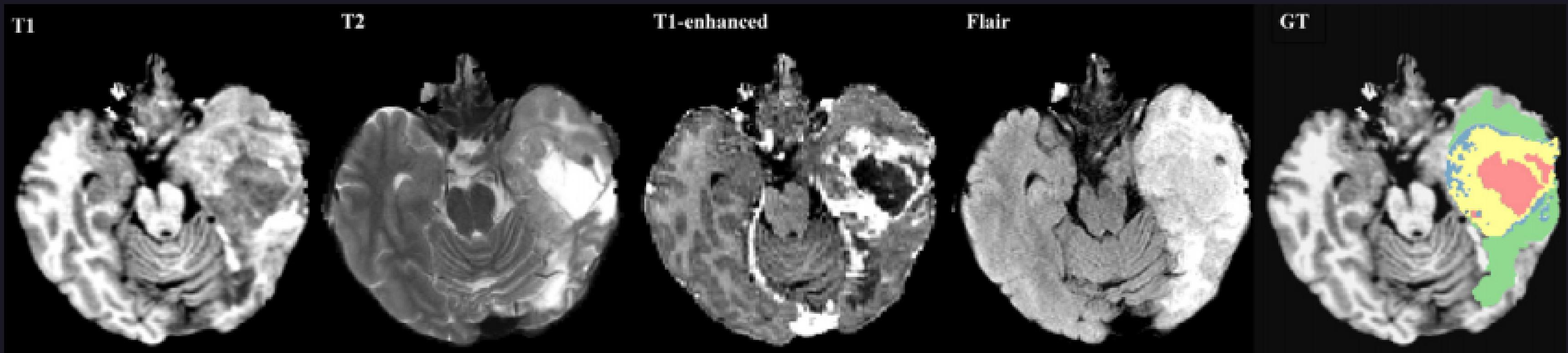
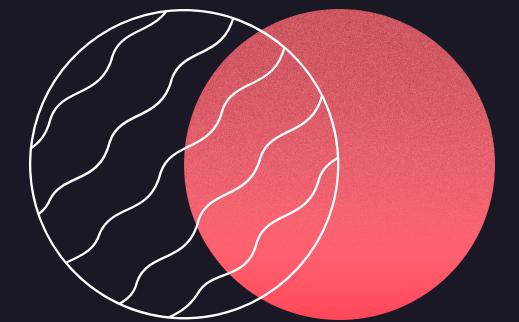


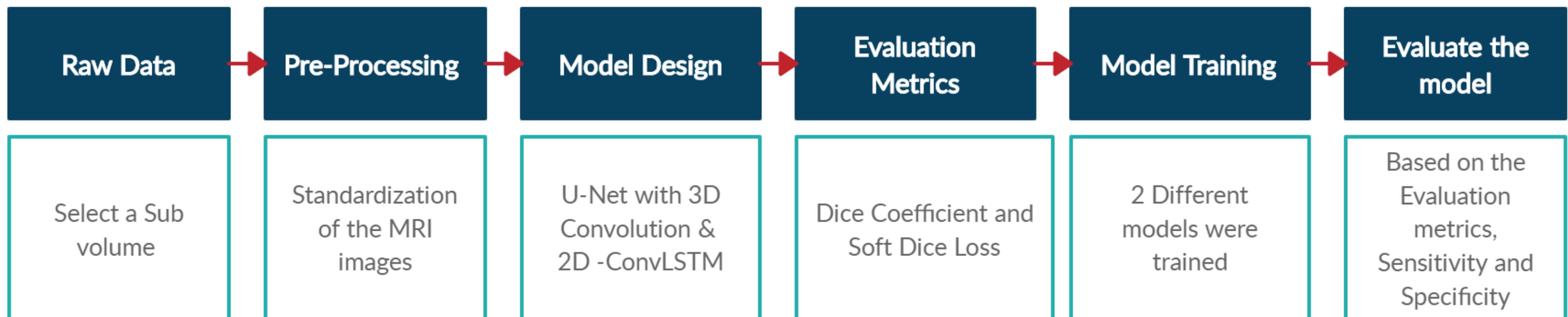
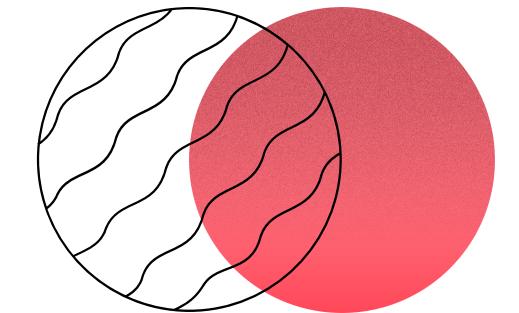
Brain Tumor Segmentation

