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Downsampling and storage of pre-computed gradients for volume rendering

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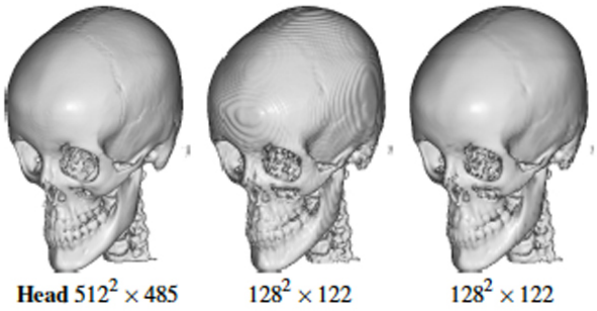

The way in which gradients are computed in volume data-sets influences both the quality of the shading and the performance obtained in rendering algorithms. In particular, the visualization of coarse datasets in multi-resolution representations is affected when gradients are evaluated on-the-fly in the shader code by accessing neighbouring positions. We propose a downsampling filter for pre-computed gradients that provides improved gradients that better match the originals such that the aforementioned artifacts disappear. Secondly, to address the storage problem, we present a method for the efficient storage of gradient directions that is able to minimize the minimum angle achieved among all representable vectors in a space of 3 bytes.

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