Docket #: S16-290

Robust Principal Component Analysis for Separation of On and Off-resonance in 3D Multispectral MRI

Stanford researchers have designed a system to provide accelerated magnetic resonance imaging (MRI) in the presence of metallic implants, which induce variations in the static magnetic field that normally require long scan times. Acquisition is accelerated by a complementary subsampling scheme. A highly constrained reconstruction is used to recover on- and off-resonance components, represented as rank 1 and sparse matrices respectively.

The system enables approximately four-fold acceleration relative to what can be achieved with conventional parallel imaging and partial Fourier.

Applications

- For use in MRI near metallic implants.

Advantages

- Improved efficiency for MRI near metal enabling shorter scan time for faster clinical workflow or higher resolution and coverage in comparable scan time;
- Optimization framework providing ease of integration with other reconstruction techniques and acceleration methods, including conventional partial Fourier and parallel MRI acceleration; and
- Minimal assumptions about the underlying signal, allowing flexibility to vary slice profiles without modifications to the reconstruction.

Patents

- Published Application: 20180172788
- Issued: 10,101,424 (USA)

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