Reg NO: E/15/092
Group : D

Data and Expected Outcome



WORK FLOW

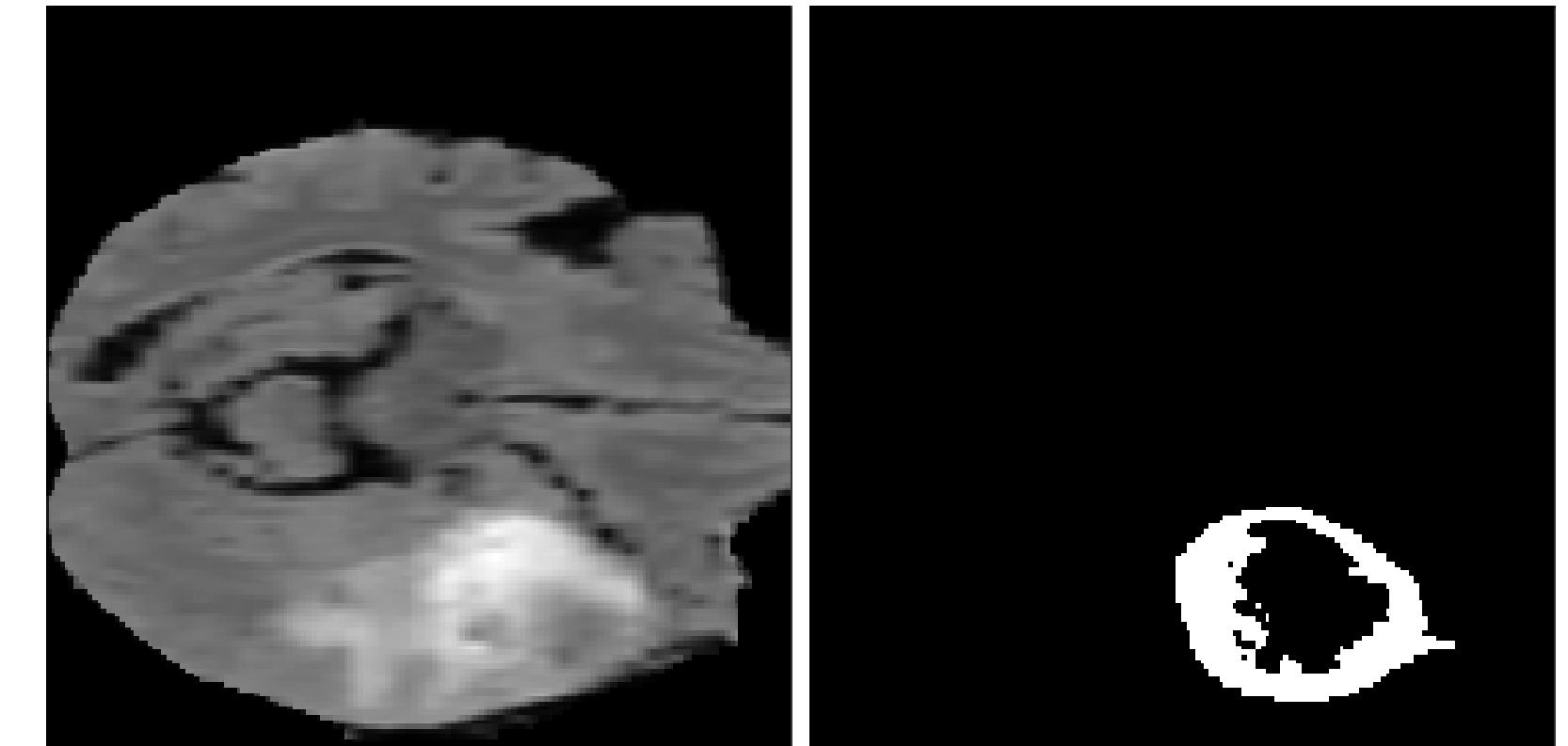
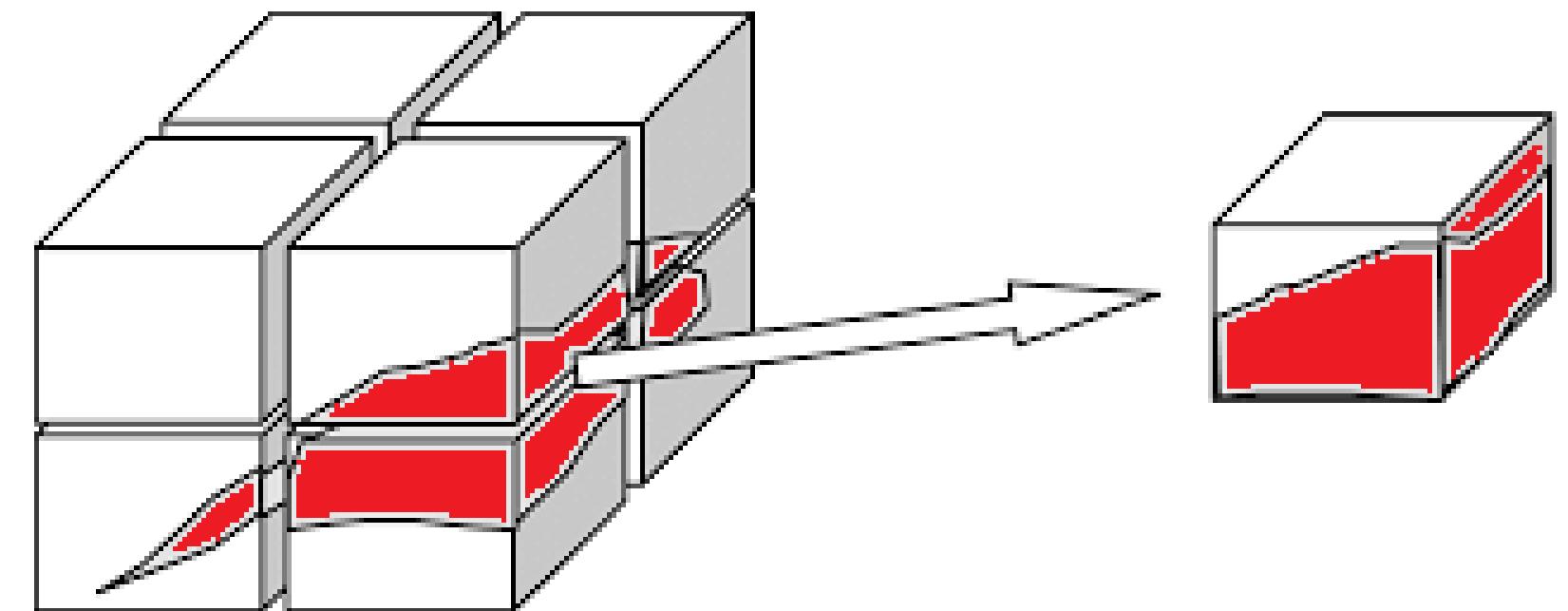


