

Automatic Brain Tumor Detection Using Feature Selection and Machine Learning from MRI Images



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Abstract A brain tumor is a group of defective cells in the brain. It happens when a cell in the brain develops a dysfunctional structure. Nowadays it becoming a crucial factor of death for a large number of people. Among all the varieties of tumors, the seriousness of a brain tumor is high. Therefore, instant detection and proper care to be done to save a life from brain tumors. Microscopic examination can separate the tumor cells from healthy cells. They are typically less well separated than normal cells. In modern imaging technology, the detection and classification of brain tumors is a primary concern. For a clinical supervisor or radiologist, it is time-consuming and frustrating work. The accuracy of recognition and classification of tumors executed by radiologists or clinical experts is depended on their experience only. Therefore, accurate identification and classification of brain tumors can be determined by image processing techniques. This research suggests a machine learning module to detect brain tumors using magnetic resonance imaging (MRI) of brain tumors. The method consists of pre-processing of nearly raw raster data (NRRD) of the MRI images, feature extraction, feature selection, and the classification learner to evaluate and construct the final model. The classification learner is designed with a support vector machine (SVM) classifier. The classification method performs well with weighted sensitivity, specificity, precision, and accuracy of 98.81%, 98.88%, 98.82%, and 98.81% respectively. The findings may infer a remarkable step for detecting the presence of tumors in neuro-medicine diagnosis.

Keywords Brain tumors · Magnetic resonance imaging · Feature extraction · Feature selection · Classification

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