

LGG Architecture for Brain Tumor Segmentation Using Convolutional Neural Network

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Abstract : The most aggressive form of brain tumor is called glioma. Glioma is kind of tumor that arises from glial tissue of the brain and occurs quite often. A fully automatic 2D-CNN model for brain tumor segmentation is presented in this paper. We performed pre-processing steps to remove noise and intensity variances using N4ITK and standard intensity correction, respectively. We used Keras open-source library with Theano as backend for fast implementation of CNN model. In addition, we used BRATS 2015 MRI dataset to evaluate our proposed model. Furthermore, we have used SimpleITK open-source library in our proposed model to analyze images. Moreover, we have extracted random 2D patches for proposed 2D-CNN model for efficient brain segmentation. Extracting 2D patched instead of 3D due to less dimensional information present in 2D which helps us in reducing computational time. Dice Similarity Coefficient (DSC) is used as performance measure for the evaluation of the proposed method. Our method achieved DSC score of 0.77 for complete, 0.76 for core, 0.77 for enhanced tumor regions. However, these results are comparable with methods already implemented 2D CNN architecture.

Keywords : brain tumor segmentation, convolutional neural networks, deep learning, LGG

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