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Faculty of Computers & Artificial Intelligence
Faculty of Computers and Artificial Intelligence

Computer Science Department

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CS 396 Selected Topics in CS-2

Research Project

Report Submitted for Fulfillment of the Requirements and ILO's for Selected Topics in CS-2 course for Fall 2021

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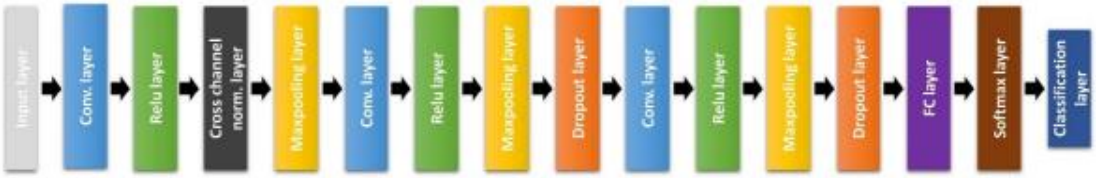
- **Architecture Used In Paper:**
  - **Multi-Classification of Brain Tumor Images Using Deep Neural Network.**

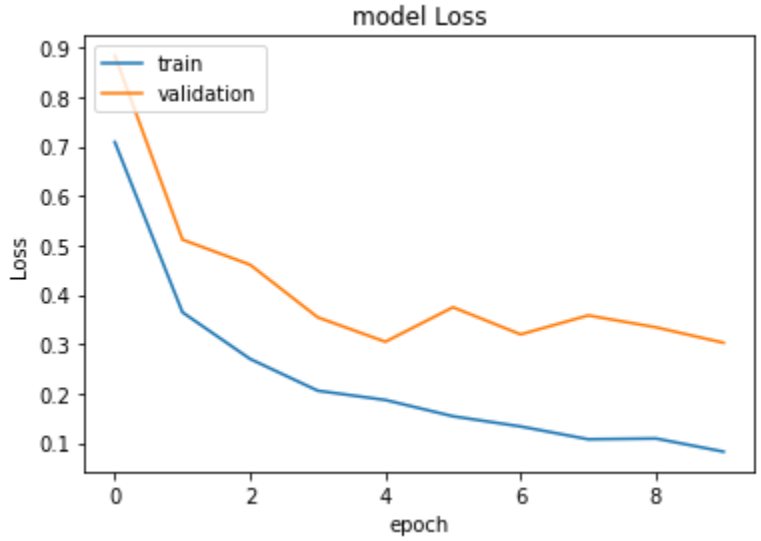


- ## Dataset Used In the Architecture:
  - **Brain Tumor dataset consists of 7020 Samples 512x512 divided into 4 classes (glioma – meningioma – notumor – pituitary) 68% for training and 32% for validation.**

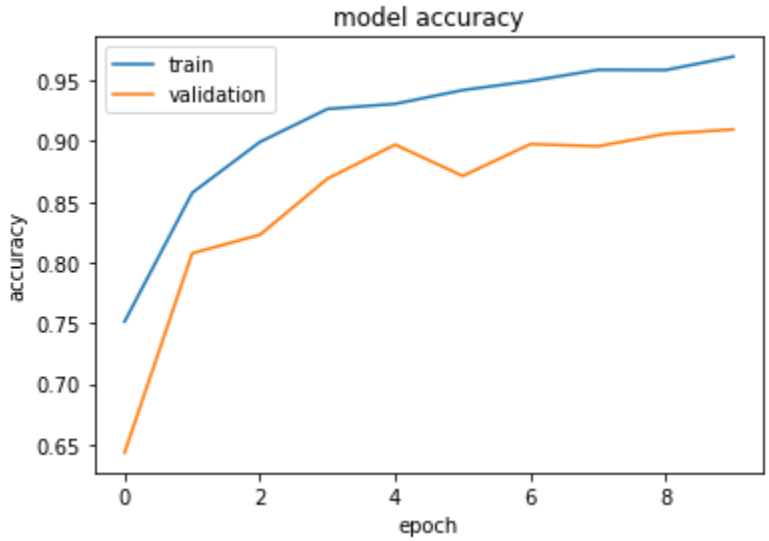
- **Implementation Details:**
  - **We used the Datagenerator for the preprocessing with Rescaling of 1.0/255. , Color mode :grayscale, Target size(128,128).**
  - **Splitted the dataset into 68% Training 32 Validation.**
  - **Built the model with the Sequential method consists of 12 Layers (3 Conv2D , 1 BatchNormalization , 3 MaxPool2D, 2 Dropout, 1 Flatten , 2 NN)**
  - **Filters (8,16,32)**
  - **Kernel_size (5,3,2)**
  - **Strides (2)**
  - **Pool Size (2,2)**
  - **Dropout (0.25 , 0.5)**
  - **Padding (same)**
  -

```
Model: "sequential"
_________________________________________________________________
 Layer (type)                Output Shape              Param #
=================================================================
 conv2d (Conv2D)             (None, 128, 128, 8)       208

 batch_normalization (BatchN  (None, 128, 128, 8)      32
 ormalization)

 max_pooling2d (MaxPooling2D  (None, 64, 64, 8)        0
 )

 conv2d_1 (Conv2D)           (None, 64, 64, 16)        1168

 max_pooling2d_1 (MaxPooling  (None, 32, 32, 16)       0
 2D)

 dropout (Dropout)           (None, 32, 32, 16)        0

 conv2d_2 (Conv2D)           (None, 32, 32, 32)        2080

 max_pooling2d_2 (MaxPooling  (None, 16, 16, 32)       0
 2D)

 dropout_1 (Dropout)         (None, 16, 16, 32)        0

 flatten (Flatten)           (None, 8192)              0

 dense (Dense)               (None, 256)               2097408

 dense_1 (Dense)             (None, 4)                 1028

=================================================================
Total params: 2,101,924
Trainable params: 2,101,908
Non-trainable params: 16
```

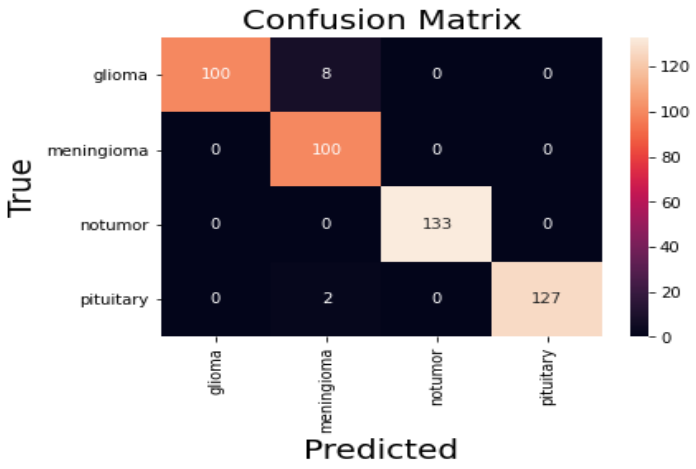
- **Model results and visualization:**
  - **Model Loss:**



  - **Model Accuracy:**



➢ Confusion Matrix:



Classification Report

	precision	recall	f1-score	support
0	1.00	0.93	0.96	108
1	0.91	1.00	0.95	100
2	1.00	1.00	1.00	133
3	1.00	0.98	0.99	129
accuracy			0.98	470
macro avg	0.98	0.98	0.98	470
weighted avg	0.98	0.98	0.98	470

➢ Roc Curv: