Tumor Detection From Brain MRI Image Using Neural Network Approach: A Review

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Abstract – *In recent years the number of cancer patients have been increased tremendously. In medical field the digital image processing plays an important role in diagnosis and analysis of internal dysfunction. Specifically in tumor detection the image segmentation, clustering and feature extraction are main processes to get done with the proper diagnosis. Now-a-days for the automated brain tumor detection the probabilistic neural network have been used on large scale. MRI images are the key components in tumor detection as it allows the cross sectional view of the body. In this paper the tumor detection from brain MRI images using neural network have been proposed.*

Key Words: **Digital image processing, tumor detection, segmentation, clustering, neural network.**

1.INTRODUCTION

A tumor can be defined as the group of unwanted tissue which has an unregulated growth pattern. Certainly all tumors are not harmful unless and until it distress the other group of tissues to work less efficiently. Basically, the tumors found in human body can be classified as the:

1. Cancerous,

2. Non-cancerous. But transition process of a specific tumor is: Non-cancerous – Precancerous – Cancerous.

The non-cancerous stage tumor termed as the Benign tumor which is almost harmless and if diagnosed early can be removed without any risk. Next to benign there is precancerous stage and the associated tumor called as the pre-malignant, which is also recoverable with the proper diagnosis and the perfect removal operation. The final state is the cancerous one and the tumor is stated as the Malignant tumor.

The tumor classification is according to the WHO(World Health Organization), where cell origin and the cell behavior are the key parameters.

Basically brain comprised of the enormous number of cells, it possess the most complex architecture compared to other body parts. As brain controls the whole body specific group of tissue associated with the controlling action of specific body part. Hence the symptoms of brain tumor varies accordingly

the performing action some general symptoms are: nausea, vomiting, loss in sensation, headache, seizures, etc.

Presently the treatments available for brain tumor are:

1. Surgery - removal of defective cells/tissues.

2. Radio therapy - Killing tumor cells using beta/gamma rays

3. Chemotherapy – Controlling blood flow to the tumor using medication.

MRI – Magnetic Resonance Imaging is preferred the most. As MRI is mostly used for the diagnosis of soft tissues present within the body. Also MRI is useful in analysis of trauma, stroke, bipolar disorder, etc.

In Magnetic Resonance Imaging the images are classified as T1, T2 and FLAIR i.e. Fluid Attenuated Inversion Recovery. For diagnosis the normal images captured using the MRI comprised of three regions as follows:

1. Cerebrospinal fluid (CSF)

2. Gray matter (GM)

3. White matter (WM)

In MRI techniques there are several methods listed as:

1. Neural networks

2. Support vector machine (SVM)

3. Finite Gaussian mixture model

4. Fuzzy C-means (FCM)

5. Knowledge based methods

6. Atlas based method

In the tumor detection using MRI captured images, segmentation plays a vital role. As segmentation can be defined as the process of identifying specific pattern in given region.

A general approach of dealing with the method of segmentation can be elaborated with the following flowchart:
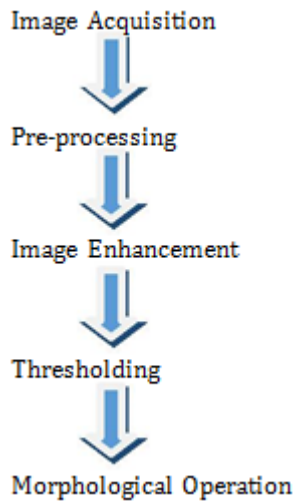
Figure1 : Steps for brain tumor detection

2. METHODOLOGY

In this paper the method for brain tumor detection have been proposed. Using the enlisted steps i.e. image acquisition, pre-processing, image enhancement, thresholding and morphological operations typical block diagram have been proposed. To process the captured image using various filters and to display output to verify or to diagnose MATLAB is used. Also the neural network included in the proposed system.

Figure 2 Pre-Processing

Figure 3 ANN Technique

3. CONCLUSIONS:

In this paper, we have proposed the tumor detection system specifically for brain which captured using the MRI scan technique along with the neural network approach. Different techniques and methods of ANN provide ease and facility for the detection, classification, segmentation and visualization of brain tumors.

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