Highly Constrained Backprojected Reconstruction (HYPR) for Magnetic Resonance Images

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WARF: P05436US

Inventors: Charles Mistretta

The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a new way for reconstructing magnetic resonance images (MRI), and in particular, an improved backprojection method for time-resolved vastly undersampled imaging with projections (VIPR).

Overview

Magnetic resonance imaging (MRI) is a medical imaging technique that measures the nuclear magnetic resonance (NMR) to image internal parts of the body. One method used to reconstruct images from NMR data sets involves backprojecting the processed NMR data to the signal receivers to reconstruct the image. An incorrect assumption is made that the backprojected signal is homogeneous. The resulting error is minimized by taking sufficient data sets, which increases scan time.

Methods developed to decrease the long scan time include using multiple NMR signal receivers or using projection reconstruction. Projection reconstruction is done by taking successive undersampled images that have overlapping NMR data.

The Invention

A UW-Madison researcher has developed a new method for reconstructing magnetic resonance images using an improved backprojection method. The method uses a composite image and an assumption of an inhomogeneous backprojected signal to weight the distribution of the backprojected views to reconstruct images.

The composite image can be obtained from either the MRI scan or from previous data to enhance undersampled data sets. The method can be applied to contrast enhanced magnetic resonance angiography (CEMRA), which would subtract out unwanted tissue in the composite image to further enhance the effectiveness of the present invention. Multiple composite images can even be utilized to reconstruct changing images such as in time-resolved angiography.

Applications

- Highly constrained backprojection reconstruction during MRI scans

Key Benefits

- Produces good quality images with far less NMR data
- Increases speed of scans
- Benefits from clinical MR applications where *a priori* information is available
- Enhances effectiveness of CEMRA applications
- Enables the use of multiple composite images for dynamic studies

Additional Information

For More Information About the Inventors

- Charles Mistretta

Related Technologies

- For information about the computed tomography (CT) version of this technology, see WARF reference number P05437US.

Tech Fields

- Medical Imaging : MRI

For current licensing status, please contact Jeanine Burmania at jeanine@warf.org or 608-960-9846