Brain Tumor Detection Using Convolutional Neural Network In Deep Learning

Pavan Kshirsagar[1], Aniket Joshi[2], Vivek Shedage[3], Abhishek Kamble[4], Miss. Sakhare Y.N[5]

Department of Information Technology, VPKBIET, Baramati, India[1-5]

Abstract: Brain tumors are the most common and the aggressive leading to very short extensive in their higher grade thus treatment planning is the highest grade key stages to improve the quality of patients. Brain Tumor Segmentation is one of the most crucial and arduous tasks in the terrain of medical image processing as a human-assisted manual. Magnetic resonance image is the image widely used for imaging technique to access these tumors but large amount of data produced by(MRI) privence manual segmentation in a reasonable time. Brain tumor is also known as aberrant growth of cells a particular region of a human body. Results show that the CNN archives rate of 97.5% accuracy with low complexity and compared with the all other state of arts methods

Keywords: Brain tumor, Brain cancer, Magnetic Resonance Imaging (MRI), CNN (Convolution Neural Networks), Convolutional Layer, Pooling Layer, Fully Connected Layer etc.

I. INTRODUCTION

Brain controls many functions and multitasks, as well as being the most complicated part of the human body. Brain tumors are one of the most serious of these conditions. It is caused by the asymmetrical and irregular growth of tissues within the brain. The classification of brain tumor is depending on their location and size. There are mainly two types of Brain tumor which is Malignant or Benign etc. Approximately 23,880 adults in those 10,160 women and 13,720 men were diagnosed with brain tumors. Similarly, there are 3,560 children affected by brain tumors. Brain tumors cause 16,830 deaths in adults (7,330 females and 9,480 males.) Modern technologies are used to predict Brain Tumors. Image visualization technique Likes MRI and CT scan images. An image becomes an active and operational research field. because of it saves doctors time as well as gives them more confidence to make decisions.

II. LITRATURE SURVEY

Yantao et al. [8] used a technique based on histograms. Regarding FLAIR and T1 as two modalities that have been used in the brain tumor segmentation task to categorize the three classes (tumor, necrosis, and edema). An active contour model that uses FLAIR to detect abnormalities was used to detect the abnormal regions. The contrast enhancement T1 modality was employed to separate the edema and tumor tissues in the abnormal regions by the k-means method and a Dice coefficient and sensitivity of 73.6 percent and 90.3 percent were obtained, respectively.

In Badran et al. [9], the ROI was extracted using the canny edge detection model accumulated with adaptive thresholding. 102 images were included in the dataset. We preprocessed the images, then applied canny edge detection and adaptive thresholding to two sets of neural networks. Using the Harris method, characteristics features are extracted from the segmented image represented as a level number. A first neural network is used to detect whether the brain is healthy or contains tumors, while a second is used to identify the type of tumor. According to this comparison and depiction of the outcomes, the canny edge detection method has a more reliable accuracies.

Pei et al. [10]A technique proposed by incorporating tumor growth patterns into longitudinal MRI segmentation to improve spatial accuracy. A tumor growth model is constructed using label maps. This model predicts cell density based on extracting features such as fractals, mBm, and intensity. Mean DSC based on the tumor cell density, LOO: 0.819302 and 3-Folder: 0.82122 indicates the performance of the model.

III. GOALS & OBJECTIVE

To design a "Brain Tumor Detection Using Convolutional Neural Network In Deep Learning which is automatically detects the brain tumor using machine learning algorithm and also provides high accuracy.

IV.   SCOPE

1. It can be useful for patients for a provide a smart technique to detect brain tumor with higest accuracy and minimum false rate .
2. Reducing the date rate by early detection.
3. Supporting fster communication,which will provide better treatemnet to patients in remote areas.

