

EARLY DETECTION OF FOREST FIRE USING DEEP LEARNING

MODEL BUILDING

SAVE THE MODEL

Team ID	PNT2022TMID53582
Project Name	Project-Early detection of forest fire using deep learning

SAVE THE MODEL

Your model is to be saved for future purposes. This saved model also is integrated with an android application or web application in order to predict something.

IMPORT LIBRARIES:

11/7/22, 12:35 AM

Untitled8.ipynb - Colaboratory

▼ Importing Keras libraries

```
import keras
```

▼ Importing ImageDataGenerator from Keras

```
from keras.preprocessing.image import ImageDataGenerator
```

IMPORT ImageDataGenerator FROM KERAS:

```
▼ Importing Keras libraries
[1] import keras

▼ Importing ImageDataGenerator from Keras
[13] from matplotlib import pyplot as plt
      from keras.preprocessing.image import ImageDataGenerator

▼ Defining the Parameters
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)
<keras.preprocessing.image.ImageDataGenerator at 0x7fb7448ac110>
```

APPLYING ImageDataGenerator to train dataset:

`flow_from_directory ()` method for Train folder.

```
Defining the Parameters

[11] 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)

<keras.preprocessing.image.ImageDataGenerator at 0x7fb7448ac110>

Applying ImageDataGenerator functionality to train dataset

[10] from google.colab import drive
     drive.mount('/content/drive')

Drive already mounted at /content/drives; to attempt to forcibly remount, call drive.mount("/content/drive", force_remount=True).

[17] x_train=train_datagen.flow_from_directory('/content/drive/MyDrive/IBM PROJECT/dataset/DATA SET/archive/Dataset/Dataset/train_set', target_size=(128,128), batch_size=32, class_mode='binary')

Found 436 images belonging to 2 classes.
```

APPLYING ImageDataGenerator to test dataset:

Applying the `flow_from_directory ()` method for test folder.

```
Applying ImageDataGenerator functionality to test dataset

x_test=test_datagen.flow_from_directory('/content/drive/MyDrive/IBM PROJECT/dataset/DATA SET/archive/Dataset/Dataset/test_set', target_size=(128,128), batch_size=32, class_mode='binary')

Found 121 images belonging to 2 classes.
```

IMPORTING MODEL BUILDING LIBRARIES:

11/8/22, 1:16 AM

Main code - Colaboratory

Importing Model Building Libraries

```
#to define the linear Initialisation import sequential
from keras.models import Sequential
#to add layers import Dense
from keras.layers import Dense
#to create Convolutional kernel import convolution2D
from keras.layers import Convolution2D
#import Maxpooling layer
from keras.layers import MaxPooling2D
#import flatten layer
from keras.layers import Flatten
import warnings
warnings.filterwarnings('ignore')
```

INITIALIZING THE MODEL:

▾ Initializing the model

```
model=Sequential()
```

ADDING CNN LAYERS:

▾ Adding CNN Layers

```
model.add(Convolution2D(32,(3,3),input_shape=(128,128,3),activation='relu'))  
#add maxpooling layers  
model.add(MaxPooling2D(pool_size=(2,2)))  
#add faltten layer  
model.add(Flatten())
```

ADDING DENSE LAYERS:

▾ Add Dense layers

```
#add hidden layers  
model.add(Dense(150,activation='relu'))  
#add output layer  
model.add(Dense(1,activation='sigmoid'))
```

CONFIGURING THE LEARNING PROCESS:

▾ configuring the learning process

```
model.compile(loss='binary_crossentropy',optimizer="adam",metrics=["accuracy"])
```

TRAINING THE MODEL:

▼ Training the model

```
model.fit_generator(x_train, steps_per_epoch=14, epochs=10, validation_data=x_test, validation_steps=7)
```

```
Epoch 1/10
14/14 [=====] - 322s 19s/step - loss: 1.5998 - accuracy: 0.70
Epoch 2/10
14/14 [=====] - 26s 2s/step - loss: 0.3427 - accuracy: 0.8625
Epoch 3/10
14/14 [=====] - 32s 2s/step - loss: 0.2979 - accuracy: 0.8857
Epoch 4/10
14/14 [=====] - 29s 2s/step - loss: 0.2585 - accuracy: 0.8929
Epoch 5/10
14/14 [=====] - 29s 2s/step - loss: 0.1926 - accuracy: 0.9243
Epoch 6/10
14/14 [=====] - 30s 2s/step - loss: 0.1971 - accuracy: 0.9264
Epoch 7/10
14/14 [=====] - 32s 2s/step - loss: 0.1781 - accuracy: 0.9281
Epoch 8/10
14/14 [=====] - 30s 2s/step - loss: 0.1796 - accuracy: 0.9243
Epoch 9/10
14/14 [=====] - 31s 2s/step - loss: 0.2306 - accuracy: 0.8964
Epoch 10/10
14/14 [=====] - 27s 2s/step - loss: 0.2593 - accuracy: 0.8857
<keras.callbacks.History at 0x7fd537101390>
```

SAVE THE MODEL:

▼ Save the model

```
model.save("forest.h5")
```