Brain Tumor Detection and Classification using Deep Learning

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Abstract: *Machine Learning (ML) models are being built for the diagnosis of different medical conditions in people. A brain tumor is one of those medical conditions. Different ML models have been built and lots are being built with improved algorithms. The purpose of these models is to reduce the need for humans as identifiers of brain tumors. Lots of Magnetic Resonance Imaging (MRI) images are produced in medical organizations. These images are then observed by medical professionals. The proposed ML model will scan these images and will provide results in a very short amount of time. This reduces many human errors and reduces the required diagnosis time. Many different models are proposed for its diagnoses like Gray-Level Co-occurrence Matrix (GLCM), Bag-of-Words (BoW), Fisher Vector, basic Convolutional Neural Network (CNN) model, watershed & thresholding segmentation, and shape features extraction. CNN models with their deep convolutional layers can be used for feature extraction. However, CNN model requires a large dataset and time to give good accuracy. The use of transfer learning models like VGG-16 can overcome the shortcomings of the basic CNN models. The proposed system uses a fine-tuned VGG-16 model for feature extraction and a softmax layer for the classification of brain tumors.*

Keywords: Bag-of-Words (Bow), Back Propagation Neural Network (BPNN), Computer-Aided Diagrams (CAD), Convolutional Neural Network (CNN), Continuous Wavelet Transformation (CWT), Decentralized Application (DAPP), Deep Learning (DL), Decision Trees (DT), Discrete Wavelet Transformation (DWT), Gray-Level Co-occurrence Matrix (GLCM), Graphics Processing Unit (GPU), Kernels Extreme Learning Machines (KELM), Machine Learning (ML), Magnetic Resonance Imaging (MRI), Multilayer Perceptron (MLP), Probabilistic Neural Network (PNN), Radial Basis Function (RBF), Rectified Linear Unit (ReLU), Support Vector Machine (SVM), Visual Geometry Group (VGG)

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