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Survey on Brain Tumor classification and Detection using MRI scan Images

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ABSTRACT:

Currently detection of brain tumor became tough in medical image processing. The task of brain tumor detection can become aggravating by the problems which are present in almost all digital images for example: Illumination problems. Tumor and non-tumor images can have overlapping image intensities which makes it difficult for any model to make good predictions from raw images. This paper proposes a novel method to detect brain tumors from various brain images by first carrying out different image pre-processing methods i.e.Histogram equalization and opening which was followed by a convolutional neural network.

KEYWORDS: Brain Tumor Detection, Computer-aided Diagnosis, Computer Vision,Convolutional Neural Networks, Deep Learning, Image Processing, Transfer Learning.

LITERATUR SURVEY:

R.Ramachandran [1]: They proposed a technique to improve the efficiency of brain tumor detection process. They proposed a spearman based brain tumor segmentation and convolution Neural Network based classification technique. They classified technique provided the best and accurate result within less time. This model need not to have large dataset, therefore it consumes low memory space is enough to maintain the dataset and the CNN based classification methods returns an accurate results.

Donges [2] z: This model became very effective cause the images which are used are trained on a big corpus of photographs and it require the model to make predictions on a relatively large number of classes. On some problems where you may not have very much data, transfer learning can enable to develop skillful models that simply could not develop in the absence of transfer learning.

Sachdeva J [3]: They have performed a multiclass brain tumor classification on MRI scan reports of 55 patients... They used principle component analysis for reduction of dimensionality of feature space.

Sajjad et al. [4]: Brain tumor classification includes two procedures: feature extraction and classification.

In some previous studies, traditional manual extraction of features was widely used, such as intensity and

texture features of brain tumor images. However, traditional feature extraction methods require the

professional knowledge and experience in specific fields. Manual feature extraction will also reduce the efficiency of the system. Deep learning techniques overcome this disadvantage

Ghasenni et al. [5]: Developed fuzzy dictionaries to deal with the uncertainty in brain tumor image classification. The classic fuzzy inference is embedded into the dictionary learning process and fuzzy membership functions are used to model uncertainty and improve sparse representation.

Wu et al. [6]: developed a parse representation method to exact important features and key feature index across different class images. Then, the learned feature weights and classification dictionary are used in a radiomics system for the diagnosis of brain tumors.

Al-shaikhli et al. [7]: Their team developed a coupled dictionary learning method, which designs one dictionary of brain tumor image patches and one dictionary of image labels. Label dictionary is used to present the foreground and background multiple

TABLE-

SI NO.	Author Name	Inventions	Pro's	Con's
1.	R.Ramachandran	They classified a spearman based brain tumor segmentation and CNN	They increased the efficiency of brain tumor detection.	High Computational Complexity.
2.	Donges	This approach is effective because the images were trained on a large corpus of photographs	The model efficiently learns to extract features from photographs in order to perform well on the problem.	Should find strong image gradients to drive the contour.
3.	Sachdeva J	Mainly used for reducing the dimensionality of feature space	That six classes are being classified by artificial neural network .	The result will not be accurate always.
4.	Sajjad et al.	Brain tumor classification includes two procedures: feature extraction and classification.	Manual feature extraction will also reduce the efficiency of the system.	Deep learning based approaches for handling Identification problems is little clumsy.

5.	Ghasenni et al.	Developed "Fuzzy Dictionaries"	The classic fuzzy inference is embedded into the dictionary learning process and fuzzy membership functions are used to model uncertainty and improve sparse representation.	Errors occur for likelihood hypothesis.
6.	Wu et al.	Developed "Sparse Representation Method"	The learned feature weights and classification dictionary are used in a radiomics system for the diagnosis of brain tumors.	Issues like Overfitting and suboptimal in learning models are caused.
7.	Al-shaikhil et al.	Developed "Coupled Dictionary Learning Method"	Thich designs one dictionary of brain tumor image patches and one dictionary of image labels.	Lack of accuracy with very weak image boundaries and image noise.

Conclusion:

Image processing proved to be effective in solving the illumination problems of the different images and reducing the noisy details thereby bringing the tumor in focus. Different variants of the images were created using image augmentation techniques which augmented the images and internally created more images for the model. Cnn combined with transfer learning proved to be an effective training model which can be seen in the extremely good values of the three performance metrics.

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