

# Brain image classification using deep convolutional neural networks

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# Problem Definition

It is a supervised learning problem in which the classification models are created Using Deep convolution neural network which can classify Normal brain image and abnormal brain image .

The data set used in this project contains 295 brain image out of which about 144 are normal brain images and 151 are abnormal abnormal brain images(tumor).

# Method or Outline

- 1 Download the dataset of MR images from the repository. It comprises of the normal and abnormal MR images
- 2 Resize the input images so that they are consistent with the size of the input layer of the pre-trained network model
- 3 Partition the data into training and test sets; 60% of images per category are taken for training and 40% as a test dataset to test the network
- 4 replace the final layer of Predefined DCNNs and add dense layers.

# Contribution of the team members

We downloaded the dataset of MR images from the clinical repository. we used transfer learning Technique to train convolutional neural network. for that VGG16, VGG19, RESNET50, RESNET101, InceptionV3 models are used which are trained on imagenet dataset. we replaced final output layer by following layers

- 1 Dropout
- 2 Dense
- 3 Dense
- 4 output

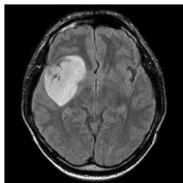


Figure: abnormal brain Image

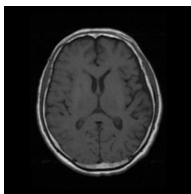


Figure: normal brain Image

- accuracy for VGG16 is 74.36% after 15 epoch

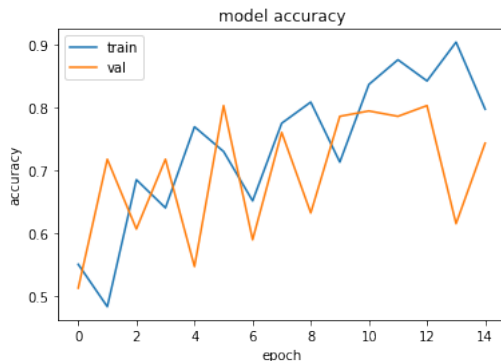


Figure: VGG16 accuracy vs epoch plot

# VGG19

- accuracy for VGG19 is 71.79% after 15 epoch

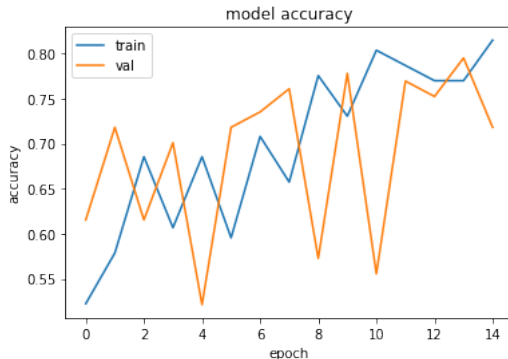


Figure: VGG19 accuracy vs epoch plot

# Resnet50

- accuracy for Resnet50 is 64.96 % after 15 epoch

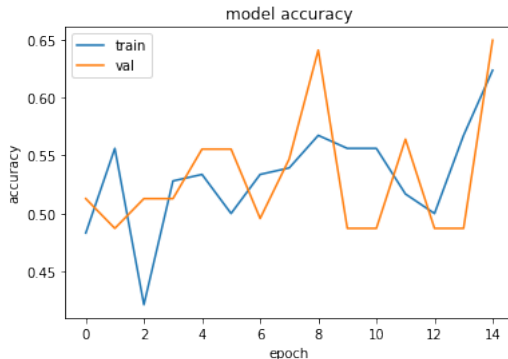


Figure: Resnet50 accuracy vs epoch plot



# Resnet101

- accuracy for Resnet101 is 61.54 % after 15 epoch

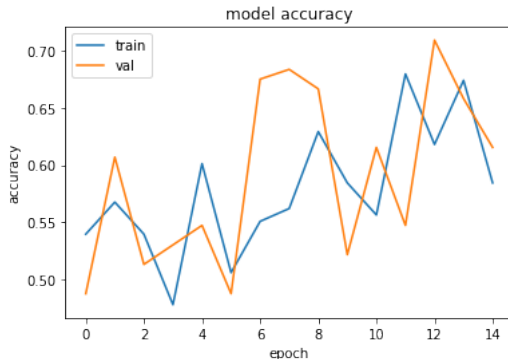


Figure: Resnet101 accuracy vs epoch plot

# InceptionV3

- accuracy for InceptionV3 is 76.92% for 15 epochs

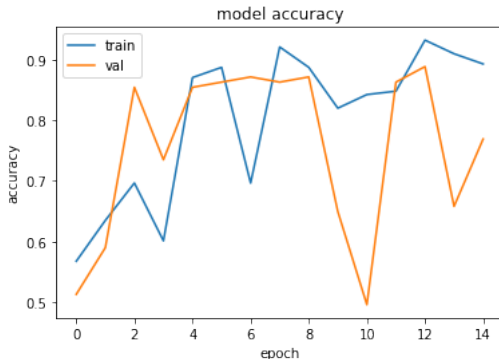


Figure: InceptionV3 accuracy vs epoch plot

# Comparison

- we tested models VGG16, VGG19, RESNET50, RESNET101, InceptionV3 . we noticed that InceptionV3 has highest accuracy

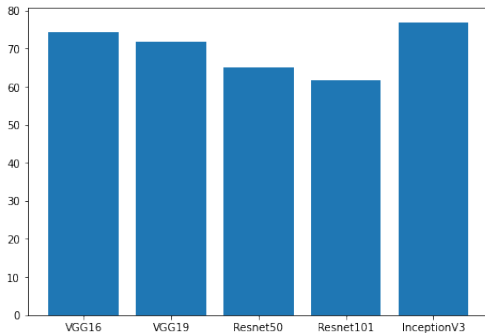


Figure: compression between different models

- **Deep convolutional neural networks with transfer learning for automated brain image classification**  
Taranjit Kaur , Tapan Kumar Gandhi  
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