V.   ALGORITHM
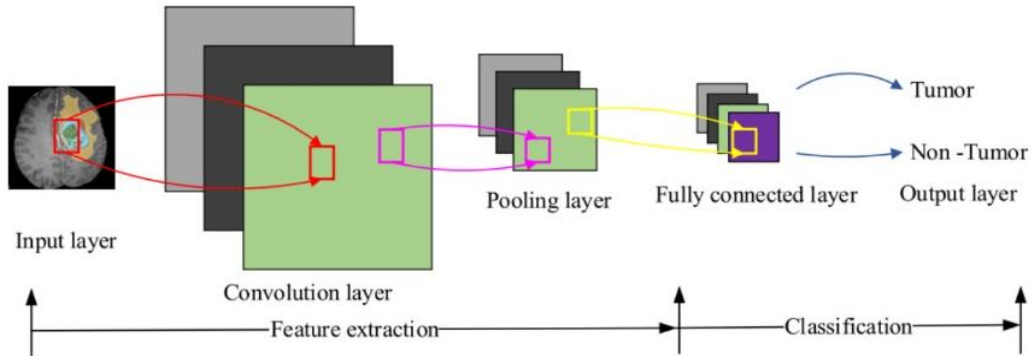
Convolution Layer:-

Convolutional neural network in machine learning is a class of artificial neural networks, in this CNN model it is the core layer which can be aimed to extract features Basically, this layer performs linear transformation without change any special information in the data. In cnn kernel we determined weight of the layer which can be process on input data training.
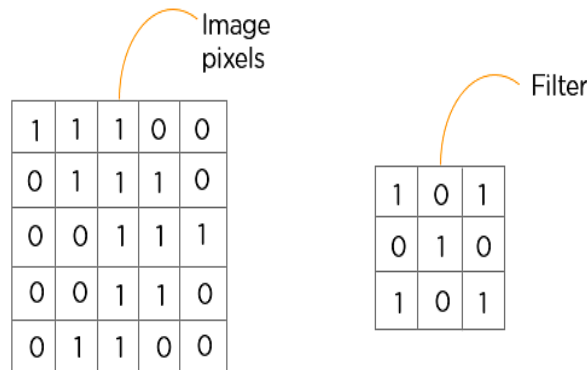

Max Pooling Layer:-

The max pooling is the pooling operations in that the maximum elements in the region can be featured covered by filter. Basically the max pooling works on divide the output on the cnn layer and it can be convert into smaller grids to take maximum value from the each grid and produce in to smaller image matrix.
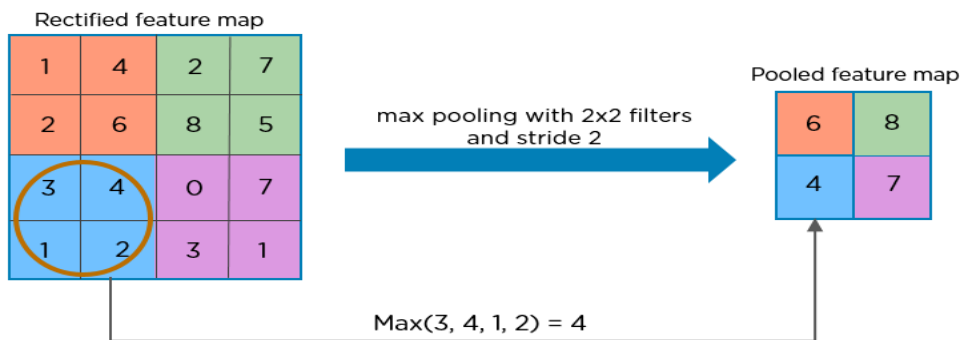
Fully Connected Layer:-

The fully connected layer which can be changes every dimensions in the data. So it can be divided linearly. In the cnn layer one dimensional data can be inserted before another layer which can be connected as the whole. This whole process can be caused in loss of special information and it can be end of fully connected layer in the network.

