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Title:Brain Tumor Identification by Hybrid CNN-SWT Model

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Abstract: Objective: Detecting brain tumor using the segmentation technique is a big challenge for researchers and takes a long time in medical image processing. Magnetic resonance image analysis techniques facilitate the accurate detection of tissues and abnormal tumors in the brain. The size of a brain tumor can vary with the individual and the specifics of the tumor. Radiologists face great difficulty in diagnosing and classifying brain tumors.

Method: This paper proposed a hybrid model-based convolutional neural network with a stationary wavelet trans-form named “CNN-SWT” to segment brain tumors using MR brain big data. We utilized 7 layers for classification in the proposed model that include 3 convolutional and 3 ReLU. Firstly, the input MR image is divided into multiple patches, and then the central pixel value of each patch is provided to the CNN-SWT. Secondly, the pre-processing stage is per-formed using the mean filter to remove the noise. Then the convolution neural network-layer approach is utilized to segment brain tumors. After segmentation, robust feature extraction such as information-extraction methods is used for the feature extraction process. Finally, a CNN-based hybrid scheme based on the stationary wavelet transform technique is used to detect tumors using MR brain images.

Materials: These experiments were obtained using 11500 MR brain images data from the hospital national of oncology.

Results: It was proved that the proposed hybrid achieved a high classification accuracy of (98.7 %) as compared with existing methods.

Conclusion: The advantage of the hybrid novelty of the model and the ability to detect the tumor area achieved excellent overall performance using different values.

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