import os

import pathlib

import numpy as np

import pandas as pd

import matplotlib.pyplot as plt

import matplotlib.image as mpimg

import random

import cv2

from sklearn.model\_selection import train\_test\_split

from tensorflow.keras.models import Sequential

from tensorflow.keras.models import Model

from tensorflow.keras.layers import Dense, Activation, Conv2D, MaxPool2D, Flatten, Dropout, BatchNormalization

from tensorflow.keras.callbacks import EarlyStopping

import tensorflow as tf

from google.colab import files

from sklearn.metrics import classification\_report,confusion\_matrix

In [ ]:

files.upload()

import os

os.environ["KAGGLE\_CONFIG\_DIR"] = "/content"

!kaggle datasets download -d sid321axn/covid-cxr-image-dataset-research

!unzip \\*.zip

for dirpath,dirnames,filenames in os.walk("/content/COVID\_IEEE"):

print(f"there are {len(dirnames)} directories and {len(filenames)} images in '{dirpath}'.")

data\_dir = pathlib.Path("/content/COVID\_IEEE")

class\_names = np.array(sorted([item.name for item in data\_dir.glob("\*")]))

class\_names

def view\_image(target\_dir, target\_class):

target\_folder = target\_dir+target\_class

random\_image = random.sample(os.listdir(target\_folder),1)

print(random\_image)

img = mpimg.imread(target\_folder+"/"+ random\_image[0])

plt.imshow(img, cmap ="gray")

plt.title(target\_class)

plt.axis("off")

print(f"image shape {img.shape}")

return img

img = view\_image("/content/COVID\_IEEE/","virus")

img = view\_image("/content/COVID\_IEEE/","normal")

img = view\_image("/content/COVID\_IEEE/","covid")

data=[]

labels=[]

covid=os.listdir("/content/COVID\_IEEE/covid/")

for a in covid:

image = cv2.imread("/content/COVID\_IEEE/covid/"+a,)

image = cv2.resize(image, (224, 224))

data.append(image)

labels.append(0)

normal=os.listdir("/content/COVID\_IEEE/normal/")

for a in normal:

image = cv2.imread("/content/COVID\_IEEE/normal/"+a,)

image = cv2.resize(image, (224, 224))

data.append(image)

labels.append(1)

virus=os.listdir("/content/COVID\_IEEE/virus/")

for a in virus:

image = cv2.imread("/content/COVID\_IEEE/virus/"+a,)

image = cv2.resize(image, (224, 224))

data.append(image)

labels.append(2)

data = np.array(data) / 255.0

img\_labels = np.array(labels)

X\_train, X\_test, y\_train, y\_test = train\_test\_split(data, img\_labels, test\_size=0.20, random\_state=42)

y\_train = tf.keras.utils.to\_categorical(y\_train, num\_classes=3)

y\_test = tf.keras.utils.to\_categorical(y\_test, num\_classes=3)

model = Sequential()

*#Block Number 1*

model.add(Conv2D(input\_shape = (224,224,3), filters=32,padding="same", kernel\_size= (3,3)))

model.add(Activation("relu"))

model.add(Conv2D(filters=32,padding="same", kernel\_size= (3,3)))

model.add(Activation("relu"))

model.add(MaxPool2D((2,2)))

*#Block Number 2*

model.add(Conv2D(filters=64,padding="same", kernel\_size= (3,3)))

model.add(Activation("relu"))

model.add(Conv2D(filters=64,padding="same", kernel\_size= (3,3)))

model.add(Activation("relu"))

model.add(MaxPool2D((2,2)))

*#Block Number 3*

model.add(Conv2D(filters=128,padding="same", kernel\_size= (3,3)))

model.add(Activation("relu"))

model.add(Conv2D(filters=128,padding="same", kernel\_size= (3,3)))

model.add(Activation("relu"))

model.add(MaxPool2D((2,2)))

model.add(MaxPool2D((2,2)))

model.summary()