Advanced intelligent Clear-IQ Engine (AiCE) Deep Learning Reconstruction: Translating the Power of Deep Learning to MR Image Reconstruction

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Key Points

AiCE DLR is an MR reconstruction method, which is based on Deep Learning specifically a Deep Convolutional Neural Network (DCNN).

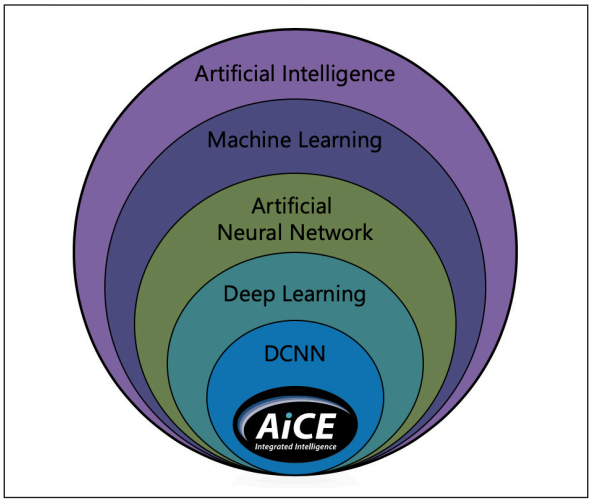

Figure 1
AiCE is based on a subtype of Deep Learning called Deep Convolutional Neural Network.

AiCE DLR intelligently removes noise while maintaining anatomical and pathological integrity that results in higher Signal-to-Noise Ratio (SNR)* reconstructed images. (Disclaimer: *AiCE provides higher SNR compared to typical low pass filters).

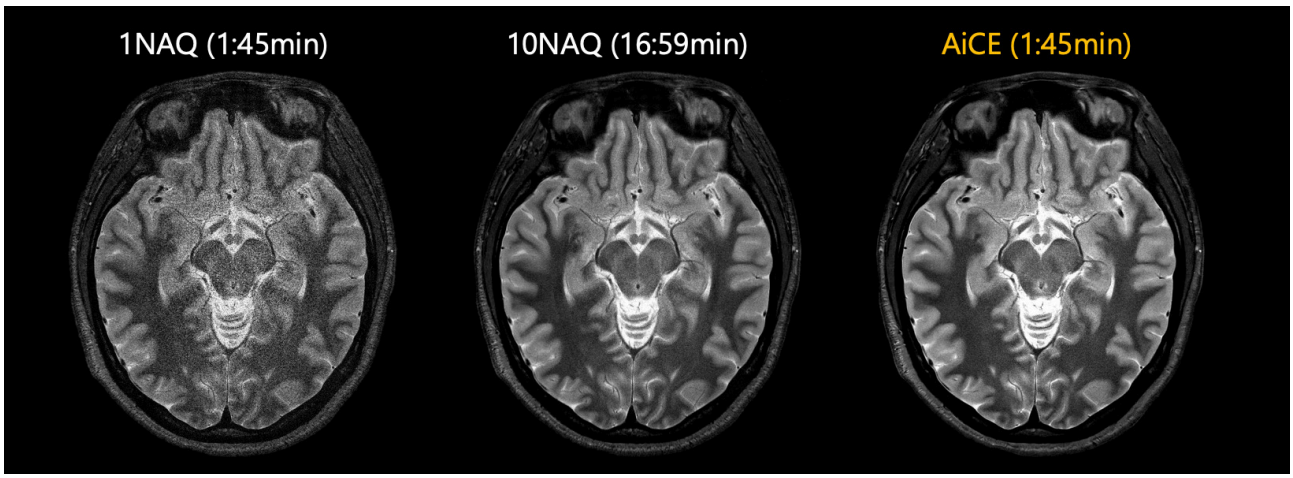

Figure 2
A representative example of the high quality brain image that was reconstructed using AiCE DLR in clinically acceptable scan time. (Disclaimer: 10 NAQs is not clinically practical).

Canon Medical Systems introduces Advanced intelligent Clear-IQ Engine (AiCE), which helps you to alleviate the fundamental tradeoffs between SNR, scan time, and resolution.

