Real – time three-dimensional anatomical reconstruction of the human heart from normalized dataset

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Four-dimensional (3D + time), real-time, cardiac image visualization is an important tool for anatomical procedure, particularly if the dynamic volumetric image can be registered to, and fused with the actual patient anatomy. 4D cardiac image visualization and manipulation platform, based on the opacity density radiation model, which exploits the power of modern graphics processing units in the rendering pipeline. A dynamic multiresolution display is implemented to enable the interactive selection and emphasis of volume of interest (VOI) within the entire contextual cardiac volume and to enhance performance, and a novel color and opacity adjustment algorithm is designed to increase the uniformity of the rendered multiresolution image of heart. Our system provides a visualization environment superior to noninteractive software-based implementations, but with a rendering speed that is comparable to traditional volume rendering approaches based on texture mapping.

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