

BRAIN TUMOR DETECTION USING CONVOLUTIONAL NEURAL NETWORK

Presented By:

Diya Singh (1903480130022)

Mitali Chaurasiya (1903480130035)

Supervised By:

Miss.Camellia Chakraborty
(ASST. PROF. PSITCOE)

Introduction

- In the field of Medical Image Analysis, research on Brain tumors is one of the most prominent ones.
- Primary brain tumors occur in around 250,000 people a year globally, making up less than 2% of cancer.
- Tumor segmentation is one of the most difficult task in medical image.
- Classification of the tumor as tumorous or non - tumorous is the primary task

Problem

- Segmentation of the tumours cell.
- Detection of the Tumor



How can we implement the problem?

- Basic image processing technique can be used for segmentation.
- Using Traditional Classifiers
- Using Convolutional Neural Network based detection



Backgrounds

BRAIN TUMOR

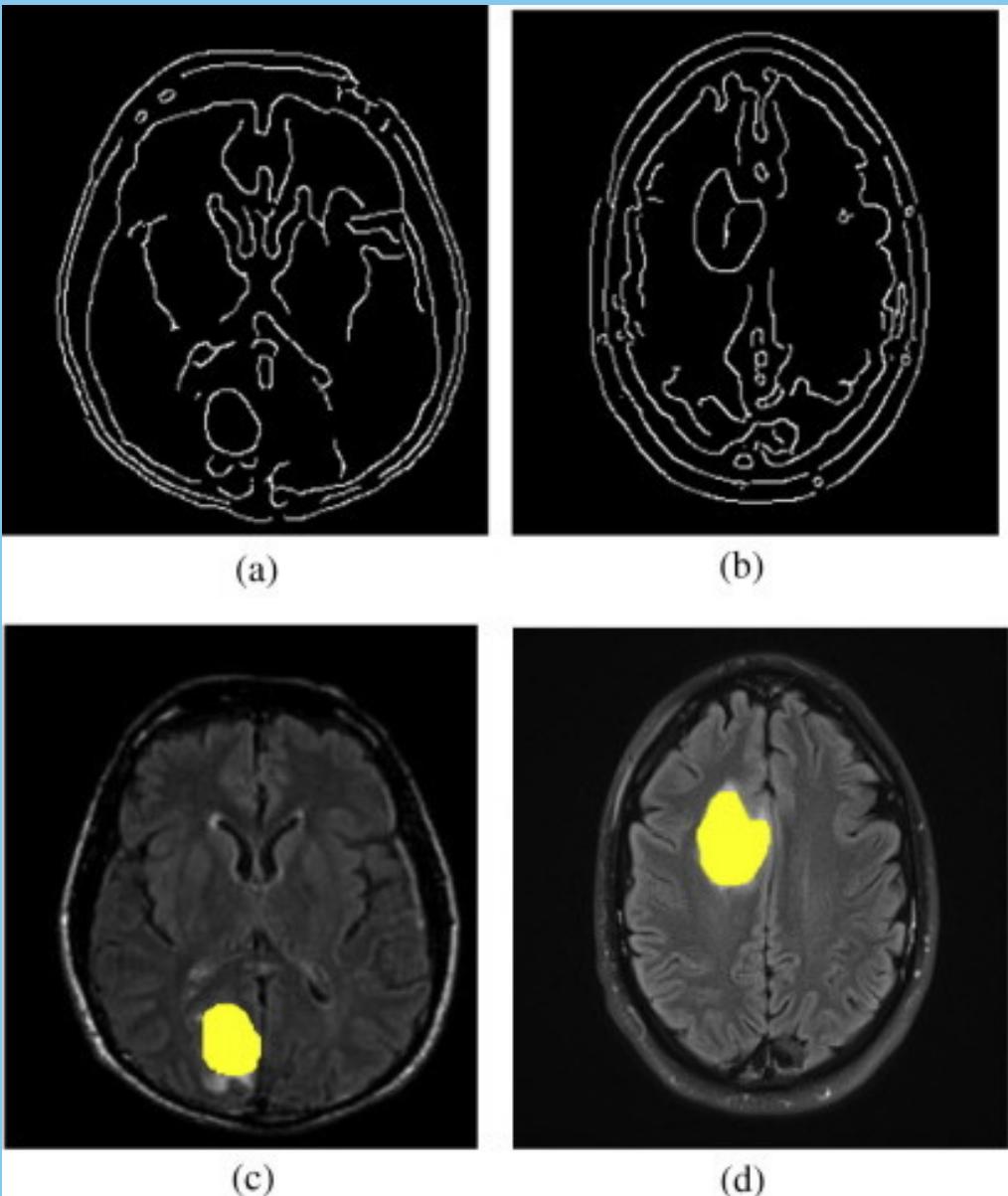
- ◆ Tumor cells which is undifferentiated in the image.
- ◆ Cells contain abnormal nuclei
- ◆ Abnormal cells forms within the brain
- ◆ Many dividing cells: disorganized arrangement
- ◆ Destroy healthy brain cells by invading them

