Study of different algorithm to find brain tumor

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Abstract – Papers in the literature solves problems of the doctors to find the detection of brain tumor from Magnetic resonance imaging (MRI) and along with that its very difficult task to the doctors. Because brain tumor is an abnormal growth caused by cells reproducing themselves in an uncontrolled manner. In MRI image amount of data is to large as compared with CT scan etc.so this paper gives easy direction to the doctors to find Brain tumors from MRI with the help of MATLAB software. IN this we use C means and Hierarchical algorithm for diagnosis of tumor.

I. INTRODUCTION

MRI has a wide range of applications in medical diagnosis and over 25,000 scanners are estimated to be in use worldwide. MRI has an impact on diagnosis and treatment in many specialties although the effect on improved health outcomes is uncertain. Primary brain cancer develops from cells within the brain. Part of the central nervous system (CNS), the brain is the control center for vital functions of the body, including speech, movement, thoughts, feelings, memory, vision, hearing and more.[10]

Brain tumor's location and quickly spreading make a critical problem in treatment of tumor [5]. Thus, image segmentation and detection are vital method to solve the medical problem of the various diseases. Imaging of the brain tumor can be done by computer tomography (CT) scan, magnetic resonance image (MRI) scan, Ultrasound, etc. In this research, MRI scan is used to implement the system [2].

Brain tumor can be benign or malignant, benign being non-cancerous and malignant are cancerous. Magnetic resonance imaging scan of the head is a imaging test that uses powerful magnets and radio waves to create pictures of the brain and surrounding nerve tissues. An MRI uses magnetic fields, not x-rays, to produce detailed images of the body. MRI can also be used to measure the tumor's size. A special dye called a contrast medium is given before the scan to create a clearer picture. This dye can be injected into a patient's vein or given as a pill to swallow. MRIs create more detailed pictures than CT scans (see below) and are the preferred way to diagnose a brain tumor. The MRI may be of the brain, spinal cord, or both, depending on the type of tumor suspected and the likelihood that it will spread in the CNS. There are different types of MRI, and the results of a neuro-examination, done by the internist or neurologist, helps determine which type of MRI to use.

The pre-processing stages needs to be done on the image initially, followed by clustering algorithms and towards the fag end thresholding be done for the extraction of the tumor which is the region of interest (ROI) from the entire image [3].

Segmentation Based on Soft Computing. Several methods in medical image processing and requirements and properties of techniques in brain tumor detection are discussed

II. PROPOSED WORK

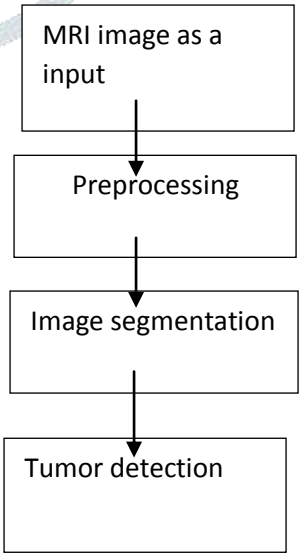
A .Study Two different algorithm used for detection of brain tumor using MATLAB.

B. Performance analysis of various algorithms w.r.t. computational complexity, the optimal cluster number, reliability, execution time & efficiency.

C. Implementation of two algorithm on MRI image

D .Study on Result of the detected tumor.

III. METHODOLOGY



Two algorithm we can apply

A .C-means algorithm

B. Hierarchical algorithm

A .C-means algorithm

The Fuzzy C-Means algorithm (often abbreviated to FCM) is an iterative algorithm [1] that finds clusters in data and which uses the concept of fuzzy membership. Instead of assigning a pixel to a single cluster, each pixel will have different membership values on each cluster. The Fuzzy C- Means [2] attempts to find clusters in the data by minimizing an objective function

B. Hierarchical algorithm

A Hierarchical clustering method works by grouping data objects into a tree of clusters. There are two types of clustering 1.Agglomerative 2.Divisive. Agglomerative clustering differs in the similarity measures which employ single link, complete link, group average, centroid similarity. Hierarchical clustering doesn't require specifying the number of clusters. It is deterministic. In agglomerative clustering each element is treated as a singleton cluster and then merged (agglomerated) until all merge in a single cluster, which results in dendograms formation. Dendograms are horizontal lines which when cut at a point you get a specific part or element and explains how clustering helps forming an image.

A Hierarchical clustering [5] method works by grouping data objects into a tree of clusters. This follows top down strategy. This algorithm starts with all objects in one cluster. It subdivides the cluster into smaller and smaller pieces until each object forms a cluster on its own or until it satisfies certain termination conditions such as desired number of clusters is obtained. This is called Divisive Hierarchical clustering. Algorithm: Divisive Hierarchical Clustering Step

1: The whole image is in one cluster

. Step 2: Find the most dissimilar point in the image and divide the image into two clusters.

