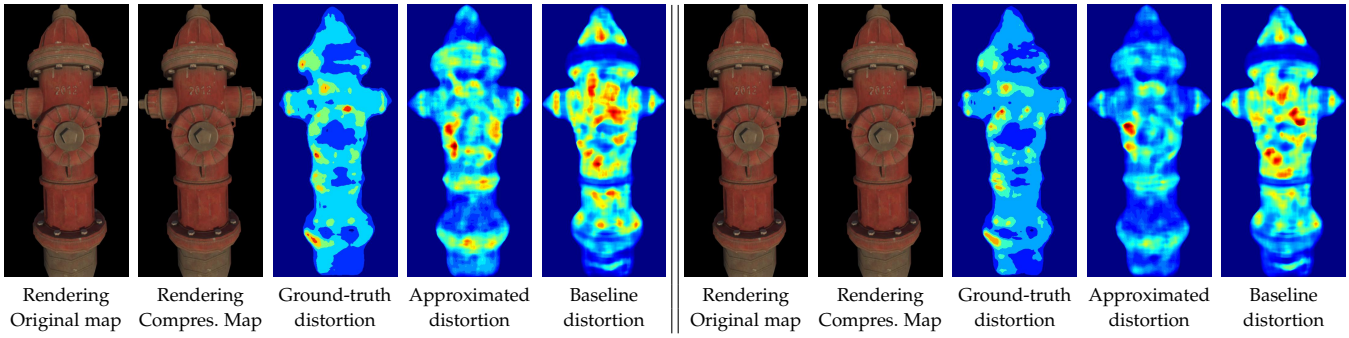


Fig. 12: Illustration of the performance of our recommended distortion (*Fire Hydrant* asset). **The left sub-figure is for 10×10 normal map compression and the right one for 12×12 normal map compression**.

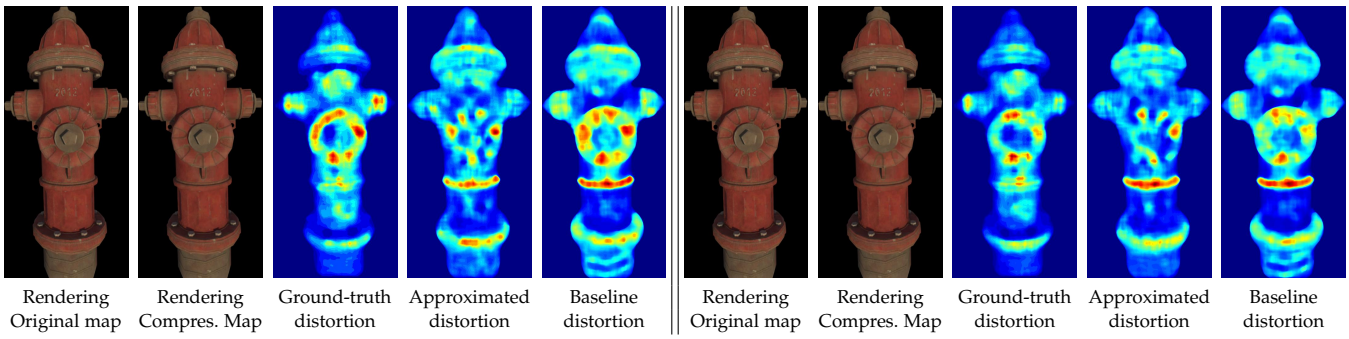


Fig. 13: Illustration of the performance of our recommended distortion (*Fire Hydrant* asset). **The left sub-figure is for 10×10 diffuse map compression and the right one for 12×12 diffuse map compression**.

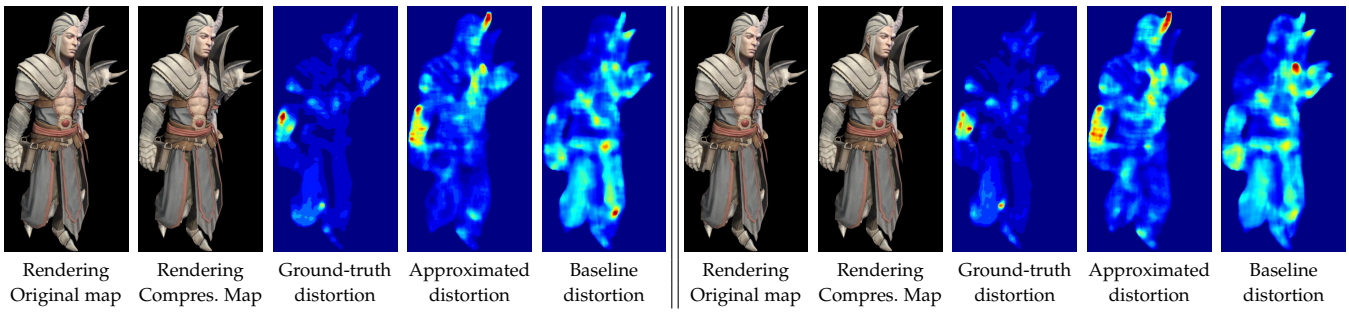


Fig. 14: Illustration of the performance of our recommended distortion (*Ganfaul* asset). **The left sub-figure is for 10×10 normal map compression and the right one for 12×12 normal map compression**.

