EPILEPTIC CLASSIFICATION WITH DEEP-TRANSFER-LEARNING FEATURE FUSION ALGORITHM

ABSTRACT

The human brain is the major controller of the humanoid system.The abnormal growth and division of cells in the brain lead to brain tumor,and the further growth of brain tumors leads to brain cancer.In the area of human health, computer vision plays a significant role,which reduces the human judgement that gives accurate results.CT scans,X ray and MRI scans are the common imaging methods among magnetic resonance imaging (MRI) that are reliable and secure .MRI detects every minute objects.Our paper aims is to focus on the use of different techniques for the discovery of brain cancer using brain MRI .In this study ,we performed pre processing using the bilateral filter for removal of the noises that are present in an MR image.This followed by the binary thresholding and Convolution Neural Network (CNN) segmentation techniques for reliable detection of the tumor region.Training,Testing,Validation datasets are used.

INTRODUCTION

Medical imaging is the technique and process of creating visual representation of the interior of a body for clinical analaysis.Medical imaging seeks to reveal internal structure hidden by skin and bones and diagonse and treat disease.

KEYWORD

Brain tumor

Magnetic resonance imaging

Adaptive Bilateral Filter

Convolution Neural Network

MOTIVATION

✓ Well adaptation of automated medical image analysis in the perspective of Bangladesh

✓ Early detection of brain tumors

✓ Reducing the pressure on Human judgement

✓ Build a user interface which can identify the cancerous cells reducing the death rate by early detection

TRADITIONAL CLASSIFIER

Adopted six traditional classifier

- ✓ K- nearest neighbour
- ✓ Logistic regression
- ✓ Multilayer perceptron
- ✓ Random forest
- ✓ Naives Bayes
- ✓ Proposed model

BACKGROUNDS

BRAIN TUMOR

✓ Tumor cells which is undifferentiated in the image cells contain abnormal nuclei

✓ Abnormal cells form within the brain

✓ Tumor may grow from neuroma,meningioma,craniopharyngioma or glioma

TYPES OF BRAIN TUMOR

1.BENIGN

*Non cancerous

*Grows slowly

*Do not spread into other tissues

2.MALIGNANT

* Non Cancerous

*Grows rapidly

The following figure shows an example of benign and malignant tumor.

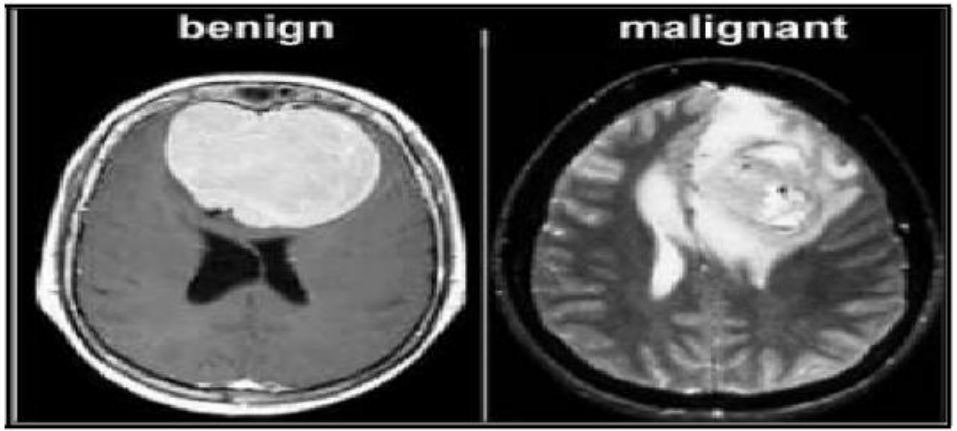


Fig 2: Benign and Malignant Tumor
[2]

MODULES

1. Input image
2. Image pre processing
3. Image Enhancement
4. Image segmentation
5. Brain classification with classifier
6. Output image

