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DL-Accelerated Abdominal MRI

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Recent advances in deep learning (DL)-based acceleration techniques have had a significant impact on magnetic resonance imaging (MRI), enabling faster acquisition without compromising, and often improving, image quality within practical scan times. In abdominal MRI, respiratory motion remains a major challenge, frequently causing image degradation and reducing diagnostic confidence. DL acceleration can mitigate these limitations by allowing rapid imaging with shorter breath-hold durations.

In this study, two state-of-the-art DL reconstruction methods—AIR Recon DL and Sonic DL—were explored in various abdominal imaging applications. AIR Recon DL utilizes a convolutional neural network trained on raw k-space data to suppress noise and Gibbs ringing artifacts while preserving fine anatomical structures. By enhancing both signal-to-noise ratio (SNR) and spatial sharpness, it allows scan time reduction of up to 50%, benefiting sequences such as LAVA, CUBE, and diffusion-weighted imaging.

More recently, Sonic DL has been introduced, integrating model-based iterative reconstruction with physics-guided neural networks. This technique enables acceleration factors exceeding 8×, offering substantial reduction in motion artifacts and improvement in image quality. Moreover, the combined use of AIR Recon DL and Sonic DL further enhances diagnostic quality within shorter breath-hold durations.

In conclusion, DL-accelerated MRI provides a powerful approach for achieving high-quality abdominal imaging with significantly reduced scan times.

Keywords: Deep learning acceleration, Abdominal MRI