MODEL BUILDING

Team ID	PNT2022TMID20850
Project Name	Emerging Methods for Early Detection of Forest Fires

Predictions

```
import keras
from keras.preprocessing.image import ImageDataGenerator
#Define the parameters/ arguments for ImageDataGenerator class
train_datagen= ImageDataGenerator (rescale=1./255,shear_range=0.2, rotation_range=180, zoom_range=0.2, horizontal_flip=True)

test_datagen= ImageDataGenerator (rescale=1./255)
#Applying ImageDataGenerator functionality to trainset
x_train=train_datagen.flow_from_directory(r‘C:\Users\dhine\Downloads\archive\Dataset/train_set’target_size=(128,128),batch_size=32,class_mode=’binary’)

Found 436 images belonging to 2 classes.

#Applying ImageDataGenerator functionality to testset
x_test=test_datagen.flow_from_directory(r‘C:\Users\dhine\Downloads\archive\Dataset\test_set’target_size=(128,128),batch_size=32,class_mode=’binary’)

Found 121 images belonging to 2 classes.

#import model building libraries

#To define Linear initialisation import Sequential
from keras.models import Sequential
```

```
#import Maxpooling layer
from keras. layers import Maxpooling2D
#import flatten layer
from keras. layers import Flatten
import warnings
warnings.filterwarnings('ignore')
#initializing the model
model=Sequential( )
#add convolution layer
model . add (convolution2D(32,(3,3), input_shape(128,128,3),activation='relu'))
#add maxpooling layer
model . add (Maxpooling2D (pool_size=(2,2)))
#add flatten layer
model . add (flatten( ))
#add hidden layer
model . add (Dense (150, activation='relu'))
#add output layer
model . add (Dense(1,activation='sigmoid'))

#configure the learning process
model.compile(loss='binary_crossentropy',optimizer="adam",metrics=["accuracy"])
#Training the model
model.fit_generator(x_train,steps_per_epoch=14,epochs=10,validation_data=x_test,validation_st
Epoch 1/10
14/14 [==============================] - 84s 6s/step - loss: 4.2334 - accuracy: 0.5619
-         val_loss: 1.3686 - val_accuracy:
0.5950 Epoch 2/10
14/14 [==============================] - 74s 5s/step - loss: 0.5689 - accuracy: 0.7362
-         val_loss: 0.2423 - val_accuracy:
0.8926 Epoch 3/10
```

14/14 [==============================] - 123s 9s/step - loss: 0.2231 - accuracy: 0.9197 - val_loss: 0.1323 - val_accuracy: 0.9669

Epoch 4/10

14/14 [==============================] - 75s 5s/step - loss: 0.2170 - accuracy: 0.9128 - val_loss: 0.1082 - val_accuracy:

0.9669 Epoch 5/10

14/14 [==============================] - 129s 10s/step - loss: 0.1918 - accuracy: 0.9151 - val_loss: 0.1145 - val_accuracy: 0.9669

Epoch 6/10

14/14 [==============================] - 111s 8s/step - loss: 0.1938 - accuracy: 0.9037 - val_loss: 0.1030 - val_accuracy: 0.9669

Epoch7/10

14/14 [==============================] - 88s 6s/step - loss: 0.1756 - accuracy: 0.9312 - val_loss: 0.0831 - val_accuracy:

0.9752 Epoch8/10

14/14 [==============================] – 86s 6s/step - loss: 0.1564 - accuracy: 0.9404 - val_loss: 0.1073 - val_accuracy:

0.9669 Epoch9/10

14/14 [==============================]- 77s 6s/step - loss: 0.1480 - accuracy: 0.9427 - val_loss: 0.0754 - val_accuracy:

0.9835 Epoch 10/10

14/14 [==============================]- 81s 6s/step - loss: 0.1641 - accuracy: 0.9289 - val_loss: 0.0601 - val_accuracy: 0.9835

<keras.callbacks.History at 0x2546507bf10>

```
model.save("forest1.h5")
#import load_model from
keras.model from keras.models
import load_model #import image
class from keras
from tensorflow.keras.preprocessing import image
#import numpy
import numpy as np
```

```
#import cv2
import cv2


#load the saved model
model = load_model("forest1.h5")
img=image.load_img(r'C:\Users\dhine\Downloads\archive\Dataset\Dataset\test_set\with fire\skyn
x=image.img_to_array(img)
res = cv2.resize(x, dsize=(128, 128), interpolation=cv2.INTER_CUBIC)
#expand the image shape
x=np.expand_dims(res,axis=0)
pred=model.predict(x)
1/1 [==============================] - 5s 5s/step
Pred
array([[1.]], dtype=float32)
```