

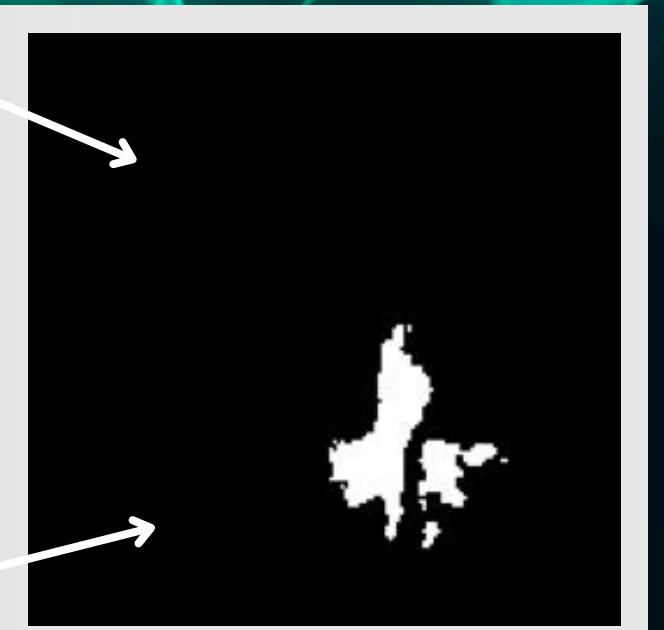
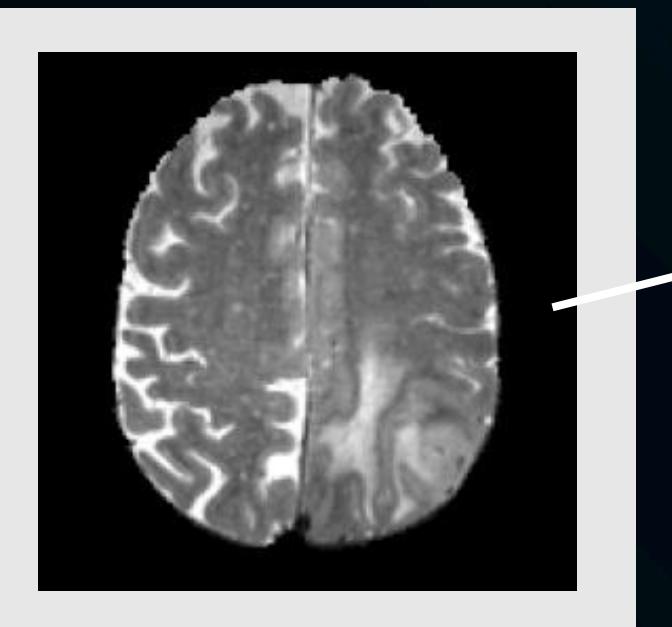
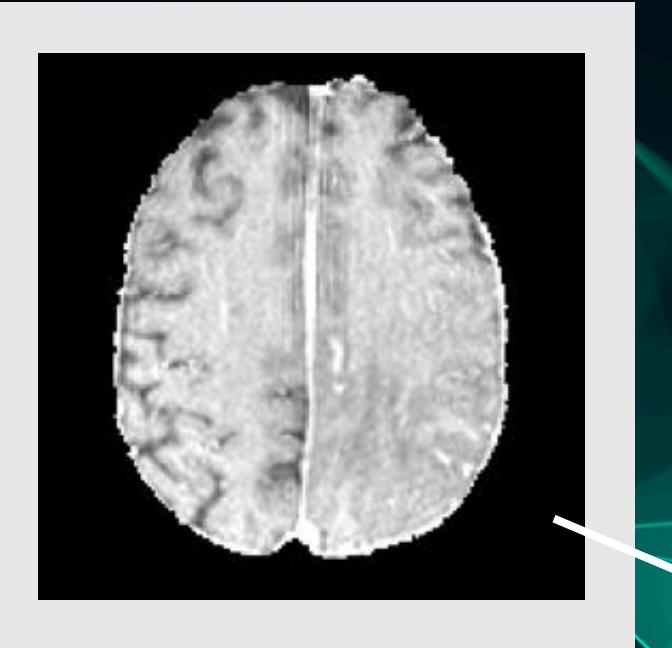
John Mark Alexis Marcelo 185018

Multi-ConDos

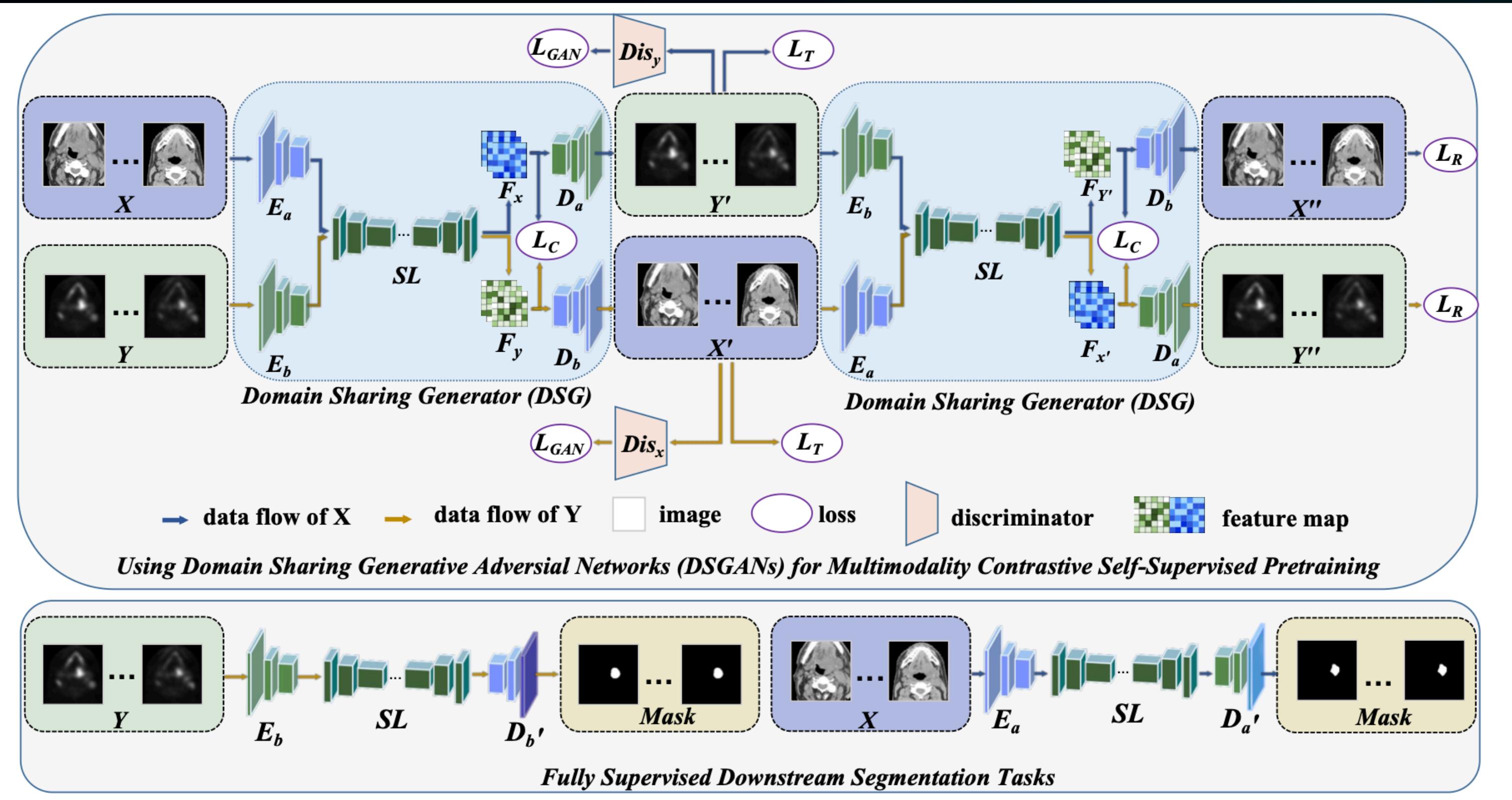
VISIOPE PROJECT

ORIGINAL PAPER

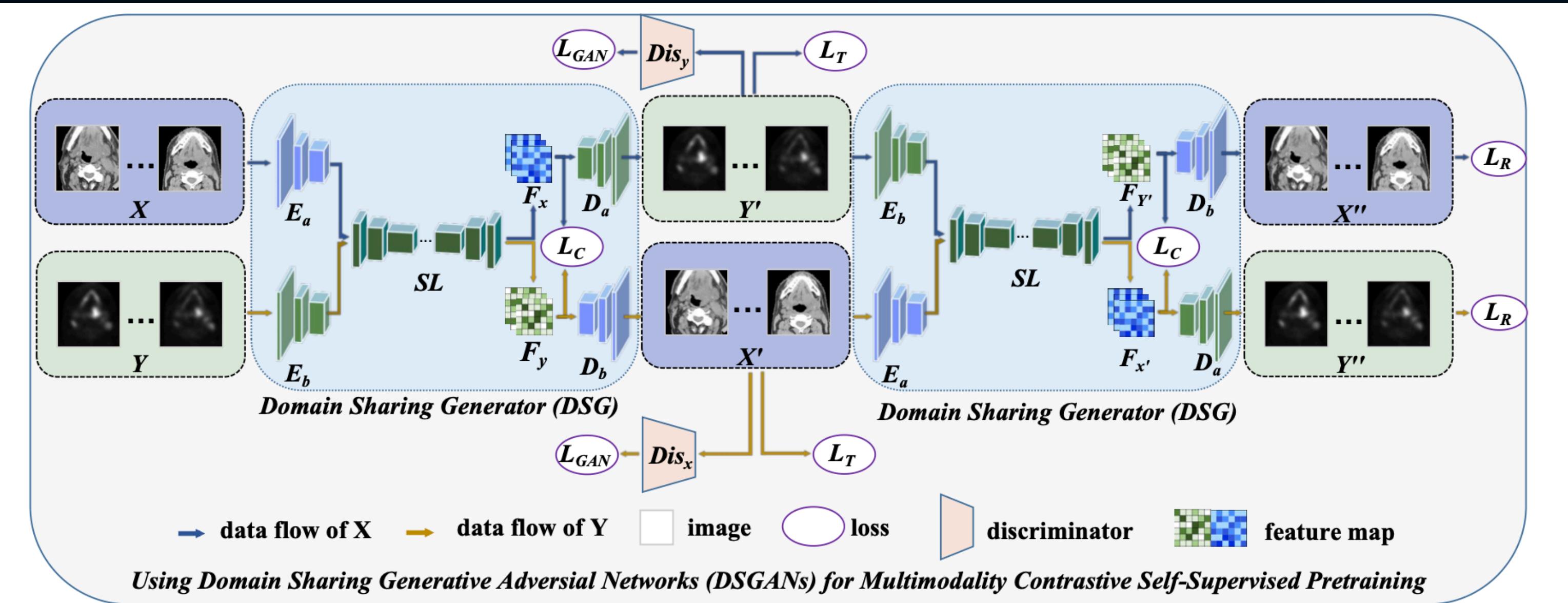
The main goal of the paper is to develop a self-supervised method for the automatic segmentation of brain tumors from multimodal medical images, such as MRI scans in T1, T2, FLAIR, and T1ce modalities.