DATA PRE-PROCESSING :

1. SUB-VOLUME SELECTION

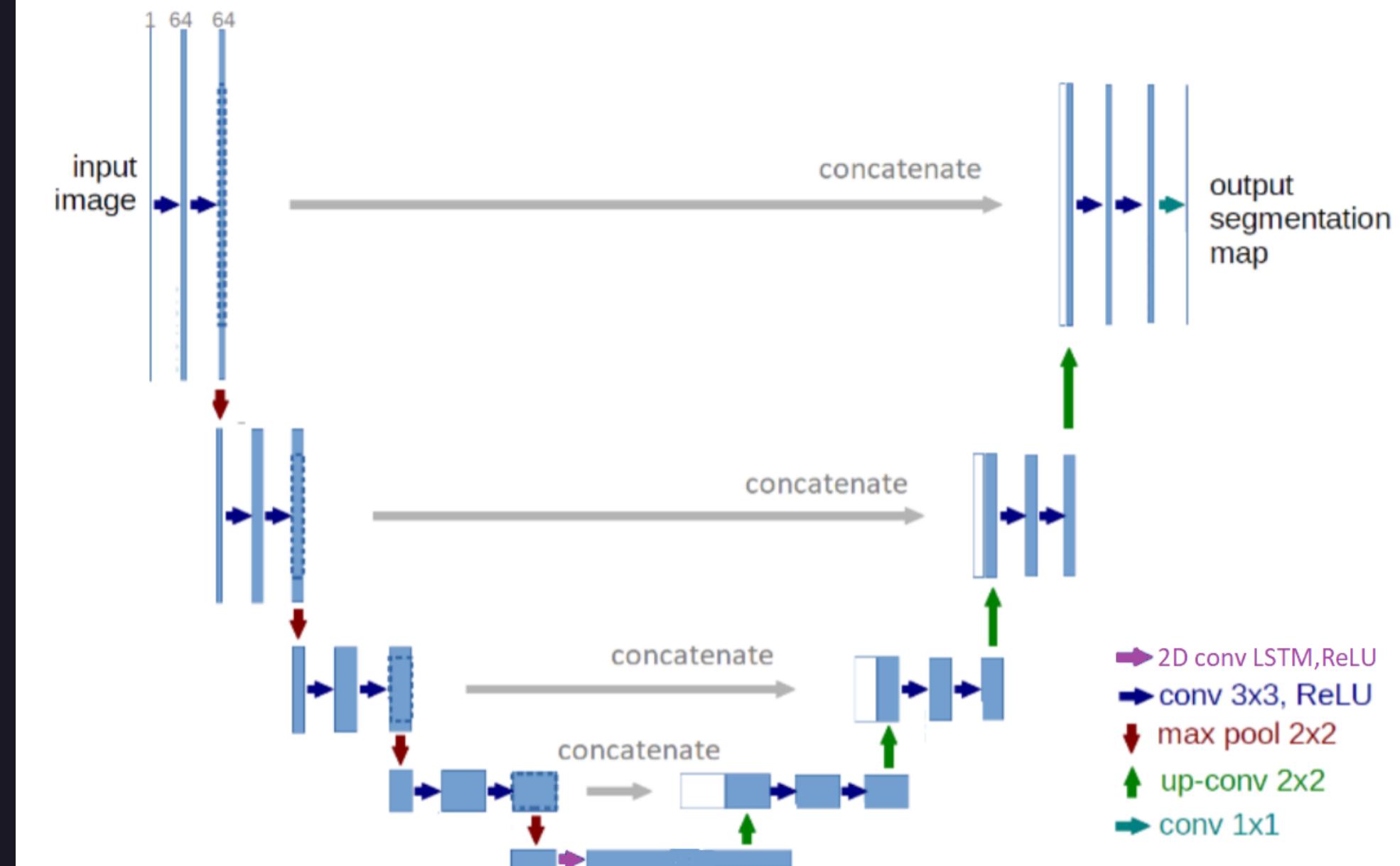
2. STANDARDIZING THE IMAGE

3. MIRROR PADDING



MODEL DESIGNING :

