



Combining VIPR with Inversion Recovery for Improved MRI

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a method for inversion-recovery MRI using radial projections ordered in a way that enhances temporal resolution.

Overview

In 2-D medical imaging, a pulse sequence called inversion recovery (IR) can be used to obtain multiple images of an area with varying magnetization contrast. This helps improve diagnostic certainty. Determining the appropriate timing for the inversion can be challenging because it is not known in advance what magnetization contrast will provide the best tissue contrast.

This drawback could be addressed by a technique, called VIPR, previously developed by UW–Madison researchers. VIPR (Vastly Undersampled Isotropic Projection Reconstruction) represents a breakthrough in magnetic resonance imaging (MRI). The technique employs radial projection acquisition in all three dimensions rather than just two. Such an improvement substantially reduces imaging artifacts that otherwise limit the speed of 2-D projection reconstruction image capture.

The Invention

UW–Madison researchers have now developed an algorithm combining VIPR with IR. This combination, along with a unique projection ordering, results in a large set of 3-D, high spatial resolution images with multiple different image contrasts.

VIPR-IR works by allowing more flexibility in creating segments of repetition times (TRs) that sweep a range of inversion times. The user may select a desired number of consecutive projections to be combined for better image quality. The number of these consecutive projections can be chosen after data acquisition. In other words, data is combined retrospectively.

Rather than trying to predict which imaging parameters will produce the best contrast for a particular patient, the method acquires multiple images across a range of contrast settings. The process does not take longer than a typical scan.

Applications

- Use in MR acquisition and reconstruction software
- Brain and cardiac imaging
- Imaging pediatric and infant patients, which can be problematic given motion artifacts and poor image contrast

Key Benefits

- VIPR-IR provides subject-specific optimized tissue contrast
- Inherently less sensitive to motion
- Enables retrospective removal of motion artifacts
- Allows multiple magnetization contrast images without a *prior* knowledge of optimal inversion timing

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- Takes advantage of VIPR's efficient and short (seven minute) scan time

Stage of Development

VIPR-IR can acquire more than 160 images with different contrasts between gray and white brain matter in the same amount of time as conventional (single-contrast) scans.

Additional Information

For More Information About the Inventors

- [Andrew Alexander](#)

Tech Fields

- [Medical Imaging : MRI](#)

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

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