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Programmed Multi-Classification of Brain Tumor Images Using Deep Neural Network

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Abstract: *In this paper, we propose a brain tumor segmentation and classification method for multi-modality magnetic resonance image scans. The data from multi-modal brain tumor segmentation challenge are utilized which are co-registered and skull stripped, and the histogram matching is performed with a reference volume of high contrast. We are detecting tumor by using preprocessing , segmentation, feature extraction ,optimization and lastly classification after that preprocessed images use to classify the tissue .We performed a leave-one out cross-validation and achieved 88 Dice overlap for the complete tumor region, 75 for the core tumor region and 95 for enhancing tumor region, which is higher than the Dice overlap reported.*

Keywords: CNN, Preprocessing, Feature Extraction

I. Introduction

The detection and diagnosis of brain tumor from MRI is crucial to decrease the rate of casualties. Brain tumor is difficult to cure, because the brain has a very complex structure and the tissues are interconnected with each other in a complicated manner. Despite many existing approaches, robust and efficient segmentation of brain tumor is still an important and challenging task. Tumor segmentation and classification is a challenging task, because tumors vary in shape, appearance and location. It is hard to fully segment and classify brain tumor from mono-modality scans, because of its complicated structure. MRI provides the ability to capture multiple images known as multimodality images, which can provide the detailed structure of brain to efficiently classify the brain tumor. shows different MRI modalities of brain.

II. Motivation

We get motivated of existing system, we have to match user object with database image using Spatial gray level dependencies method. In that system first we have pre-processing on that images then select feature extraction and compare brain with database and get the result

III. Problem Statement

To design a detection and diagnosis of brain tumor from MRI is crucial to decrease the rate of casualties. Brain tumor is difficult to cure, because the brain has a very complex structure and the tissues are interconnected with each other in a complicated manner. Despite many existing approaches, robust and efficient segmentation of brain tumor is still an important and challenging task. Tumor segmentation and classification is a challenging task, because tumsors vary in shape, appearance and location. It is hard to fully segment and classify brain tumor from mono-modality scans, because of its complicated structure. So we overcome that problem classify the brain tissues tumor area.

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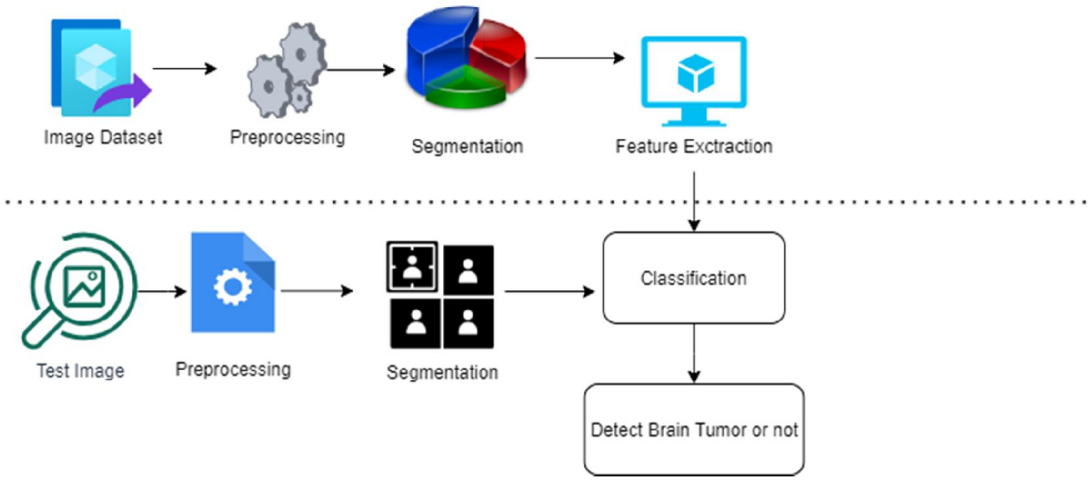
IV. System Architecture



V. Algorithm

5.1 CNN

1. Build a small convolutional neural network as defined in the architecture below.
2. Select images to train the convolutional neural network.
3. Extraction of feature filters/feature maps.
4. Implementation of the convolutional layer.
5. Apply the ReLu Activation function on the convolutional layer to convert all negative values to zero
6. Then apply max pooling on convolutional layers.
7. Next Flatten, This layer used for convert 2D matrix into 1D array.
8. Make a fully connected layer
9. Then input an image into CNN to predict the image content
10. Back propagation to calculate the error rate
11. Then Create CNN model.

VI. Acknowledgment

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VII. Conclusion

This paper presented an algorithm to hierarchically classify the tumor into three regions: whole tumor, core tumor and enhancing tumor. Intensity, intensity difference, neighborhood information and wavelet features are extracted and utilized on multimodality MRI scans with various classifiers. The use of CNN classifier has increased the classification accuracy as evident by quantitative results of our proposed method which are comparable or higher.

VIII. Future Work

In future work, research can be conducted to detect brain tumors more accurately, using real patient data from any medium. and using another algorithms and different methodology and also to detect various cancers and other diseases.

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