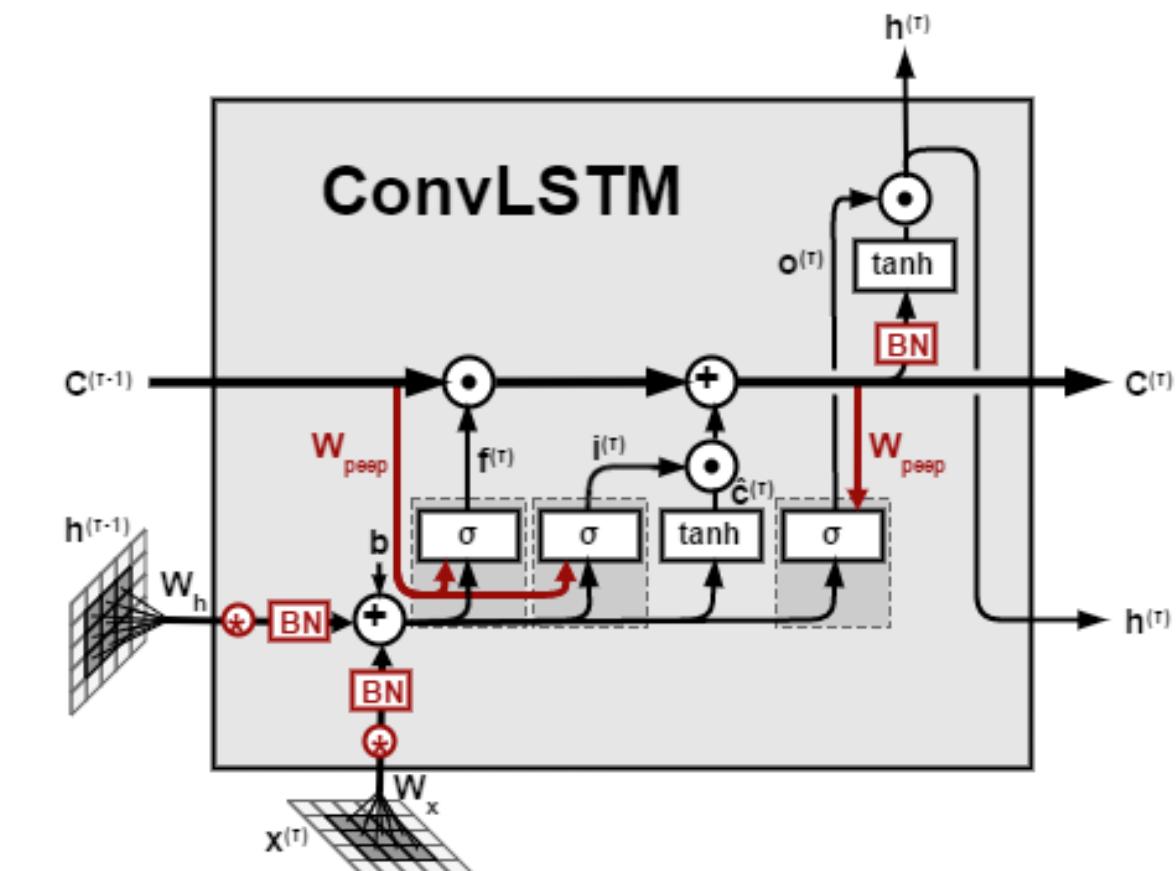
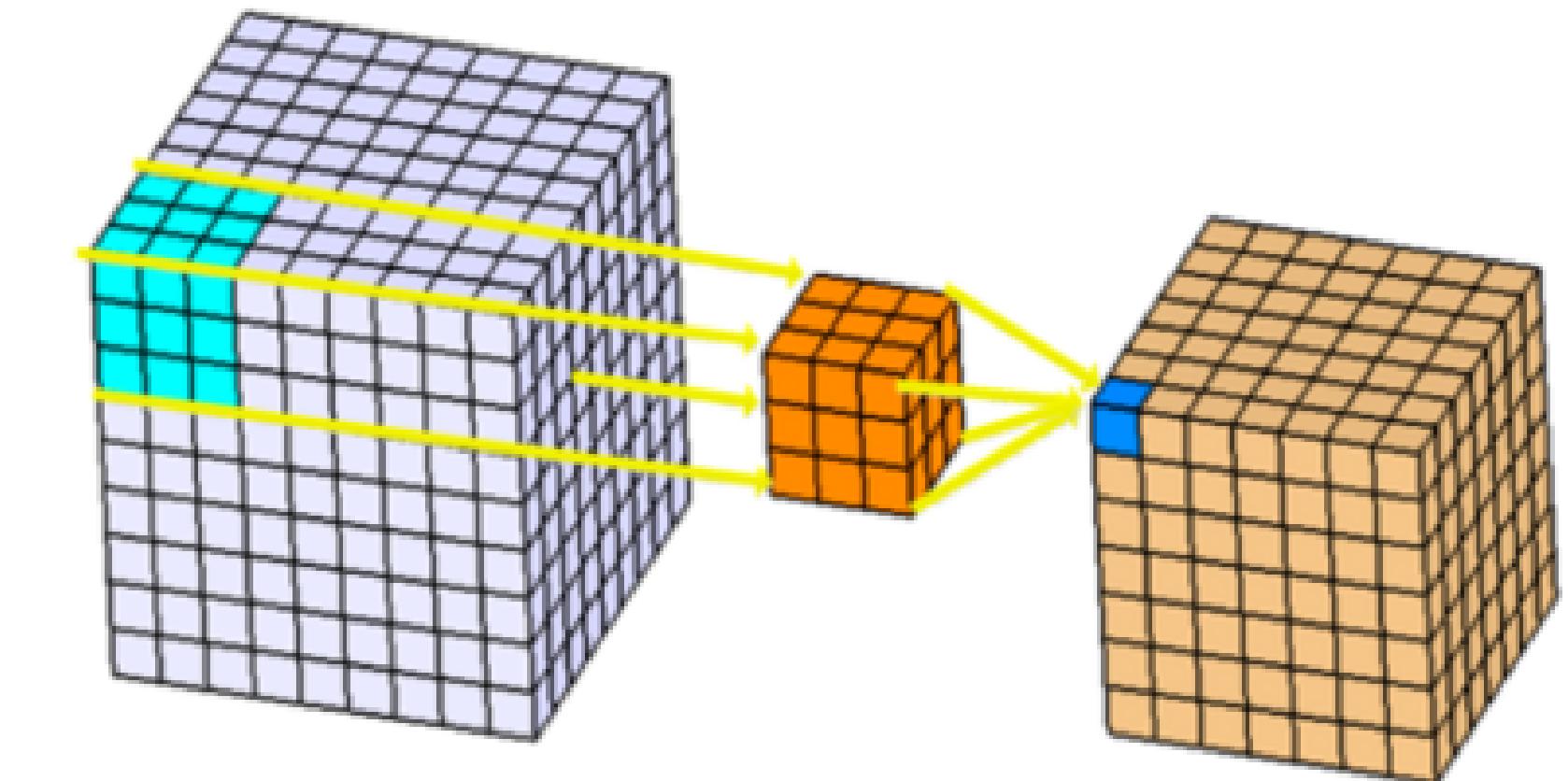
DESIGN THE NEURAL NETWORK



