**Brain Tumor Identification and Classification of MRI images using Deep learning techniques**

**Alternate Title:** A Survey on Detection and Classification of Brain Tumor from MRI Brain Images

**Aim:**

To detect and identify the Brain Tumor using Deep-Learning techniques

**Abstract:**

 Brain is the controlling unit of human body. It regulates the functions such as memory, vision, hearing, knowledge, personality, problem solving etc. The main reason for brain tumors is the uncontrolled development of brain cells. In medical practices, the early detection and recognition of brain tumors accurately is very vital. In literature, there are many techniques has been proposed by different researchers for the accurate segmentation of brain tumor. Magnetic resonance imaging (MRI) is high-quality medical imaging, particularly for brain imaging. MRI inside the human body is helpful to see the level of detail. The MRI is used even in diagnosis of most severe disease of medical science like brain tumors. The brain tumor detection process consist of image processing techniques involves four stages. Image pre-processing, image segmentation, feature extraction, and finally classification.

**Existing System:**

There are several existing of techniques are available for brain tumor segmentation and classification to detect the brain tumor. There are many techniques available presents a study of existing techniques for brain tumor detection and their advantages and limitations. To overcome these limitations, propose a Convolution Neural Network (CNN) based classifier. CNN based classifier does the comparison between trained and test data, from this to get the simplest result.

**Proposed System**

The diagnosis of tumors at the early stages is very important. Our proposed methodology is based on Deep Neural Network Model which trains on the Dataset and detects the image with a tumor and in such image the tumor gets segmented. Then we are using flask web framework to detect a tumor.

**Module Description:**

* Dataset collection
* Convolutional neural network
* Tumor Detection

**Dataset Collection:**

The dataset used in this paper is the MRI (Magnetic Resonance Imaging) scans of different patients which are read in the form of JPEG format. This dataset consists of a mixture of Tumorous and non-Tumorous images of brain.

**Convolutional Neural Network:**

Any neural network is divided into three layers. First layer being the input layer, the second as the hidden layer and the third layer is the output layer. The nodes of one layer are connected to the nodes of another layer by means of an edge. And this edge is assigned with a weight which signifies the importance of that node in the outcome of the network. At every node, the outcome is calculated by the summation of the product of the input nodes and the weights assigned to them. And then an activation function is assigned to the summation and the outcome of the node is calculated. Activation functions include Relu, Sigmoid, etc. and based on the outcome, the appropriate activation function is chosen. This process is carried on for every node in the network and the final outcome is assigned.

When we are dealing with images, the data is generally huge and if it is fed as it is, the model becomes clumsy and the training will take a lot of time as well as the memory requirements will be huge. So, we will make use of a Convolutional neural network. The pre-processed data is fed into the input layer of the Convolutional neural network. At the time of reading the pre-processed data, a filter is applied which helps in decreasing the dimensions of the input data.

We can further decrease the data by applying max-pooling or min-pooling. From here onwards, we will be carrying out the same process as we did for neural networks and this process is known as feed-forward propagation. We will calculate the error between the predicted outcome and the expected outcome. We then update the weights accordingly to get the desired result. And this process is known as backward-error propagation.

**Tumor Detection:**

Once user login to the Web-application, User should give an image as the input. If the model predicts that the given image tumor or not.

**Software Requirements:**

* Operating System : Windows 10 (64 bit)
* Software : Python
* Tools : Anaconda (Jupyter Note Book IDE)

**Hardware Requirements:**

* Hard Disk : 500GB and Above
* RAM : 4GB and Above
* Processor : I3 and Above

**Architecture Diagram**:

User

Web interface

 MRI Images

Image Pre-processing

Convolutional Neural Network

Tumor

Detection

Tumor

Non - Tumor

Data Acquisition