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A SURVEY ON DETECTION AND CLASSIFICATION OF BRAIN TUMOR USING MACHINE LEARNING ALGORITHM

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Abstract:- This work deals with the implementation of the Basic Tumor Range and Shape Detection Algorithm in brain MR images and identifies the tumor stage from the tumor region. In every part of the body, a tumor is an uncontrolled growth of tissues. There are various types of tumors and they have different characteristics and different therapies. As is understood, because of its presence in the small space of the intracranial cavity, the brain tumor is inherently extreme and life-threatening (space formed inside the skull). Most studies in developing countries indicates that due to inaccurate diagnosis, the majority of people who have brain tumors have died. Generally, a full brain image is created by a CT scan or MRI that is guided into the intracranial cavity. Some general risk factors and symptoms were found after researching a lot of statistical analysis focused on certain individuals affected by brain tumor. The advancement of technology in day-night science aims to establish new treatment methods. The doctor will visually examine this image for brain tumor identification and diagnosis. However, this specific technique determines the precision of the tumor stage & size and distinguishes the tumor stage from the tumor region. This study uses brain tumor segmentation based on algorithms based on k-means and fuzzy c-means. This technique enables tumor tissue segmentation with precision and reproducibility comparable to manual segmentation. In addition, the time for diagnosis is also decreased and the tumor stage of the given tumor region is established. Finally, implement a method using java to define a tumor stage that is simpler, cost-reducible, and time-saving.

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I INTRODUCTION

This work deals with the idea of segmentation of the brain tumor and finally the identification of brain tumor and tumor level. The anatomy of the brain can usually be viewed by an MRI or CT scan. The scanned MRI image for the whole process is taken in this article. The MRI scan is more relaxed than a diagnostic CT scan. The human body is not affected. Since it uses no

radiation. It is based on radio waves and a magnetic field. For brain tumor detection, there are various types of algorithms that have been developed. Although they may have some detection and extraction disadvantages.

For segmentation, two algorithms are used in this work. K-means algorithm clustering and Fuzzy C means algorithm clustering. So, for tumor segmentation, it provides the exact result. The tumour is caused by excessive tissue growth in every part of the body. The tumor can be secondary or primary. If it is a source, then it is considered primary. If the portion of the tumor is distributed to another location and established as its own, it is called secondary. The brain tumor usually affects CSFF (Cerebral Spinal Fluid). It induces strokes. Rather than treating the tumor, the doctor provides care for the strokes. So, for that treatment, tumor detection is critical. If it is diagnosed at the current level, the lifespan of the person who is affected by the brain tumor would increase. That will increase the life expectancy by 1 to 2 years or so. Tumor cells usually consist of two forms. Mass and Malignant, they are. Malignant tumor identification is very difficult to classify as a mass tumor. With the aid of Brain MRI images, we focused on the identification of brain tumor in this paper and identified the tumor stage from the given tumor region. Brain tumor care depends on the form and stage of the tumor, the tumor's size and location, and your overall health and medical history. In certain circumstances, the purpose of treatment is to completely eliminate or kill the tumor. Many brain tumors, if detected and treated early, may be cured.

An person who has been affected by some kind of tumor has an increased chance of developing some other kind of brain tumor. A person with two or more close relatives (mother, father, sister, brother, or child) who is responsible for the development of a brain tumor has a risk factor for his or her own brain tumor. In rare cases, family members may have a hereditary disease that makes the brain more vulnerable and raises the risk of brain cancer. Inherited (genetic) causes or disorders can be associated with around 5 percent of brain tumors.

Day by day, due to unconsciousness, the number of brain tumor individuals is increasingly growing. The purpose of this research is to acquire such a tool that can tell people about his or her estimated brain tumor status, whether or not he or she is at risk and how much?

The detection framework being developed is Java. Finally, we have systems that detect the tumor and its form and define the stage of the tumor from the tumor region in question.

II PROBLEM STATEMENT

The healthcare industry varies entirely from other sectors. It is a high priority sector and people, regardless of cost, demand the highest quality of care and services. It also offers exciting solutions with good accuracy for medical imaging after the success of deep learning in other real-world applications, and is a key tool for future health sector applications. The brain is an organ that governs the functions of all body parts. Automated brain tumor identification is a challenging task in magnetic resonance imaging (MRI) due to the difficulty of size and position variability. In this study, algorithms are suggested to process the images obtained by MRI for Tumor Detection from Brain MRI Images by using K-means and Fuzzy-C. The results provided by this method would increase accuracy and decrease the number of iterations.

