Image Reconstruction Method for Cardiac Gated Magnetic Resonance Imaging

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Technology description

Magnetic resonance imaging (MRI) is a medical imaging technique that takes measurements, or "views," of a subject's nuclear magnetic resonance (NMR) to form images of internal structures. Magnetic resonance angiography (MRA) uses the same magnetic resonance phenomenon to produce images of the human vasculature and heart. MRA images can be enhanced by a contrast agent, but this method needs to be timed precisely to capture images during the short time when the agent is entering the vasculature.

When imaging certain arteries, the results are greatly affected by the beating of the heart. Cardiac gating, which employs electrocardiography (ECG) to trigger acquisition of an image at a certain point in the heart's cardiac cycle, is necessary to allow the same image to be taken throughout multiple cardiac phases. Two-dimensional images have been acquired using this technique, but no existing method is fast enough to acquire a 3-D image or multiple 2-D images at each cardiac phase. A UW-Madison researcher has developed a new method for reconstructing cardiac gated MR images and specifically for improving the quality of highly undersampled cardiac phase images. A series of views for one image from a specific cardiac phase are combined into a composite image. Then a highly constrained backprojection method, using the composite image, allows for the reconstruction of 2-D and 3-D images for each phase. A highly sampled composite image also can be constructed from multiple undersampled images from a certain cardiac phase to increase the signal-to-noise ratio of the final images.
The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a new method for reconstructing cardiac gated magnetic resonance (MR) images.

Additional Information

For information about phase contrast magnetic resonance imaging (PCMRI), see WARF reference number P06241US.
http://www.warf.org/technologies/summary/P06241US.cmsx

Application area

Image reconstruction for cardiac gated MRI

Advantages

Increases 2-D image quality for cardiac gated MRI
Produces good quality 3-D images for cardiac gated MRI

Institution

Wisconsin Alumni Research Foundation

Inventors

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