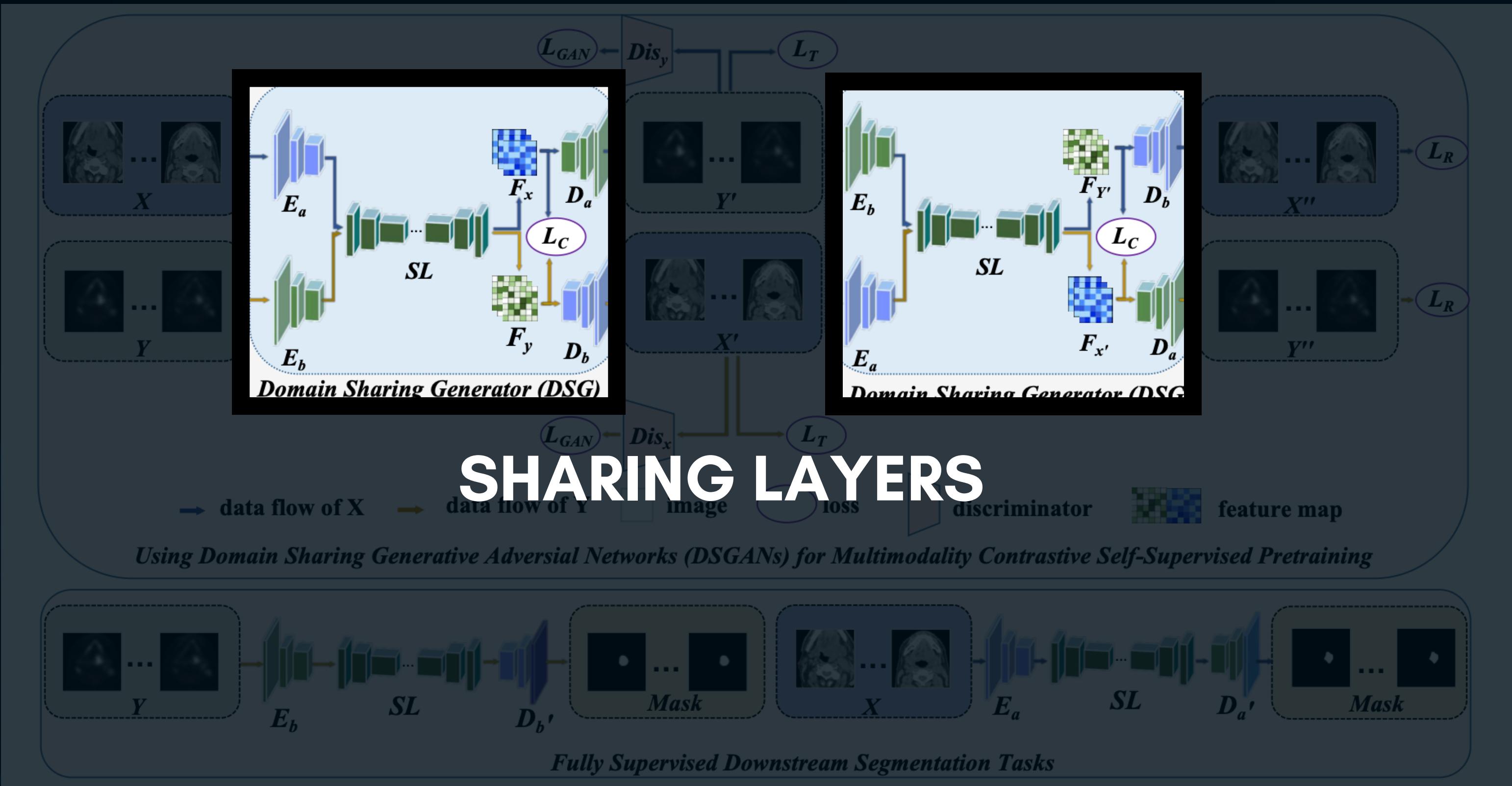
ORIGINAL ARCHITECTURE



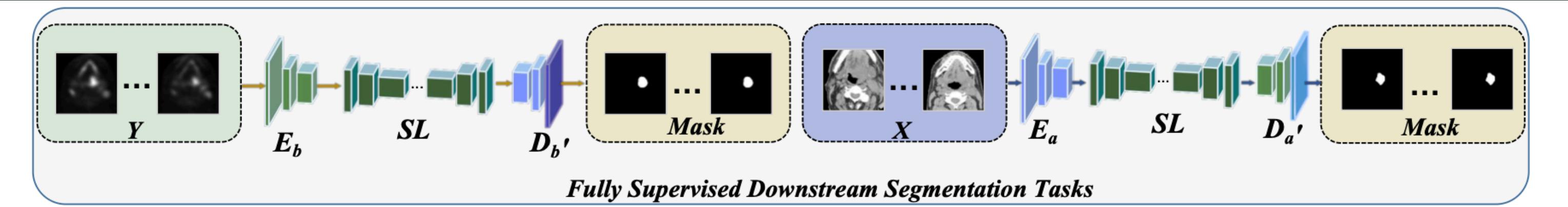
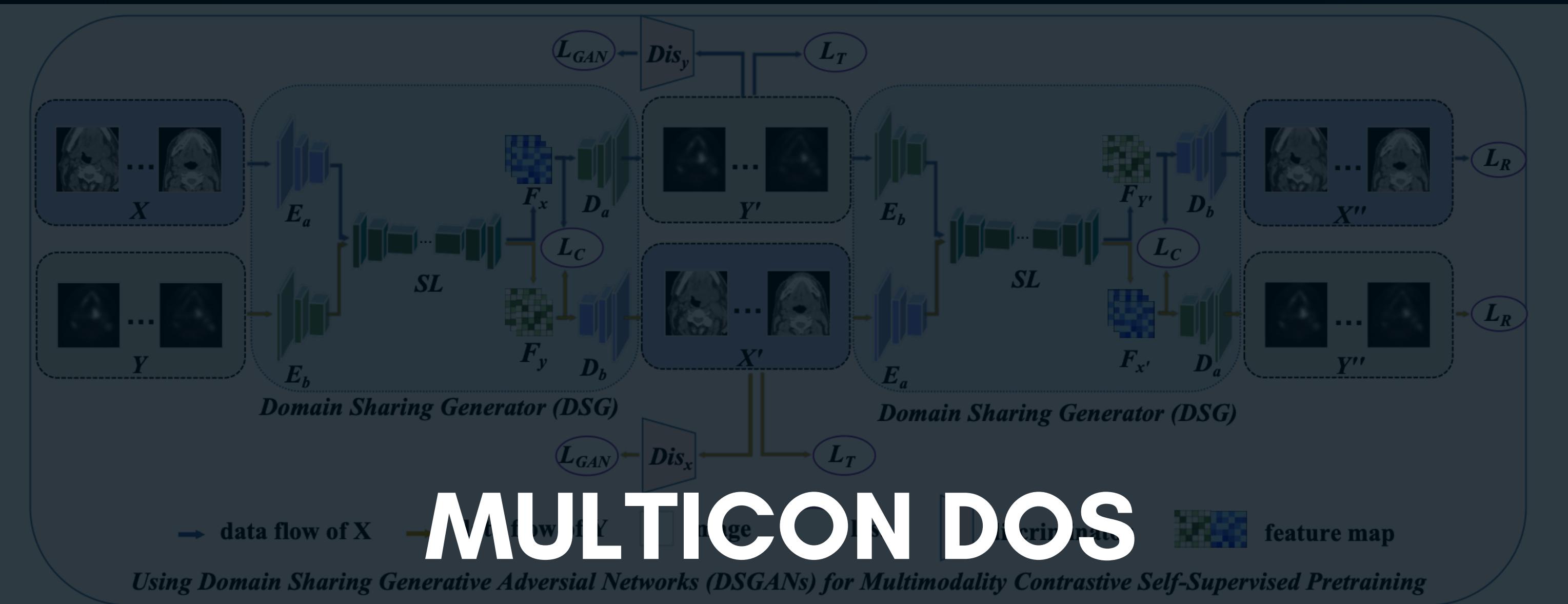
ORIGINAL ARCHITECTURE



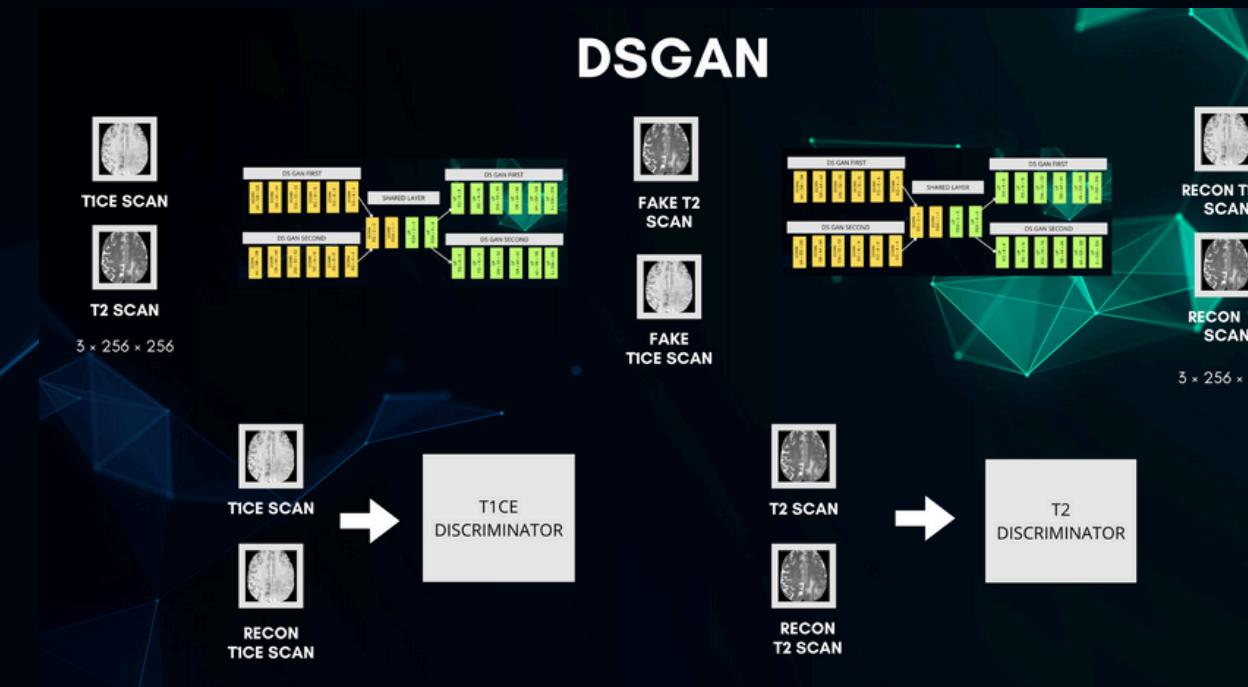
ORIGINAL ARCHITECTURE



ORIGINAL ARCHITECTURE



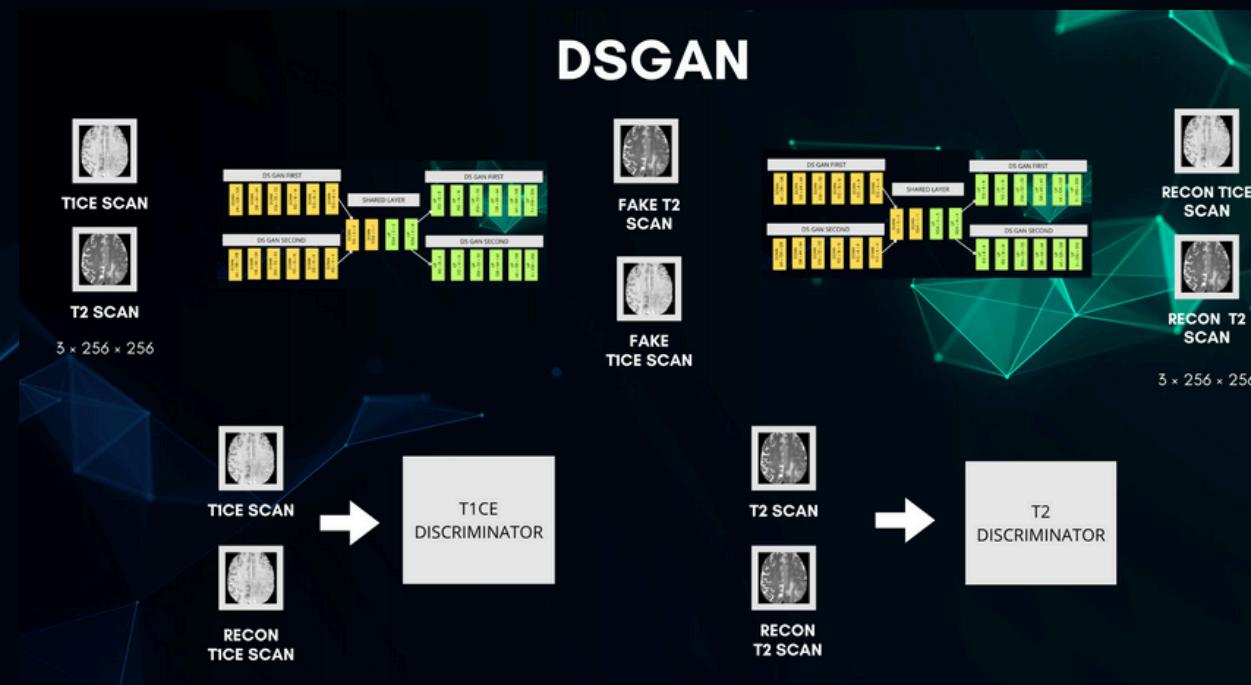
MY WORK



MY WORK



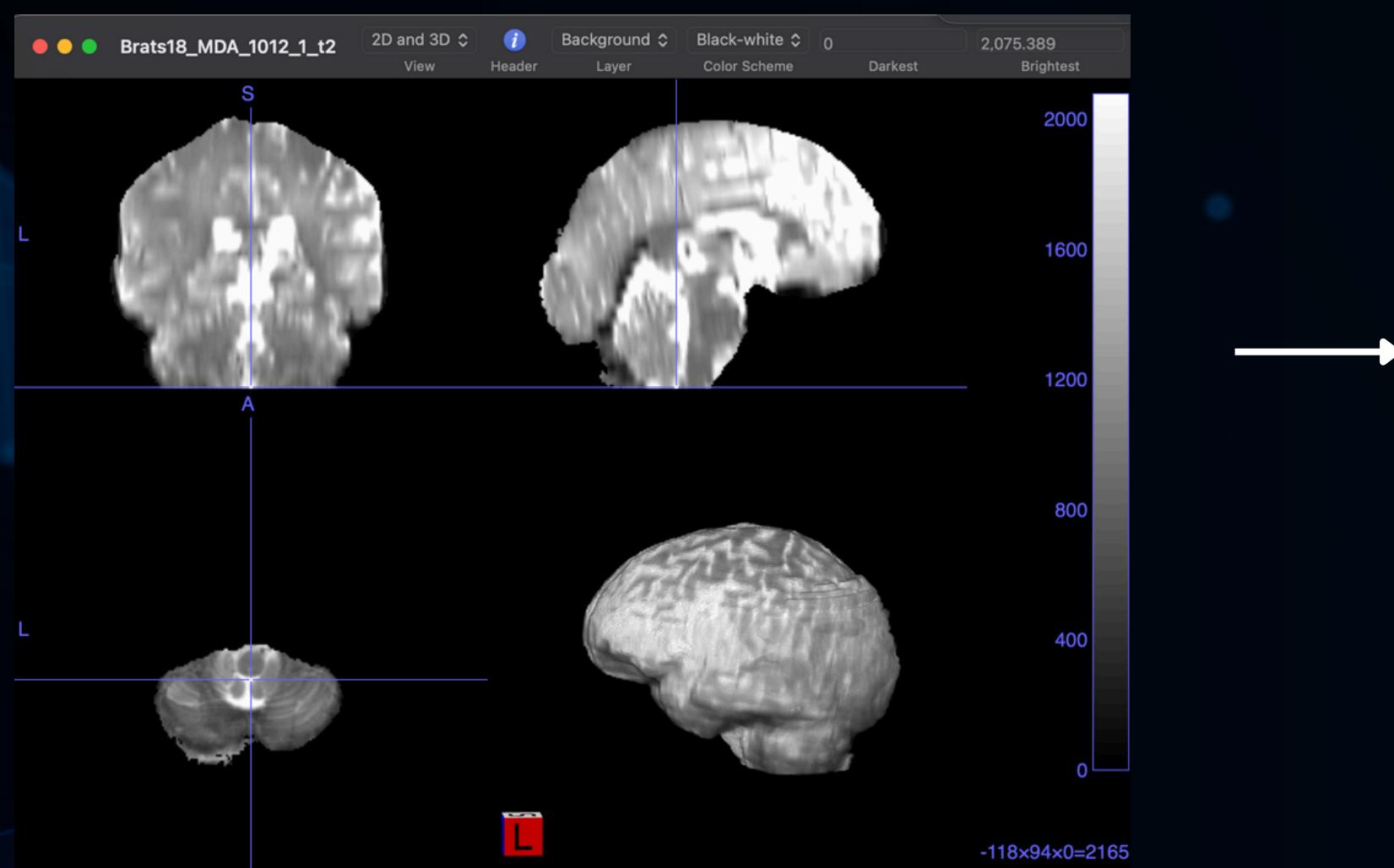
Reimplementation on
lightning on MacOs Env



