An AI-driven Magnetic Resonance Imaging synthesis framework

Key challenge:

- Cross-comparison of magnetic resonance brain images acquired in different machines is difficult.
- MRs are often repeated, which is inefficient and time-consuming

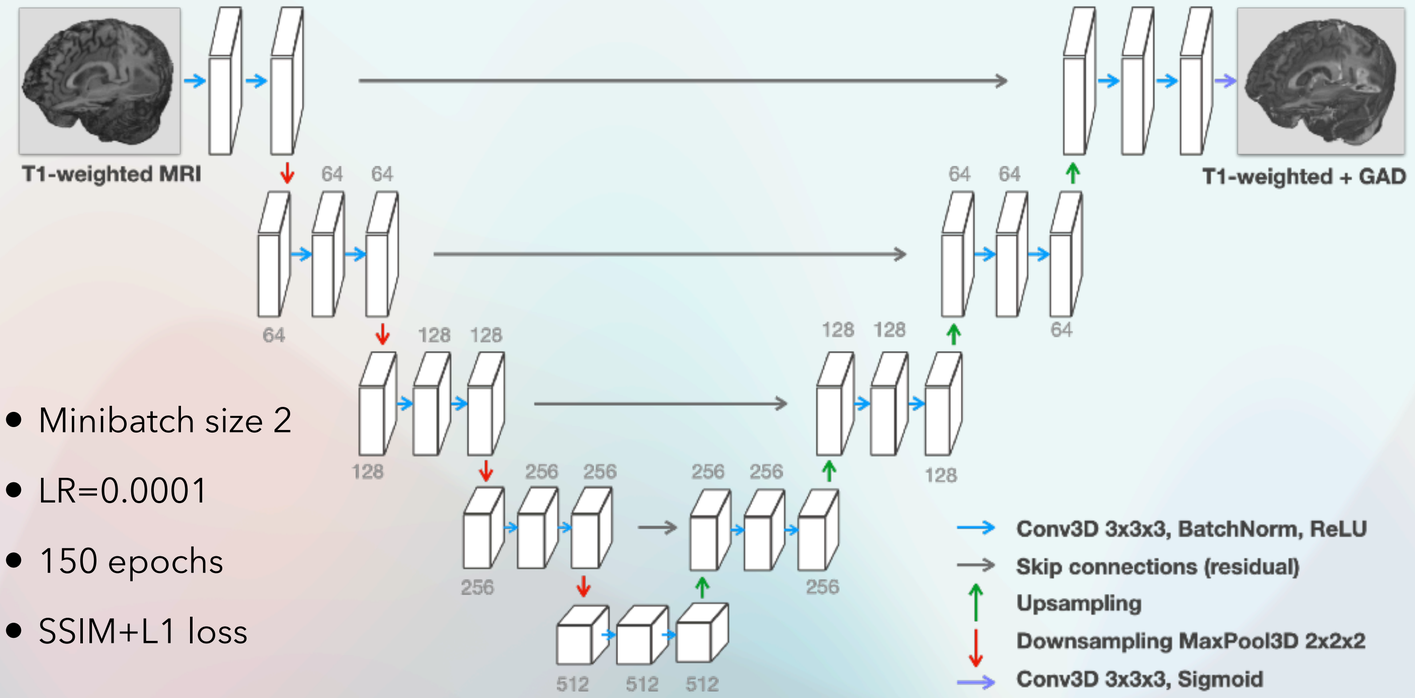
Objective:

- Explore the efficacy of using modern generative models for synthesizing realistic MR imaging data using the T1-weighted images as input

Training datasets

- AOMIC ID 1000
- BraTS 2021 (total n ~2000)

Models: 3D-UNET (baseline), Pix2Pix-GAN



- Minibatch size 2
- LR=0.0001
- 150 epochs
- SSIM+L1 loss

CIFAR

Temerty Centre for AI Research and Education in Medicine
UNIVERSITY OF TORONTO

Digital Research Alliance of Canada

Framework output - DTI FA

Results (DTI FA synthesis):

Measure	Value
SSIM	0.91
R sq.	0.89
Regional	p<0.0001