Working Algorithm

CNN

Within Deep Learning, a Convolutional Neural Network or CNN is a type of artificial neural network, which is widely used for image/object recognition and classification. Deep Learning thus recognizes objects in an image by using a CNN.

METHODOLOGY



Data Extraction

- Image dataset acquisition
- Classification of brain images
- Image Preprocessing
- Image enhancement

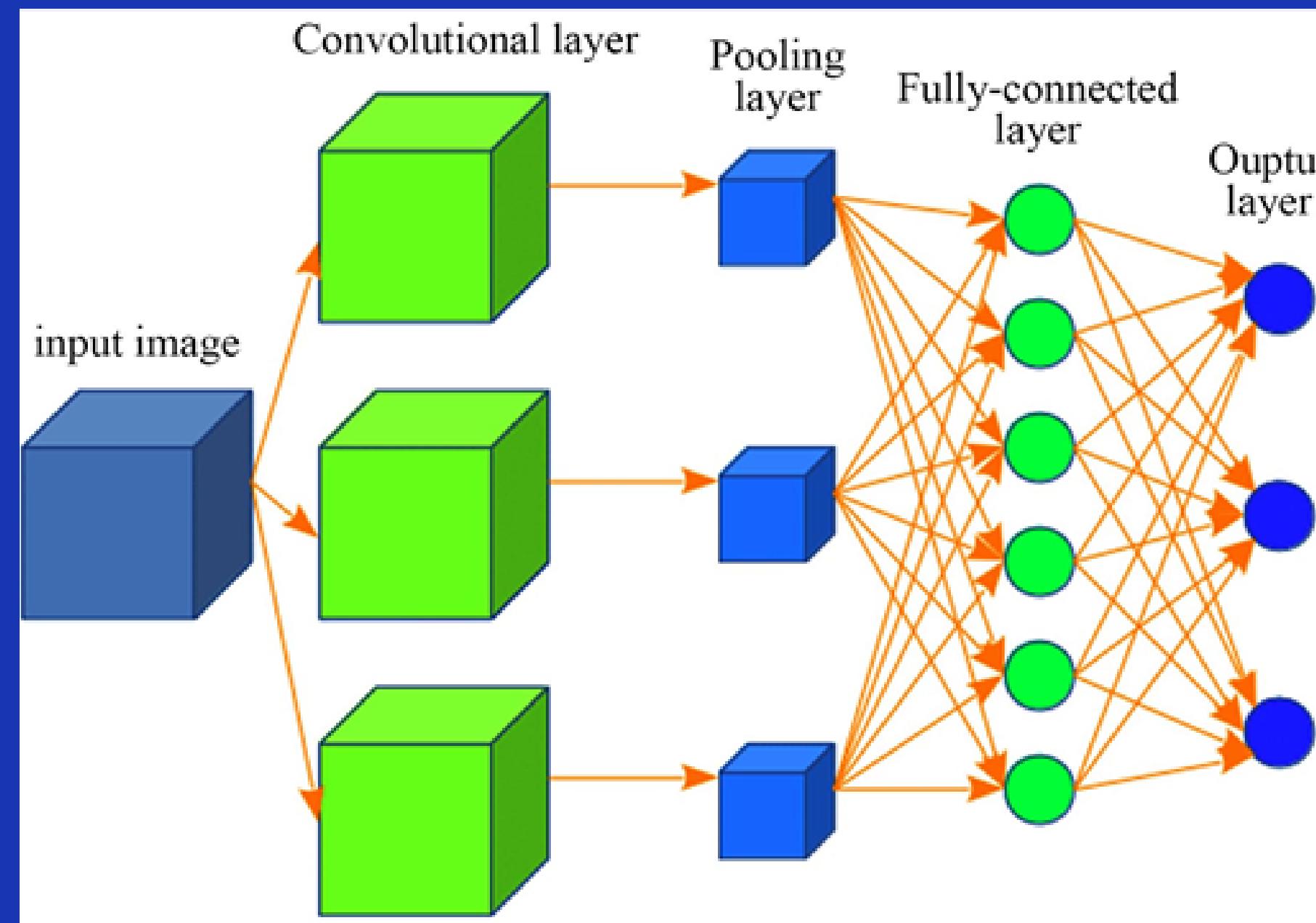
Color image processing

- Image segmentation

Design of Artificial Neural Network

- Convolutional neural network
- Weights and biases
- Back propagation

CNN developed for tumor detection



CNN Layers developed for tumor detection

Convolution Layer

- The beginning layer
- Converting all images into homogenous dimension