Reform the
architecture

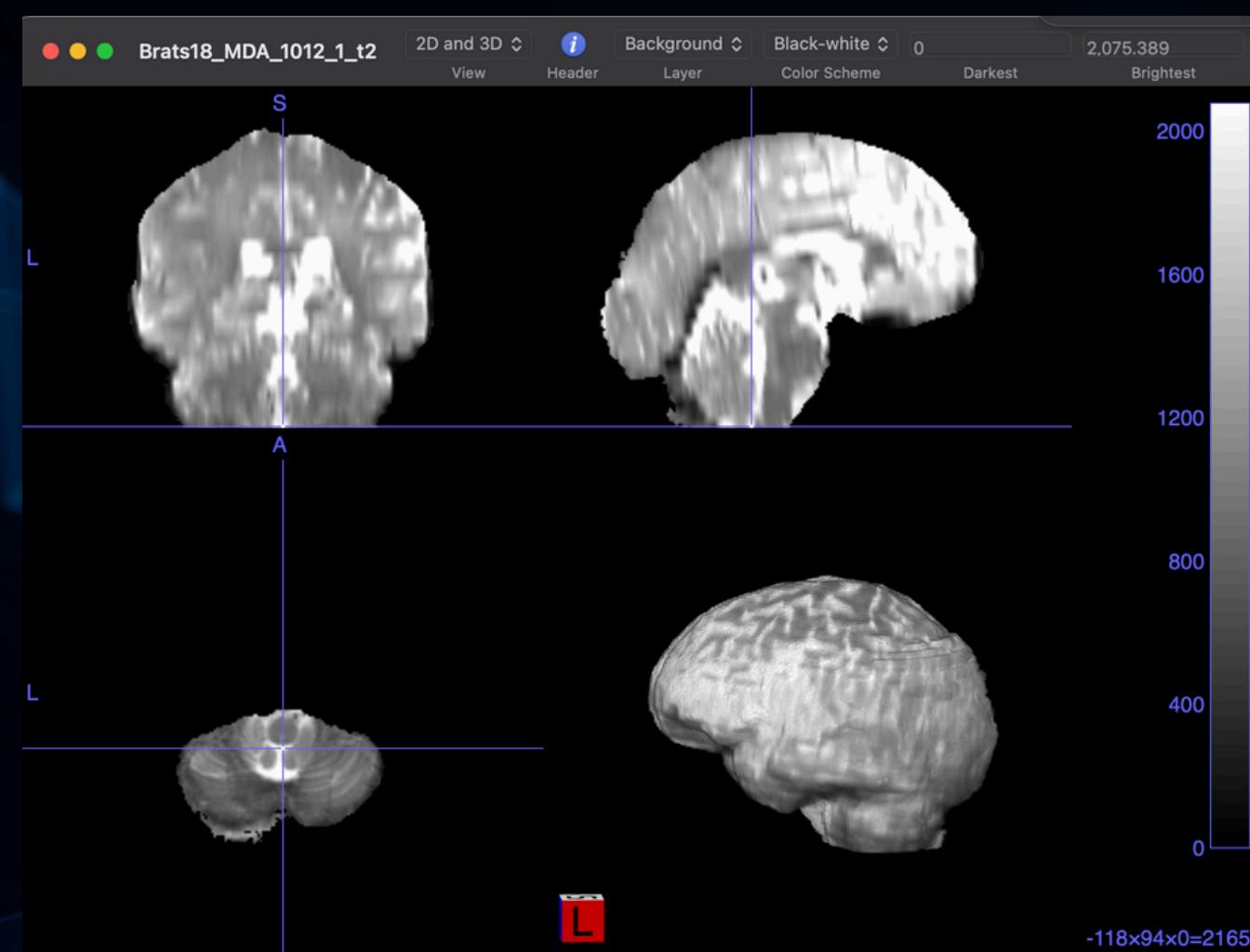
MICCAI DATASET

**Preprocess via
SimpleITK module**

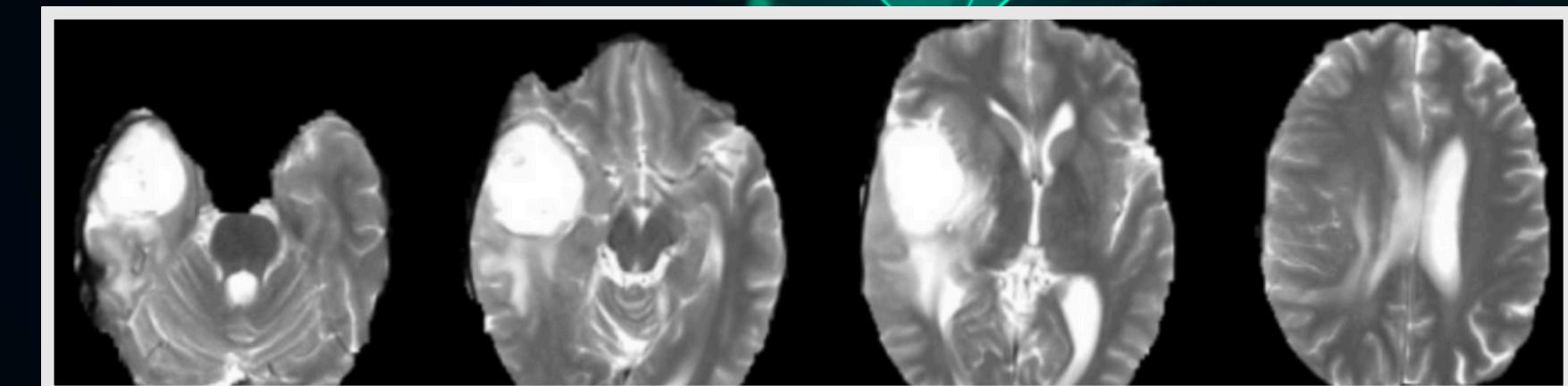


MICCAI DATASET

**Preprocess via
SimpleITK module**



**3D to .jpg files
(256 x 256px)**

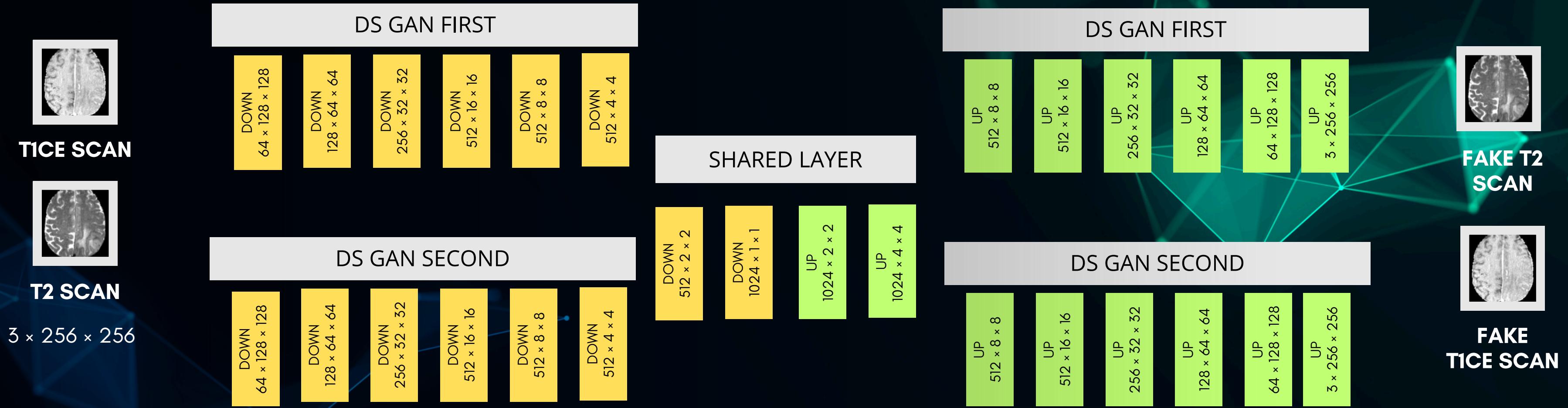


**144 images for
each 3d Brain**

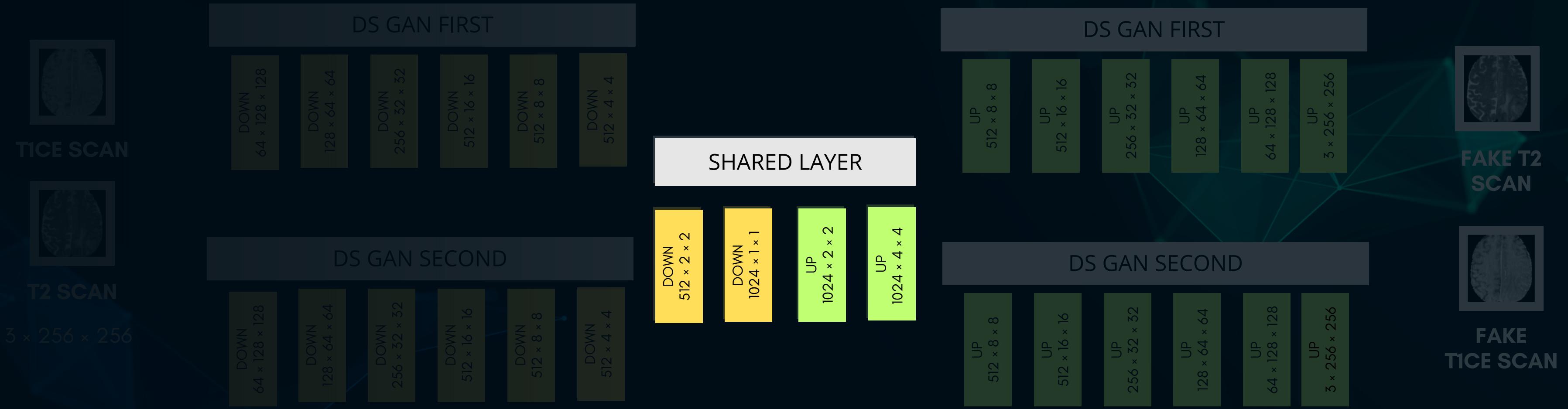
DSGAN GENERATOR



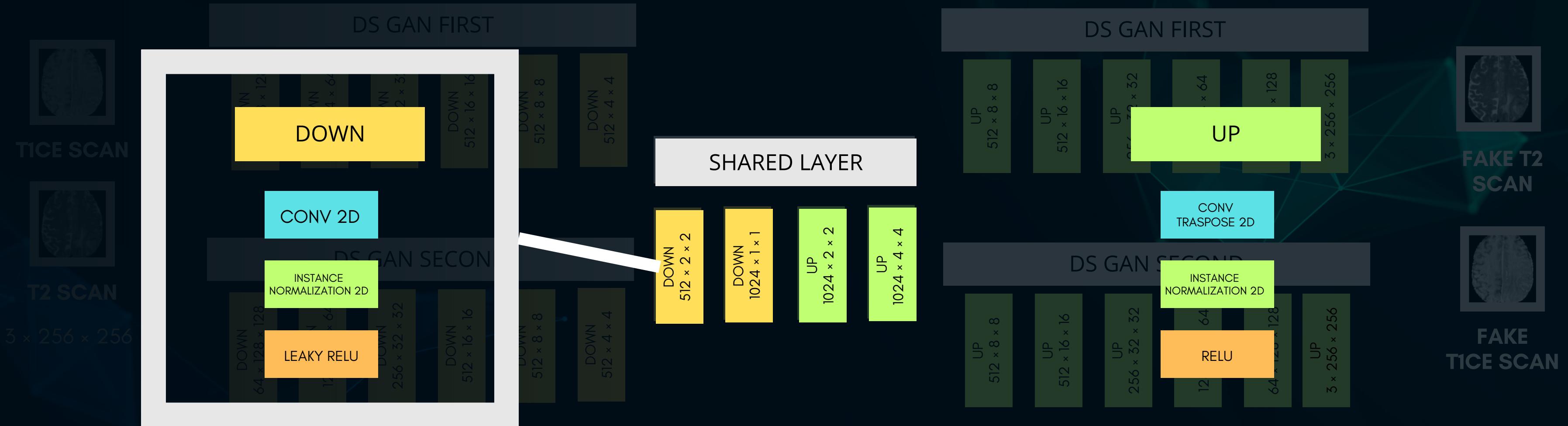
DSGAN GENERATOR



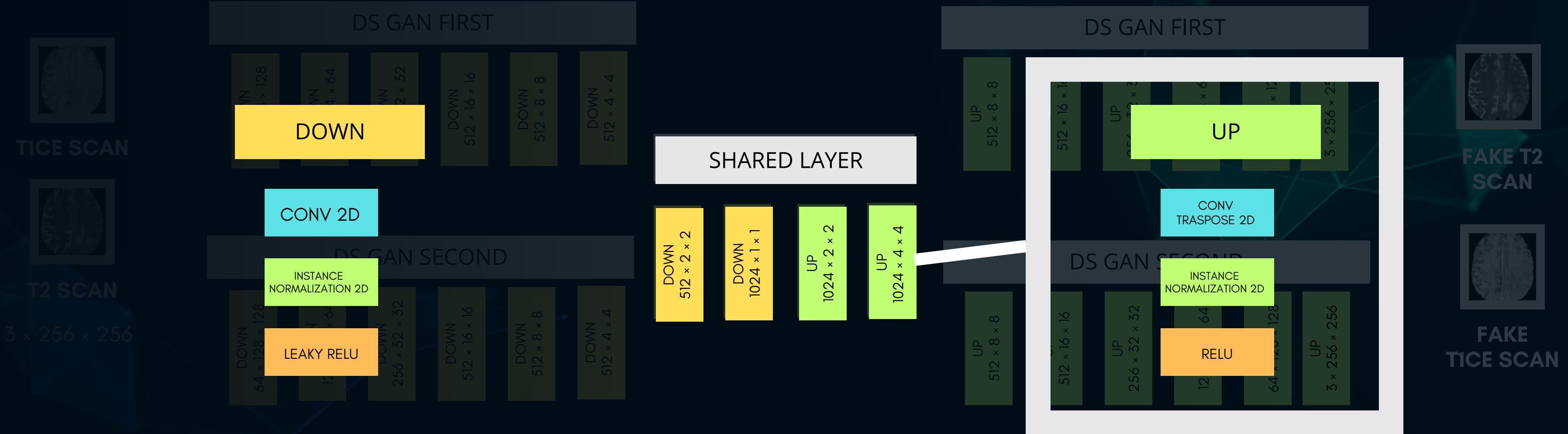
DSGAN GENERATOR



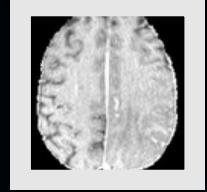
DSGAN GENERATOR



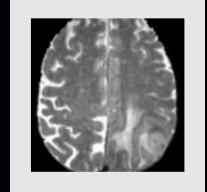
DSGAN GENERATOR



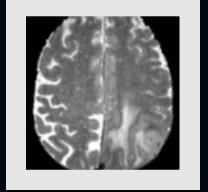
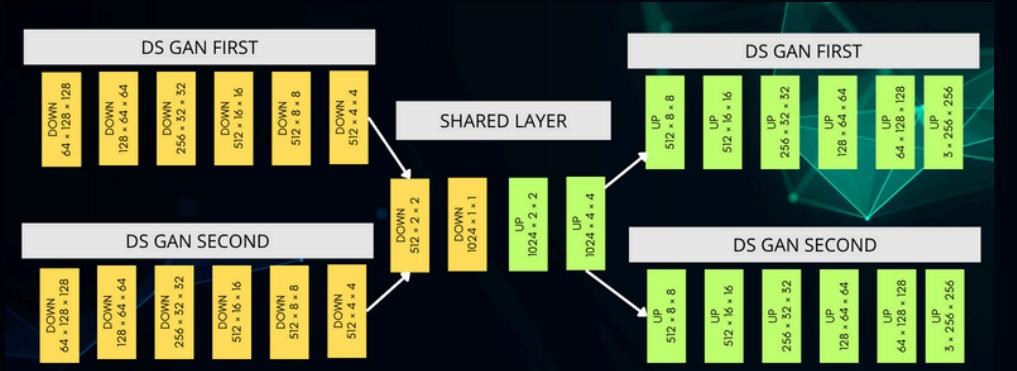
DSGAN



