A Survey on Brain Tumor Detection Using MRI Scan And Image Segmentation Technique

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Abstract- *The paper presents a formal review on evolution of the image processing techniques for tumor detection. A lump is caused when brain cells divide and grow in a uncontrolled way which is known as brain tumor. According to the type and size the brain tumor is classified. World Health Organization (WHO) classified 120 types of brain tumor. This classification is based on behavior of the cell. The primary goal of medical imaging is to extract meaningful and accurate information from these images with the least error possible. According to IARC (International Agency for Research on Cancer), nearly 126000 people faces brain tumor problem per year around the world we are doing research on the brain tumor detection and segmentation to solve this problem. Several types of medical imaging processes available to us MRI is the most reliable and safe.*

Keywords- MRI, Segmentation, Brain Tumor.

I. INTRODUCTION

A brain is the most complex and important part of human body. Without brain nothing can function. Certain diseases of brain can make drastic changes in human body and completely turn their life upside down. One such disease is Brain tumor. This disease can happen to anyone. . Headache, weakness, numbness, vomiting or seizures are the some common sign of brain tumor. Indication of brain tumors are affect by slice of the brain is implicated and the utility system it impacts. For illustration, delusion issue may result from a tumor hither the sighted nerve. A tumor ahead of the brain may influence the capability to bring to bear and think.
Brain tumors are mainly classified in to two Benign and Malignant.

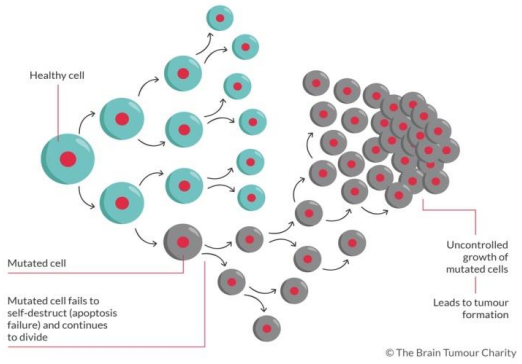
Benign tumors are noncancerous

- Growing slow
- Relatively contained with well-defined edges
- Unlikely to spread to other parts of the brain
- Have less chance returning (if they can be completely removed)

Malignant tumors are cancerous

- Growing fast
- Can be referred to as 'malignant' or 'cancerous' growths
- More likely to spread to other parts of the brain may return even if actively processed.

Difference between normal cells and affected cells:



II. RELATED WORK

The location of tumor in brain helps the individual to determine how the brain tumor effects an individual normal functioning. Brain tumor can be diagnosed by taking personal and family medical history and also by physical examination, brain CT/MRI scan, brain angiogram, spinal tap biopsy etc. Histogram equalization, image segmentation, image enhancement, morphological operation, feature selection and extraction and classification techniques are used in Digital Image Processing.

So, proper treatment and diagnosis is required for any type tumors. Image processing is basic step in identifying the tumor that helps in proceeding with further treatments. Digital Image processing is one of the field where we use computer algorithms that helps to perform image processing on digital images. Choosing Digital Image processing over Analog Image processing (in which image processing is the job

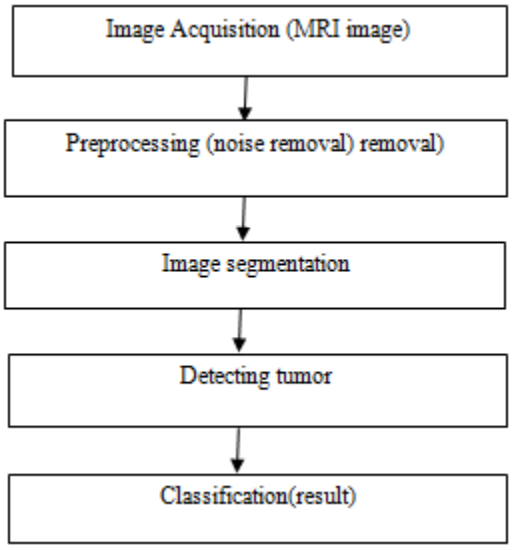
conducted on two dimensional analog signals by analog means) has many advantages.

