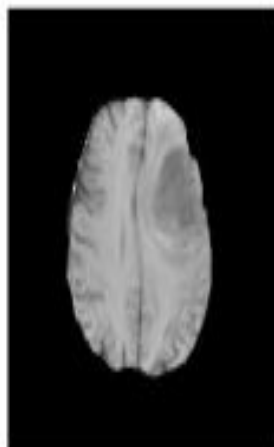# BRAIN TUMOR SEGMENTATION USING ATTENTION UNET
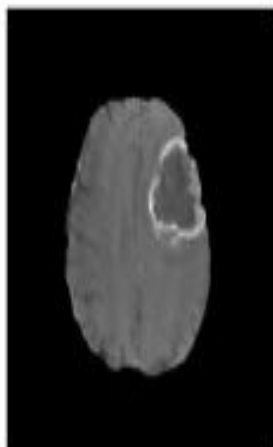
PROBLEM STATEMENT

The main aim of Brain Tumor Segmentation is to accurately portray the regions of Brain tumor along with the relevant masks.

This can be used for remote detection of Brain Tumor as well as has the potential to serve as a pre diagnostic test which be done quickly along with the MRI images.
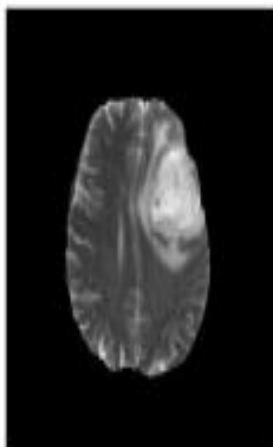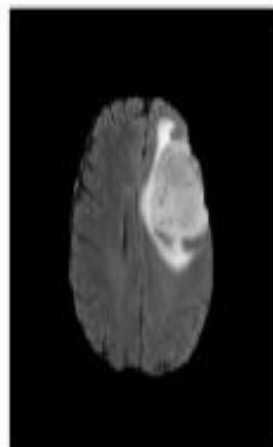
T1	T1ce	T2	FLAIR	Ground Truth	Legend

Legend:
- GD-Enhancing Tumor
- Pertumoral Edema
- NCR\ECT
- Background
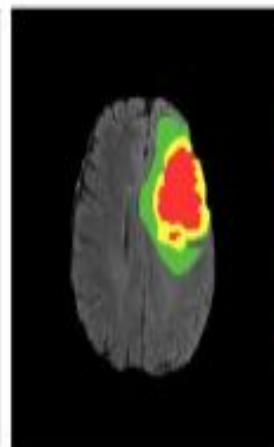
DATA AUGMENTATION

The following data augmentations can be applied for getting better results :-

- ❖ Horizontal Flip
- ❖ Random Rotation
- ❖ Vertical Flip
- ❖ Dihedral

Literature Survey

Various deep learning based architectures have been used for the problem of Brain Tumor Segmentation. These can be broadly divided into :-

- ❖ CNN based models :- Various CNN based models like single path CNNs, multi path CNNs , various FCNs have been used for segmentation. Some o the notable examples include U-Net, 3D U-Net.
- ❖ RNN based models :- Although RNNs were created for handling sequential process problems, they have been used for various Image Analysis problems like Brain Tumor Segmentation too. Variations of RNNs like LSTMs, GRUs, CNN-RNN, CRF-RNNs have been widely used.

contd.

❖ Deep Generative models:- With the increase in computational power, the use of generative models for Brain Tumor Segmentation has become possible. These include various variants of GANs like DCGANS, segANs as well as stacked autoencoders and Bayesian convolutional AEs.

❖ Ensemble models :- Ensemble models have also been preferred for this task. Some of the ensemble based models include 3D UNet along with 4FCNs, DeconvNets with multi-scale Convolutional Label Evaluation Net.

Proposed Method : Attention UNet
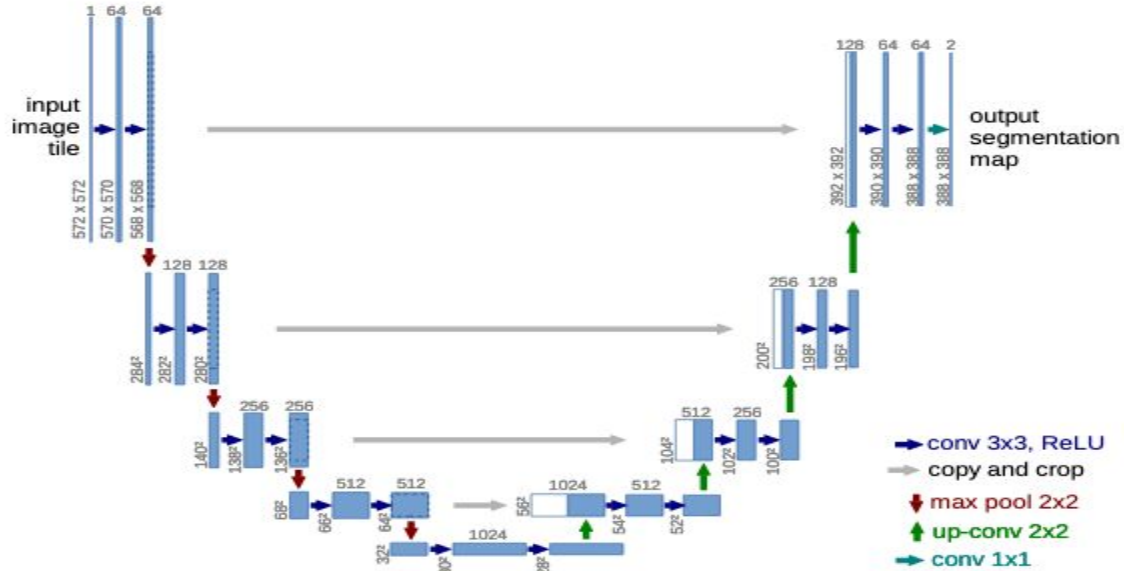
Proposed Method : Attention UNet

UNets are widely used for medical data analysis as they can provide excellent results using limited data. Although Attention mechanisms are predominantly used in NLP, they have many applications in the field of CV as well. Attention mechanisms can help to increase the accuracy of standard UNets. Using the attention mechanism can help during the upsampling stage of UNet as the deep neural network can concentrate on the relevant data.