

New Reconstruction Method for Magnetic Resonance Imaging

We are looking to out-license the technology for its commercialization.

Allows for the reduction of imaging time while maintaining the image quality of MRI and NMR magnetic resonance images

◆Background

In a typical magnetic resonance imaging (MRI) device, the detected magnetic resonance signals are converted into k-space signals by passing them through an orthogonal detector, and the magnetic resonance images of the object are reconstructed by performing an inverse Fourier transform on the k-space signals. However, such imaging process requires a long time. Furthermore, conventional compressed sensing methods that aim to capture magnetic resonance images in a relatively short time use the randomness of the acquired imaging data to estimate and complement missing data. When the process of phase estimation based on symmetry is introduced, the efficiency of compressed sensing is known to decrease.

◆Description and Advantages

Kyoto University researchers found that, by using the reconstruction method for magnetic resonance images shown in the below flowchart (Fig.1), the image quality of the reconstructed magnetic resonance images can be maintained without changing imaging methods of existing compressed sensing techniques.

Quantitative Image Quality Indicators	Example Image (C)	Example Image (B)	Example Image (B)
SSIM(50%)	0.909	0.744	0.756
SSIM(30%)	0.846	0.709	0.721
PSNR(50%)	27.10 dB	18.89 dB	19.69 dB
PSNR(30%)	24.55 dB	18.63 dB	19.34 dB

Table 1. Comparison of SSIM and PSNR (qualitative indicators for image quality)

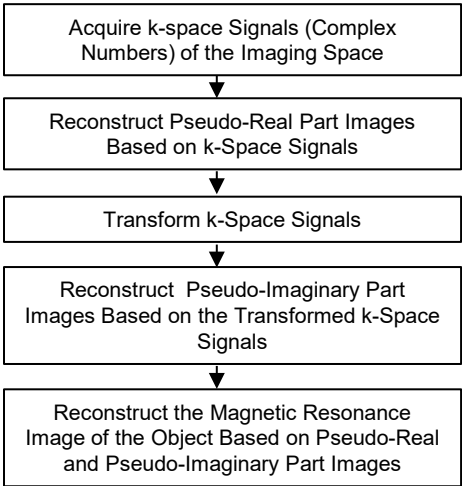


Fig. 1. Flowchart of Image Reconstruction

◆Development Status

- Basic practicality of the new reconstruction method confirmed
- The quality assessment indicators (SSIM and PSNR) improved, yielding high values close to practical use (Table 1)
 - Images equivalent to the reference image obtained in half the imaging time (50% reduction in image data) (Fig.2)

◆Applications

- MRI and NMR magnetic resonance images

◆Offer

- Collaborative Research
- Patent License
- Option for License

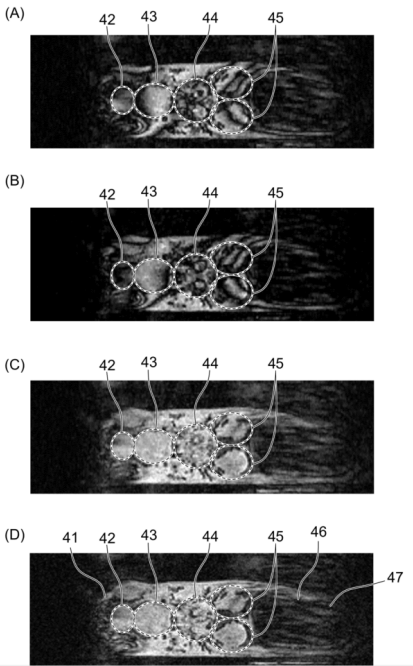


Fig. 2. Reconstruction of MRI Images
(A) Image without phase correction
(B) Image with single phase correction
(C) Image obtained by the new reconstruction method
(D) Image reconstructed from complete imaging data without reducing measurement points

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