Compared to analog, Digital image processing provides a wide range algorithms. So, There are more choices in selecting the best suitable algorithm. Digital image processing can avoid buildup of noise and signal distortion. Using digital image processing the images can be modeled to multi-dimensional image which is not possible with analog image processing .This is the main advantage of Digital image processing. Digital Image processing consist of numerous types involved some of them are image Acquisition, Image Enhancement, Image Restoration, Compression, Image segmentation, object recognition and so on.

The most important step is the Image Segmentation as identifying the exact tumor area would ease process of deciding on the further treatment. The main objective is to change the representation of the image into something which is meaningful. Therefore, identification of accurate tumor area has greater importance. In United States an estimation of 23,800 adults will be identified with Benign brain tumors which accounts for 85% to 90% of all Benign CNS tumors. Approximately, 4,300 children younger than age 20 were identified with Benign brain tumors, of 3,000 were under age 15 in 2013.The malignant type of cancers can lead to people's death. Some cancers can be removed but some cannot. So, from past few decades' doctors are trying to treat people with these dangerous cancerous cells.

Brain tumor is most treatable and curable if detected in starting stages of growth of abnormal tissues in brain. We used MATLAB software to detect and extract tumor from MRI scan images of the brain. For this reason algorithm is used which has two stages, first is preprocessing of MRI Image and second is segmentation of given image, After that perform morphological operations on them. Based on the area of the tumor ,the stage of tumor is stated . For this expanse of the tumor can be deducted by computing the number of white pixels in tumor binary image. Brain tumor segmentation is the crucial step amongst the whole of digital image processing. There are many algorithms that is been used to segment the tumor more efficiently and it has been the key curiosity of researcher in recent times realizing the importance in declining the accurate tumor area.

Steps involved in tumor detection:



III. IMAGE SEGMENTATION

In many biomedical-applications the Image segmentation is used. Dividing of digital images into sets of pixels is called segmentation. It focus to represent an image in a much simpler way, to make it easier to examine and much more instructive.

As a result of segmentation set of segments thirty is obtain which extend over whole picture collectively. Each and every pixel within a segment have similar characteristics like color, intensity, texture and label as others. In medical imaging segmentation is of extreme importance to find contour of various anatomical structures.

Types of Segmentation:

- Region approach
- Edge approach
- Boundary approach

IV. MAGNETIC RESONANCE IMAGING (MRI)

MRI differencing trustee is less likely to make disgust effect that may occur when iodine-based subsidy is used for x-rays and CT scans. MRI delivers intensely acquire, elaborated images of soft-tissue stroppy that other imaging technology cannot accomplish. MRI does not implicate radiation.

There are lot of imaging techniques which are useful for the study of brain tumor such as Computed Tomography (CT), MRI (Magnetic Resonance Imaging), Single Photon Emission Computer Tomography (SPECT), Positron Emission Tomography (PET). Now a days CT and MRI techniques are

most popular method .Compare to other technology the variation determination of MRI is extreme.

MRI devices can generate 3D space images. For MR imaging, patient want to placed in strong magnetic field which produce the proton affiliate in parallel or anti parallel aimed with magnetic field. After this the spinning proton are move out of stability affirm by presenting radio constancy pulse. The proton come backs to stability state when we delete or stop radio constancy pulse also it makes sinusoidal signal. This created signal is identified by scanner and final image will be generated.

V. CONCLUSION

In this paper, we reviewed some of recent research work done on brain tumor identification and segmentation. By analyzing literature we determine segmentation method is needed for correct identification of brain tumor detection and segmentation. This paper gives the overview of variant techniques that brain tumor can be detected by several method as preprocessing, enhancement, segmentation and feature extraction and classification. Using MRI we can get unambiguous output.

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