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MRI picture of a human brain for area detection for Brain Tumor

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Abstract

The identification, segmentation, and detection of the infected area in brain tumor is a tedious and a time-consuming task. The different structures of the human body can be visualized by an image processing concept, an MRI. It is very difficult to visualize abnormal structures of the human brain using simple imaging techniques. An MRI technique contains many imaging modalities that scan and capture the internal structure of the human brain. This article concentrates on a noise removal technique, followed by improvement of medical images for a correct diagnosis using a balance contrast enhancement technique (BCET). Then, image segmentation is used. Finally, the canny edge detection method is applied to detect the fine edges. The experiment results achieved nearly 98% accuracy in detecting the area of the tumor and normal brain regions in MRI images demonstrating the effectiveness of the proposed technique.

Keywords:-Brain Tumor, MRI Image,Fuzzy Clustering,Color Map & Caney Edge.

1. INTRODUCTION

The National Cancer Institute (NCI) predicted that 22,070 new instances of brain and different vital apprehensive device(CNS) cancers might be diagnosed inside the US in 2009. The American Brain TumourAssociation(ABTA) clarifies this statistic further by using estimating that 62,930 new instances of brain tumors had been diagnosed in 2010. A Brain Tumor is a group, or mass of peculiar cells in our mind. Our skull which encloses our brain, could be very inflexible. Any boom inner this sort of restrained space can cause problems. Brain tumors may be cancerous or non-cancerous. When cancerous or non cancerous tumors grow, they could motive the strain interior or skull to increase. This can reason mind harm, and it can be existence threatening. Today, maximum clinical establishments use the World Health Organization (WHO) type device to perceive mind tumours. The WHO classifies brain tumours by means of cellular beginning and the way the cells behave, from the least competitive (benign) to the most aggressive (malignant).

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2. RELATED WORK

A mind tumor is a set of bizarre cells in the mind. A tumor may additionally cause most cancers, that's a prime leading motive of demise and liable for round 11% of all deaths global. The most cancers incidence price is developing at an alarming fee in the global. So, detection of the tumor is very vital in in advance ranges. This paper attempts to remedy the hassle of how to make a clearer area for tumor cells of the mind and the region which contains the normal mind cells of MRI picture with a minimum range of configurable parameters dependable at the input picture. Thus, the researchers advocate a set of computational procedures for photograph instruction for in addition evaluation through clinical professionals. In this set, main additives can be outstanding: improvement of photograph first-class and segmentation of objects of interest (mind tumors and location of brains in the MRI photos) with the formation of an side map.

3. IMPLEMENTATION

System Architecture

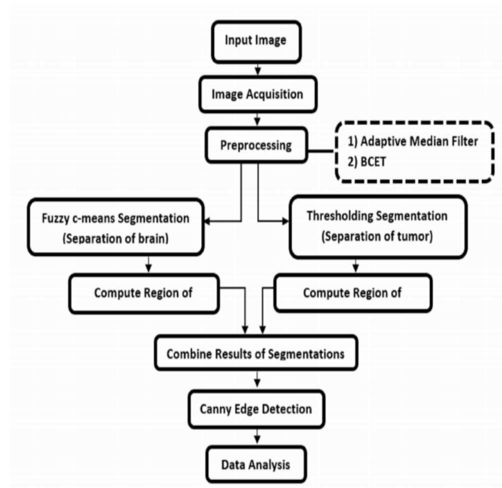

Fig:-1 **System Architecture**

Image Acquisition

In this system suggested approach the authors first believed that the MRI scan images as per the Following syntax

```
class Ui_ImageAcquisition(object):
    def __init__(self, Dialog):
        self.dialog = Dialog

    def browse_file(self):
        fileName, _ = QtWidgets.QFileDialog.getOpenFileName(None, "Select Photo")
        print(fileName)
        self.lineEdit.setText(fileName)

    def submit(self):
        try:
            image = self.lineEdit.text()
            if image == "" or image == "null":
                self.showMessageBox("Information", "Please Select Image")
            else:
                image = cv2.imread(image)  # READ THE INPUT IMAGE
                image = cv2.resize(image, (256, 256), interpolation=cv2.INTER_AREA)
                # print(image.shape)
                gray_image = cv2.cvtColor(image, cv2.COLOR_BGR2GRAY)
                print("Resize=",gray_image.shape)
                self.showMessageBox("Information", "Resize & Converted to Gray Color Image")
                cv2.imwrite('images/resize.jpg', image)
                cv2.imshow("GrayColor Image", gray_image)
                cv2.waitKey(0)
                self.dialog.hide()
```