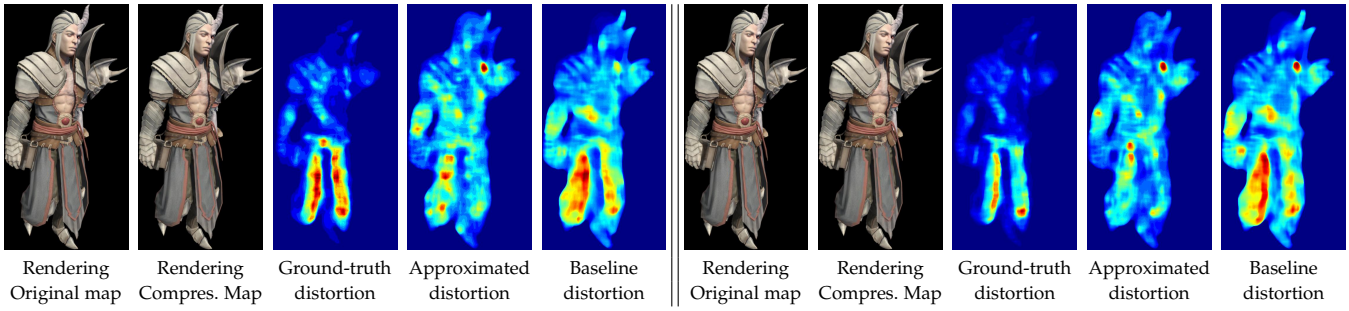


Fig. 15: Illustration of the performance of our recommended distortion (*Ganfaul* asset). **The left sub-figure is for 10×10 diffuse map compression and the right one for 12×12 diffuse map compression**.

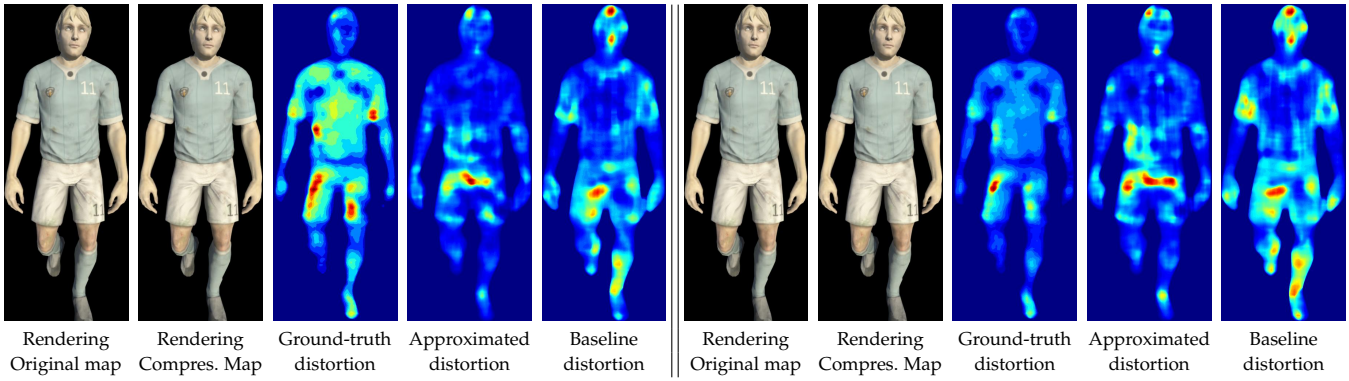


Fig. 16: Illustration of the performance of our recommended distortion (*Lumber* asset). **The left sub-figure is for 10×10 normal map compression and the right one for 12×12 normal map compression**.