III PROPOSED WORK

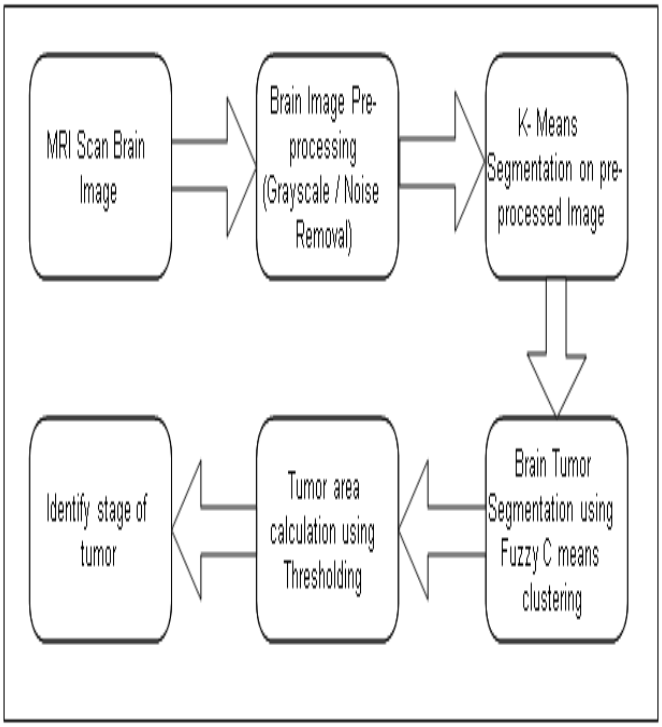
There are mainly four modules in the suggested system: pre-processing, segmentation, extraction of features, approximate reasoning and classification. Pre-processing is accomplished by filtering. Segmentation is carried out by algorithms with advanced K-means and Fuzzy C-means. The extraction of features is by

thresholding and, ultimately, approximate reasoning to recognize the tumor region and location in the MRI image and to classify the tumor stage from the brain tumor result area. I.e. actually introducing a tumor phase recognition method that is simpler, cost-reducible and time-savable. A combination of two algorithms is the suggested methodology.

IV LITERATURE REVIEW

SN.	Author and Title	Proposed System
1	Samir Kumar Bandhyopadhyay, Tuhin Utsab Paul , **"Automatic Segmentation of Brain Tumor from Multiple Images of Brain MRI"**	This paper has proposed a system of image registration and data fusion theory adapted for the segmentation of MR images. This system provides an efficient and fast way for diagnosis of the brain tumor called K-means algorithm.
2	A. Meena, K. Raja, **" Spatial Fuzzy C-Means PET Image Segmentation of Neurodegenerative Disorder"**	Meena and Raja proposed an approach of Spatial Fuzzy C means (PET-SFCM) clustering algorithm on Positron Emission Tomography (PET) scan image datasets.
3	Suman Tatiraju, Avi Mehta**, " Image Segmentation using k-means clustering, EM and Normalized Cuts"**	In this project, we look at three algorithms namely K Means clustering, Expectation Maximization and the Normalized cuts and compare them for image segmentation
4	Ajala Funmilola, **" Fuzzy k-c-means Clustering Algorithm for Medical Image Segmentation"**	Funmilola et al proposed the Fuzzy K-means method, which carries more of Fuzzy C-means properties than that of K-means.
5	Beshiba Wilson, Julia Punitha Malar Dhas, **" An Experimental Analysis of Fuzzy C-Means and K-Means Segmentation Algorithm for Iron Detection in Brain SWI using Matlab"**	Wilson and Dhas used K-means and Fuzzy C-means respectively to detect the iron in brain using SWI technique.

System Architecture:



Hardware Requirements:

The minimum configuration required on server platform

- 2.4 GHZ, 1.5 GB HDD for installation.
- 512 MB Main Memory
- 60 GB or more Space on Hard disk.
- USB Drive Connectivity
- Wi-Fi Connectivity/Internet Access

Software Requirements:

Operating system : - Windows Professional.

Programming Language : - Java.

Tool Used : - Eclipse 6.5 or more.

