



Academy of  
Engineering

(An Autonomous Institute Affiliated to Savitribai Phule Pune University)

## **BRAIN TUMOR CLASSIFICATION USING CNN**

### **TY B.Tech. Mini Project Report**

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**MAHARASHTRA (INDIA)**

**MAY, 2020**



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*submitted in partial fulfilment of the  
requirements for the award of the degree*

*of*

**Bachelor of Technology**

*in*

**COMPUTER ENGINEERING AND TECHNOLOGY**

**BY**

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### CERTIFICATE

It is hereby certified that the work which is being presented in the TY B.Tech. Mini Project Report entitled “*Brain tumor classification using CNN*”, in partial fulfillment of the requirements for the award of the **Bachelor of Technology in Computer Engineering** and submitted to the **School of Computer Engineering and Technology of MIT Academy of Engineering, Alandi(D), Pune, Affiliated to Savitribai Phule Pune University (SPPU), Pune** is an authentic record of work carried out during an Academic Year 2019-2020, under the supervision of **Dr. Avinash Bhute, School of Computer Engineering and Technology.**

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- |                        |      |
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## **ABSTRACT**

These papers mainly focuses on brain tumor detection using various techniques i.e Soft computing techniques, Neural Network, KNN (K-nearest neighbour), ANN (Artificial Neural Network). Brief description was given about stages of brain tumor, extraction of features. Classification used for to know tumor stages.

The problem for classification was it is very complex to train CNN model from scratch so they have used pre-trained model to build their model. By doing this lot of time saved and also it is very time consuming process. In one of the paper the extraction of texture features in the detected tumor has been achieved by using Gabor filter. Which gives good result over the others.

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# **1. INTRODUCTION**

## **1.1 Motivations**

In day to day life scenario many people are unaware of the brain tumor. If any case one of the person may having tumor in brain. Initially there are no such symptoms. If he/she going for checkup there having some processing time for declaring person having tumor or not. It also more harmful for that person.

First we should know what is tumor. Tumor is uncontrolled growth of cells which harmful to human being. There are two main types of brain tumor. First is benign (low grade) another is malignant (high grade). Malignant is spread rapidly which causes immediate death.

Most of the hospitals having MRI machine which used for detection of brain tumor. To diagnosis wants the team of expert doctors. To help that doctor to sort images using our model helps to remove human error in sorting images. It doesn't mean that it predict 100% of images but it helps rapid diagnosis and reduce time to analyze piles of MRI images

## **1.2 Problem Statement**

Detection and Classification of Brain tumor from images of MRI using Convolutional Neural Networks.



### **1.3 Objectives and Scope**

- To study and identify the symptoms of brain tumor
- To analyze the feasibility of brain tumor
- To design and develop the classification model
- To evaluate the performance for CNN

