

Subjective and Objective Visual Quality Assessment of Textured 3D Meshes

Supplementary materials

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1. WIREFRAMES AND TEXTURE SEAMS OF OUR 3D MODELS

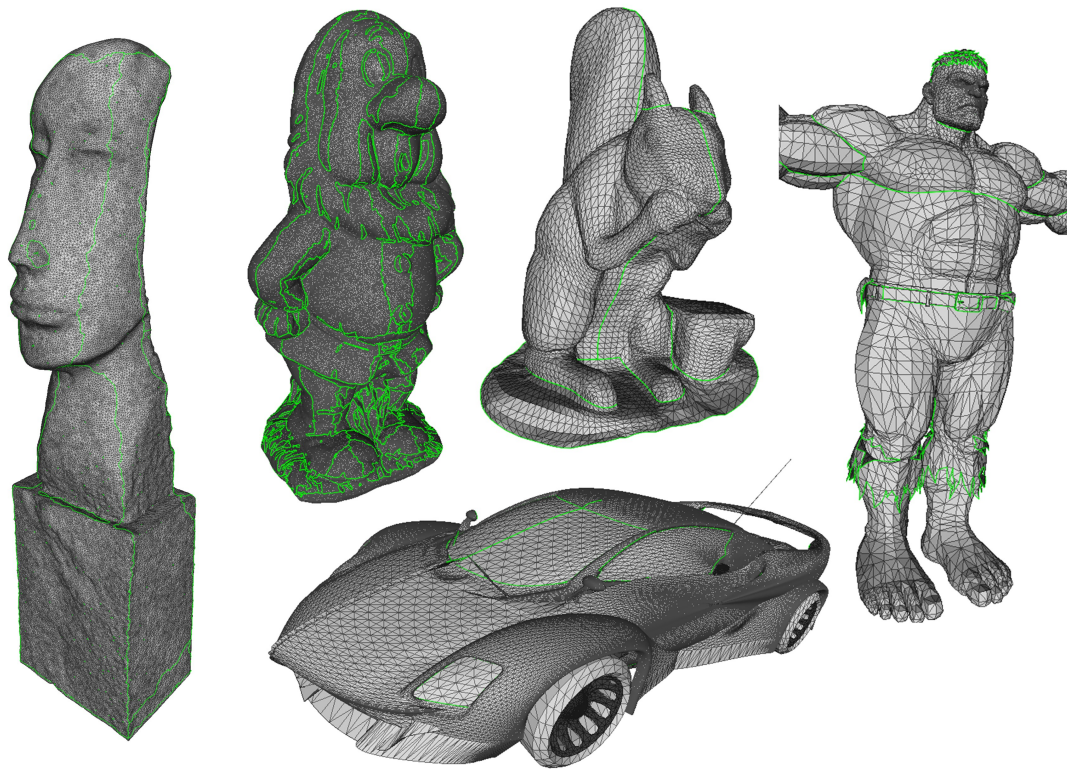


Fig. 1. Wireframes and texture seams (in green)

2. DISTORTIONS ON THE DWARF MODEL

Table I. Details about the distortions applied on the *Dwarf* model.