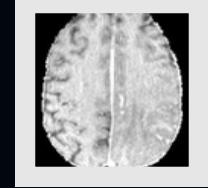
T1CE SCAN



T2 SCAN

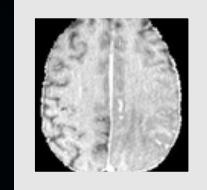


FAKE T2
SCAN

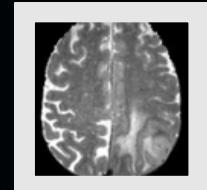


FAKE
T1CE SCAN

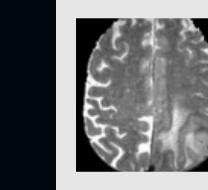
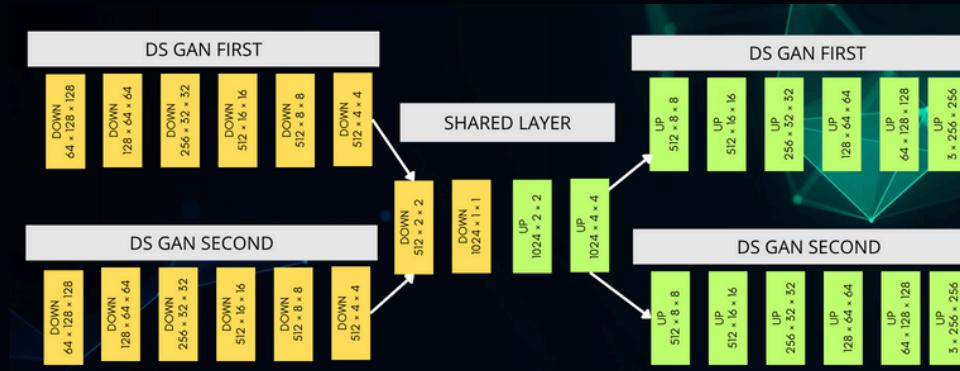
DSGAN



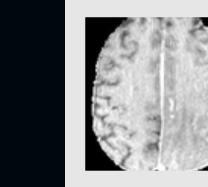
T1CE SCAN



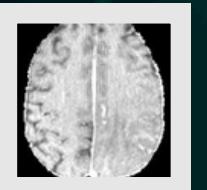
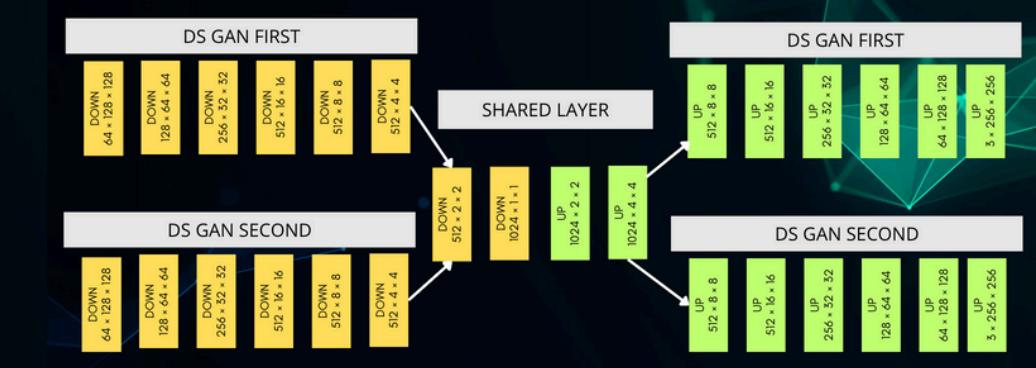
T2 SCAN



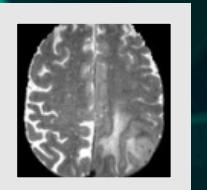
FAKE T2
SCAN



FAKE
T1CE SCAN

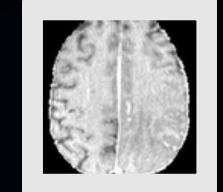


RECON T1CE
SCAN

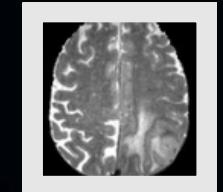


RECON T2
SCAN

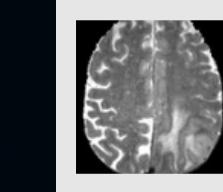
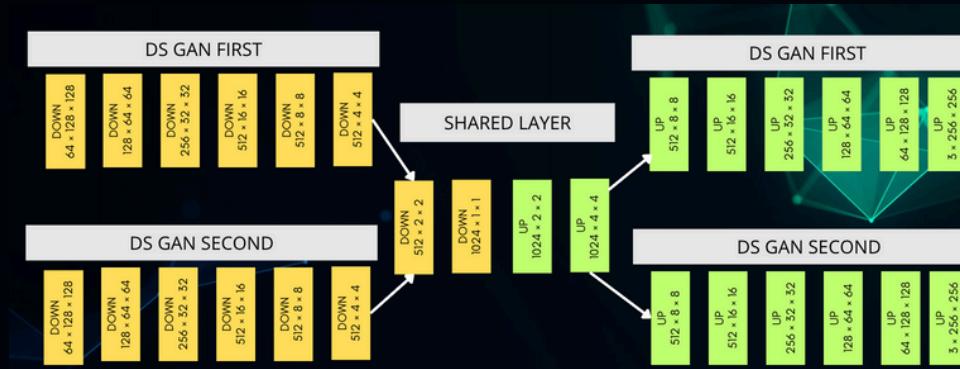
DSGAN



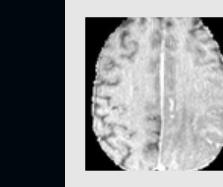
T1CE SCAN



T2 SCAN



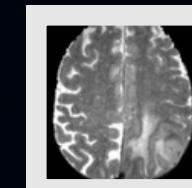
FAKE T2
SCAN



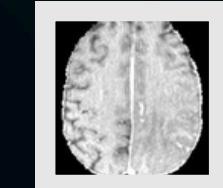
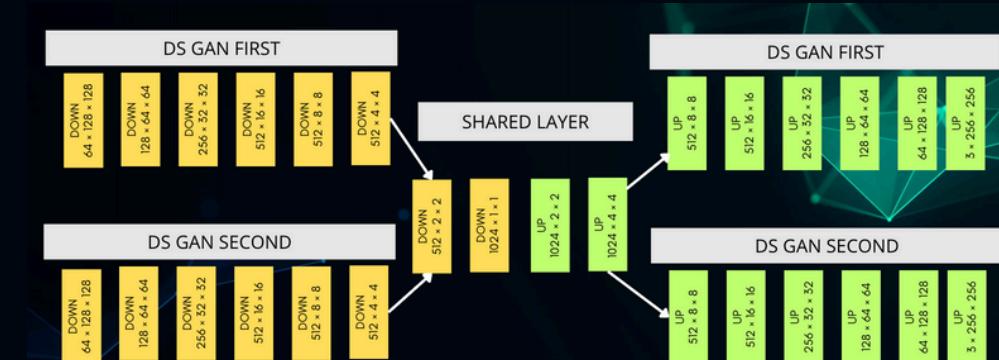
FAKE
T1CE SCAN



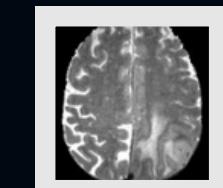
T1CE SCAN



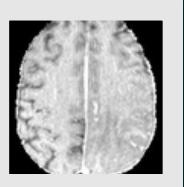
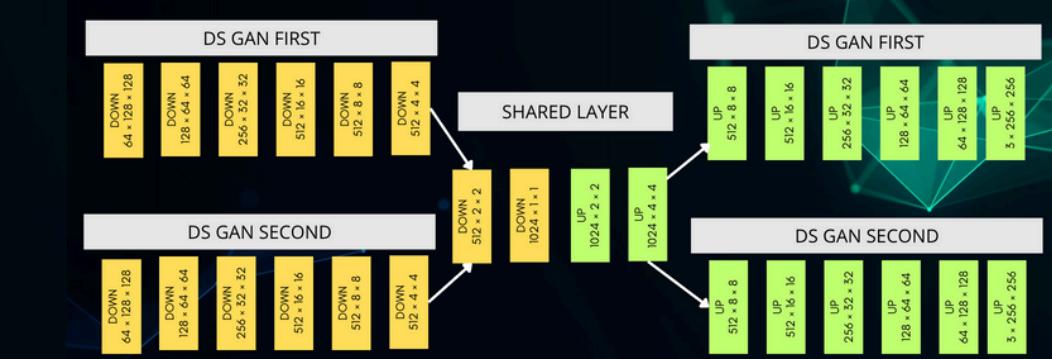
T2 SCAN



