



Characterization of Receiver Demodulation for Correcting Off-Axis MR Imaging Degradation

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Inventors: Walter Block, Youngkyoo Jung, Yogesh Jashnani

The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing an MRI pre-scan calibration procedure that can reduce blurring in non-Cartesian imaging.

Overview

Non-Cartesian imaging in magnetic resonance imaging (MRI), often accomplished by radial or spiral data acquisition, permits significant acceleration of the MRI process. However, non-Cartesian imaging is more sensitive to system instabilities like hardware delays.

Because the gradient amplitude during acquisition in non-Cartesian imaging changes over time, when the anatomy of interest is not located at the magnet center, real-time demodulation of the received signal to center images is more complicated than in Cartesian imaging. Uncompensated hardware delays between the real-time frequency demodulation system and the data acquisition system can cause serious blurring.

The Invention

UW-Madison researchers have developed an MRI pre-scan calibration procedure that allows easier demodulation corrections. The procedure measures the hardware timing error to 0.1 ms accuracy between the real-time frequency demodulation hardware and the data acquisition subsystem.

By knowing the timing delay, the actual demodulation phase applied to each raw data point by the hardware can be calculated rapidly. A phase correction can then be applied before the image is reconstructed to account for the phase errors created by the delay. Alternatively, knowledge of the correct delay can be used to adjust the hardware prior to image acquisition; however, this is less accurate as current hardware can only be adjusted in quantized interval of 1 or 2 ms.

Applications

- Non-Cartesian imaging in MRI

Key Benefits

- Allows non-Cartesian acquisition of MRIs away from the magnetic center
- Eliminates substantial blurring of knees, shoulders and heart images
- Program can adjust during or after image acquisition

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Additional Information

For More Information About the Inventors

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WARF
Wisconsin Alumni Research Foundation

| info@warf.org | 608.960.9850

- [Walter Block](#)

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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