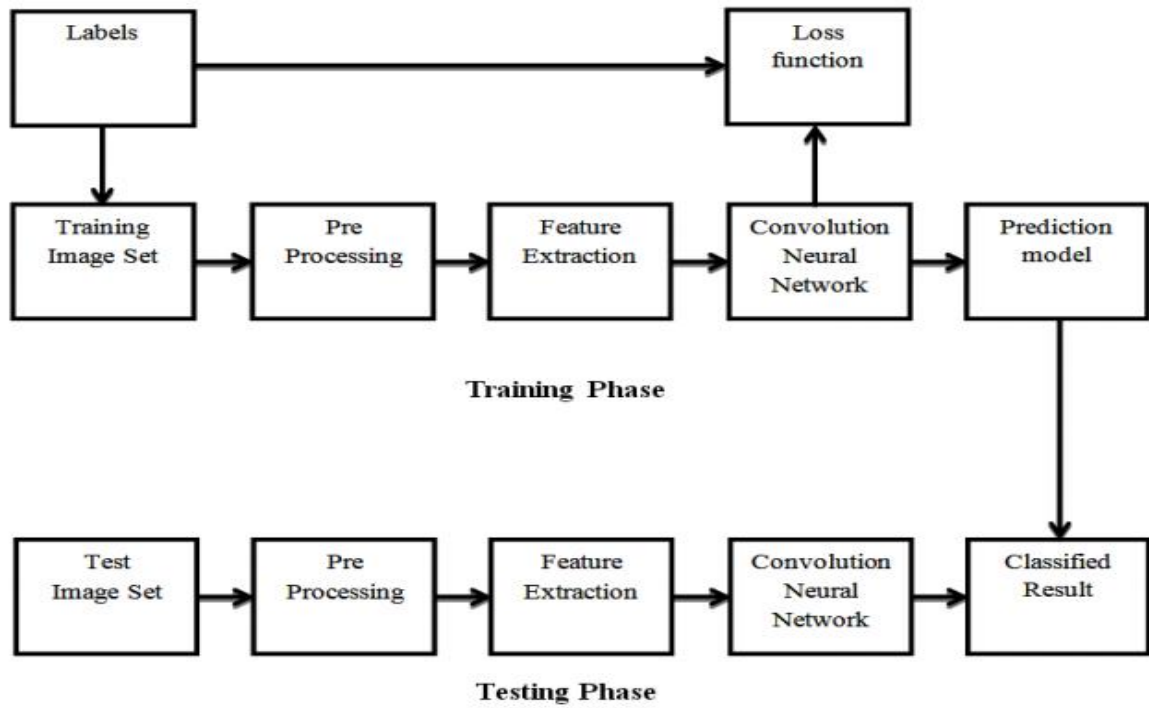
## **2. LITERATURE SURVEY**

H. B. Nandpuru et al. [1] present the method for brain tumor classification. The brains MRI are classified into the normal and cancerous using SVM a supervised machine learning technique. Firstly, the texture, symmetrical and gray features were extracted. The proposed classifier gives 84% accuracy

El-Dahshan et al. [6]. The brain MRI is an input to the system; features were extracted by discrete wavelet transform, reduced by principal component analysis technique and classify by using feed forward back propagation artificial neural network (FF- BPNN) and KNN. Using these classifiers gives an accuracy of 99% on both training and testing datasets.

Hong Men, et al. [7] present two machine learning algorithm neural network and SVM for classification of brain MRI. They used two kind of support vector machine based on polynomial kernel and radial basis function for different parametric values. The result of this experiment indicates that the support vector machine method is superior to the neural network algorithm.

### 3. SYSTEM DESIGN (Block Diagram)



**Fig 3.1 : Block Diagram.**

## 4. IMPLEMENTATION DETAILS

### 1. Data Collection :-

We collect MRI images from kaggle. We use labeled data that is making two folder of positive and negetive brain tumor images.

### 2. Data Augmentation :-

Importing all required libraries using Tenserflow backed. We make more copied of given images. Which helps to increase the accuracy of the model. In that data augmentation process. We done the same number of copies that is positive and negative images of brain tumor. It helps to increase variance of model.

### 3. Data Processing :-

In order to crop the part that contains only the brain of the image, I used a cropping technique to find the extreme top, bottom, left and right points of the brain.

### 4. Load Up Data :-

First we read image from folder then crop the part of the image representing only the brain. After that we resize the image in standard resolution. Then apply normalization because we want pixel values to be scaled to the range 0-1. Lastly append image to X and label to Y.

### 5. Splitting of Data :-

As we know we split data into 80% training and 20% for testing phase.

### 6. Train the Model :-

We start training our model with 10 epochs. If we increase number of epochs which may increase accuracy but slow the computation of model.

## Confusion Matrix

- Total number of 'No' = 22
- Total number of 'Yes' = 259
- Correct predicted 'Yes' = 247
- Correct predicted 'No' = 19
- Accuracy = 0.94

		Predicted	
		'No' 19+12	'Yes' 247+3
Actual	'No' 22	True 'No' 19	False 'Yes' 3
	'Yes' 259	False 'No' 12	True 'No' 247

Table 4.1 : Confusion Matrix

## **5. CONCLUSION & FUTURE SCOPE**

This research discuss about detection of brain tumor using convolution neural network. CNN is used to reduce computing power and complexity. The system help doctor(neurosurgeon, neurologist etc.) to classify brain tumor (Medulloblastom, Glioma, Craniopharyngioma etc.) from MRI images with high accuracy and low complexity.

The experiment result shows the classification accuracy of 89.9%. using CAD model. It is essential to use large number of patient's data which will further improve the accuracy of the system. Soft computing method achieve the optimum result in the shortest time.

Our project future scope to develop desktop application. After developing application setup in computer which is connected to MRI machine. This helps to doctor who work for detection of brain tumor. This application will alert that severe patient's information to respective doctor.

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