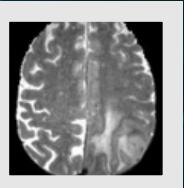
IDENTITY
T1CE



IDENTITY
RECON T2

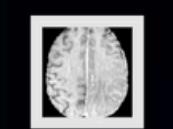


RECON T1CE
SCAN

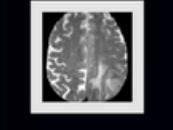


RECON T2
SCAN

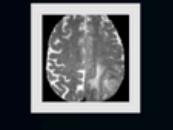
DSGAN LOSSES



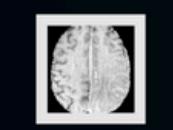
T1CE SCAN



T2 SCAN



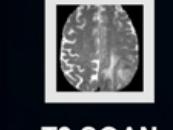
FAKE T2 SCAN



FAKE T1CE SCAN



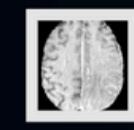
T1CE SCAN



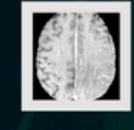
T2 SCAN



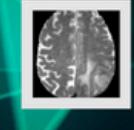
FAKE T2 SCAN



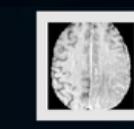
FAKE T1CE SCAN



RECON T1CE SCAN



RECON T2 SCAN



IDENTITY T1CE



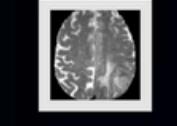
IDENTITY RECON T2



DSGAN LOSSES



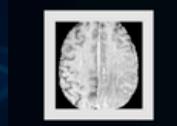
T1CE SCAN



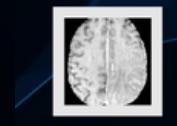
T2 SCAN



FAKE T2 SCAN



FAKE T1CE SCAN



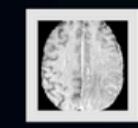
T1CE SCAN



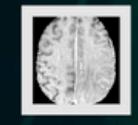
T2 SCAN