Software : - JDK, MySQL

V EXPLANATION:

The pre-processing phase converts the image, depending on the need for the next stage. This filters noise and other objects in the image and sharpens the edges of the image. There is also RGB to grey conversion and reshaping here. It contains a median noise-removal filter. There are far less possibilities for noise in modern MRI scans. It can happen because of the thermal effect. The main purpose of this paper is the identification and segmentation of tumor cells. But it requires the noise reduction process for the full device

.Using K-means segmentation

Steps:-Steps:

1. Enter the importance of cluster no as k.
2. Selecting the k cluster centers at random
3. Calculate the cluster average or core
4. Calculate each pixel's distance b/w to each cluster core
5. Move to that cluster if the distance is close to the middle.
6. If not, switch to the next cluster.
7. Center re-estimate.
8. Until the center does not move, repeat the operation.

Segmentation using Fuzzy C means

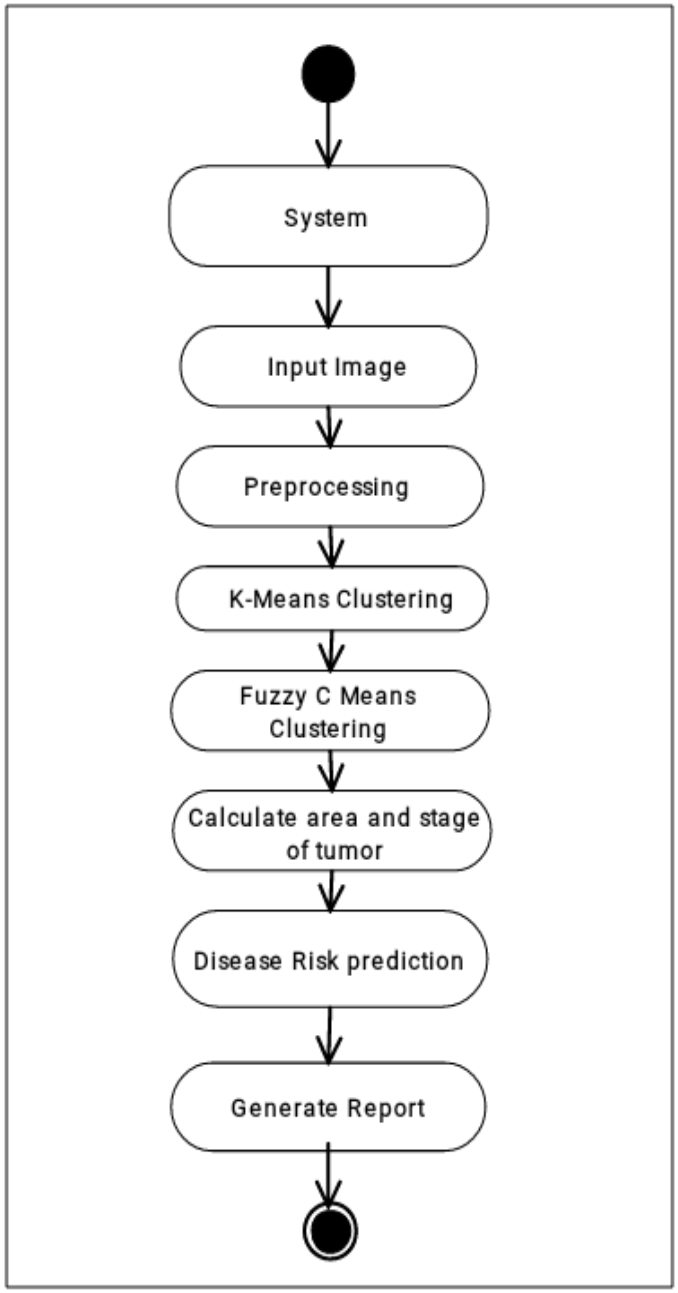
By giving the partial membership value to each pixel in the image, the fuzzy logic is a way to process the data.

The membership value of a fuzzy set varies between 0 and 1.

Basically, Fuzzy clustering is a multi-valued logic that allows for intermediate values, i.e. member of one fuzzy set in the same picture may also be member of other fuzzy sets. The transition between full membership and non-membership is not abrupt.

The membership feature determines the fuzziness of an image and the information contained in the image is also defined.

System Diagram



VI CONCLUSION

There are various kinds of tumors available. They can be over the brain as mass in the brain or malignant. If it is a mass, assume that K- implies that the algorithm is sufficient to remove it from the brain cells. It is removed before the K-means phase if there is any noise present in the MR picture. The noise-free image is given as an input to the k-means, and the MRI image extracts the tumor. And then segmentation using Fuzzy C means accurate extraction of malignant tumor tumor form and output thresholding in function extraction. Finally, an estimated reasoning step for determining the tumor area and location calculation and finally identifying the tumor stage from the resulting tumor area, i.e. identifying a tumor stage that is simpler, cost-reducible and time-saving.

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