

IMG-92-002 - ULTRASOUND -3D Ultrasound Imaging Systems and Methods

Published date: May 28, 2009

Technology description

Description

These inventions describe novel ultrasound systems and methods for obtaining high quality three dimensional (3D) images of a target volume. The patented system includes a conventional ultrasound probe, a universal probe assembly, and a clinical ultrasound machine coupled to a computer. The ultrasound probe is mounted to a universal component that moves the probe along the organ being studied and scans the probe in one scan to obtain a series of 2-D images. The assembly includes a motor and driver for rotating or scanning the probe relative to the organ being studied. The computer is used to control the motion of the component and collect a two-dimensional image used to construct the final three-dimensional image. Since the position and velocity of the probe can be determined based on the motion of the component, a precise spatial relationship between the two-dimensional images can be determined. Using this information, the computer can use any of three proprietary methods to construct the final 3-D image. "Full volume" reconstruction is the most intensive method proposed in three-dimensional ultrasound imaging, which involves converting each pixel in a two-dimensional slice into a suitable voxel for a given image volume. "Fast linear" and "axial" are more efficient (less time consuming) methods where only specific data points from 2-D image slices are needed to view selected images in 3-D (relative to the target) All data for the entire volume). Also included is a claim for a method of displaying and manipulating the obtained 3-D ultrasound image. The described 3-D ultrasound imaging systems and methods are expected to greatly expand the clinical imaging capabilities of existing and new ultrasound devices.

The total medical diagnostic imaging market is growing at an average annual growth rate of 5.9% and is expected to reach \$5.4 billion dollars by 2004. Within the United States, 3D imaging modalities reported to generate revenues of \$400 million in 2002. These revenues are projected to reach \$1.15 billion by 2009. Ultrasound imaging given its availability, low cost, and safety, as compared to other modalities such as x-ray, magnetic resonance imaging (MRI), or computed tomography (CT), is expected to contribute to a significant portion of these revenues. The cost of operating ultrasound equipment can be as much as one-tenth that of MRI and CT. There are currently over 150,000 ultrasound instruments installed worldwide performing more than 135 million scans per annum. 3-D ultrasound imaging has been used as a replacement for diagnoses made using other imaging

modalities. Continued market growth is anticipated as 3D ultrasound is implemented for broader medical diagnostic imaging applications.

Institution

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