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Adaptive transfer functions. Improved multiresolution visualization of medical models

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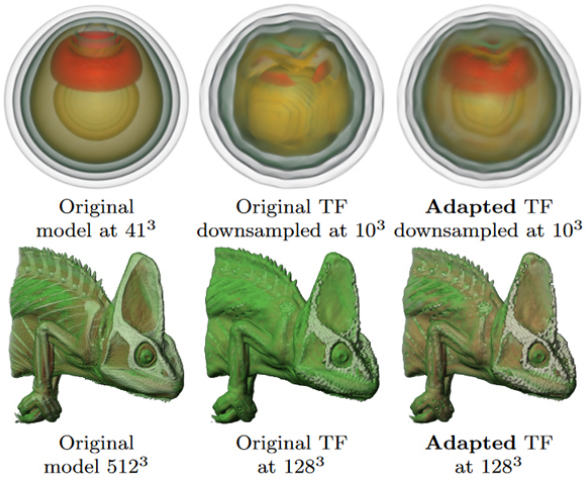

Medical datasets are continuously increasing in size. Although larger models may be available for certain research purposes, in the common clinical practice the models are usually of up to 512ï¿½ï¿½512ï¿½ï¿½2000 voxels. These resolutions exceed the capabilities of conventional GPUs, the ones usually found in the medical doctorsï¿½ï¿½ï¿½ desktop PCs. Commercial solutions typically reduce the data by downsampling the dataset iteratively until it fits the available target specifications. The data loss reduces the visualization quality and this is not commonly compensated with other actions that might alleviate its effects. In this paper, we propose adaptive transfer functions, an algorithm that improves the transfer function in downsampled multiresolution models so that the quality of renderings is highly improved. The technique is simple and lightweight, and it is suitable, not only to visualize huge models that would not fit in a GPU, but also to render not-so-large models in mobile GPUs, which are less capable than their desktop counterparts. Moreover, it can also be used to accelerate rendering frame rates using lower levels of the multiresolution hierarchy while still maintaining high-quality results in a focus and context approach. We also show an evaluation of these results based on perceptual metrics.

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