VI.   SYSTEM STRUCTURE
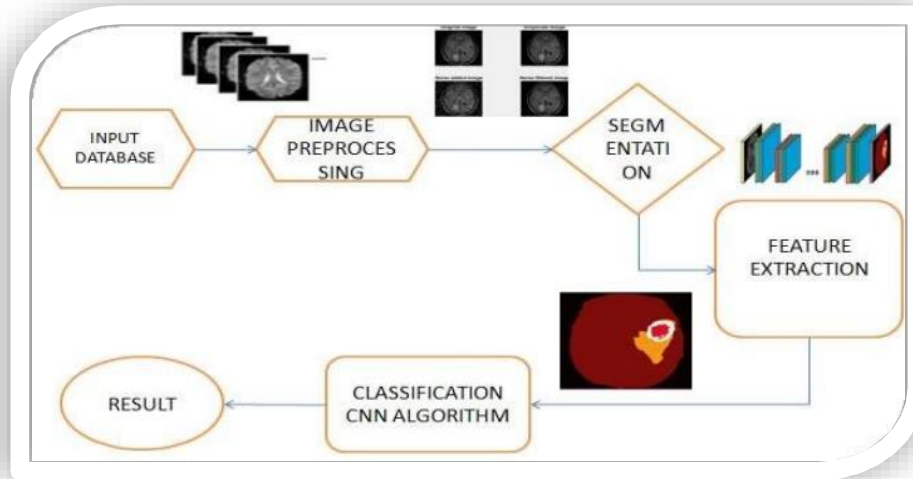
VII.   CONCLUSION

Different techniques and methods of CNN provide ease and facility for the detection, classification, segmentation and visualization of brain tumors. CNN plays important role in the treatment of Brain tumors The resulting method is very fast, robust and reliable for indexing tumour or edema images for both archival and retrieval purposes and it can use as a vehicle for further clinical investigations.

REFERENCES

[1] Hemanth, G., M. Janardhan, and L. Sujihelen. "Design and Implementing Brain Tumour Detection Using Machine Learning Approach." In 2019 3rd International Conference on Trends in Electronics and Informatics   (ICOEI), pp. 1289-1294. IEEE, 2019

[2] Swati, Zara Nawab Khan, Qinghua Zhao, Muhammad Kabir, Farman Ali, Zakir Ali, Saeed Ahmed, and Jianfeng Lu. "Brain tumour classification for MR images using transfer learning and fine-tuning." Computerized Medical Imaging and Graphics 75 (2019): 34-46.

[3] A. joshi, D. H. Shah, et al, Survey of brain tumor detection techniques through MRI images, International Journal of Research in Engineering and Technology, 10, pp. 586-594, 2013.

[4] K. J. Johnson, J. Schwartzbaum, C. Kruchko et al., "Brain tumor epidemiology in the era of precision medicine: the 2017 brain tumor epidemiology consortium meeting report," Clinical Neuropathology, vol. 36, no. 11, pp. 255–263, 2017.

[5] Y. M. Y. Abdallah and T. Alqahtani, "Research in medical imaging using image processing techniques," in Medical Imaging—Principles and Applications, IntechOpen, 2019.

[6] S. L. Fernandes, U. J. Tanik, V. Rajinikanth, and K. A. Karthik, "A reliable framework for accurate brain image examination and treatment planning based on early diagnosis support for clinicians," Neural Computing and Applications, vol. 32, no. 20, pp. 15897–15908, 2020.

[7] M. Alfonse and A. B. M. Salem, "An automatic classification of brain tumors through MRI using support vector machine," Egyptian Computer Science Journal, vol. 40, no. 3, 2016.

[8] A. K. Samanta and A. A. Khan, "Computer aided diagnostic system for automatic detection of brain tumor through MRI using clustering based segmentation technique and SVM classifier," in International Conference on Advanced Machine Learning Technologies and Applications, pp. 343–351, Cham, 2018.

[9] Z. N. K. Swati, Q. Zhao, M. Kabir et al., "Brain tumor classification for MR images using transfer learning and fine-tuning," Computerized Medical Imaging and Graphics, vol. 75, pp. 34–46, 2019.