Time-Resolved Magnetic Resonance Fingerprinting (TRMRF): A Novel Algorithm for Accelerated Multi-Parametric Quantitative MRI and Enhanced Diagnostic Imaging

Tech ID: 34566 / UC Case 2024-106-0

TECHNOLOGY DESCRIPTION

UCSF inventors have developed a novel algorithm, Time-Resolved Magnetic Resonance Fingerprinting (TRMRF), designed to enhance MRI by accurately measuring key tissue properties, including T1 (the time tissues take to realign with the magnetic field), T2 (the rate at which tissues lose coherence after a pulse), T2* (which accounts for both T2 and magnetic field variations), proton density, and quantitative susceptibility mapping (QSM). TRMRF addresses common challenges in current MRI techniques, such as long scan times, difficulty in simultaneously measuring T2 and T2*, motion-related artifacts, and slow, complex image reconstruction. Using a faster imaging method called time-resolved echo planar imaging (EPI) with a specialized sampling design, TRMRF enables quicker, more efficient scans while maintaining clear, high-quality images. Its advanced reconstruction methods, including subspace modeling and two-dimensional decomposition, improve computational efficiency by breaking down complex data into smaller components and enhance image quality by reducing motion artifacts and distortions. Currently in the development stage, TRMRF is compatible with major MRI systems and applicable to brain, abdomen, and other body imaging, offering transformative benefits for radiologists, patients, medical device companies, and healthcare facilities.

PATENT STATUS

Patent Pending

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KEYWORDS

Magnetic Resonance Fingerprinting (MRF), Diagnostic Imaging Innovation, MRI Efficiency Optimization, Advanced Imaging Algorithm, Motion Artifact Reduction

CATEGORIZED AS

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  - Bioinformatics
- **Imaging**
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