Medical Imaging

Controlling Motion Effects in MRI

View U.S. Patent No. 10,162,035 in PDF format.

WARF: P150149US01

Inventors: Kevin Johnson

The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a method for generating MRI images that are less sensitive to respiratory motion.

Overview

Magnetic resonance imaging (MRI) is sensitive to patient movements due to the long scan times sometimes required. A major source of motion is breathing, which causes artifacts to appear in MR images. Imaging abdominal organs (e.g., liver) is especially challenging for this reason.

Patients may have difficulty holding their breath during a scan or may suffer from a disease that affects respiration. Moreover, when contrast agents are injected into tissue (to perform dynamic contrast enhanced imaging or DCE), the process takes even longer and cannot be completed within a single breath hold.

The Invention

UW–Madison researchers have developed a method for overcoming motion effects in MRI images. The new method makes dynamic contrast enhanced imaging less susceptible to a patient's respiratory movement.

In essence, a sliding slice acquisition strategy is used to sample k-space in a pseudorandom manner relative to the trajectories extending between the center and peripheral areas of k-space. A two-dimensional (2-D) slice may be slid from one position to another faster than the patient is breathing/moving. This allows motion artifacts to be reflected as geometric distortions that do not detract from the clinical utility of the images.

Applications

- MR software

Key Benefits

- Addresses longstanding problems caused by respiration and blood flow
- Outperforms competing techniques
- Confines motion effects to a particular slice or local area
- Effects don't plague all images.

Stage of Development

To assess feasibility, phantoms and healthy volunteers were imaged on a clinical 3.0T system.

Additional Information

For More Information About the Inventors

- Kevin Johnson

Related Technologies

- WARF reference number P110244US02 describes a method for correcting patient motion with T1-weighted PROPELLER MRI.
- WARF reference number P07066US describes a method for removing patient motion effects using an improved diffusion-weighted imaging technique.

Tech Fields

- Medical Imaging : MRI

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