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A REVIEW STUDY ON CYBER SECURITY REQUIREMENT IN POWER GRIDS

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ABSTRACT

Brain Tumor is one of the diseases caused in the human brain. Tumor is an uncontrolled, abnormal growth of cells reproducing themselves. A benign brain tumor consists of benign (harmless) cells and has distinct boundaries. Timely Detection of Brain tumor helps in saving a human life. The exact size and location of tumor is proposed to be detected. We propose an efficient algorithm in this paper for tumor detection. This algorithm is based on segmentation and morphological operators. Image of the brain is taken and Quality of scanned image is enhanced and then morphological operators are applied to detect the tumor in the scanned image.

Keywords: Brain tumor, MRI, MATLAB, Segmentation

I. INTRODUCTION

Image segmentation is the process of dividing a digital image into multiple segments (sets of pixels, also known as super pixels). The goal of segmentation is to simplify and/or change the representation of an image into something that is more meaningful and easier to analyze. Image segmentation is typically used to find objects and boundaries (lines, curves, etc.) in an image. Image segmentation is the process of assigning a label to every pixel in an image such that pixels with the same label share certain visual characteristics.

Segmentation methods in image processing and analysis image segmentation are the process of dividing an image into multiple parts. This is typically used to identify objects, faces, hand gestures or other relevant information in digital images. There are many different ways to perform image segmentation, including:

- Thresholding methods, such as Otsu's method
- Clustering methods, such as K-means and principle components analysis
- Transform methods, such as watershed
- Texture methods, such as texture filters

Image segmentation is the first step in many computer vision methods and serves to simplify the problem by grouping the pixels in the image in logical ways. Here we develop a new approach to deal with the problem of image segmentation in the framework of MATLAB programming environment which integrates threshold, edge extraction and color information and shows good results when applied to some sample images. The result of image segmentation is a set of segments that collectively cover the entire image, or a set of contours extracted from the image.

A. MRI

An MRI, also known as magnetic resonance imaging, is a pain-free non-invasive medical test used to produce two dimensional images of the structures of the body. MRI's are used to detect problems within the body or brain without surgery, and can identify abnormalities from outside the body.

B. Coronal plane and Sagittal view

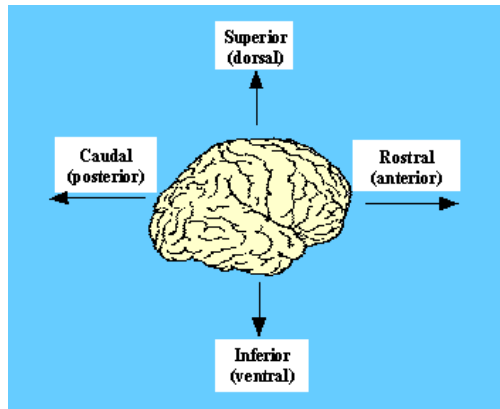


Fig 1: Brain Section

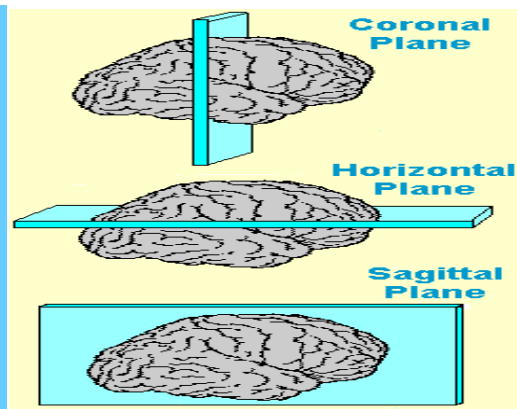


Fig 2: Different views of Brain

Sagittal plane is a vertical plane which passes from ventral (front) to dorsal (rear) dividing the body into right and left halves in figure 1.

- The terms median plane or mid-sagittal plane are sometimes used to describe the sagittal plane running through the midline. This plane cuts the body into halves passing through midline structures such as the navel and spine. It is one of the lines defining the right upper quadrant of the human abdomen.
- A coronal plane (also known as the frontal plane) is any vertical plane that divides the body into ventral and dorsal (belly and back) sections.

The figure shows the coronal plane, horizontal plane and sagittal plane. The coronal plane is also known as the frontal plane. The sagittal plane divides the right hand side and left hand side of the brain into two parts. The mid sagittal plane would divide the right and left sides of the brain into two equal parts, like cutting down the middle of a baked potato before you put on the toppings.

C. Tumor

The word tumor is a synonym for a word neoplasm which is formed by an abnormal growth of cells Tumor is something totally different from cancer[4].

1) Types of Tumor:

There are three common types of tumor:

1) Benign 2) Pre-Malignant 3) Malignant (cancer can only be malignant). [1]

a) Benign Tumor: A benign tumor is a tumor is the one that does not expand in an abrupt way; it doesn't affect its neighboring healthy tissues and also does not expand to non-adjacent tissues. Moles are the common example of benign tumors.

b) Pre-Malignant Tumor: Premalignant Tumor is a precancerous stage, considered as a disease, if not properly treated it may lead to cancer.

c) Malignant Tumor: Malignancy (mal- = "bad" and -ignis = "fire") is the type of tumor, that grows worse with the passage of time and ultimately results in the death of a person. Malignant is basically a medical term that describes a severe progressing disease.

