Combined Inverse Fourier Transformation of Magnetic Resonance and Intensity-Curvature Functional Images

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Abstract

This research reports on an image processing technique used to merge Magnetic Resonance Imaging (MRI) or Magnetic Resonance Angiography (MRA) with their intensity-curvature functional (ICF). Given a two-dimensional MR image, six 2D model polynomial functions were fitted to the image, and six ICF images were calculated. The MR image and its ICF were direct Fourier transformed. The phase of MR image was estimated pixel-by-pixel as arctangent of ratio between imaginary and real components of k-space and is called phase ratio. The phase of ICF is the phase of inverse Fourier transformation and is called base phase. The two values of phase were summed up and used to reconstruct ICF images through inverse Fourier transformation. The reconstructed image is the combination of MR and ICF. Data obtained with T2-MRI and MRA indicates that the technique improves vessel detection in T2-MRI and contrast enhances T2-MRI and MRA.

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