Study of Marching Cube Algorithm in Reverse Engineering

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ABSTRACT

Fast development in the computer science and technology has caused the great promotion in the performance and accuracy of the medical instruments, such as CT and MRI scanning. Those are related with the generation of large-scale volumetric data. The Marching Cubes algorithm has long been employed as a standard indirect volume rendering approach to extract isosurface from this type of data. The Marching Cubes algorithm is fast because it uses table look-up to build polygonal contours. This research mainly concerns with visualizing and rendering the segmented medical image scanned from CT (or MRI) by using Marching Cube algorithm. . Here the uniform 3D grid from segmented image is generated first. For each cell on the grid, the edges intersected with the isosurface are detected from signs at cell corners. Then triangulations for each sign configuration is established by using a look-up table recomputed, and also visualized via OpenGL. Finally, the solid model is constructed after smoothing by using Reverse Engineering software. In addition, the box-example is illustrated for the application of MC outputs to the product design.

Keywords: Reverse Engineering; volume rendering; Marching Cube; visualization

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