ALGORITHM SELECTION :

1. 3D-CONVOLUTION

2. 2D CONV-LSTM

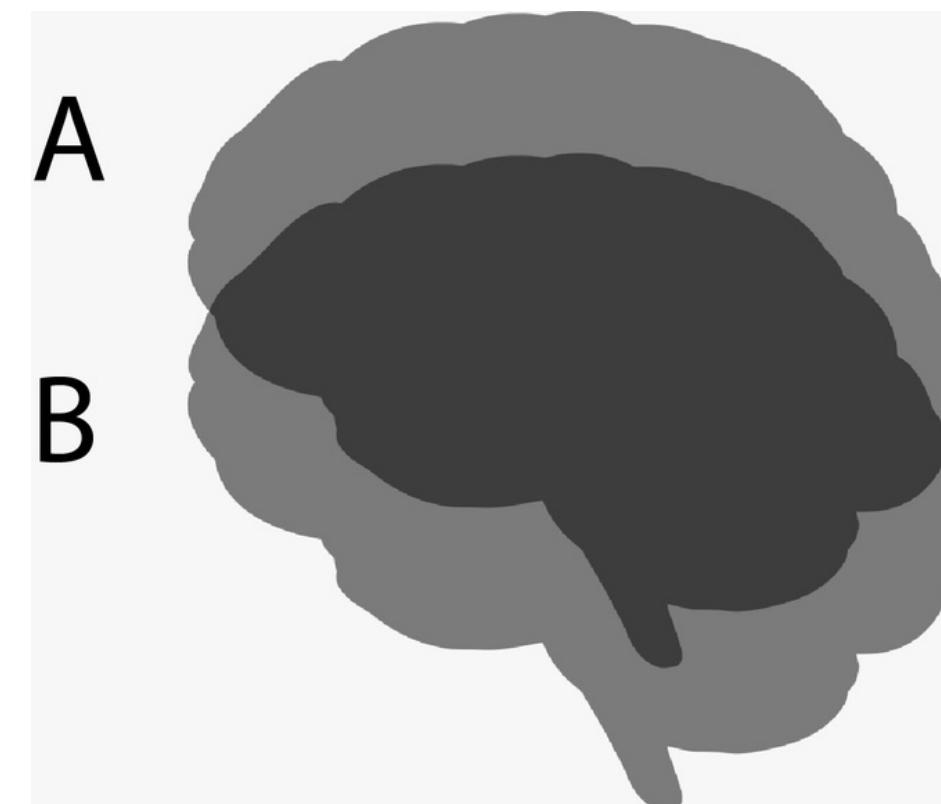


$$DSC(A, B) = \frac{2 \times |A \cap B|}{(|A| + |B|)}$$

COST FUNCTION :

1. DICE SIMILARITY COEFFICIENT

2. DICE COEFFICIENT FOR MULTIPLE CLASSES



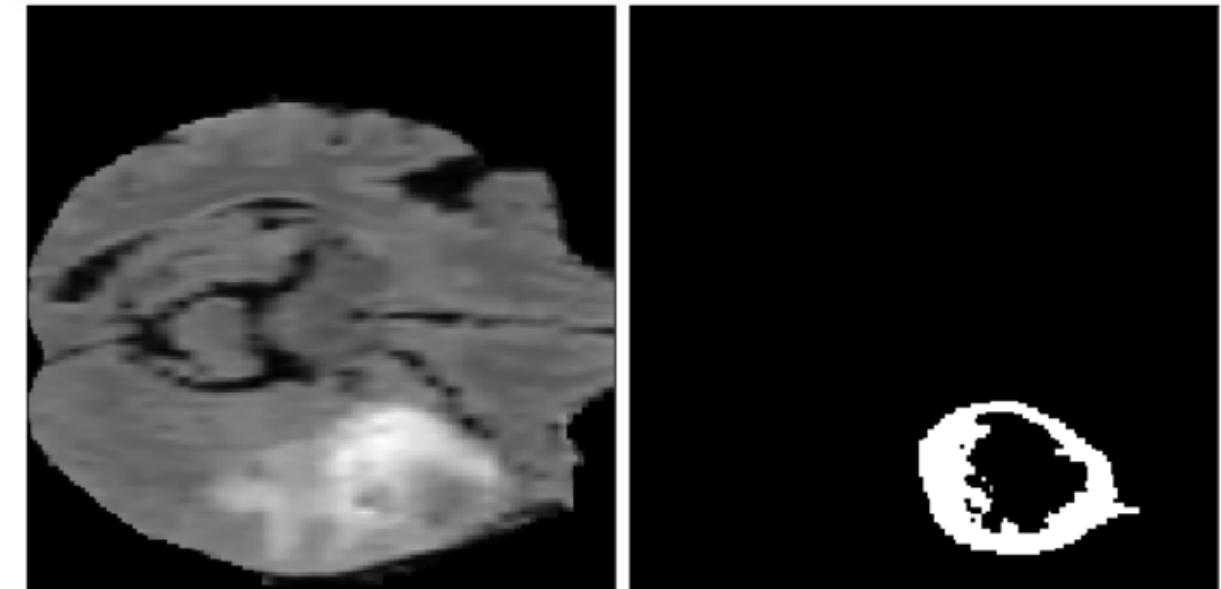
$$DSC(f, x, y) = \frac{2 \times \sum_{i,j} f(x)_{ij} \times y_{ij} + \epsilon}{\sum_{i,j} f(x)_{ij} + \sum_{i,j} y_{ij} + \epsilon}$$