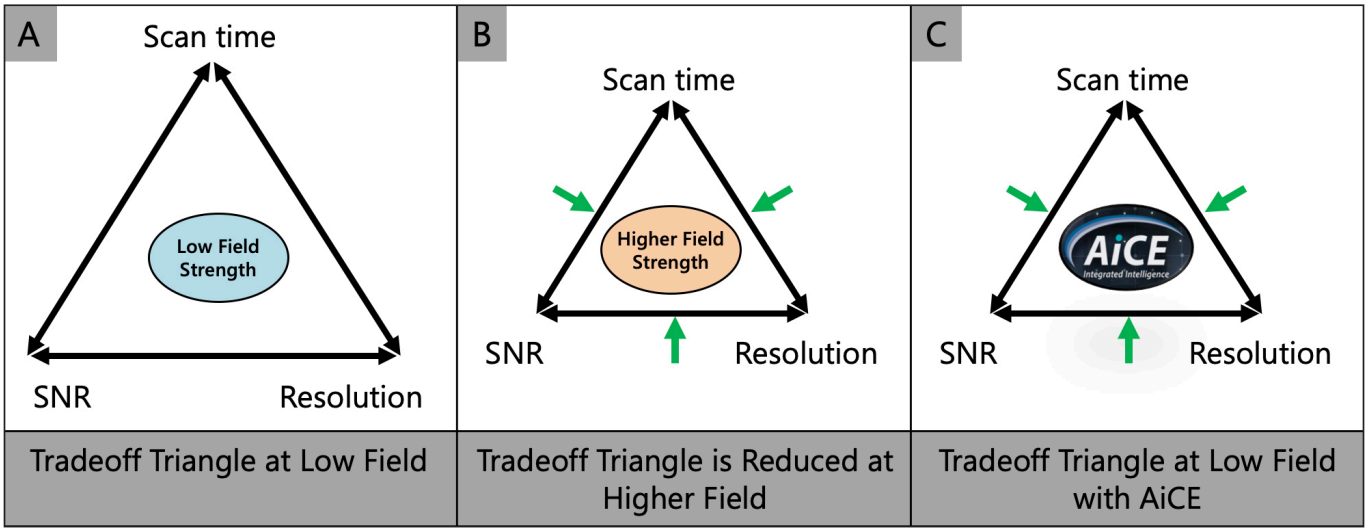

Figure 3
(A) Inherent tradeoffs between SNR, resolution, and scan time. (B) Higher field strength can reduce the triangular tradeoff but it is associated with several challenges such as increased equipment and operating cost, increased safety risks due to higher heat deposition to the patient, and increased image artifacts due to higher field inhomogeneities. (C) AiCE is able to alleviate the inherent and fundamental tradeoffs between SNR, scan time, resolution without the challenges associated with higher field strength. (Note that the images are not necessarily drawn to scale.)

Imaging at higher field strength often associates with the challenges such as (i) higher equipment and operation cost, (ii) higher specific absorption rate (SAR), and (iii) higher degree of image artifacts due to increased field inhomogeneities at higher field strength.

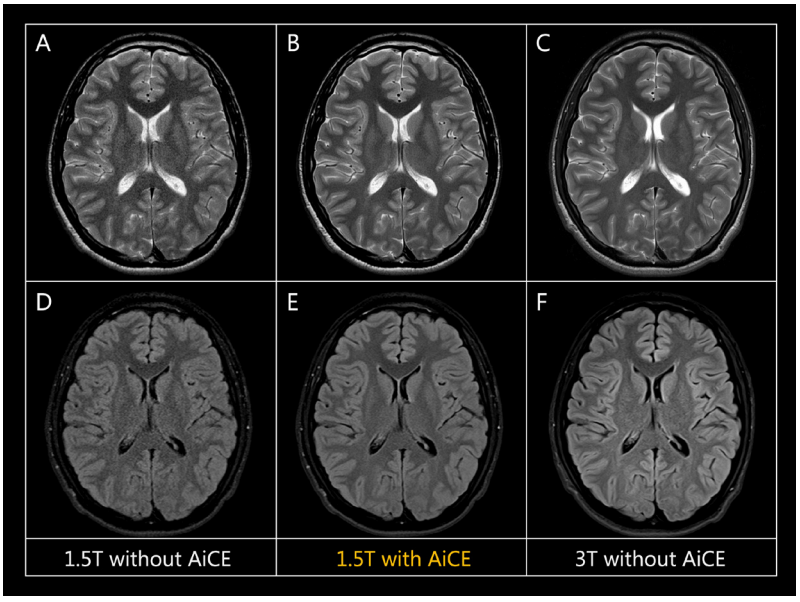

Figure 4
1.5 T vs. 3 T brain images from the same subject. 1.5 T images before (A, D) and after (B, E) AiCE in comparison to 3 T images (C, F). The 1.5T and 3T images were acquired with the same scan time and resolution while other parameters were optimized for appropriate contrast at different field strength.

For more details, please refer to the AiCE White Paper MRWP13266US: https://us.medical.canon/products/magnetic-resonance/experience/

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