

Brain Tissue Segmentation using U-Net Inception and Morphological Gradient Channel

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For this task of brain tissue segmentation from MR images, we have used an end-to-end Deep Learning framework with 2D U-Net as its architectural backbone. As edge information are vital for segmentation purpose we have extracted edge enhanced images from T1 modal images using morphological gradient operation in the pre-processing stage. Further, inception modules are used in place of regular convolutional layers to introduce flexibility in the network in terms of decision making. A feature extractor block with residual connections (for eliminating the possibility of information loss) is added prior to main architecture to enrich it with local as well as original information. The model is trained with two modalities (T1 and T2 Flair) and merged labels (GM, WM and CSF). The method is automatic and takes approximately 30 seconds to result segmentation maps for each subject during inference period on NVIDIA Tesla K80 GPU. Publication of this work is under progress and will be available soon.