$$DC(f, x, y) = \frac{1}{3} (DC_1(f, x, y) + DC_2(f, x, y) + DC_3(f, x, y))$$

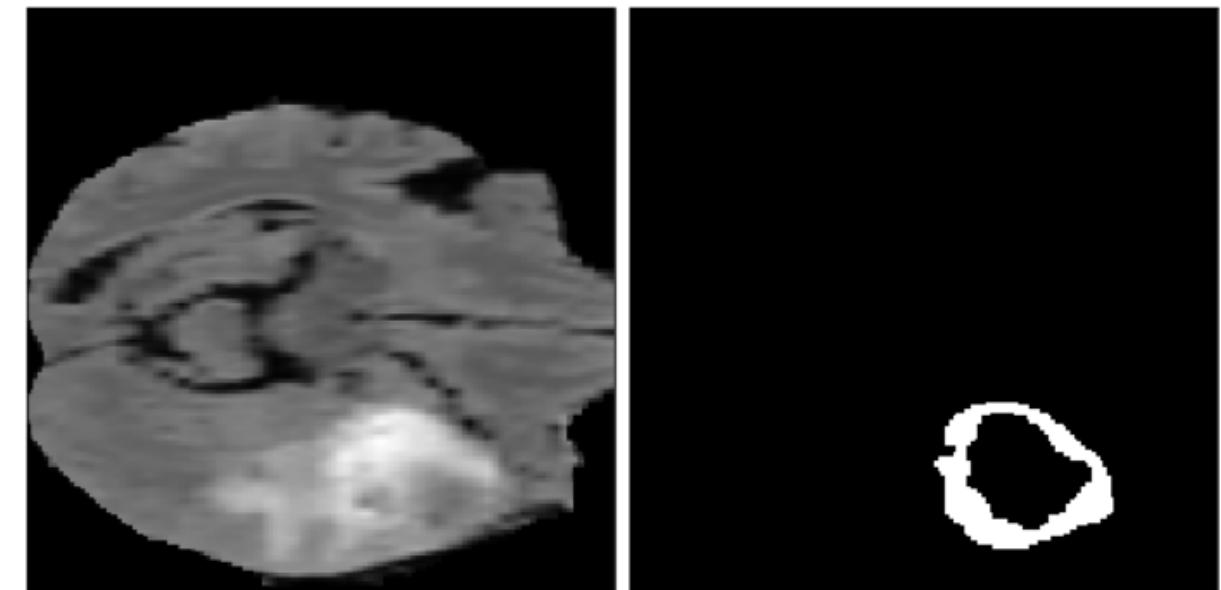
COST FUNCTION :

1. SOFT DICE LOSS

$$\mathcal{L}_{Dice}(p, q) = 1 - \frac{1}{N} \sum_{c=1}^C \frac{2 \times \sum_{i,j} p_{cij} q_{cij} + \epsilon}{\left(\sum_{i,j} p_{cij}^2\right) + \left(\sum_{i,j} q_{cij}^2\right) + \epsilon}$$



