Canon

Artificial Intelligence to Boost MR Imaging Quality and Productivity

AiCE
Integrated Intelligence

The power of AI is brought to routine MR imaging by Canon Medical's Deep Learning Reconstruction (DLR) technology: Advanced intelligent Clear-IQ Engine (AiCE). AiCE is the world's first fully integrated DLR technology for MRI.

One of the main challenges in MRI is finding the optimal balance between the signal-to-noise ratio (SNR) and image resolution. A higher spatial resolution could improve visualization of structures, but when spatial resolution is increased, SNR drops. To regain SNR, typically scan times need to be increased, reducing patient comfort and decreasing throughput.

Canon Medical found a solution in artificial intelligence: AiCE. AiCE is a deep-learning based solution trained on vast amounts of low and high signal-to-noise MR images to detect noise and remove it from the MR images. By removing noise, AiCE enables spatial resolution to be increased or acquisition time to be reduced.

"AiCE changes the way we think about MRI."

Prof. Garry E. Gold

AiCE expands diagnostic capabilities, enriches radiologist's confidence and reduces examination times and thus improves patient comfort. With AiCE we enter a new era in MRI.


Training Phase

Using high SNR images, Advanced intelligent Clear-IQ Engine (AiCE) learns to differentiate between signal and noise in low SNR images.

Low SNR

Deep Learning
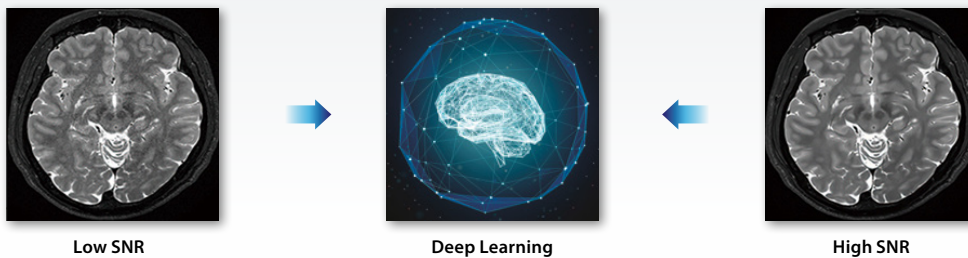
High SNR

Operational Phase

Using the intelligence from the Training Phase, AiCE removes noise from images which results in high SNR.

Data Acquisition

Deep Convolutional Neural Network

High SNR

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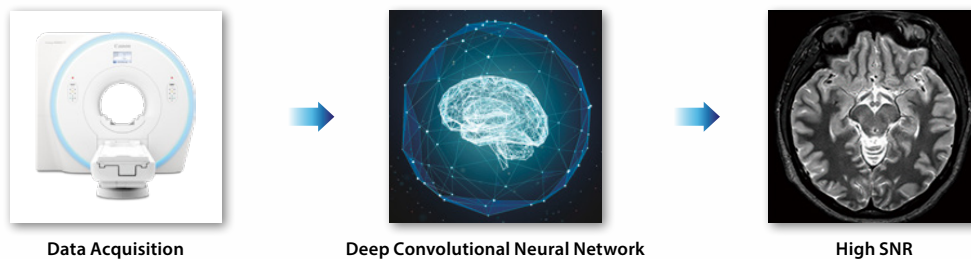
"With DLR we can achieve both high resolution images without losing time or signal and reduce the image acquisition time."

Prof. Vincent Dousset,
Head of the diagnostic and therapeutic Neuro Radiology department at Bordeaux University Hospital.

"I'm impressed by the ease-of-use, how it maintains image contrast and structural detail, while at the same time eliminating noise."

Prof. Garry E. Gold,
Clinical radiologist and researcher, Past president of the International Society for Magnetic Resonance in Medicine (ISMRM) and the Society of Computed Body Tomography and Magnetic Resonance (SCBT/MR)

PD STIR - 1024 x 1024 matrix - 3mm slice thickness

Standard Image
1 Average - 1:45 min

Improved quality by long scan times
10 Averages - 16:49 min

Improved quality by AiCE
1 Average - 1:45 min

Fast knee protocol with AiCE on Vantage Orian 1.5T

Sag T2 - 0.5 x 0.5 min - 0:56 min

Ax PD FatSat - 0.6 x 0.6 mm - 1:30 min

Cor PD FatSat - 0.6 x 0.6 mm - 1:15 min

Cor PD - 0.5 x 0.5 mm - 0:58 min

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