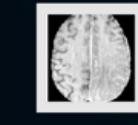
FAKE T2 SCAN



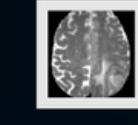
FAKE T1CE SCAN



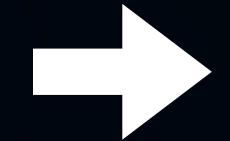
RECON T2 SCAN



IDENTITY TICE



IDENTITY RECON T2



DISCRIMINATOR

DOWN
64X128X128

DOWN
128X64X64

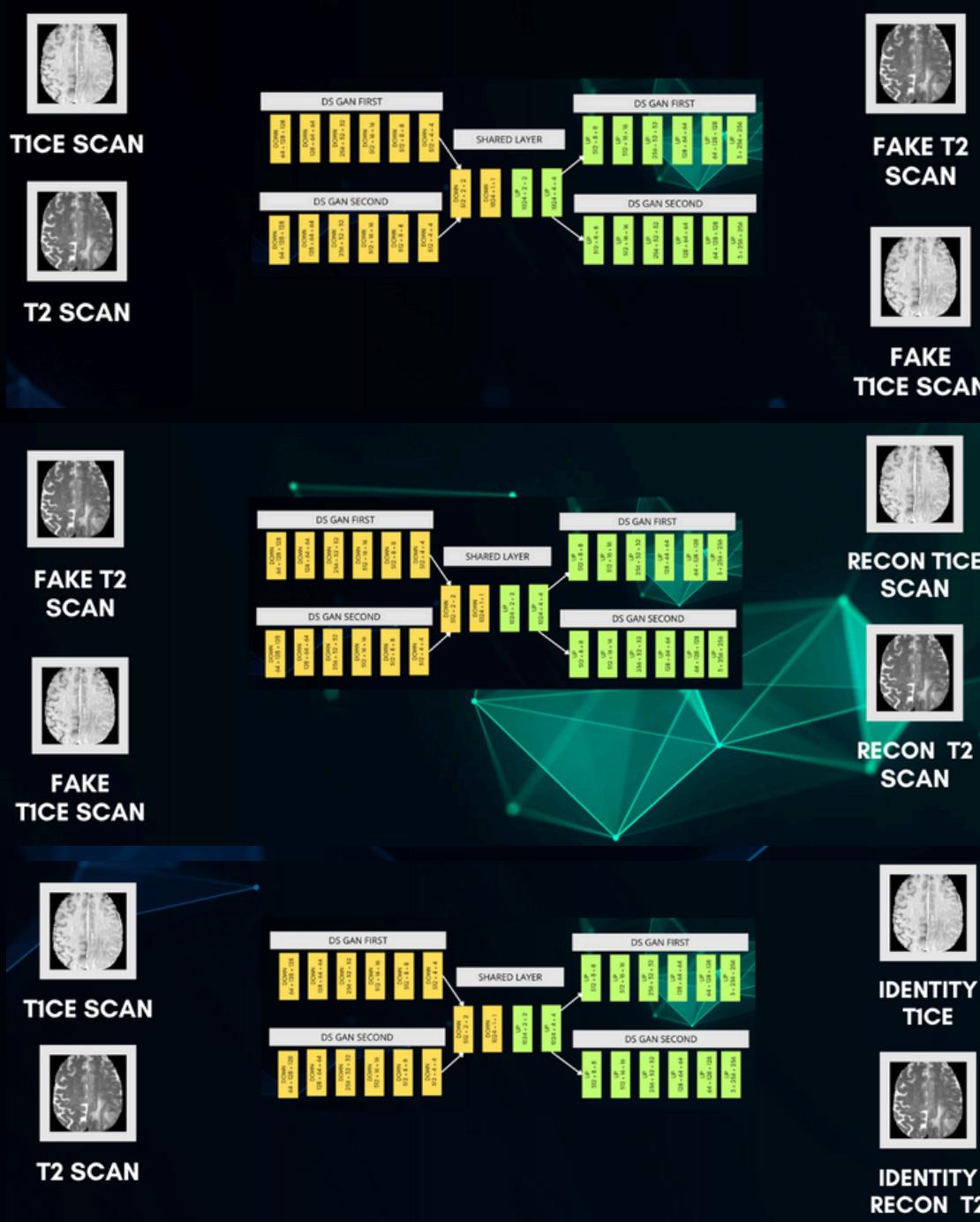
DOWN
256X32X32

DOWN
512X31X31

CONV2D
1X30X30

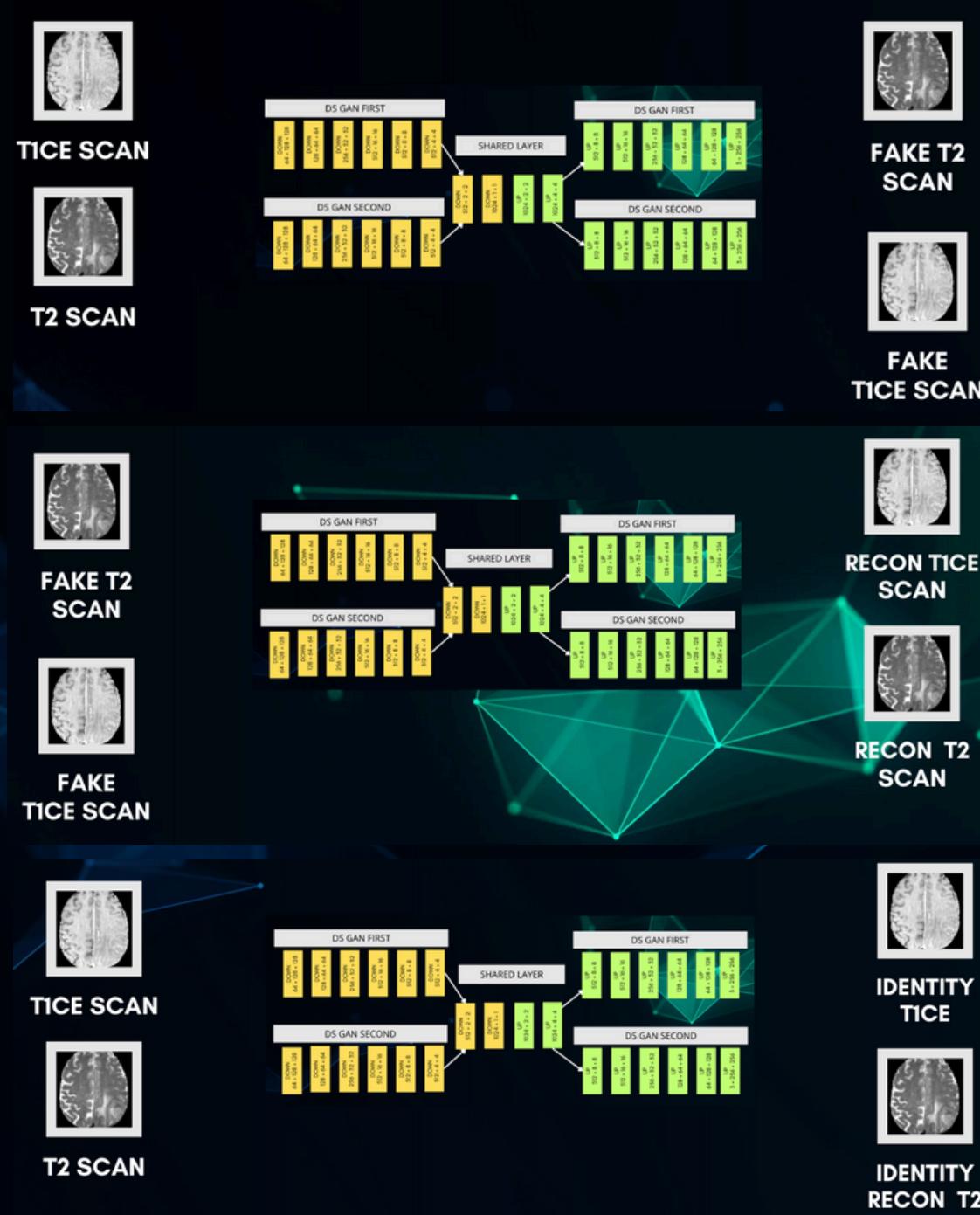


DSGAN LOSSES



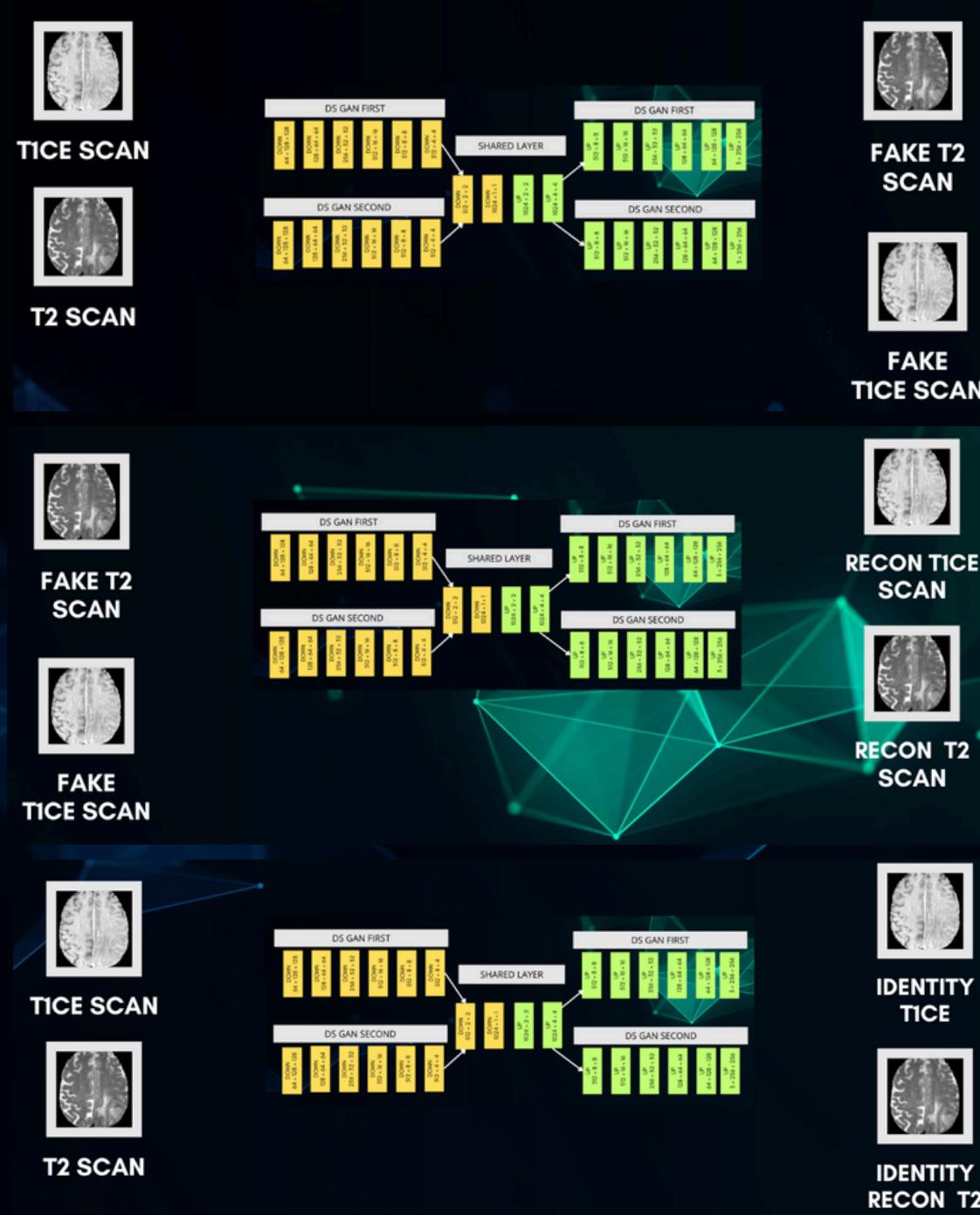
DISCRIMINATOR LOSS
ADVERSARIAL LOSS

DSGAN LOSSES



DISCRIMINATOR LOSS
ADVERSARIAL LOSS
CYCLE LOSS

DSGAN LOSSES

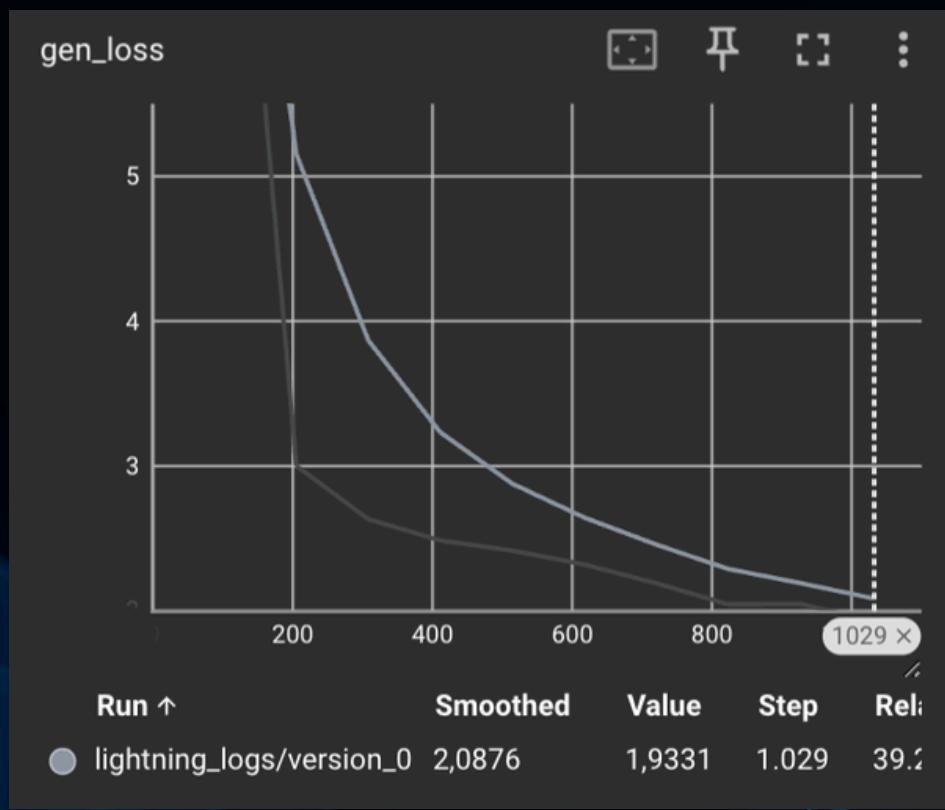


DISCRIMINATOR LOSS
ADVERSARIAL LOSS

CYCLE LOSS

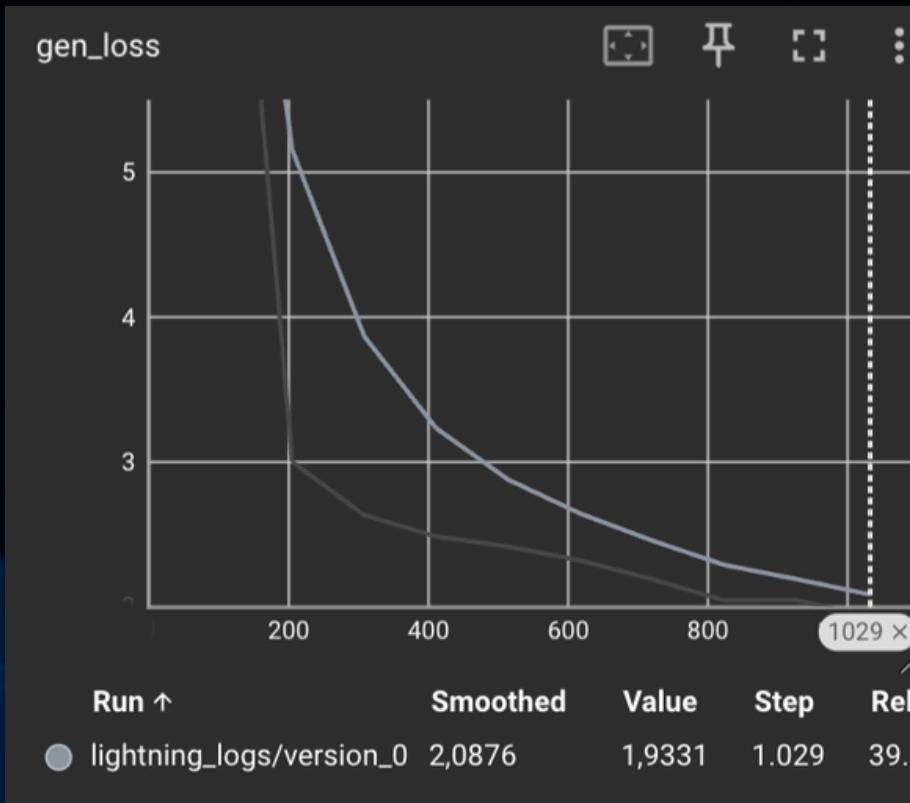
IDENTITY LOSS

DSGAN RESULTS

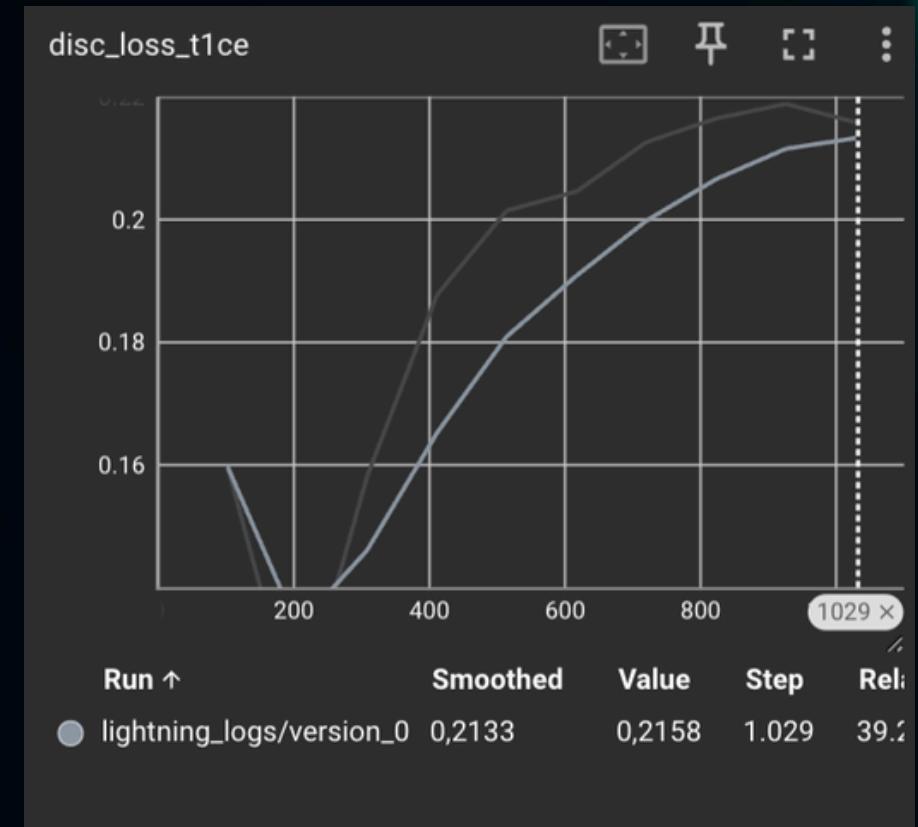


**CYCLE + ADVERSARIAL + IDENTITY
LOSS**

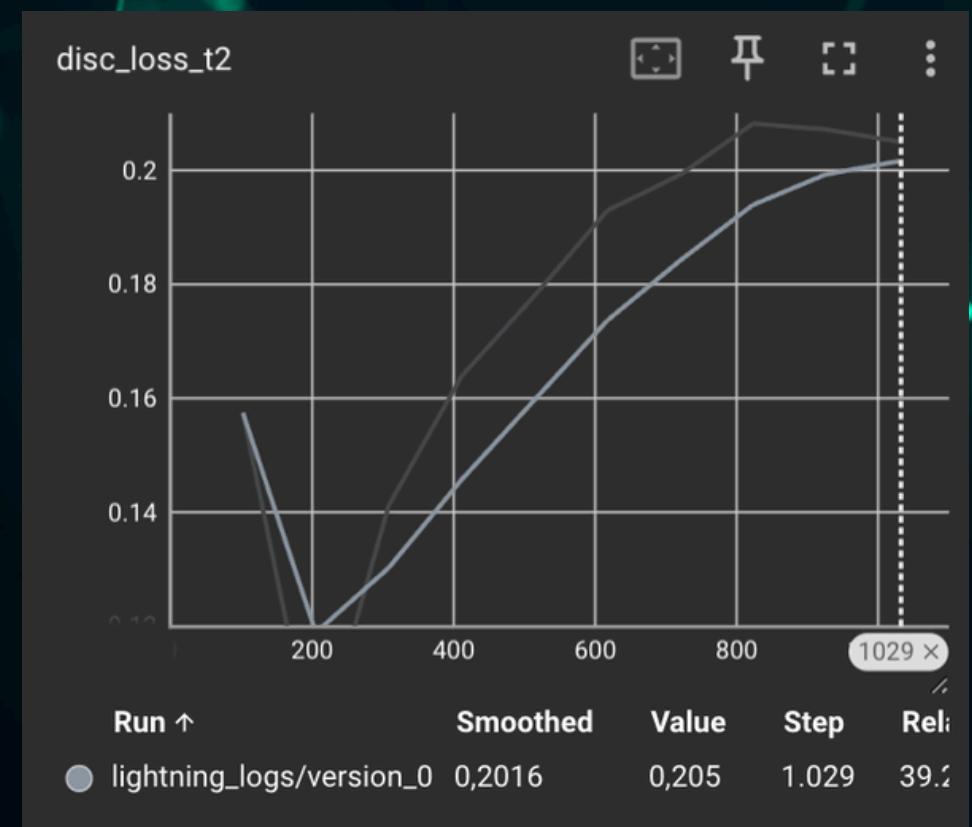
DSGAN RESULTS



**CYCLE + ADVERSARIAL + IDENTITY
LOSS**



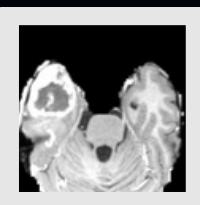
(T1CE REAL LOSS + FAKE LOSS) / 2



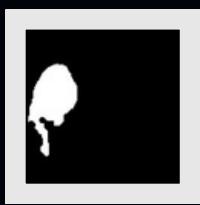