ID	Texture Distortion		Geometric Distortion	
D1	JPEG	6% quality	Smoothing	25 iterations
D2	JPEG	6% quality	Smoothing	50 iterations
D3	JPEG	6% quality	Quantization	10 bits
D4	JPEG	6% quality	Quantization	8 bits
D5	JPEG	6% quality	Simplification	92% removed
D6	JPEG	6% quality	Simplification	98.7% removed
D7	JPEG	8% quality	Smoothing	25 iterations
D8	JPEG	8% quality	Smoothing	50 iterations
D9	JPEG	8% quality	Quantization	10 bits
D10	JPEG	8% quality	Quantization	8 bits
D11	JPEG	8% quality	Simplification	92% removed
D12	JPEG	8% quality	Simplification	98.7% removed
D13	JPEG	10% quality	Smoothing	25 iterations
D14	JPEG	10% quality	Smoothing	50 iterations
D15	JPEG	10% quality	Quantization	10 bits
D16	JPEG	10% quality	Quantization	8 bits
D17	JPEG	10% quality	Simplification	92% removed
D18	JPEG	10% quality	Simplification	98.7% removed
D19	Sub-sampling	3% sampled	Smoothing	25 iterations
D20	Sub-sampling	3% sampled	Smoothing	50 iterations
D21	Sub-sampling	3% sampled	Quantization	10 bits
D22	Sub-sampling	3% sampled	Quantization	8 bits
D23	Sub-sampling	3% sampled	Simplification	92% removed
D24	Sub-sampling	3% sampled	Simplification	98.7% removed
D25	Sub-sampling	5% sampled	Smoothing	25 iterations
D26	Sub-sampling	5% sampled	Smoothing	50 iterations
D27	Sub-sampling	5% sampled	Quantization	10 bits
D28	Sub-sampling	5% sampled	Quantization	8 bits
D29	Sub-sampling	5% sampled	Simplification	92% removed
D30	Sub-sampling	5% sampled	Simplification	98.7% removed
D31	Sub-sampling	8% sampled	Smoothing	25 iterations
D32	Sub-sampling	8% sampled	Smoothing	50 iterations
D33	Sub-sampling	8% sampled	Quantization	10 bits
D34	Sub-sampling	8% sampled	Quantization	8 bits
D35	Sub-sampling	8% sampled	Simplification	92% removed
D36	Sub-sampling	8% sampled	Simplification	98.7% removed

3. ILLUSTRATION OF OUR SORTING ALGORITHM

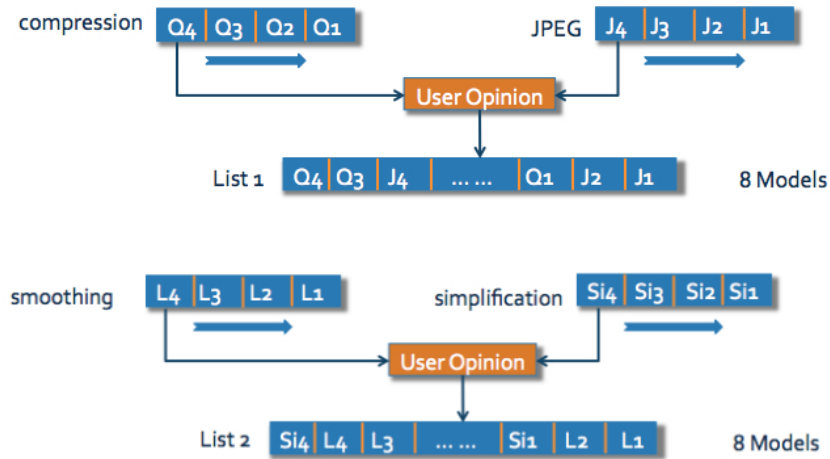


Fig. 2. **Step 1** Two groups (e.g., Q and J) are randomly chosen. The subject firstly compares Q_4 and J_4 . When the subject determines the model closer to the reference (J_4), the index of the other model (Q_4) will be pushed into a list ($List 1$) as the worst quality model. Then the next two models will be shown. In this round, the selected model from previous round (J_4) and a distorted model with a decreased strength from the other group (Q_3) are shuffled and displayed to the subject. Then, following this way, we repeat the comparisons until all 8 models are sorted from the worst visual quality to the best into $List 1$. The same process is conducted between two other groups (e.g., L and Si), and another list ($List 2$) is obtained from these two groups.

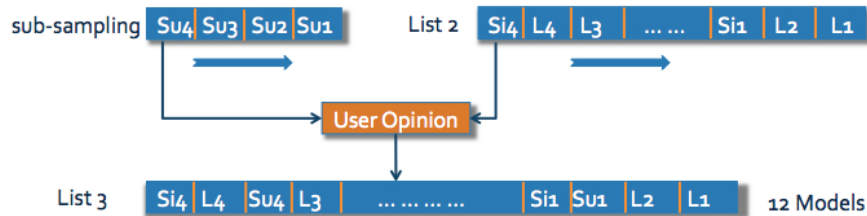


Fig. 3. **Step 2** One list among $List 1$ and $List 2$ is randomly chosen (e.g., $List 2$), in which all the models are already sorted by their visual qualities. This list will be merged with the remaining group (Su). Following the procedure detailed in step 1, these two sets of models are interleaved into $List 3$.

