Brain Tumoor Detection Using X-Ray Images

Ajinkya Aher[1], Abhishek Deshmukh[2], Surbhi Gaikwad[3], Kundan Patil[4], Swati Bhavsar[5]
[1, 2, 3, 4, 5] Dept of Computer Engineering
[1, 2, 3, 4, 5] Matoshri College of Engineering and Research Center, Nashik, Maharashtra, India

Abstract- *Brain tumor is one of disease type that attacks the brain in the form of clots. There is a way to see brain tumor in detail requires by an MRI image.*

There is difficulty in distinguishing brain tumor tissue from normal tissue because of the similar color. Brain tumor must be analyzed accurately. The solution for analyze brain tumor is doing segmentation. Brain tumor segmentation is done to separate brain tumor tissue from other tissues such as fat, edema, normal brain tissue and cerebrospinal fluid to overcome this difficulty, The MRI image must be maintained at the edge of the image first with the median filtering. Then the tumor segmentation process requires thresholding method which is then iterated to take the largest area. The brain segmentation is done by giving a mark on the area of the brain and areas outside the brain using watershed method then clearing skull with cropping method. In this study, 14 brain tumor MRI images are used. The segmentation results are compared brain tumors area and brain tissues area. This system obtained the calculation of tumor area has an average error of 10%.

Keywords- Thresholding, Segmentation, Brain Tumors,MRI Image

I. INTRODUCTION

Cancer cells that grow uncontrolled and attack brain tissue are called brain tumors. Brain tumors consist of benign and malignant tumors. Malignant brain tumors are usually in the form of blood clots accompanied by fat surrounding it.To detect the location and size of brain tumors required MRI images of brain tumors.

MRI images can help differentiate brain tissue, brain tumors, edema, and cerebrospinal fluid based on differences in color contrast in each tissue[1]. The problem in radiological is still analyzing the results of MRI brain tumor manually so that it takes a long time to find out the diagnostic from the doctor[2]. Early detection is needed to determine the results of tumor analysis effectively. The MRI scan is more comfortable than CT scan for diagnosis. It is not affect the human body because it does not use any radiation. It is based on the magnetic field and radio waves[3].

Solution to overcome this problem by creating a system that can be integrated automatically and can determine the presence of brain tumors and their extent.

The area of the brain tumor that has been detected will help the surgeon to estimate the area of the tumor to be dissected. In future, this system will be developed kiosk for checking brain tumor automatically and effectively[4].

II. OVERALL DESCRIPTION

MRI scanner machine gives effect to MRI images to have a frequency pulse and a strong magnetic field. It can produce detailed images such as images of internal organs, soft tissues, and bones. A detailed MRI image will make it easier for the radiologist to analyze the network to be seen.

The MRI image that has been targeted will be saved in the DICOM format. Then if the DICOM image wants to be processed into the system, the DICOM image is converted in jpg format [5].

III. METHODOLOGY

In this section, the procedures segmentation of MRI Scan Brain tumor is represented. The method for MRI Scan Brain tumor segmentation that involves median filtering,threshold, largest contour, watershed segmentation, and crop. The procedure is described in a schematic diagram shown in Fig. 1.

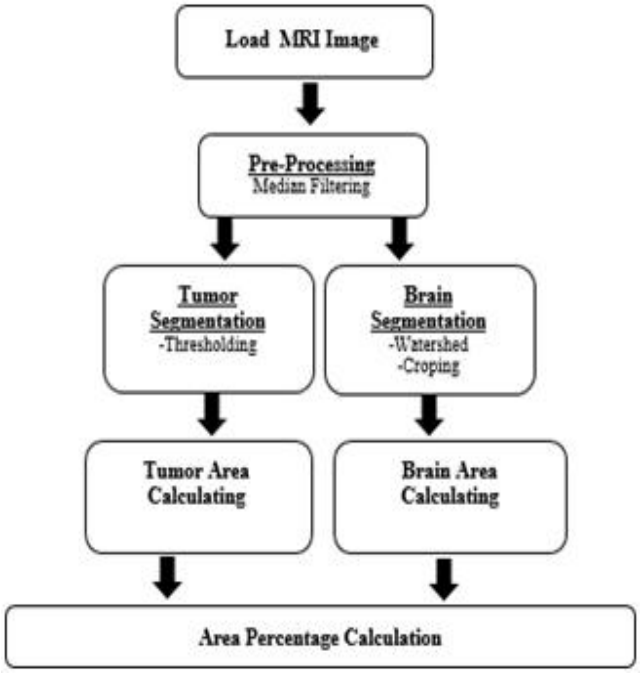


Fig. 1. Schematic diagram of the algorithm

A. MRI Scan Brain Tumor Image

All brain tumor MRI Scans in this research were performed in axial perspective. We just can see the brain from axial perspective . Size of the image is 512 x 512 pixels.

Fig. 2 represents the brain images in axial perspective.

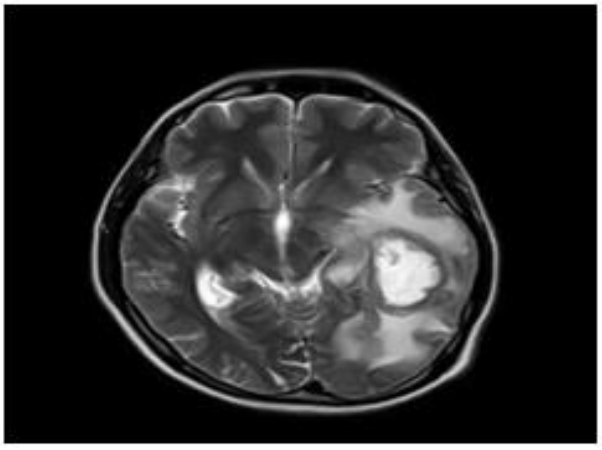


Fig. 2. The brain image in axial perspective

B. Median Filtering

Median filtering is one of methods that can remove noise and retaining edges.

