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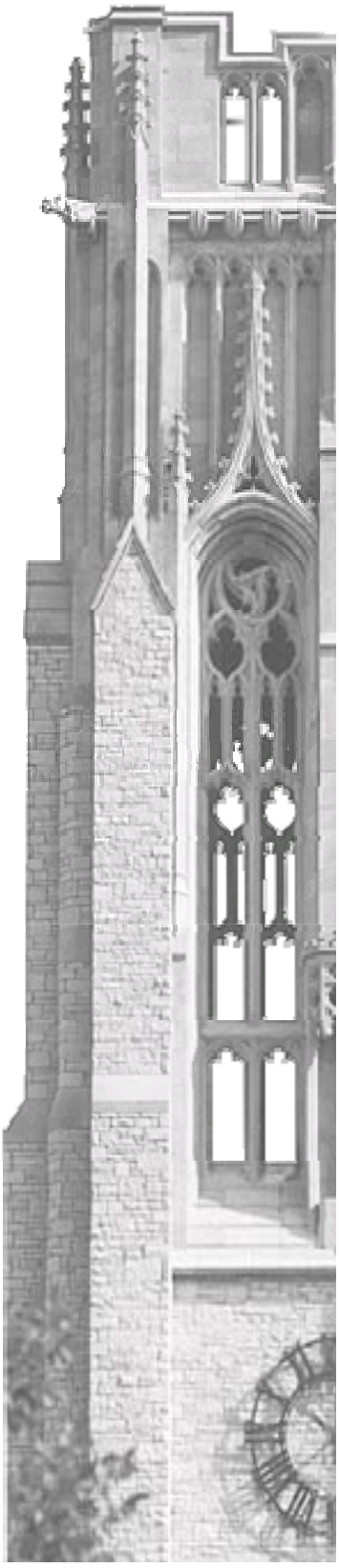
High Frame Rate Imaging System



The University of Toledo is seeking a company interested in utilizing technology relating to a high-speed or high-quality 3D ultrasound imaging system. High frame rate systems can improve the state of the medical art by allowing fast moving objects to be clearly imaged or allowing highest possible image quality. Present systems build a 3D image from a composite of 2D frames, and therefore require the transmission of many frames to form a single useful 3D image. This process slows the frame rate to a level that is unacceptable for use on objects such as the heart. Present systems may also use a sub-array approach to moderately speed up 3D imaging at the cost of image quality. This invention can form a 3D image from a single transmission, thereby enabling highest speed imaging. Additionally, this new technology allows for the use of a fast Fourier transform, a computationally efficient method that is performed by inexpensive components and reduces the total cost of the imaging system. Speckle noise can be reduced and image resolution can be increased while the field of image view is increased, as well. For uses where high speed is not critical, such as the imaging of the liver or kidneys, this technology can be optimized for improved image quality with a loss in frame rate. This invention can also create 2D images and 3D image sequences displayed over time.

Application:

This technology can meet a need in the medical field for fast, low-cost 3D ultrasound imaging. This is especially helpful for imaging fast moving objects such as the heart, as conventional ultrasound techniques cannot keep pace with its changes while transmitting the large number of 2D images needed to form a composite 3D image. This improves over a conventional system, which sacrifices image resolution to gain a moderate increase in image speed. When high speed is not required, this invention can provide high quality images at lower frame rates for radiology applications. Additionally, this technology can create 2D images and 3D image sequences displayed over time.

Advantages:

1. Allows high frame rate imaging, which is especially useful in 3D medical ultrasound applications
2. Uses efficient computational methods which enable the use of relatively simple and inex pensive components
3. Can be optimized to increase field of view while reducing noise or enhancing image resolution
4. Can also be optimized to produce maximum image quality at the expense of frame rate in applications where this is preferable such as radiology

This invention is patent pending

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