- Activation function:ReLU

Pooling Layer

- MaxPooling2D for the model
- Because of overfitting this layer was introduced.
- Output: Pooled feature map

Fully Connected Layers

- Two fully connected layers were employed Dense-1 and Dense-2 represented the dense layer.
- Dense function was applied in Keras

Model's Workflow

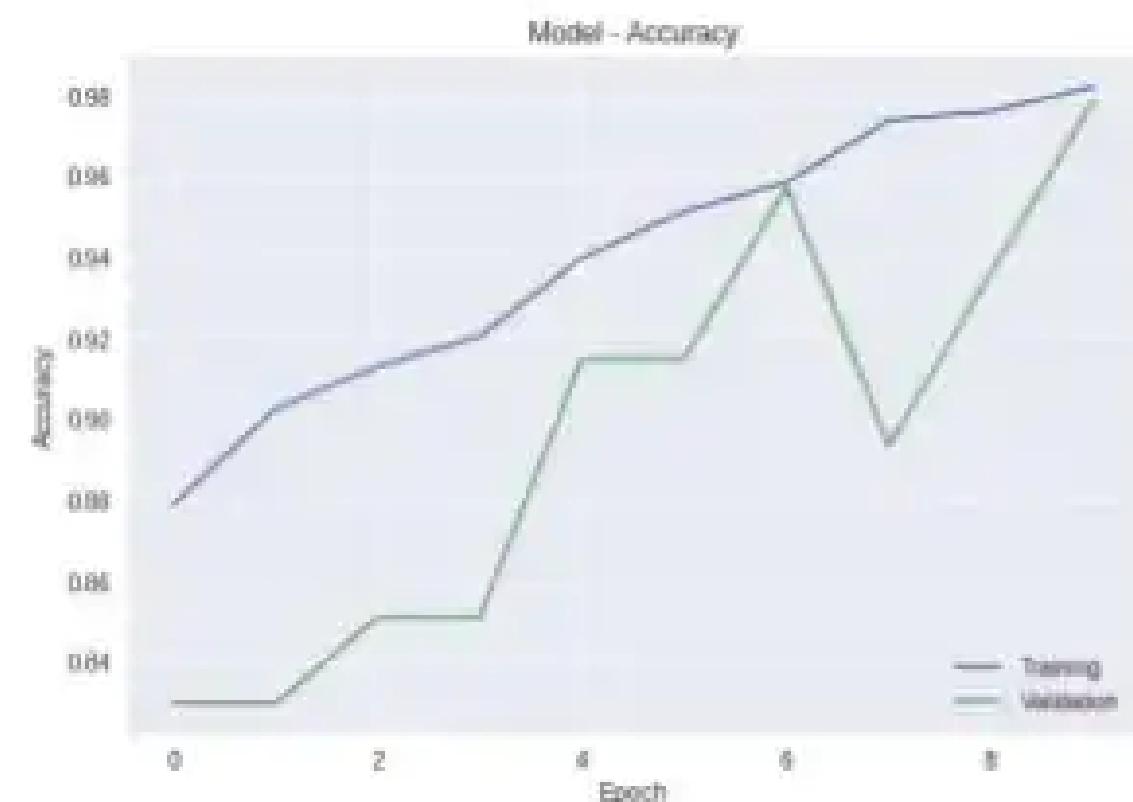
Workflow

- Load the input dataset.
- Adding a Convolutional layer with 32 convolutional filter.
- Passing the Convolutional kernal into the Max Pooling layer.
- Pooled feature map is used to get the single coloumn vector.
- Processing of the dense vector layer with 120 nodes.
- Final dense layer applying Sigmoid as the Activation function.
- Validation Stage and Performance evaluation.

