**Swin UNETR: Swin Transformers for Semantic**

**Segmentation of Brain Tumors in MRI Images**

* Semantic segmentation of brain tumours is a fundamental medical image analysis task involving multiple MRI imaging modalities that can assist clinicians in diagnosing the patient and successively studying the progression of the malignant entity.
* The Swin transformer encoder extracts features at five different resolutions by utilizing shifted windows for computing self-attention and is connected to an FCNN-based decoder at each resolution via skip connections.
* Brain tumours are categorized into primary and secondary tumour types. Primary brain tumours originate from brain cells, while secondary tumours metastasize into the brain from other organs.
* We propose a novel architecture termed Swin UNEt Transformers (Swin UNETR), which utilizes a U-shaped network with a Swin transformer as the encoder and connects it to a CNN-based decoder at different resolutions via skip connections.
* Transformer-based models have recently gained a lot of attraction in computer vision and medical image analysis.
* Swin UNETR is implemented using PyTorch and MONAI and trained on a DGX-1 cluster with 8 NVIDIA V100 GPUs.
* Our proposed model has a U-shaped network design and uses a Swin transformer as the encoder and CNN-based decoder that is connected to the encoder via skip connections at different resolutions.
* Our model ranks among top performing approaches in the validation phase and demonstrates competitive performance in the testing phase.
* We believe that Swin UNETR could be the foundation of a new class of transformer-based models with hierarchical encoders for the task of brain tumour segmentation.