Original

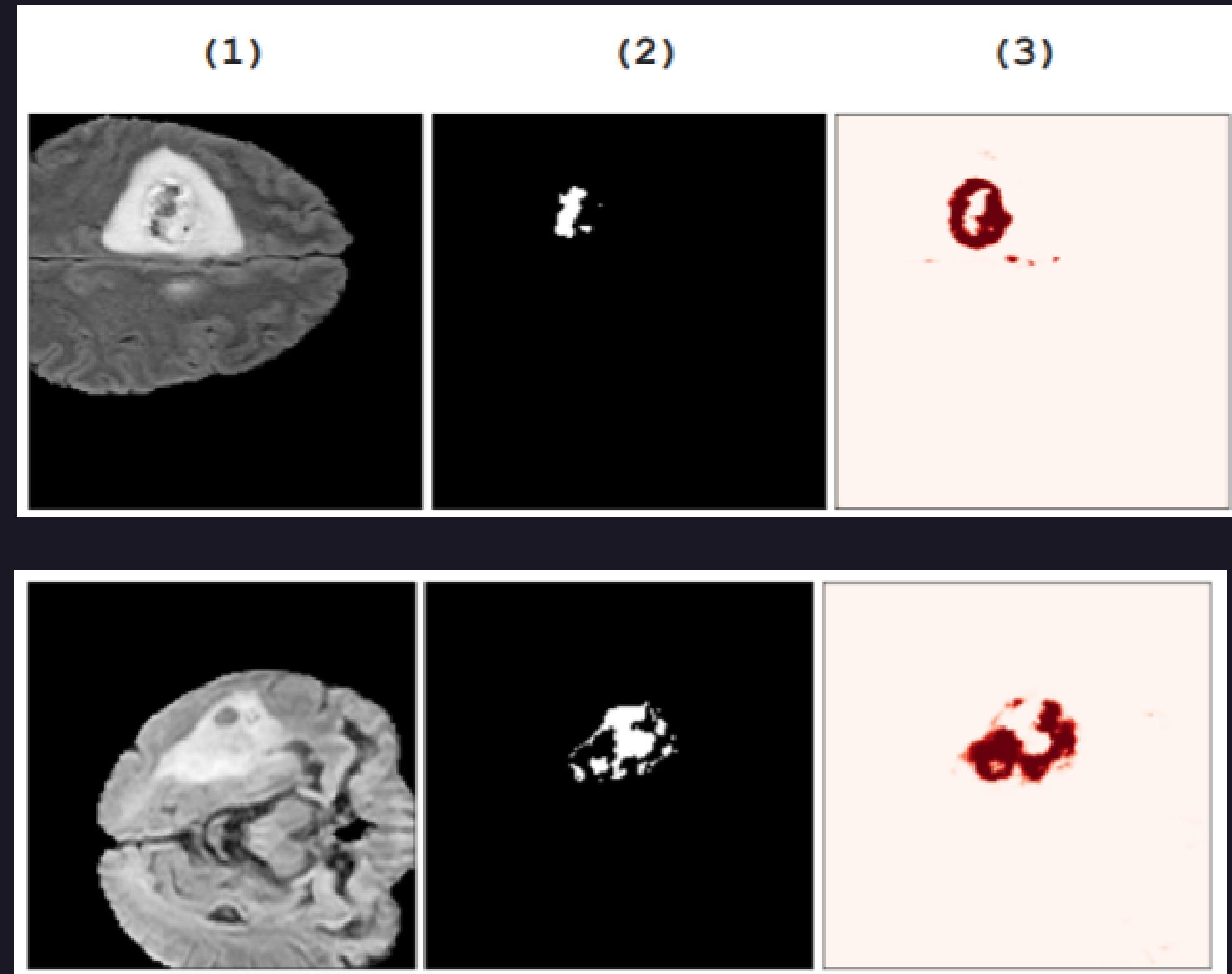
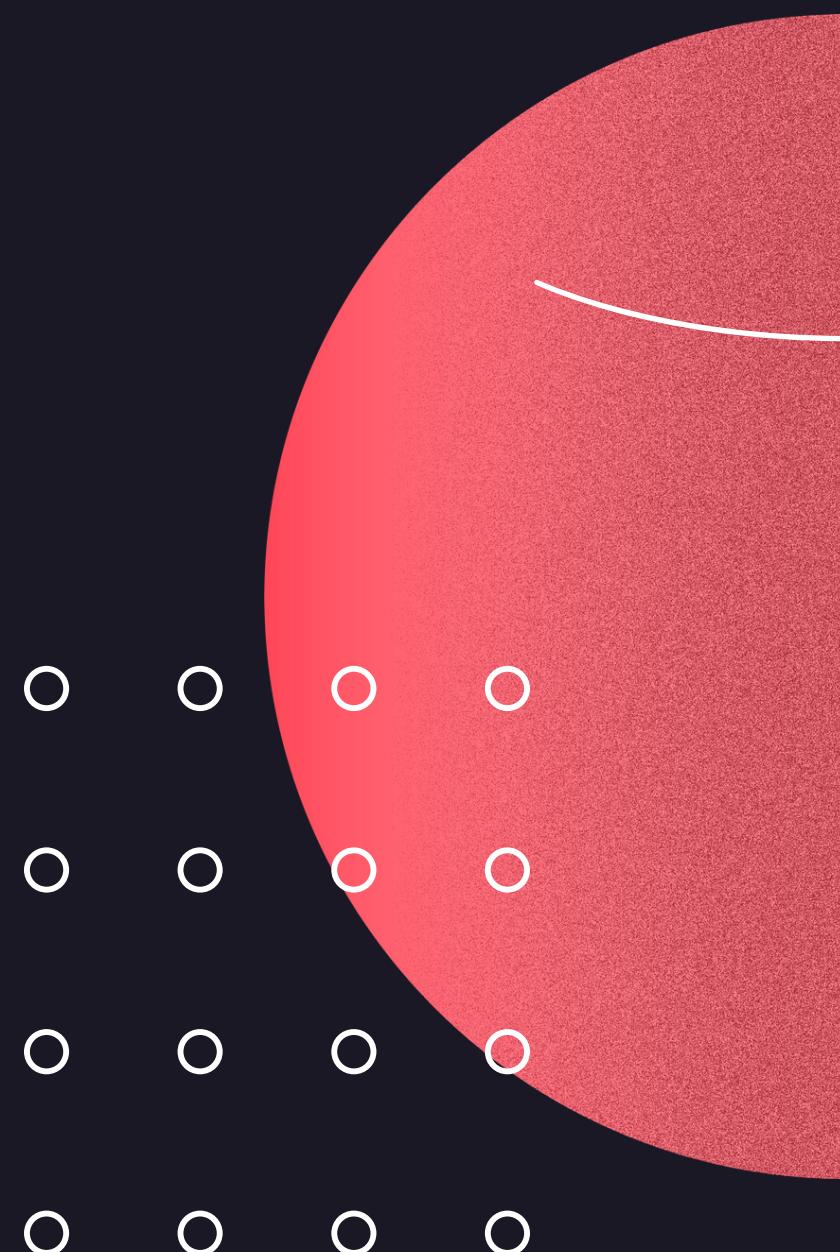