(T1CE REAL LOSS + FAKE LOSS) / 2

FINE TUNING PHASE

NEW INPUT



T1CE SCAN

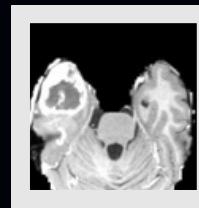


MASK

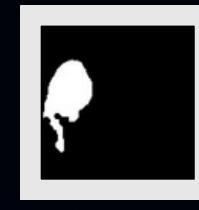
$3 \times 256 \times 256$

FINE TUNING PHASE

NEW INPUT



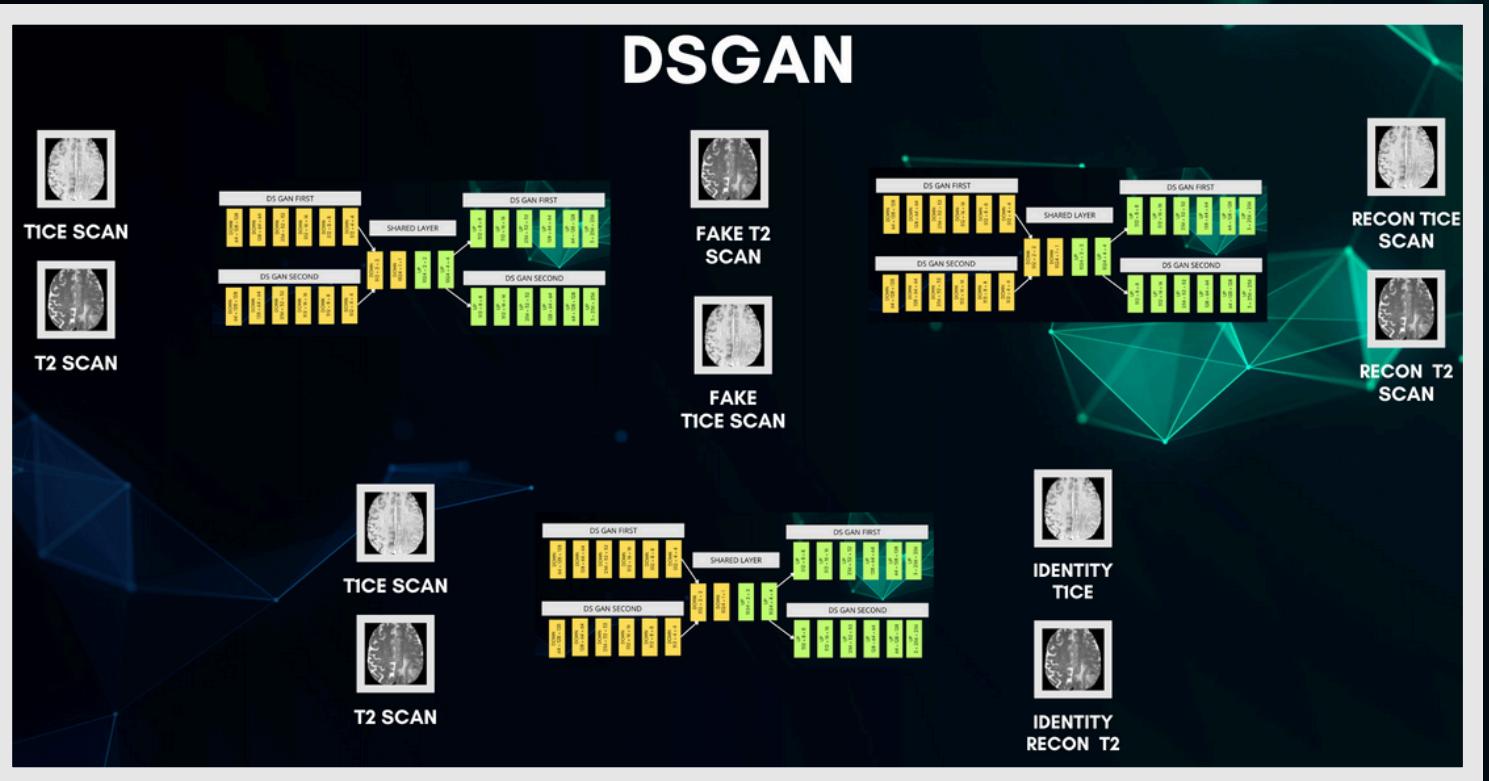
T1CE SCAN



MASK

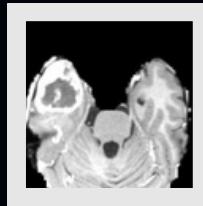
$3 \times 256 \times 256$

PRE-TRAINED

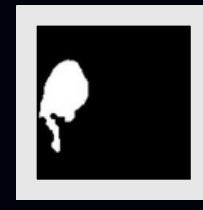


FINE TUNING PHASE

NEW INPUT



T1CE SCAN

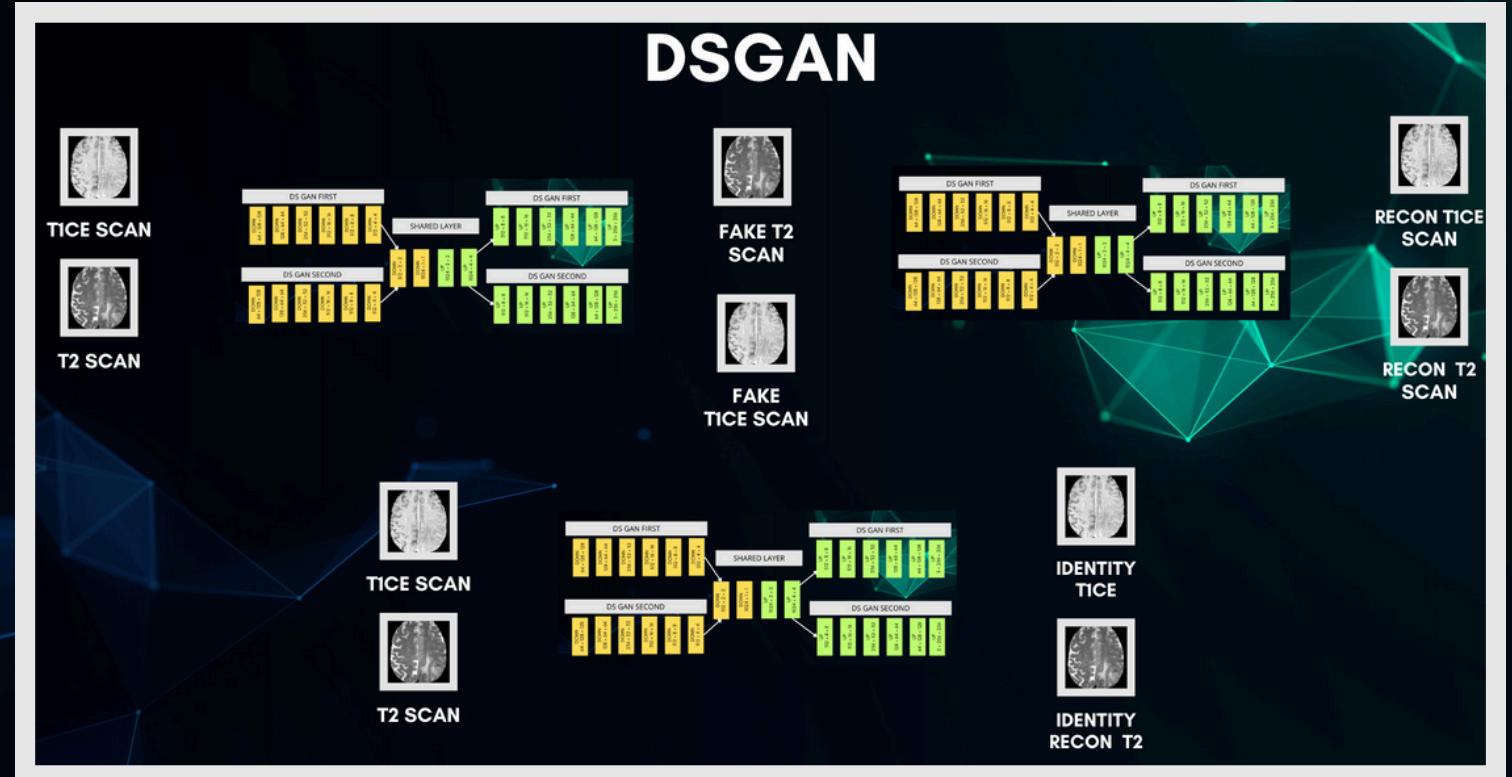


MASK

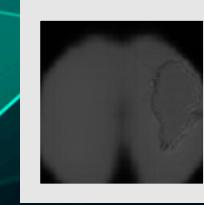
$3 \times 256 \times 256$

PRE-TRAINED

DSGAN

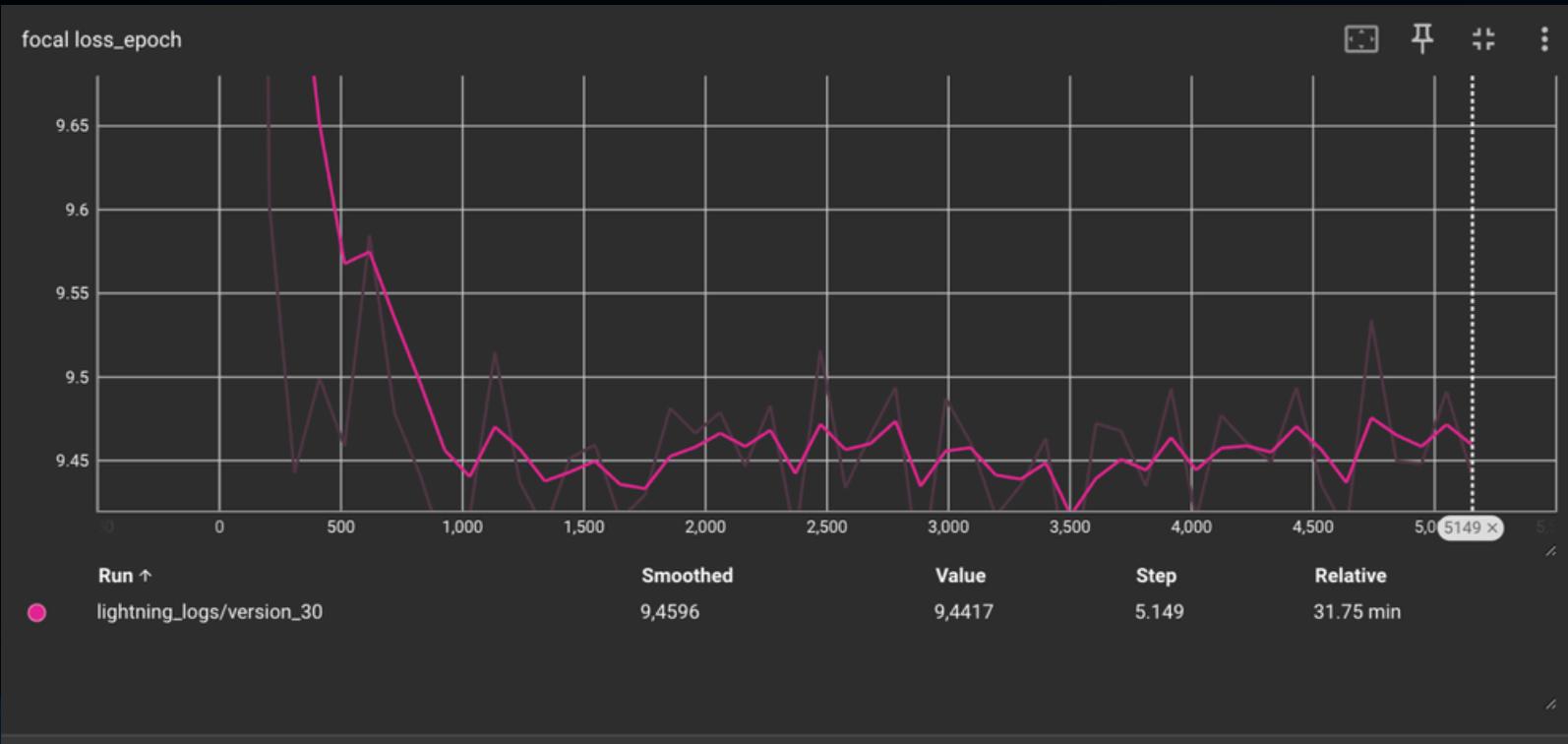


OUTPUT

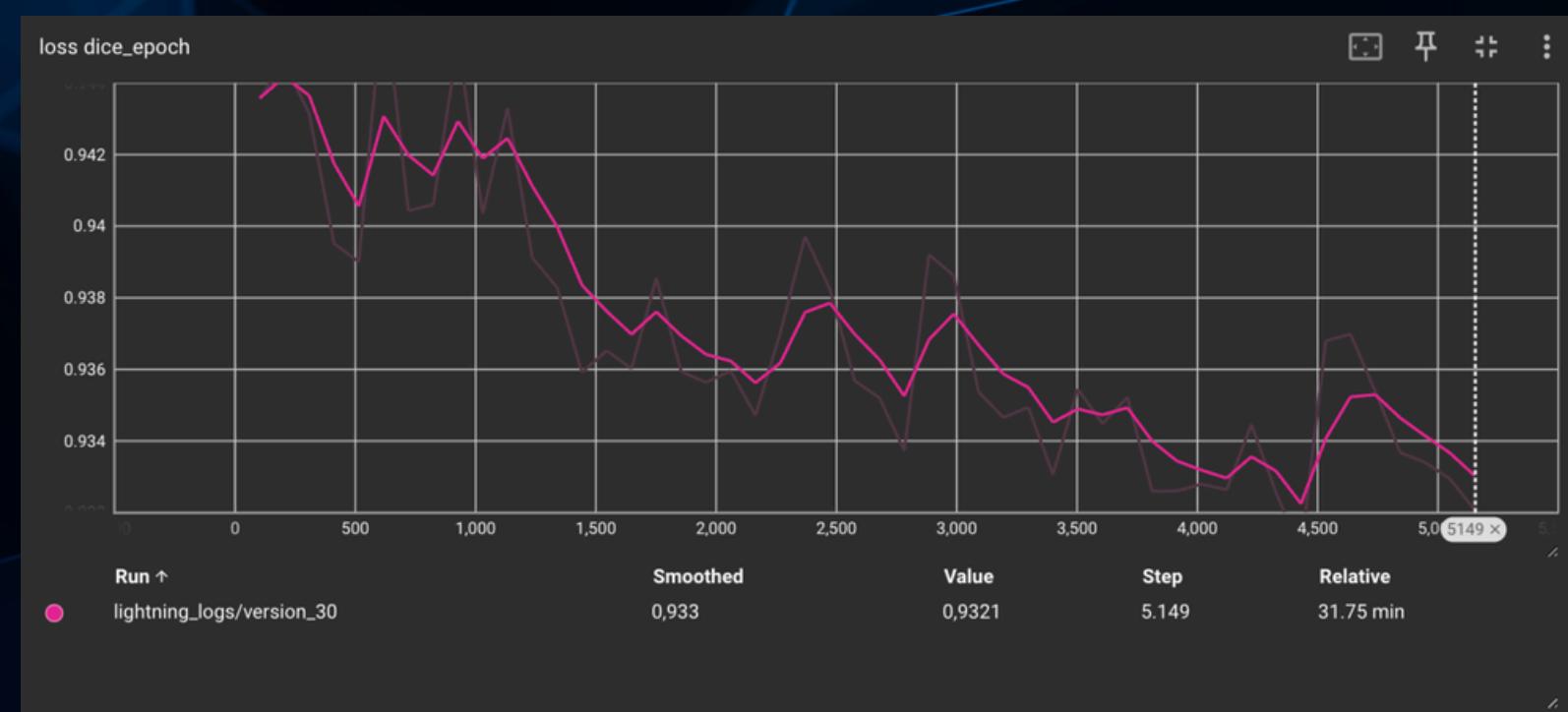


LOSSES

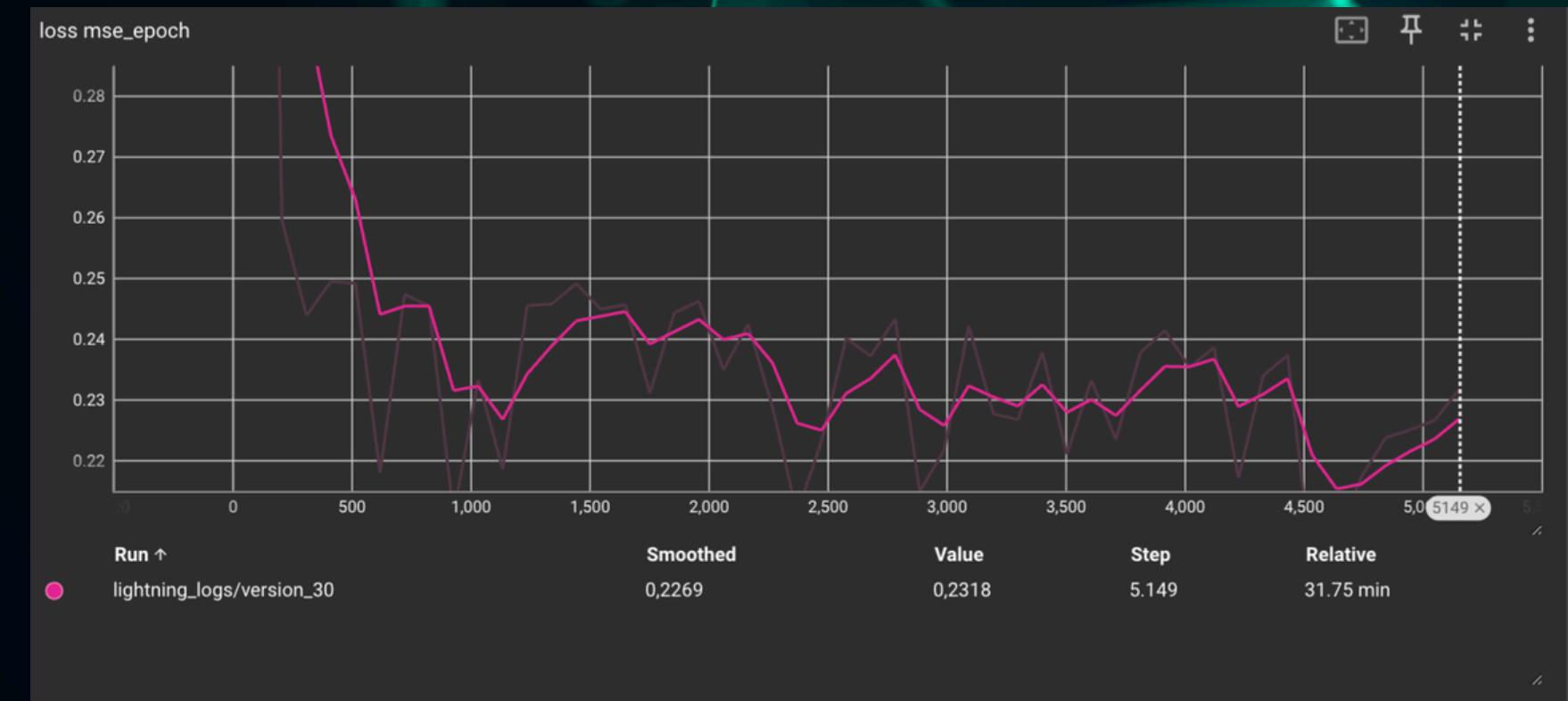
FOCAL LOSS



DICE LOSS

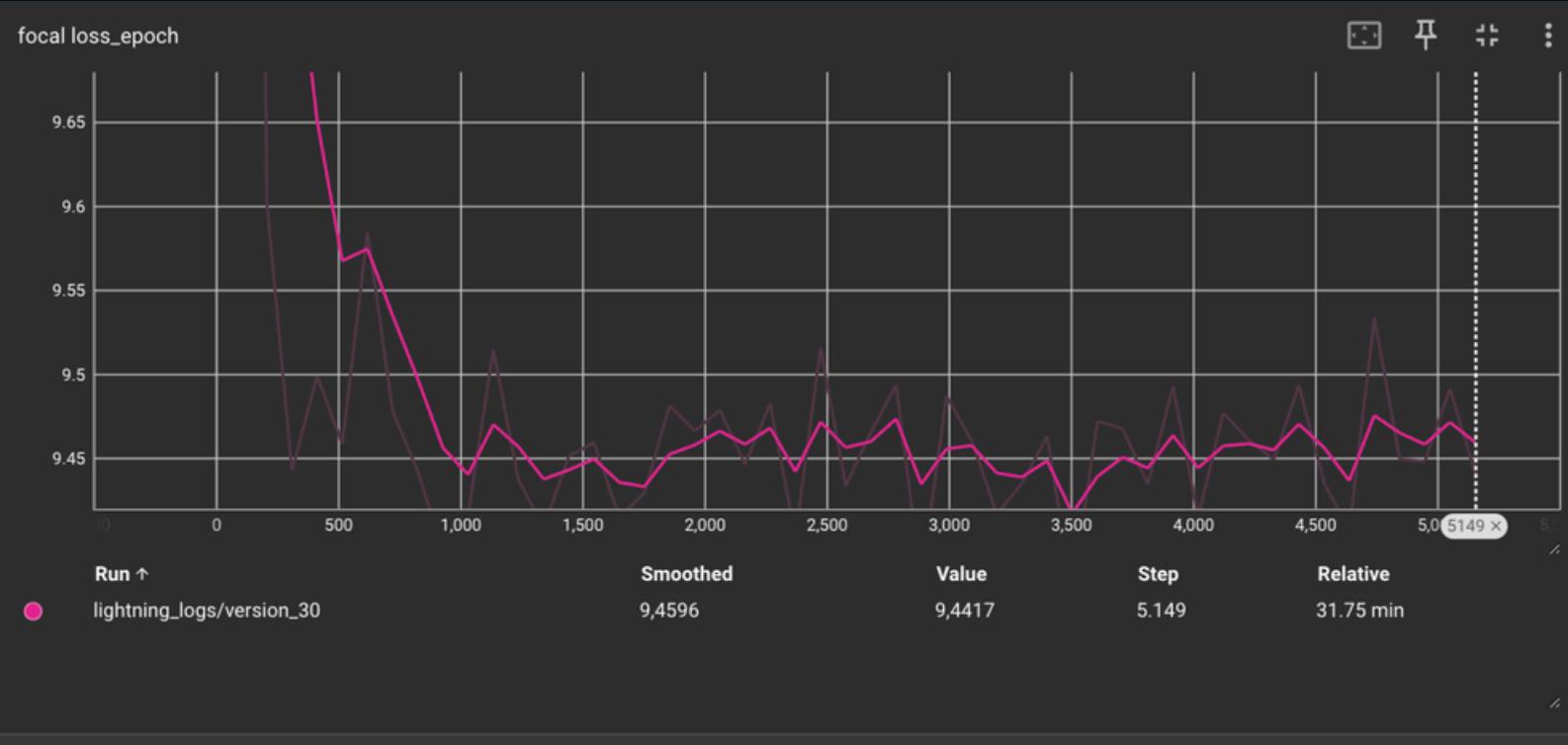


MEAN SQUARED ERROR



LOSSES

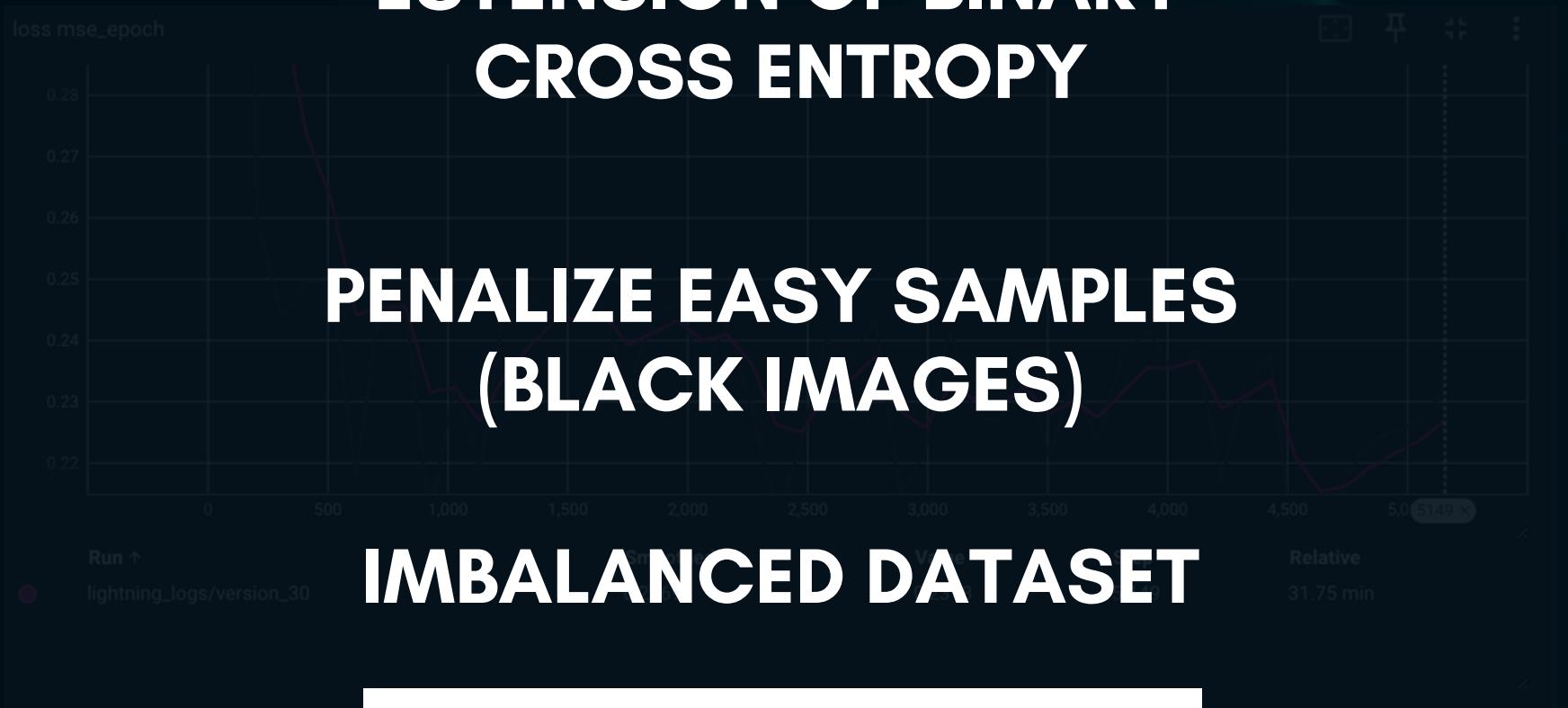
FOCAL LOSS



DICE LOSS



MEAN SQUARED ERROR
ESTENSION OF BINARY
CROSS ENTROPY



PENALIZE EASY SAMPLES
(BLACK IMAGES)

