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(57) Abstract :

Automated segmentation of brain tumor from multi-modal MRI images is pivotal for the analysis and monitoring of disease progression. As gliomas are malignant and heterogeneous, efficient and accurate segmentation techniques are used for the successful delineation of tumor’s into intro-tumoral classes. Deep learning algorithms outperform on tasks of semantic segmentation as opposed to the more conventional, context-based computer vision approaches. Extensively used for biomedical image segmentation, Convolutional Neural Networks have significantly improved the state-of-the- art accuracy on the task of brain tumor segmentation. In this invention, we propose an ensemble of two segmentation networks: a 3D CNN and a U-Net, in a significant yet straightforward combinative technique that results in better and accurate predictions. Both models were trained separately on the BraTS-19 challenge dataset and evaluated to yield segmentation maps which considerably differed from each other in terms of segmented tumor sub-regions and were ensembled variably to achieve the final prediction. The suggested ensemble achieved dice scores of 0.750, 0.906 and 0.846 for enhancing tumor, whole tumor, and tumor core, respectively, on the validation set, performing favorably in comparison to the state-of-the-art architectures currently available.

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