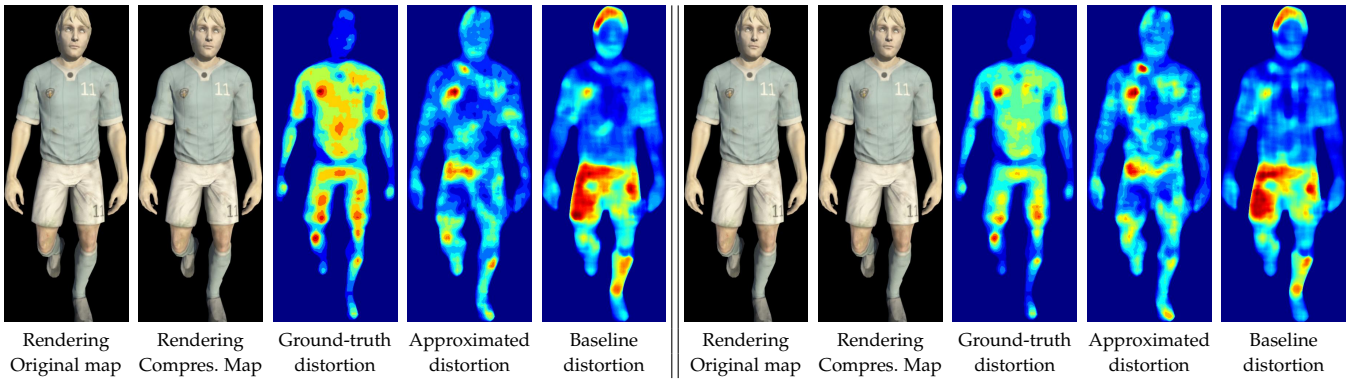


Fig. 17: Illustration of the performance of our recommended distortion (*Lumber* asset). **The left sub-figure is for 10×10 diffuse map compression and the right one for 12×12 diffuse map compression**.

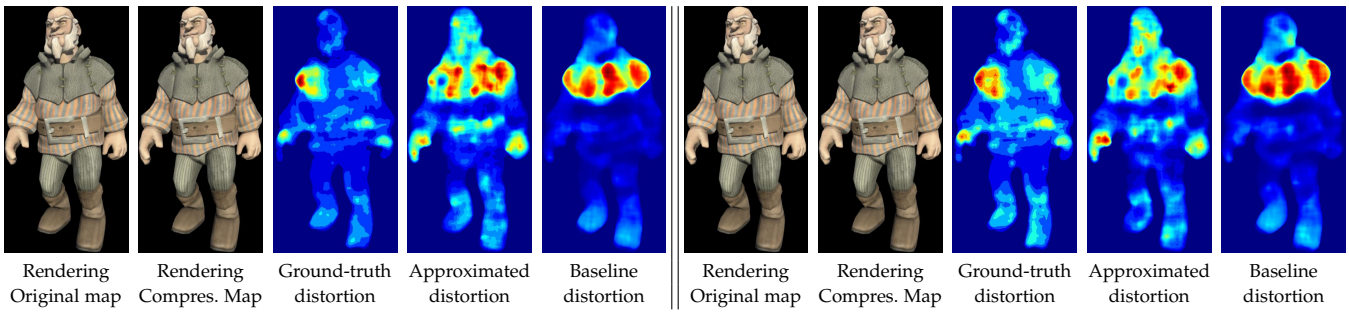


Fig. 18: Illustration of the performance of our recommended distortion (*Peasant* asset). **The left sub-figure is for 10×10 normal map compression and the right one for 12×12 normal map compression**.

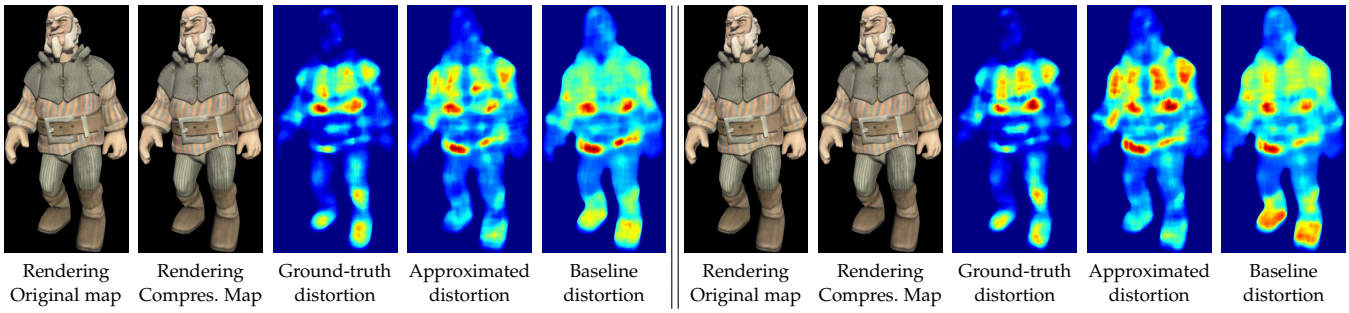


Fig. 19: Illustration of the performance of our recommended distortion (*Peasant* asset). **The left sub-figure is for 10×10 diffuse map compression and the right one for 12×12 diffuse map compression**.