Rapid Acquisition Magnetic Resonance Imaging Using Radial Projections

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WARF: P98238US
View U.S. Patent No. 6,630,828 in PDF format.

The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a method to rapidly capture MR images without losing resolution.

OVERVIEW

Rapid capture of high-resolution images is critical in magnetic resonance imaging (MRI), especially when an image must be timed to a short-lived event, such as passage of a contrast agent. In conventional Cartesian MRI data acquisition, image resolution is sacrificed in order to attain faster imaging rates.

THE INVENTION

UW-Madison researchers have developed a method of achieving rapid capture of images without loss of resolution by applying projection reconstruction (PR) methods to MRI. PR data acquisition involves collecting k-space data as a series of radial projections through the center of k-space. To reduce the scan time needed to build an image, a subset of the radial projections are sampled. Image resolution is unaffected by the number of sampled projections, but radial streak artifacts may intensify as fewer projections are used. However, as these artifacts usually represent only a few percent of the signal coming from objects being viewed, they present little problem in MRI applications where a bright object dominates surrounding tissues (e.g., an artery in contrast-enhanced MR angiography).

APPLICATIONS

• Rapid capture of MR images

KEY BENEFITS

• Produces images with four times the resolution of those obtained through conventional Cartesian data acquisition for the same length of scan time
• Offers the speed and resolution of reduced field of view (FOV) imaging techniques throughout an entire, larger FOV
• Well suited for imaging bright objects that dominate the FOV, including liver and pancreatic ducts, and arteries during contrast-enhanced MR angiography
• PR data acquisition is a well-established technique that is widely applied in X-ray computed tomography.
• Can be combined with methods for time-resolved 3-D MR angiography, such as 3-D TRICKS (see link below)

ADDITIONAL INFORMATION

Related Technologies
For an improved PR data acquisition method for MRA, see WARF reference number P01008US.
For information on time-resolved 3-D MR angiography (3-D TRICKS), see WARF reference number P96011US.
PR data acquisition can also be applied to phase contrast MRA (see WARF reference number P99144US).

Tech Fields
Medical Imaging - MRI

CONTACT INFORMATION

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