INSTRUCTIONS FOR THE STUDENTS

1. Kindly Adhere to the presentation format
2. Kindly note that the Evaluation Committee would focus more on knowing about the Implementation and Functionality in your project
3. Total interaction duration: 15 minutes
   Duration of Presentation: 12 minutes
   Q&A round: 3 minutes
5. Candidates will be requested to wait in a meeting room before interacting with the Evaluation Committee
6. Candidates are requested to join 15 minutes prior to their designated slot and be present in a formal attire for the meeting along with Guide.

	Evaluation by Review Committee	Evaluation by Guide
Implementation of Module-1	3	3
Implementation of Module-2	3	3
Integration & Deployment	2	2
Project Demo	3	3
Results	2	2
Conclusion & Future Scope	2	2
Total	15	15

MVSR Engineering College, Hyderabad - 501 510

Bachelor of Engineering

Department of Computer Science and Engineering

Project Name: DEEP LEARNING ANALYSIS OF COVID-19 USING CHEST CT SCAN

Batch No:

Mohd. Ataur Rahman – 2451-17-733-026

Sahithya Namani – 2451-17-733-027

Lalita Snigdha Akkapeddi – 2451-17-733-054

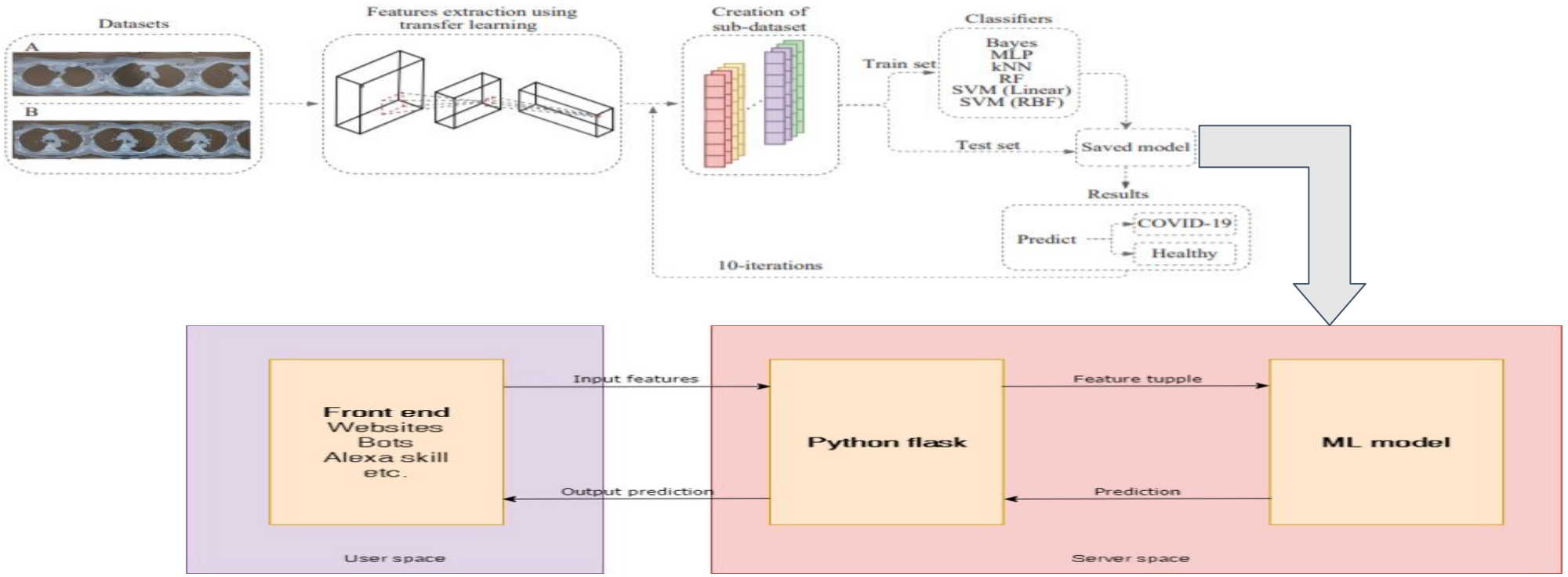
Internal Guide:
B. Saritha
Associate Professor,
CSED, MVSREC

Batch No: A19 **Name of the project:** DEEP LEARNING ANALYSIS OF COVID-19 USING CHEST CT SCAN

Project Objective:

To screen Covid-19 using CT Scan images in a quick and accurate manner using the concepts of deep learning