Thresholded

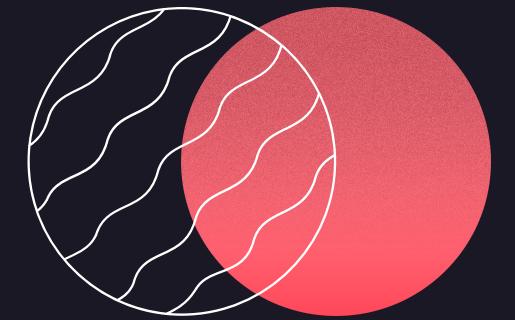
THRESHOLDING :

Results

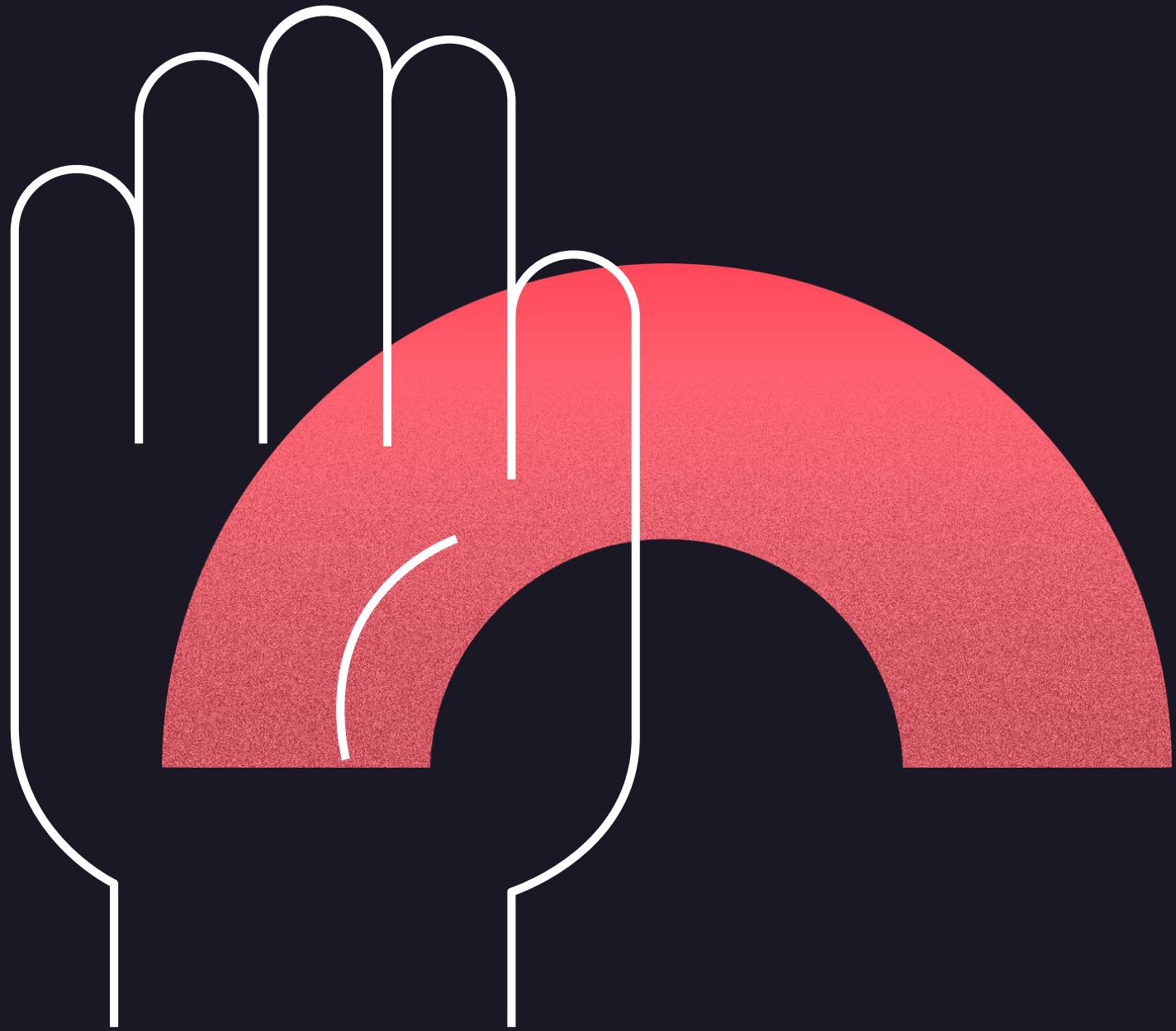
Dice Coefficient=0.8315
(F1-Score)



CHALLENGES FACED



1. Number of training data 480.
2. Finding a proper cost function for segmentation
3. Finding algorithms for (RAM and CPU) and Kernel types
4. Selecting a neural network architecture
5. Kernel optimization and model training time.



THANK YOU



Q&A