II. MATERIALS AND METHODS

The algorithm has two stages, first is pre-processing of given MRI image and after that segmentation and then performs morphological operations. Steps of algorithm are as following:-

- 1) Provide MRI image of brain as input.
- 2) View MRI as montage

- 3) Take mid Saggital slices
- 4) Extract Sagittal Slice from the Horizontal Slices using TFORMARRAY.
- 5) Create and Display Coronal Slices.
- 6) Create and Display Sagittal Slices.
- 7) Compute morphological operation.
- 8) The output will be a tumour region.

All above steps are explained here in detail.

A. Image Acquisition

Images of the brain are acquired using MRI scan and these scanned images are converted into a two dimensional matrices having pixels as its rows and columns. These matrices are dependent on matrix size and its field of view. Images are stored in MATLAB and displayed as a gray scale image and add two variables to the workspace: D (128-by-128-by-1-by-27, class uint8) and a grayscale color map (89-by-3, class double). D comprises 27 128-by-128 horizontal slices from an MRI data scan of a human cranium.

B. Extraction of brain

Mid-sagittal plane are sometimes used to describe the sagittal plane running through the midline. This plane cuts the body into halves passing through midline structures such as the navel and spine. It is one of the lines defining the right upper quadrant of the human abdomen. The key of this method is to select the threshold value.[6] In computer vision, Segmentation is the process of dividing a digital image into a number of parts. Each segment is a group of pixels, also called super pixels. The main aim of segmentation is to change the representation of an image into a digital format that is more meaningful and easier to analyze. [2]

C. Array Segmentation

It is one of the best methods to group pixels of an image on the basis of their intensities. Pixels falling under similar intensities are grouped together. It is a good segmentation technique for dividing an image to separate a tumor from the image. Array is normally used for checking output rather than using as an input segmentation technique because it usually suffers from over segmentation and under segmentation.

D. Morphological Operators

After the conversion of the image into binary format, some morphological operations are performed. The morphological operators separate the tumor part of the image. Now only the tumor portion of the image is visible, shown as white color. This portion has the highest intensity than other regions of the image[3].

III. RESULTS AND DISCUSSION

In the following figure white spot is shown, which the result of segmentation applied on the images. This is basically the area with the intensity values higher than the defined threshold as shown in figure3

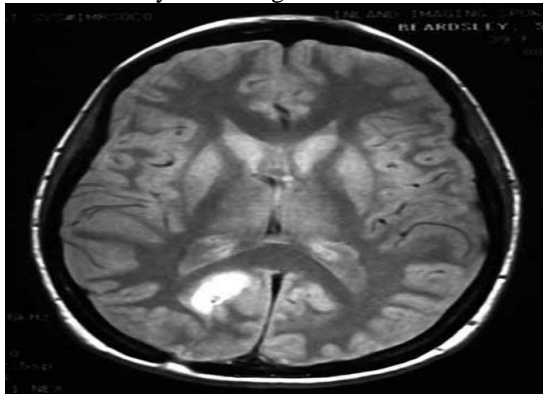


Fig 3: MRI Brain Tumor Image

Sagittal - TFORMARRAY

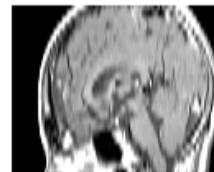


Fig4: Sagittal view of Brain

High intensity areas mostly comprises of tumors. So through threshold segmentation we can specify the location of tumor as shown in figure 4.

Morphological operators are applied after the array segmentation. The results are quite prominent and this technique is very efficient.

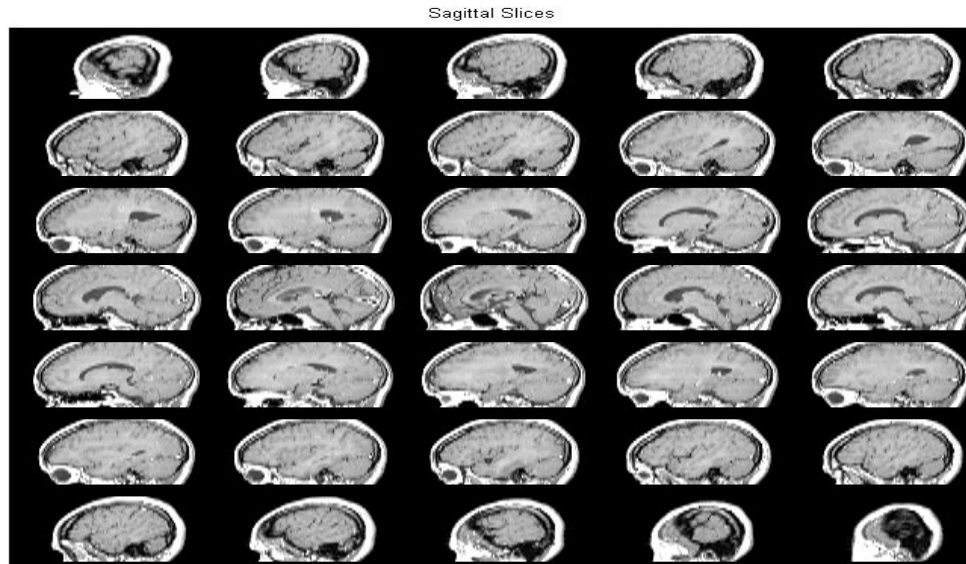


Fig.5: Array Segmentation

IV. CONCLUSION

Future strategy to detect and extraction of Prostate cancer cells from patient's MRI scan image of the Prostate organ. This proposed method incorporates some noise removal functions, segmentation and morphological functions that are basic concepts of Image Processing. Detection and extraction of cancer cells from MRI Prostate image is done by using the MATLAB software[5]

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