Stage-1:Skull Stripping

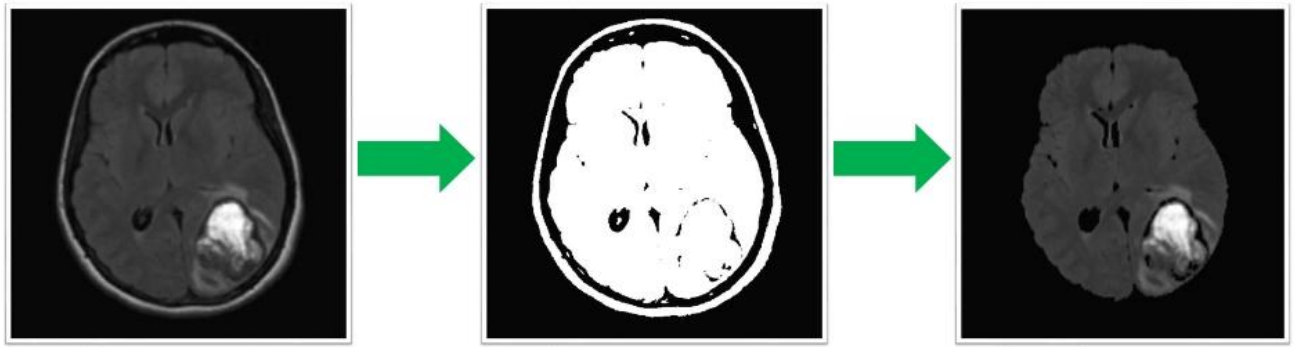


Figure 9.1: input image

Fig 9.2: thresholded image

Fig 9.3: skull removed image

Fig 9: steps of skull stripping

Segmentation Using FCM

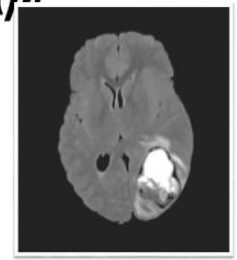


Fig 11.1(a): enhanced MRI

Fig 11.1(b): segmented tumor

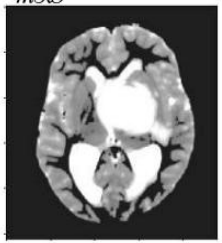


Fig 11.2(a): enhanced MRI Fig 11.2(b): segmented tumor

Fig 11: segmentation using FCM

Segmentation Using K-Means Clustering

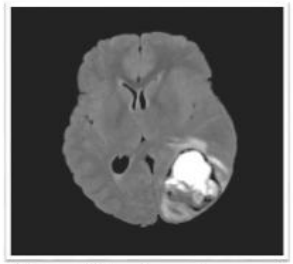


Fig 12.1(a): enhanced MRI

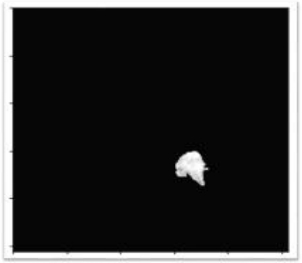
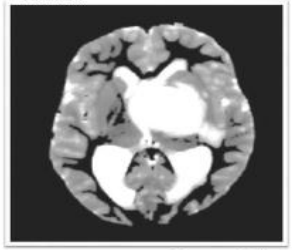


Fig 12.1(b): segmented tumor



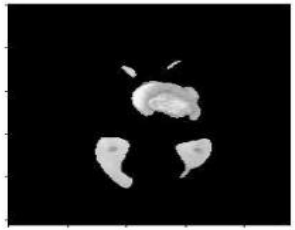


Fig 12.2(a): enhanced MRI Fig 12.2(b): segmented tumor

Fig 12: segmentation using K-Means Clustering

Segmentation Using K-Means Clustering

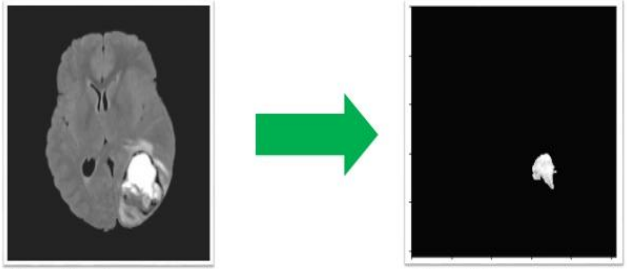


Fig 12.1(a): enhanced M.R.I

Fig 12.1(b): segmented tumor

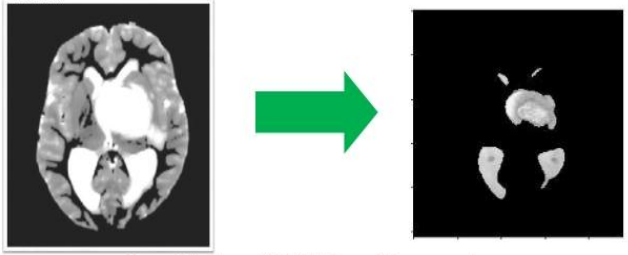


Fig 12.2(a): enhanced MRI Fig 12.2(b): segmented tumor

Fig 12: segmentation using K-Means Clustering

Performance Comparison(2)

No	Paper Name	Year	Method	Accuracy
1	Brain tumor segmentation based on a new threshold approach [6]	2017	Pixel Subtraction + thresholding	96%
2	Image analysis for MRI based brain tumor detection and feature extraction using biologically inspired BWT and PROPOSED [5]	2017	Berkely wavelet transform + PROPOSED	96.51%
3	Tumor Diagnosis in MRI Brain Image using ACM Segmentation and ANN-LM Classification Techniques [3]	2016	Artificial Neural Network	93.74%
4	Identification and classification of brain tumor MRI images with feature extraction using DWT and probabilistic neural network [4]	2017	Probabilistic Neural Network	95%
5	**Proposed Model**	—	**Five layer proposed model**	**99.7%**

Fig 32: Performance Comparison with the existing works

CONCLUSION

We proposed a computerized method for the segmentation and identification of a brain tumor using the Convolution Neural Network. The input MR images are read from the local device using the file path and converted into grayscale images. These images are pre-processed using an adaptive bilateral filtering technique for the elimination of noises that are present inside the original image. The binary thresholding is applied to the denoised image, and Convolution Neural Network segmentation is applied, which helps in figuring out the tumor region in the MR images. The proposed model had obtained an accuracy of 84% and yields promising results without any errors

FUTURE SCOPE

It is observed on extermination that the proposed approach needs a vast training set for better accurate results; in the field of medical image processing, the gathering of medical data is a tedious job, and, in few cases, the datasets might not be available. In all such cases, the proposed algorithm must be robust enough for accurate recognition of tumor regions from MR Images. The proposed approach can be further improvised through in cooperating weakly trained algorithms that can identify the abnormalities with a minimum training data and also self-learning algorithms would aid in enhancing the accuracy of the algorithm and reduce the computational time.