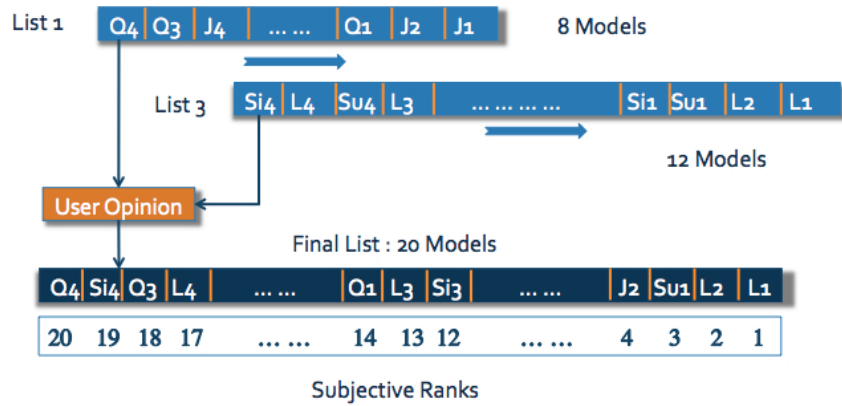


Fig. 4. **Step 3** Finally the remaining lists (*List 3*) and (*List 1*) are merged with the same process than before, to obtain the *Final List*, which contains the 20 models ranked from the worst visual quality to the best (1 means the best, and 20 means the worst).

4. SUBJECTIVE SCORES

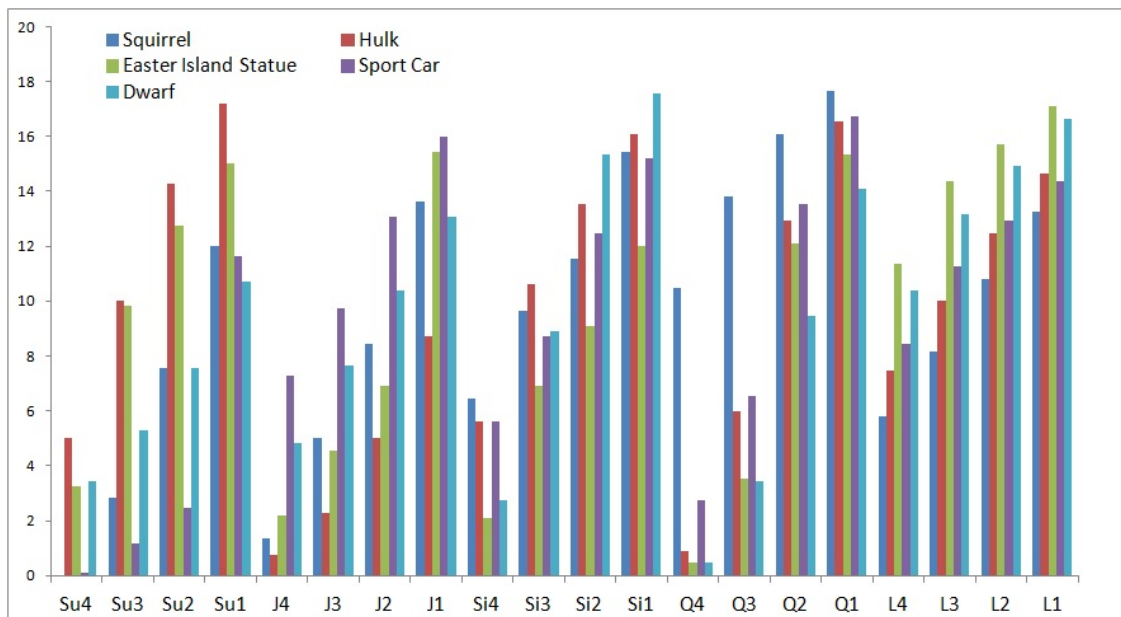


Fig. 5. Subjective vote scores for all the 100 distorted models (single-type distortion setting) for the rendering with shading. Higher scores mean better visual quality.