Experimental Result

Model Accuracy Curve

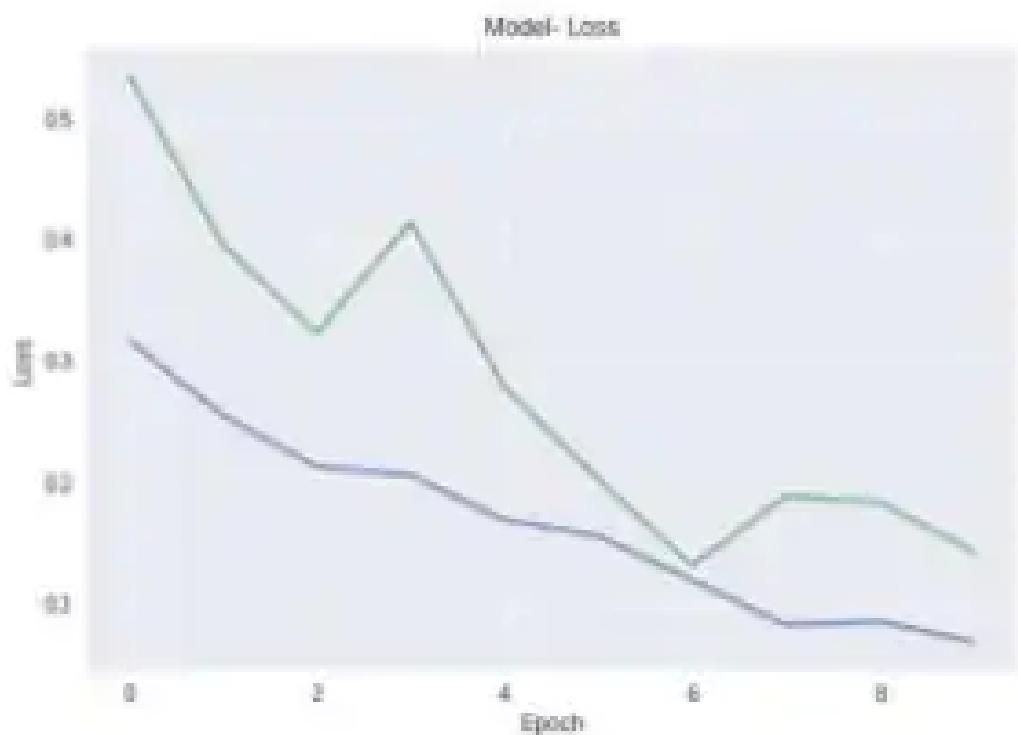
- Curve represents the training & Validation accuracy of model.
- Prediction value in the last is high, so model accuracy is high.



Model Loss Curve

The actual loss per epochs represents the graph.

Initially no prediction so the loss function is high and upto 10 epochs it is gradually decreased.



Model's Limitation

Limitations

- **Early detection of Brain Tumor.**
- **Reducing the pressure on Human judgement.**
- **Build a user interface which can identify the cancerous cells.**
- **Reducing the death rate by early detection.**
- **Supporting the faster communication, where patient care can be extended to remote areas.**

Future Plan

Plan

- ❖ Work on 3D image
- ❖ Build our own dataset
- ❖ Try to detect the grade and stage of the tumor
- ❖ Try to predict the location of the tumor from 3D image

A photograph of four women standing outdoors at night. They are all smiling and have their right fists raised in the air. From left to right: a woman with short blonde hair wearing a teal short-sleeved top; a woman with long dark hair wearing a black top; a woman with long blonde hair wearing a dark blue cardigan over a purple top; and a woman with long blonde hair wearing a pink sleeveless top and a dark blue cardigan. They are standing in front of a building with a glass door and a metal staircase. The background is dark.

Thank You