AN AUTOMATIC TUMOUR GROWTH PREDICTION BASED SEGMENTATION USING FULL RESOLUTION CONVOLUTIONAL NETWORK FOR BRAIN TUMOUR

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Segmenting the brain tumour from MRI using a tumour growth model is a developing research field because the intensity feature obtained from first scan point using Lattice Boltzmann Method (LBM) largely improves tumour segmentation result. However, the random selection of LBM parameters reduces the effectiveness of tumour growth model. To overcome that, the Modified Sunflower Optimization (MSFO) algorithm is hybrid along with LBM which optimally selects the parameters that maximize the performance of tumour growth model. Along with these intensity features, the texture features (fractal and multi-fractal Brownian motion (mBm)) are extracted. Before going for feature extraction, the data needs to be pre-processed. Therefore, a scalable range based adaptive bilateral filter (SCRAB) is used at the pre-processing step which removes the noise from the data and improves the edges. Finally, the extracted features are combined and provided as an input to fully resolution convolutional network (FrCN) for segmentation. The performance of the proposed approach is analysed using different metrics viz. accuracy, precision, recall, sensitivity, specificity, and F1-score. Further, the error attained by proposed method is also evaluated using mean absolute percentage error (MAPE), and Root mean square error (RMSE). Three benchmark BRATS dataset such as BRATS 2020, BRATS 2019, and BRATS 2018 are used in this work for performance analysis. The resultant values are compared with the performance of existing methods. The overall accuracy attained by proposed approach for three different datasets are 97% (2020), 95.56% (2019) and 95.23% (2018) respectively.