Preprocessing

We suggested an adaptive median filter to remove noise from an image as preprocessing as following

```
class Ui_Preprocessing(object):

    def __init__(self, Dialog):
        self.dialog = Dialog

    def processimg(self):
        path="images/resize.jpg"
        self.lineEdit.setText(path)

    def AMF(self):
        try:
            gray_image = self.lineEdit.text()
            gray_image = cv2.imread(gray_image)
            gray_image = cv2.cvtColor(gray_image, cv2.COLOR_BGR2GRAY)
            image_amf = AdaptiveMedianFilter(gray_image)
            self.showMessageBox("Information", "Removed noisy data by AMF")
            cv2.imwrite('images/AMF.jpg', image_amf)
            cv2.imshow("Adaptive Median Filter", image_amf)
            cv2.waitKey(0)
        except Exception as e:
            print("Error=" + e.args[0])
            tb = sys.exc_info()[2]
            print(tb.tb_lineno)
```

FuzzyClustering

```
def FCM(image_AMF):
    list_img = []
    img = cv2.imread("images/"+str(image_AMF))
    #img = cv2.cvtColor(img, cv2.COLOR_BGR2GRAY)
    rgb_img = img.reshape((img.shape[0] * img.shape[1], 3))
    list_img.append(rgb_img)
    n_data = len(list_img)
    clusters = [2]

    # looping every images
    for index, rgb_img in enumerate(list_img):
        img = np.reshape(rgb_img, (256, 256, 3)).astype(np.uint8)
        shape = np.shape(img)

        # initialize graph
        #plt.figure(figsize=(20, 20))
        #plt.subplot(1, 4, 1)
        #plt.imshow(img)
        # looping every cluster
        print('Image ' + str(index + 1))
        for i, cluster in enumerate(clusters):
            # Fuzzy C Means
            new_time = time()
```

AdaptiveMedianFilter

```
def AdaptiveMedianFilter(grayimage):
    try:
        img_out = grayimage.copy()

        height = grayimage.shape[0]
        width = grayimage.shape[1]

        for i in np.arange(6, height - 5):
            for j in np.arange(6, width - 5):
                neighbors = []
                for k in np.arange(-6, 6):
                    for l in np.arange(-6, 6):
                        a = grayimage.item(i + k, j + l)
                        neighbors.append(a)
                neighbors.sort()
                median = neighbors[30]
                b = median
                img_out.itemset((i, j), b)

        cv2.imwrite('images/AMF.jpg', img_out.astype(np.uint8))
        #cv2.imshow('image', img_out)
        #cv2.waitKey(0)
        # cv2.destroyAllWindows()

    except Exception as e:
        print("Error=" + e.args[0])
        tb = sys.exc_info()[2]
        print(tb.tb_lineno)
    return img_out.astype(np.uint8)
```

4. EXPERIMENTAL RESULTS

In this paper the pre-processing degree plays picture filtering. The median clear out is used for image enhancement .It's far used to get rid of the noise in an photo .It is better than imply filter out ,weiner filter, Gaussian filter. Threshold is used to transform an depth photo. On applying morphological operation erode the image to get tumor element photo.

