



# A REVIEW BRAIN TUMOR DETECTION USING DATA MINING TECHNIQUES

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## **ABSTRACT**

*Data mining is a powerful method for mining useful patterns or data from image and textual data sets. Medical data mining is very important field as it has significant utility in healthcare domain in the real world. Clustering and Classification are the popular data mining methods used to understand the different features of the health data set. This paper is focused on understanding different techniques for the detection of brain tumor which is an essential decision making feature and is a part of healthcare application. Brain tumor is a life threatening disease which produces problems like brain damage, loss of memory etc. There exist various data mining techniques for early assessment of brain tumor from scanned brain images. The main idea of this review paper is to present an overview about brain tumor detection system and various data mining methods used in this system.*

**Keywords:***Brain tumor, Classification, Clustering, Data mining, Scanned brain images.*

## **1.INTRODUCTION**

Brain is a lively organ in human body. The cluster of abnormal cells in brain is known as brain tumor. It can be cancerous or non-cancerous and found in any person at almost any age. Brain tumor is very dangerous disease and it occurs in any size at any location in the brain. It causes pressure inside the skull to enlarge. There exist various kinds of brain tumor like, primary brain tumor and secondary brain tumor. Primary tumors are originated from the brain cells and it doesn't spread from one part to another. But the secondary tumors cause brain cancer and it starts in one part of the body and spread to the brain.

The treatment of brain tumor is based on size of the tumor, location of the tumor and the type of the tumor. Healthcare industry need to give more attention in addressing dangerous brain tumor diseases. For better decision making health care industry started using data mining techniques to identify the presence of such sort of diseases. Here we studied different methodologies used in brain tumor detection system with scanned brain images include, CT images and MRI images. All the existing systems contains pre-processing phase, where input images are pre-processed and are used for further processing.

There exist various segmentation, clustering and classification methods for the detection of brain tumor. All these methods include image datasets for processing. Here we discuss about few existing methods used for the

detection of brain tumor. This paper is outlined as follows: first section describes about brain tumor disease and its problems. Second section describes about brain tumor detection system and third section reviews various methods used in brain tumor detection system. Finally, the conclusion with future scope.

## II. BRAIN TUMOR DETECTION SYSTEM

Brain tumor detection system is one of the health care applications and it is essential for early stage detection of tumor. It is a software based application and it is used for better decision making in health care industry. Brain tumor detection system will make an early diagnosis of the disease based on several methods like data mining, machine learning etc. Most of the existing system consists of training part and testing part for detecting the disease. And it uses scanned brain MRI images as input data and train data. The system may consist of pre-processing stage and diagnosis stage. In pre-processing stage the training and testing MRI images are subjected to various image processing techniques for enhancing their quality. After that this enhanced images are subjected to feature extraction and diagnosis. The diagnosis part is done based on the extracted feature. Such system provides powerful decision making and doctors can use it as a second opinion to detect the disease.

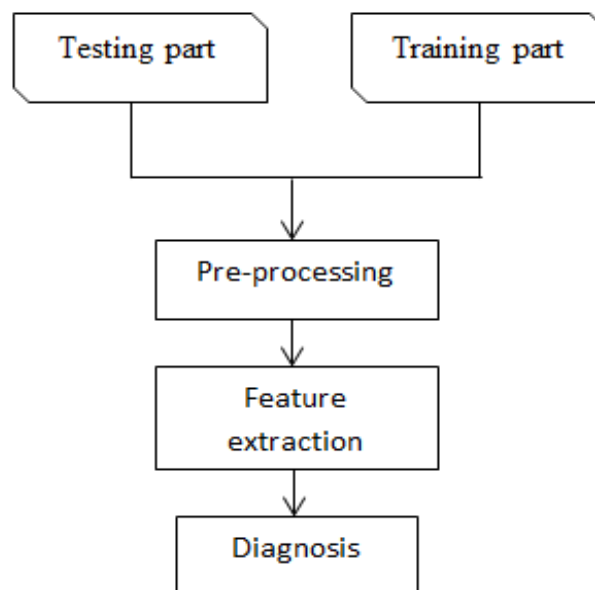


Fig.1 Common Design of Brain Tumor Detection System

### III. LITERATURE SURVEY

Data mining is a best technique in many fields and it has a great potential to help healthcare industries to focus on the detection of dangerous diseases.

#### 3.1 Classification approach.

Classification is a classic data mining technique based on machine learning. The classification process is used to classify each item in a set of data into one of predefined set of groups or classes. Classification methods are based on mathematical techniques such as statistics and linear programming etc. In classification, new data items are classified in to various groups. K Nearest neighbour (KNN), Artificial Neural Network (ANN), Decision tree etc. are some classification algorithms in data mining.

In [1] they propose a decision tree approach for the detection of brain tumor. They use brain MRI image dataset for classification. The system consists of both training and testing part. Each part consists of brain MRI images. Here both train and test images are subjected to pre-processing, segmentation and feature extraction. Extracted features are classified into normal and abnormal category by constructing a decision tree classifier. Here ID3 is used as the decision tree. The tree contains internal nodes to represent attributes and leaf nodes to represent desired category of input data. They use MATLAB tool for processing and building the decision tree and they find the presence of brain tumor in early stage.

In [2] the authors will uses another technique for the classification of brain MRI images in to normal and abnormal category. This paper presents a hybrid technique for the detection of brain tumor. This system consists of three stages namely, feature extraction, dimensionality reduction, and classification. In the first stage features are extracted using a mathematical tool, Discrete Wavelet Transform (DWT). In second stage the obtained features from MRI images are reduced using Principal Component Analysis (PCA). In the classification stage, they use two classifier like KNN and feed forward back propagation artificial neural network (FP-ANN). In k-nearest neighbour algorithm  $k$  is a user defined constant and the algorithm is used for classification and regression. Here KNN obtains 98% and FP-ANN obtains 97% respectively.

#### 3.2 Clustering approach.

Clustering is the process of grouping identical data in to same group.

In [3] authors propose a segmentation method for the detection of brain tumor. Here the input image is partitioned in to several small regions and it is done by using K-MEANS clustering algorithm. It is a unsupervised learning algorithms that solve the well-known clustering problem. By using clustering approach one can classify a given data set in to several clusters (assume  $k$  clusters). They use MRI image data as input and these images are subjected to pre-processing and segmentation. Noise present in input images is removed by median filter and this noise free MRI images are then used for segmentation.

In [4] they propose another clustering technique for brain MRI segmentation to find the presence of tumor in the brain. They used a hybrid clustering method for segmentation which integrates the benefits of K-MEANS clustering and Fuzzy C-Means in the aspects of least computation cost and accuracy. Then these images are

subjected to two further segmentation by level set segmentation and threshold segmentation. This proposed algorithm provides improved accuracy in various datasets.

#### IV. CONCLUSION AND FUTURE SCOPE

This paper is focused on understanding various methods for brain tumor detection which is an essential decision making feature and is a part of healthcare application. There exist many data mining methods for early stage detection of brain tumor from scanned brain images like MRI. These methods are used for classification or clustering of input MRI images. Here we compare different data mining methods based on their performance and the identified drawback is less accuracy. As future work we can improve performance of brain tumor detection system with another classification method and also we can improve the detection system by finding the growth stage, type and location of the tumor in the brain.

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