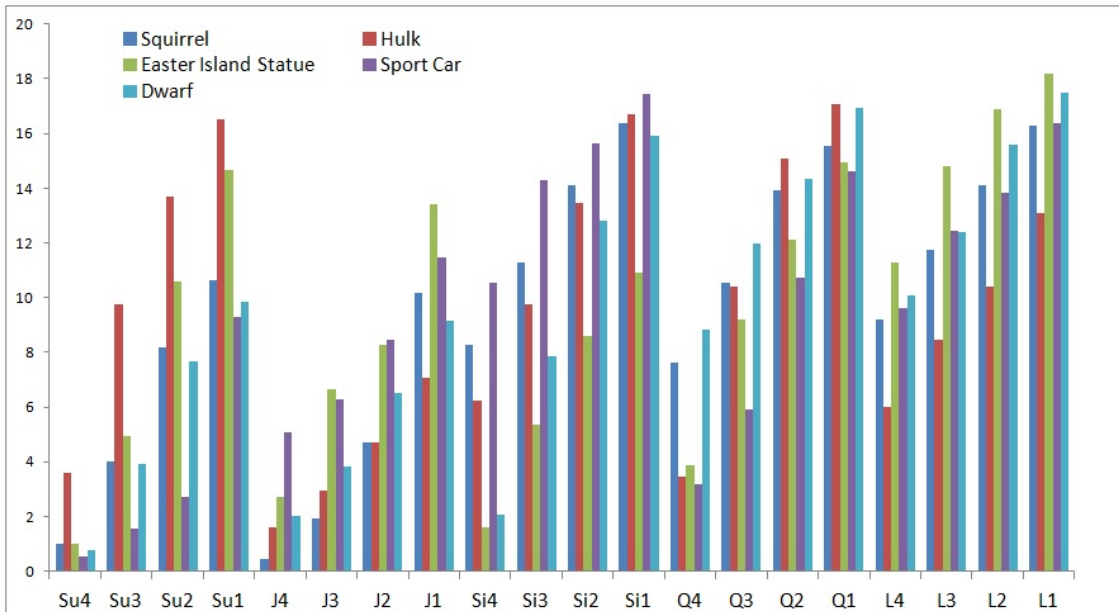


Fig. 6. Subjective vote scores for all the 100 distorted models (single-type distortion setting) for the rendering without shading. Higher scores mean better visual quality.

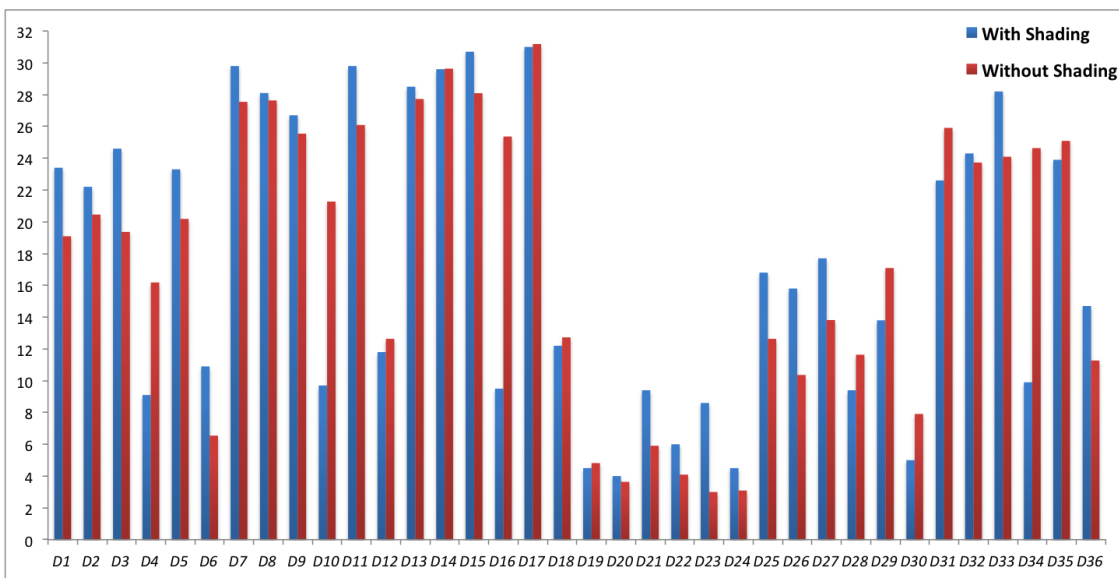


Fig. 7. Subjective vote scores for the 36 distorted Dwarf models (mixed-type distortion setting) for the renderings with shading and without shading respectively. Higher scores mean better visual quality.