Perceptually Lossless Coder for Volumetric Medical Image Data

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Abstract

With the development of modern imaging techniques, every medical examination would result in a huge volume of image data. Analysis, storage and/or transmission of these data demands high compression without any loss of diagnostically significant data. Although, various 3-D compression techniques have been proposed, they have not been able to meet the current requirements. This paper proposes a novel method to compress 3-D medical images based on human vision model to remove visually insignificant information. The block matching algorithm applied to exploit the anatomical symmetry remove the spatial redundancies. The results obtained are compared with those of lossless compression techniques. The results show better compression without any degradation in visual quality. The rate-distortion performance of the proposed coders is compared with that of the state-of-the-art lossy coders. The subjective evaluation performed by the medical experts confirms that the visual quality of the reconstructed image is excellent.

Keywords: image compression; visual perception; human visual system; bilateral symmetry; MRI and CT images

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