SYSTEM ARCHITECTURE



Batch No: A19 **Name of the project:** DEEP LEARNING ANALYSIS OF COVID-19 USING CHEST CT SCAN

Implementation of Module-1

Software Environment Used : Google Colab
Major Functions used : VGG19(),cv2.imread(), cv2.cvtColor(),cv2.resize()
Number of lines of code : 40 cells

Test cases for Module 1: Training and Testing

Scenario 1: Evaluating Image modifications

Test case 1 :
Input : HRCT image of Covid-19 positive patient with random dimensions
Output : Image modified according to the requirements of model

Test case 2 :
Input : HRCT image of Covid-19 negative patient with random dimensions
Output : Image modified according to the requirements of model

Input HRCT image with random dimensions

Output HRCT image with 224x224 pixels size

Marks:3

Batch No: A19 **Name of the project:** DEEP LEARNING ANALYSIS OF COVID-19 USING CHEST CT SCAN

Implementation of Module-1(Contd.)

Software Environment Used : Google Colab
Major Functions used : VGG19(),cv2.imread(), cv2.cvtColor(),cv2.resize()
Number of lines of code : 40 cells

Scenario 2: Building the model
Test case 1:
Input : Existing VGG19 model
Output : Modified VGG19 model

Scenario 3: **Training the model**
Test case 1:
Input : Weights obtained from VGG19 and training dataset
Output : Trained model

```
Model: "model"
_________________________________________________________________
Layer (type)                 Output Shape              Param #
=================================================================
input_1 (InputLayer)         [(None, 224, 224, 3)]     0
_________________________________________________________________
block1_conv1 (Conv2D)        (None, 224, 224, 64)      1792
_________________________________________________________________
block1_conv2 (Conv2D)        (None, 224, 224, 64)      36928
_________________________________________________________________
block1_pool (MaxPooling2D)   (None, 112, 112, 64)      0
_________________________________________________________________
block2_conv1 (Conv2D)        (None, 112, 112, 128)     73856
_________________________________________________________________
block2_conv2 (Conv2D)        (None, 112, 112, 128)     147584
_________________________________________________________________
block2_pool (MaxPooling2D)   (None, 56, 56, 128)       0
_________________________________________________________________
block3_conv1 (Conv2D)        (None, 56, 56, 256)       295168
_________________________________________________________________
block3_conv2 (Conv2D)        (None, 56, 56, 256)       590080
_________________________________________________________________
block3_conv3 (Conv2D)        (None, 56, 56, 256)       590080
_________________________________________________________________
block3_conv4 (Conv2D)        (None, 56, 56, 256)       590080
_________________________________________________________________
block3_pool (MaxPooling2D)   (None, 28, 28, 256)       0
_________________________________________________________________
block4_conv1 (Conv2D)        (None, 28, 28, 512)       1180160
_________________________________________________________________
block4_conv2 (Conv2D)        (None, 28, 28, 512)       2359808
_________________________________________________________________
block4_conv3 (Conv2D)        (None, 28, 28, 512)       2359808
_________________________________________________________________
block4_conv4 (Conv2D)        (None, 28, 28, 512)       2359808
_________________________________________________________________
block4_pool (MaxPooling2D)   (None, 14, 14, 512)       0
_________________________________________________________________
block5_conv1 (Conv2D)        (None, 14, 14, 512)       2359808
_________________________________________________________________
block5_conv2 (Conv2D)        (None, 14, 14, 512)       2359808
_________________________________________________________________
block5_conv3 (Conv2D)        (None, 14, 14, 512)       2359808
_________________________________________________________________
block5_conv4 (Conv2D)        (None, 14, 14, 512)       2359808
_________________________________________________________________
block5_pool (MaxPooling2D)   (None, 7, 7, 512)         0
_________________________________________________________________
flatten (Flatten)            (None, 25088)             0
_________________________________________________________________
dropout (Dropout)            (None, 25088)             0
_________________________________________________________________
dense (Dense)                (None, 2)                 50178
=================================================================
Total params: 20,074,562
Trainable params: 50,178
Non-trainable params: 20,024,384
```

Output of Testcase-1

Marks:3

Batch No: **A19** **Name of the project:** **DEEP LEARNING ANALYSIS OF COVID-19 USING CHEST CT SCAN**

