

Generating Unfolded Views of Tracts by Cutting and Deforming Medical CT Data

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The remarkable progress of multi-detector row CT scanners has enabled us to take hundreds of high resolution CT slices containing very precise information of a human body in only twenty to thirty seconds. To assist medical doctors in diagnosis using such images, we have been developing a method which can virtually unfold an organ having a large cavity, such as the colon or the stomach, and visualize the entire luminal surface in only one image. These so-called unfolded views correspond to pathological specimens which are commonly used in the medical field. Unfolded views of tracts can be very useful for not only diagnosis but also surgical planning as they allow medical doctors to understand various kinds of information of the luminal surface intuitively, just as observing a pathological specimen. Unfolded views of an organ are generated by cutting and deforming the organ region in CT data and then visualizing the deformed data by volume rendering. Image deformation is represented as deforming an organ model consisting of mass-points and visco-elastic elements to a flat shape, followed by image data reconstruction using the geometric relation between the two shapes of the model before and after deformation. Unfolded views generated from several 3D CT image datasets are presented to medical doctors for surgical planning and get evaluated.