Step 3: Repeat step2 for each cluster.

Step 4: A tree like structure is formed. Repeat step 2 until level 4 is reached. Level 4 has 8 clusters.

IV. RESULTS

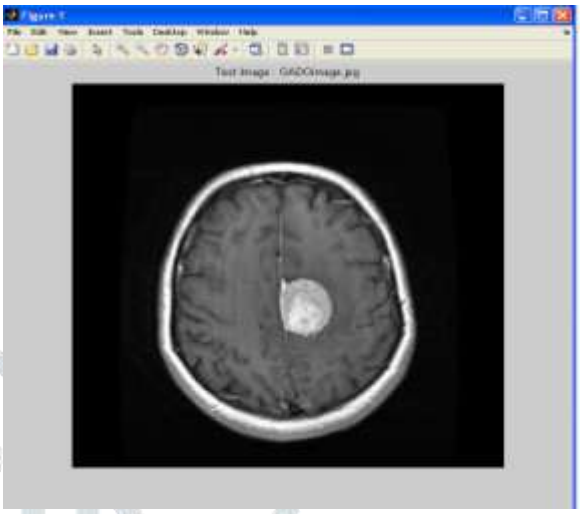


Fig a. shows original MRI image

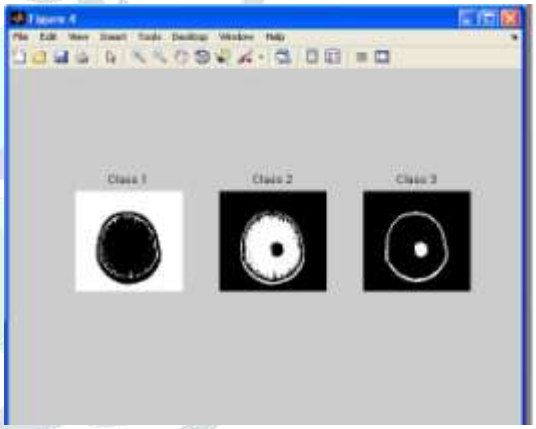


Fig b. After applying C means Algorithm

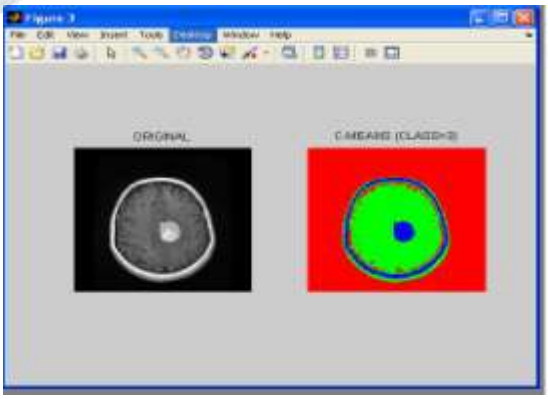


Fig c. final brain tumor detected image

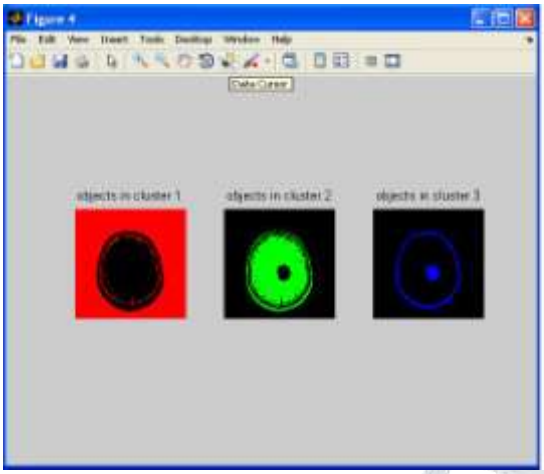


Fig d. After applying Hierarchical algorithm on original image

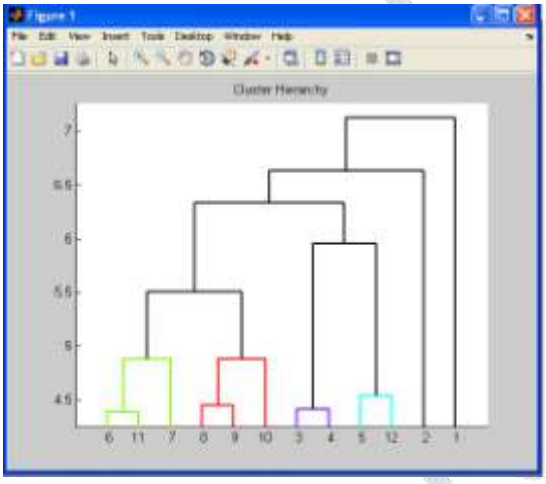


Fig e .graphical representation by Hierarchical algorithm

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