Implementation of Module-2

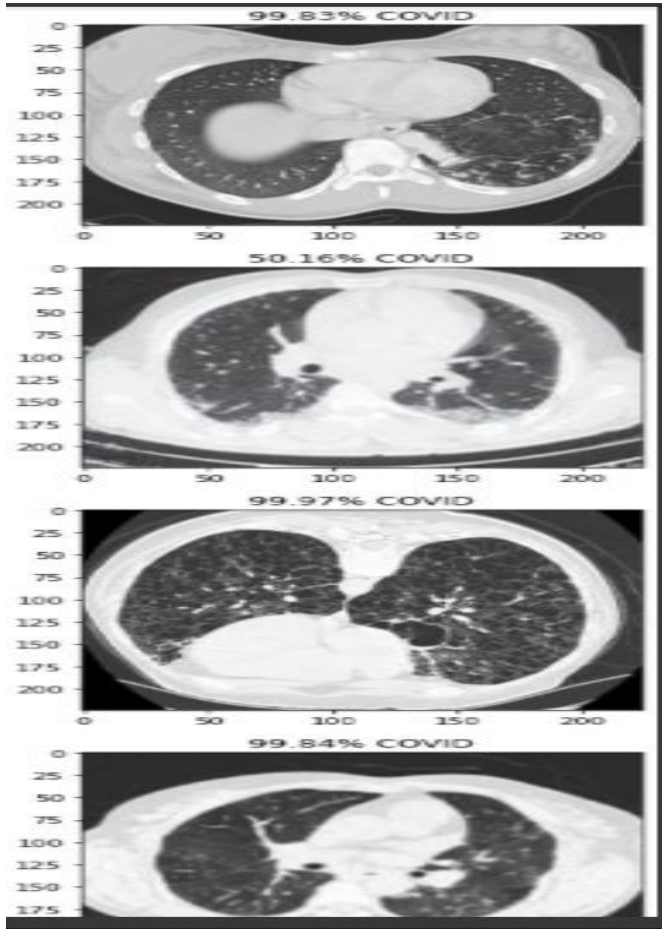
Software Environment Used : Google Colab
Major Functions used :cv2.imread(), cv2.cvtColor(),cv2.resize()
Number of lines of code : 83

Test cases for Module 2: Deploying the model into Flask App

Scenario 1: Evaluating the trained model

Test case 1:
Input : HRCT image of COVID-19 patient
Output : Predictions by model

Test case 2:
Input : HRCT image of Non-COVID patient
Output : Predictions by model



Marks:3

Batch No: A19 **Name of the project:** DEEP LEARNING ANALYSIS OF COVID-19 USING CHEST CT SCAN

Implementation of Module-2(Contd.)

Software Environment Used : Google Colab
Major Functions used :cv2.imread(), cv2.cvtColor(),cv2.resize()
Number of lines of code : 83

Test cases for Module 2: Deploying the model into Flask App
Scenario 2: Evaluating the outputs in Flask app

Test case 1:
Input : HRCT image of COVID-19 patient
Output : Predictions by model

Test case 2:
Input : HRCT image of Non-COVID patient
Output : Predictions by model

Marks:3

Integration & Deployment

Technical challenges faced / Issues addressed :

- Collection of datasets was difficult.
- Lack of availability of properly marked data.
- Since the used dataset was very large, loading it was not timely.
- Working with Anaconda was very challenging.
- Availability of GPU is appreciable.
- Using Google Colab to run the Flask application was quite difficult.

Marks:2

Batch No: A19 **Name of the project:** DEEP LEARNING ANALYSIS OF COVID-19 USING CHEST CT SCAN

Project Demo

Demo of project

Subjective Evaluation
(As observed)

Marks:3

Batch No: A19 **Name of the project:** DEEP LEARNING ANALYSIS OF COVID-19 USING CHEST CT SCAN