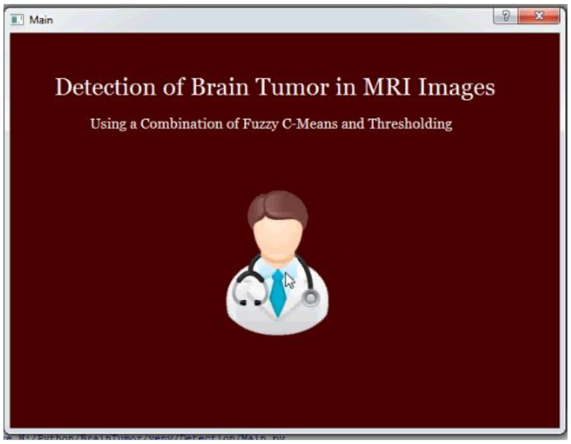

Fig:-2 Application Home Screen

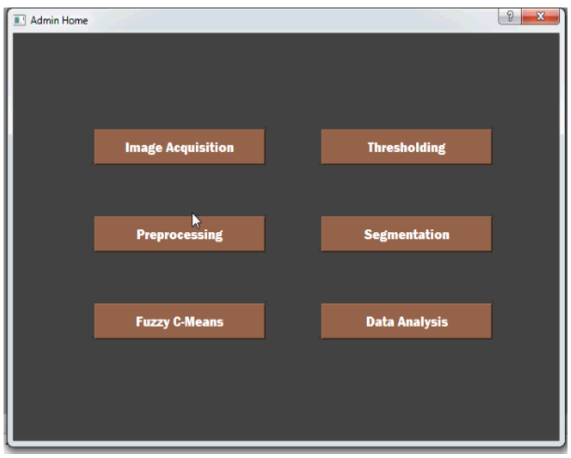

Fig:-3 Operation on MRI image

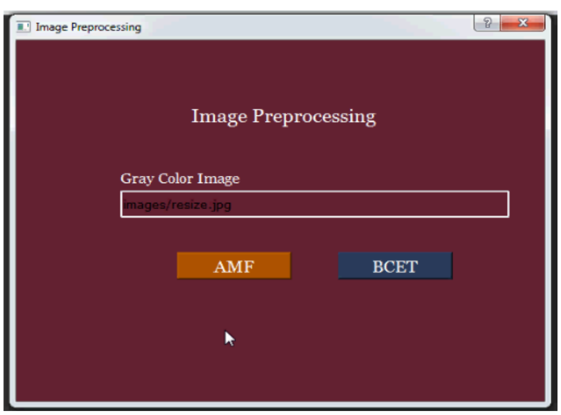

Fig:-4 Preprocessing

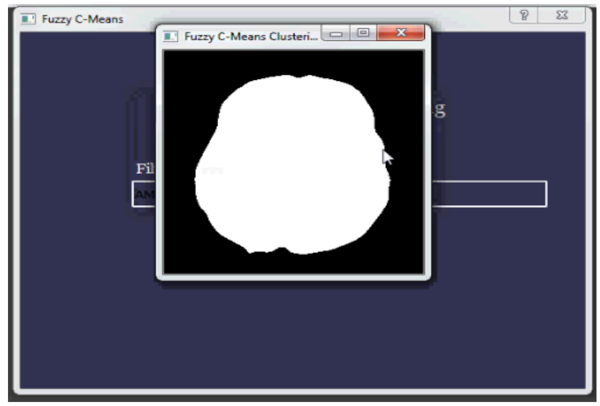

Fig:-5 Fuzzy C-Means Result

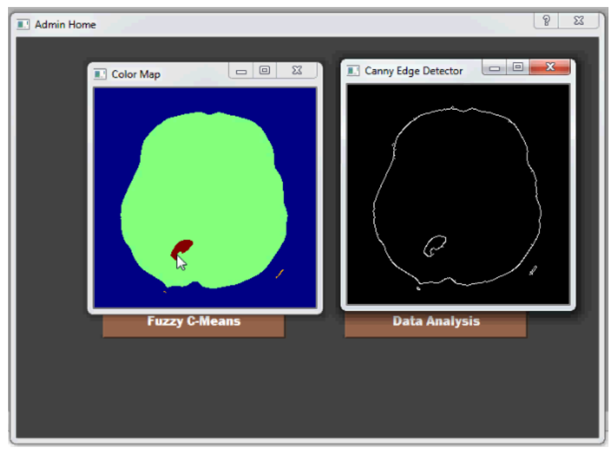

Fig:-6 Color Map & Caney Edge Results

5. CONCLUSION

In this method we take an MRI picture of a human brain for area detection. MRI picture given as input to the gadget and its histogram segmented the usage of our proposed approach and get higher results. In this step, a process need to be performed after giving input, which checks all the required outputs and acquire the one which produces pictures in a right and preferred layout. Each MRI picture of a human brain

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is segmented while applying every form of edge detector. The performance assessment of diverse aspect detectors may be made by using two approaches. First on the premise of human judgment that is referred to as subjective approach. Second on the basis of values of signal to noise ratio and suggest rectangular mistakes among the threshold detector photograph and the unique photo, this is known as an goal method. The edge detection is achieved the use of computerized era of threshold values using fuzzy technique. While the usage of automatic thrusholding method the preliminary organizations are computed the use of ok-method clustering algorithm. Then for every acquired group a exceptional threshold fee is being generated the usage of fuzzy inference machine rules set. These thresholds are then furnished to Caney aspect detector.

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