IMBALANCED DATASET

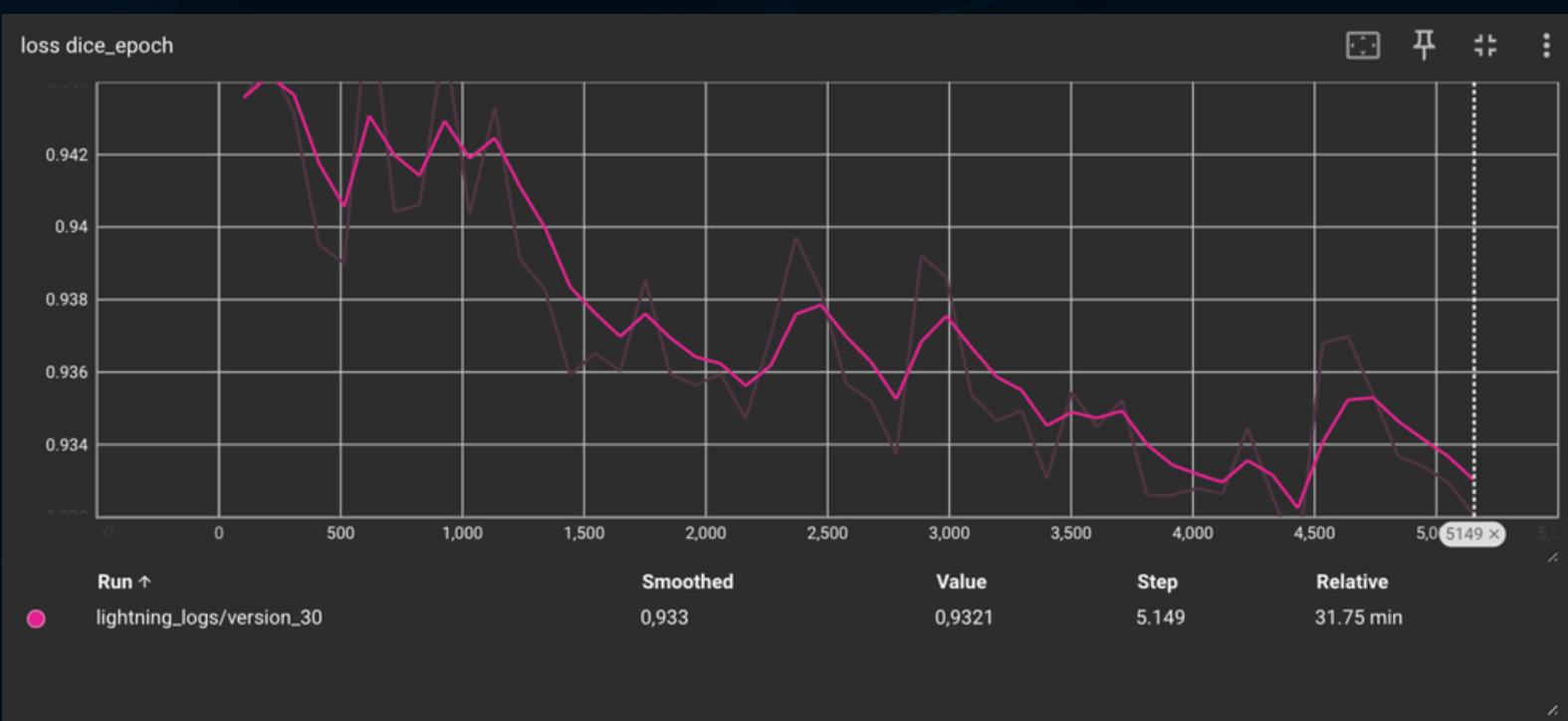
$$\text{FL}(p_t) = -(1 - p_t)^\gamma \log(p_t)$$

LOSSES

FOCAL LOSS



DICE LOSS



MEAN SQUARED ERROR
IT USED
SEGMENTATION TASKS

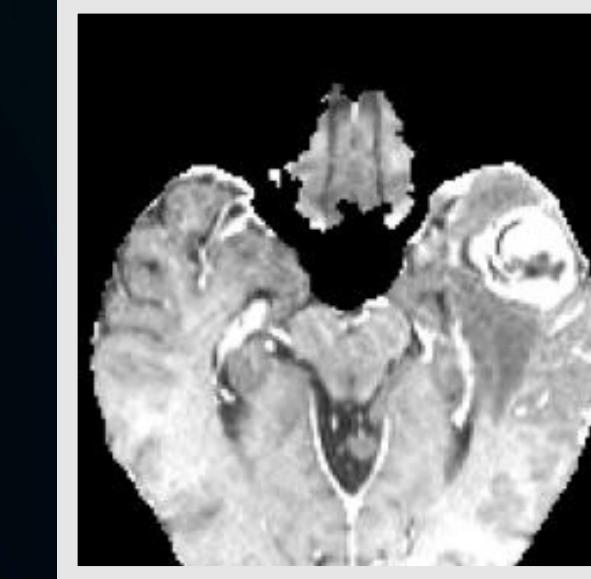
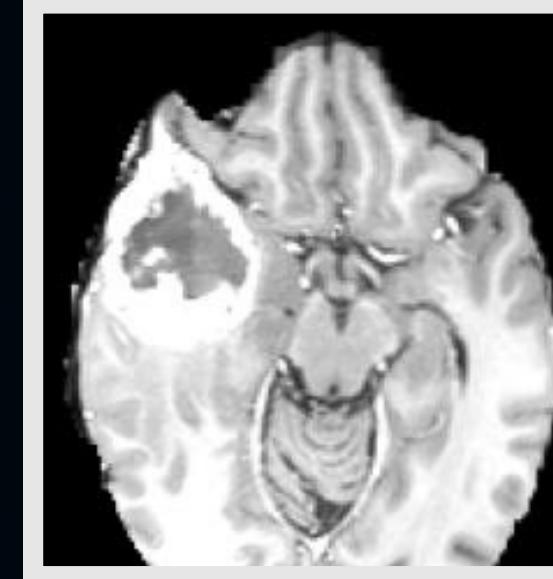
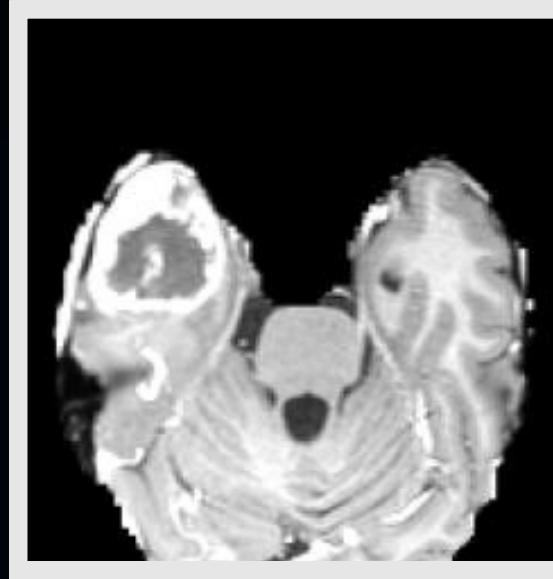


PENALIZES MISSING
REGIONS
(FALSE NEGATIVE)

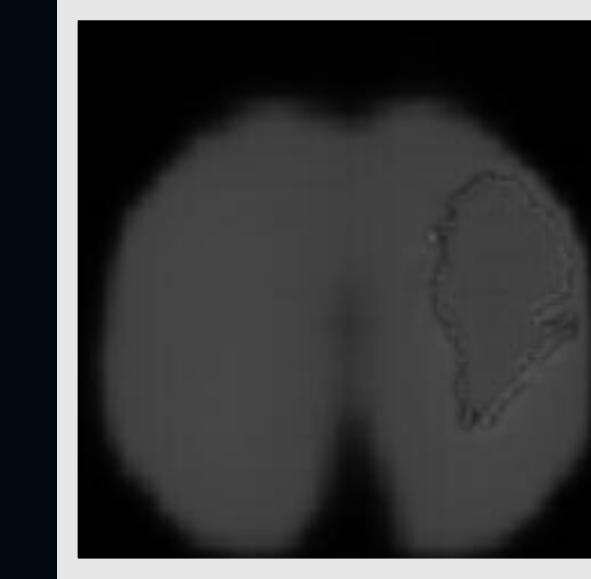
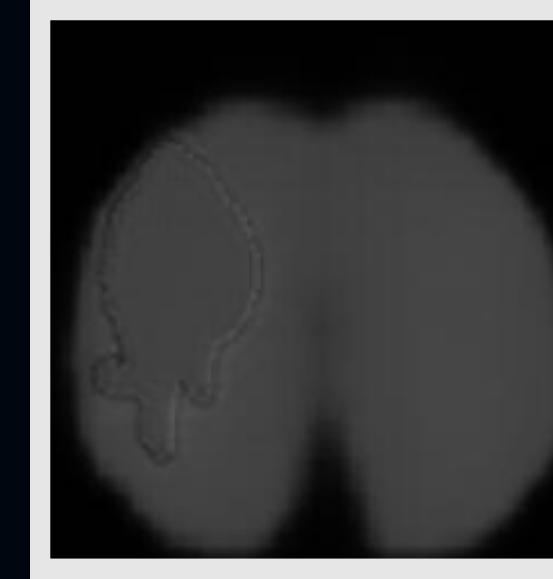
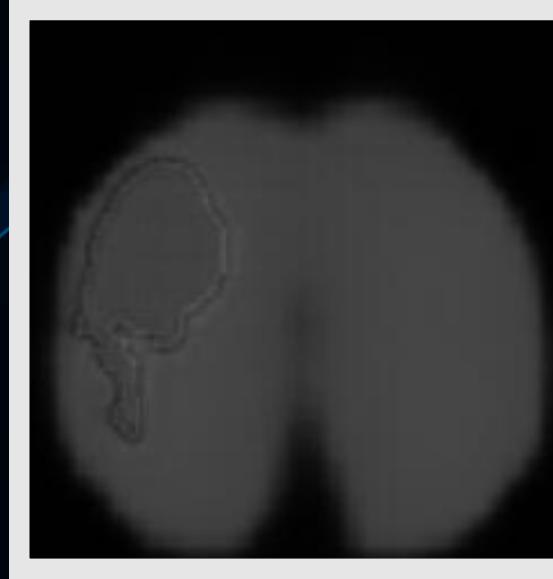
$$DiceLoss(y, \bar{p}) = 1 - \frac{(2y\bar{p} + 1)}{(y + \bar{p} + 1)}$$

RESULTS

T1CE SCAN

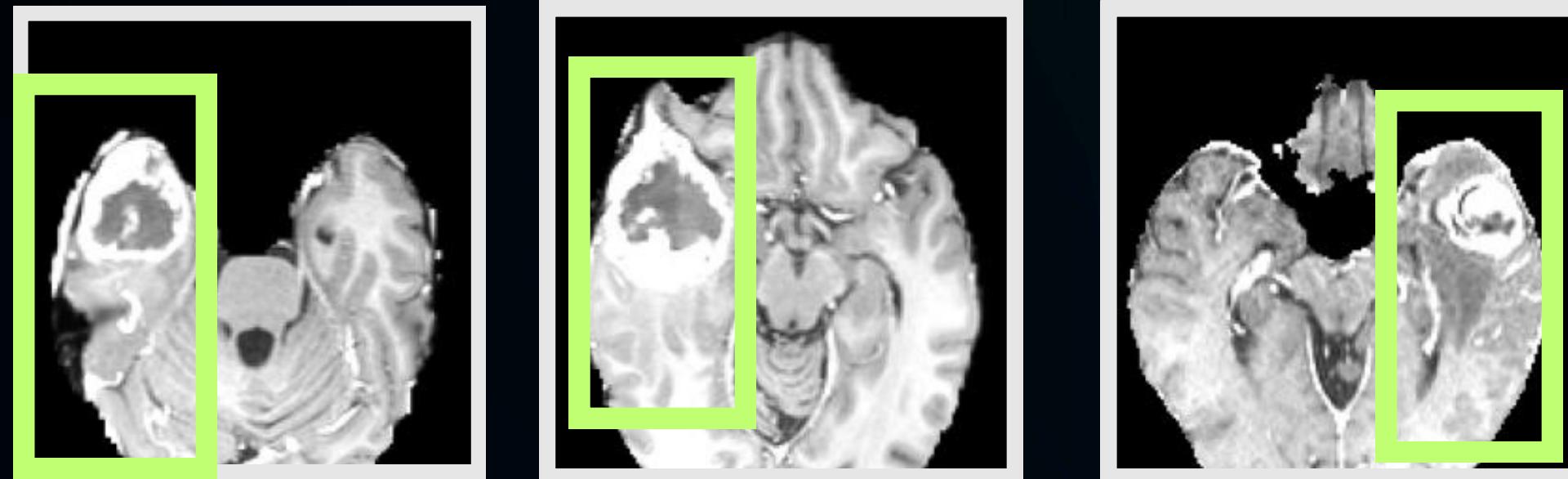


MASK
GENERATED

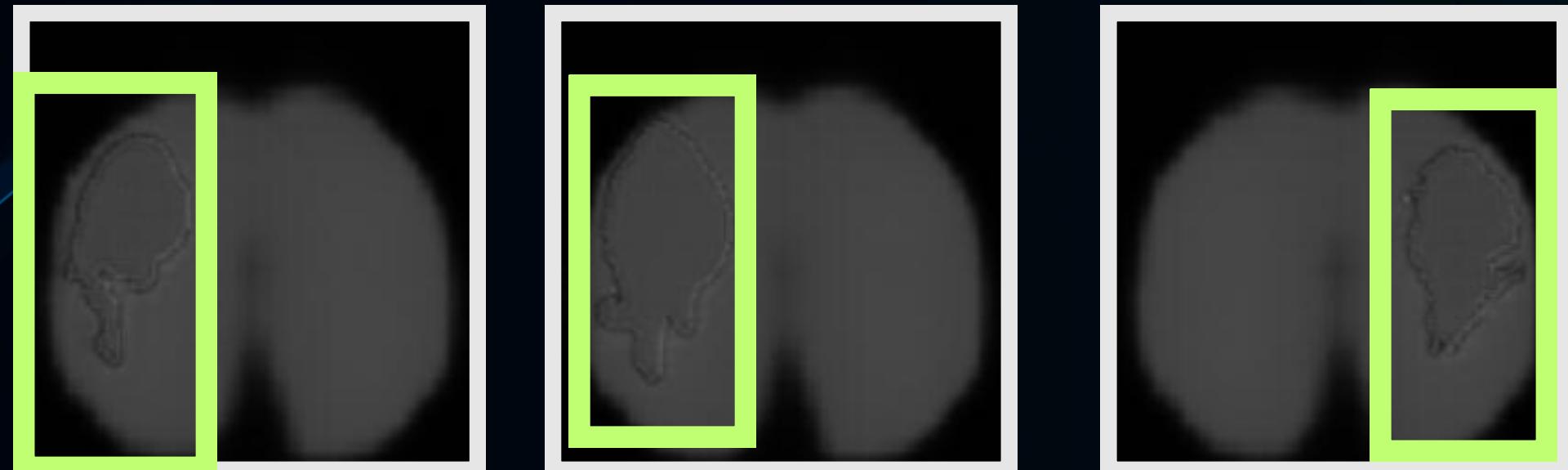


RESULTS

T1CE SCAN



MASK
GENERATED



THANK YOU!

FOR YOUR ATTENTION