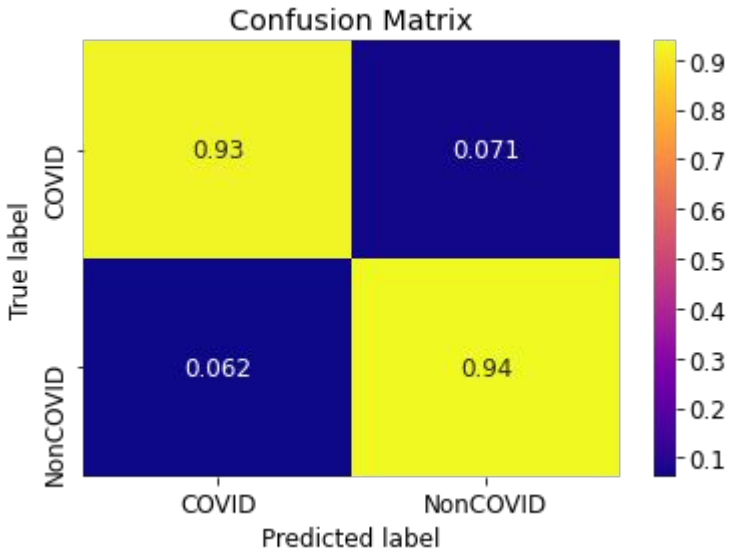
Results

Objective Evaluation
(Using Evaluation Metrics)

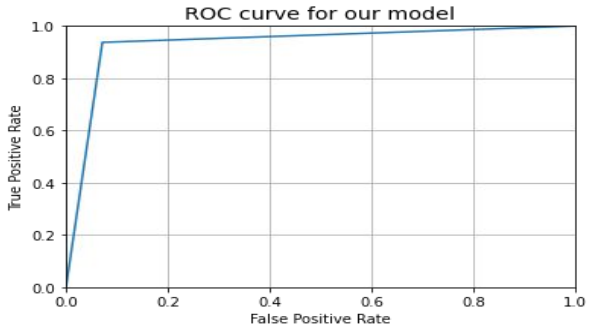
- Accuracy : 93%
- Classification Report:

	precision	recall	f1-score	support
0	0.93	0.93	0.93	70
1	0.94	0.94	0.94	80
accuracy			0.93	150
macro avg	0.93	0.93	0.93	150
weighted avg	0.93	0.93	0.93	150

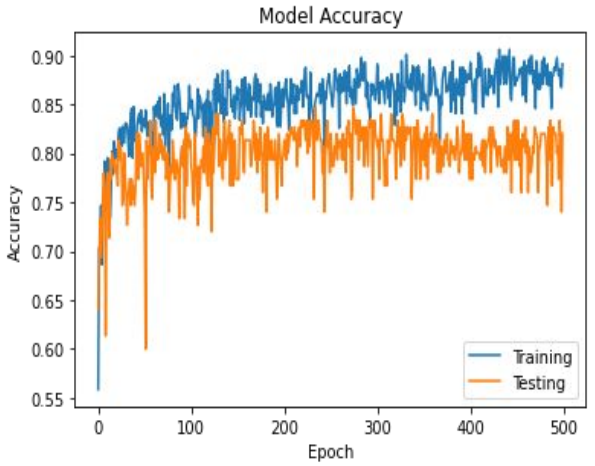
- Confusion Matrix:

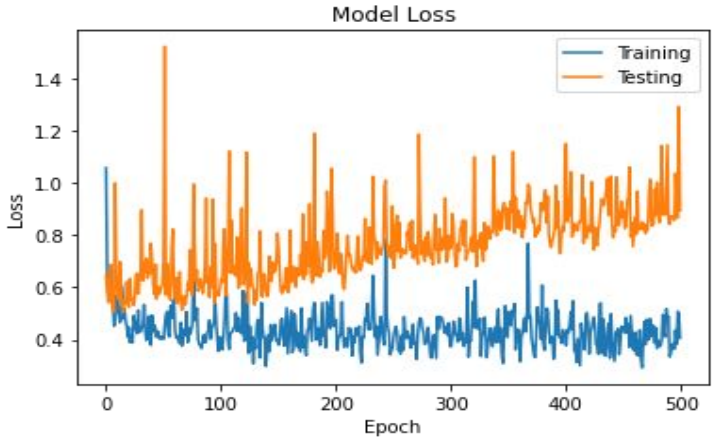


- ROC Curve:



- Accuracy, Loss Plots:





Marks:2

Batch No: A19 **Name of the project:** DEEP LEARNING ANALYSIS OF COVID-19 USING CHEST CT SCAN

Conclusion & Future scope

Conclusion :

Future Scope:

Artificial Intelligence (AI) is very powerful on image analytics and radiology is all about images from MRI, CT scans and X-rays. Analysing these images and identifying the pathology or disease, to what extent it has infected or progressed, is radiology AI.

- Radiology AI -Several other models can be built on top of this model which in turn will be useful in detecting family of such viral diseases
- The volume of training data can be increased to develop a new CNN model specifically trained on COVID data.
- The model can also be trained using other suitable Transfer Learning models

Marks:2

THANK YOU