The Median filter can move through pixels to pixels in an image then replace each value with the median value of neighboring pixels. Process to calculate median filtering is to sort all pixe values from window to numerical sequence, and the replacing pixels with pixel middle values. There are steps for finding the above median value. The first step to find the above median value is to read the pixel value to be processed along with its neighbor pixels. The second step to find the above median value is to sort the pixel values from the smallest to the largest. The last step to find the above median value is to select the value in the middle for the new value for pixels(x,y).

C. Support Vector Machines

Implementing classification is an important Support Vector Machine (SVM) is an efficient machine method developed from analytical learning. A distinguished property of SVM is to minimize the empirical classification error and maximize the geometric margin synchronously. SVM predominantly classifies the training data into two classes. In this paper training data includes MRI brain tumor images with malign tumor and benign tumor and normal brain image. The training samples have data arranged as vectors such that the number of rows in each vector indicates different observations concerning the medical images and the number of columns represents the set of features. Using training samples the classifier is able to differentiate the tumor in malign and benign, and also the normal brain image can be detected [1],

D. Crop

One of method to deleting part of an image to cut, retrieve and remove part of the image to obtain the desired result is the cropping method. The cropping method works by cutting the skull bone area to get only the brain region. Find the contours and create a mask is the first step to do cropping.

E. Prototype Model

1)Using Login Page

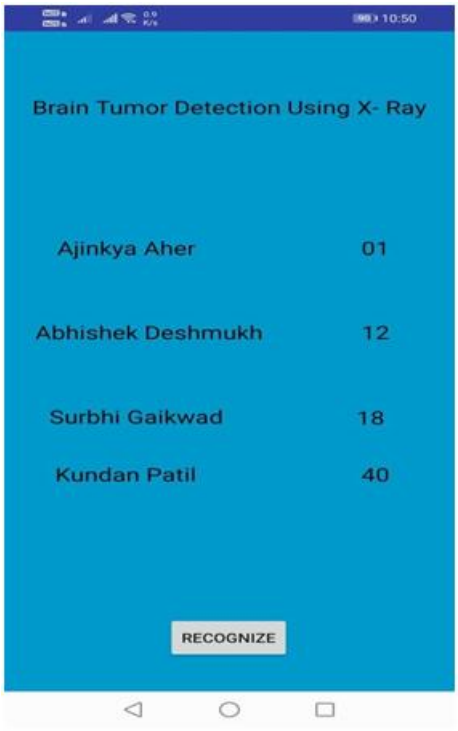
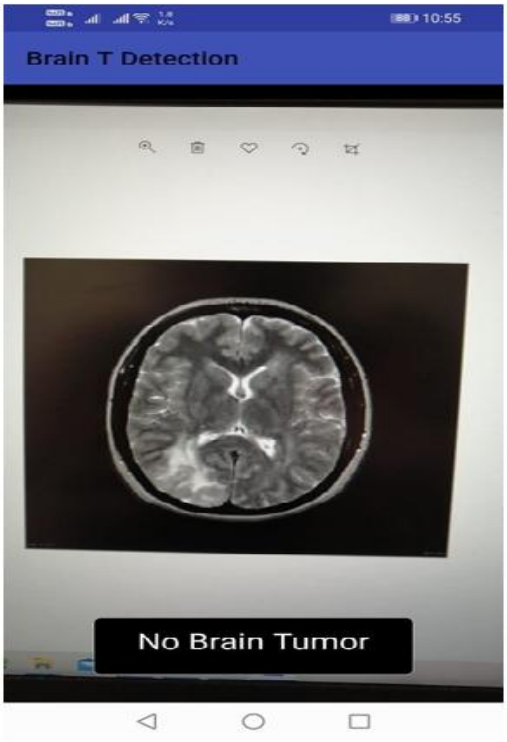


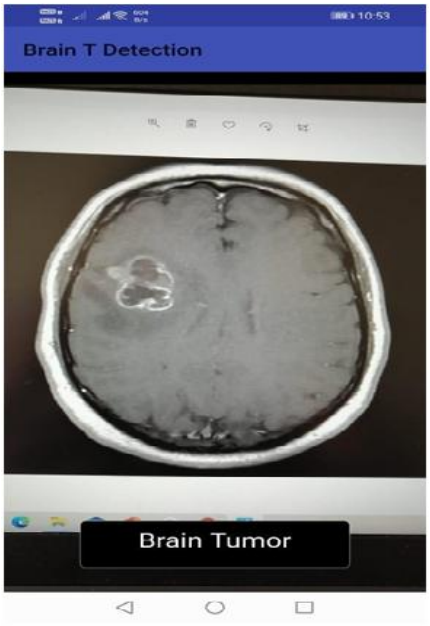
Fig:Login Page

2) Detection Screen:



Detection screen 01

3) Main Windows



Detection screen 02

IV. CONCLUSIONS

The experimental results give conclusion that before do segmentation the brain tumor, the skull shell should be removed first because it has a similarity color with brain tumor object. The process of cutting the skull is done by using Watershed Segmentation method by initializing two lines. In the segmentation of brain tumors performed by thresholding method. After that threholding results were done the largest contour search to separate the object of tumor with other tissues. From the system test obtained the calculation of tumor area has an average error of 10%.

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