

EARLY DETECTION OF FOREST FIRE USING DEEP LEARNING

MODEL BUILDING PREDICTIONS

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Project Name	Project-Early detection of forest fire using deep learning

PREDICTIONS:

The last and final step is to make use of our saved model to do predictions. For that we have a class in keras called load_model. Load_model is used to load our saved model h5 file (alert.h5).

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
```

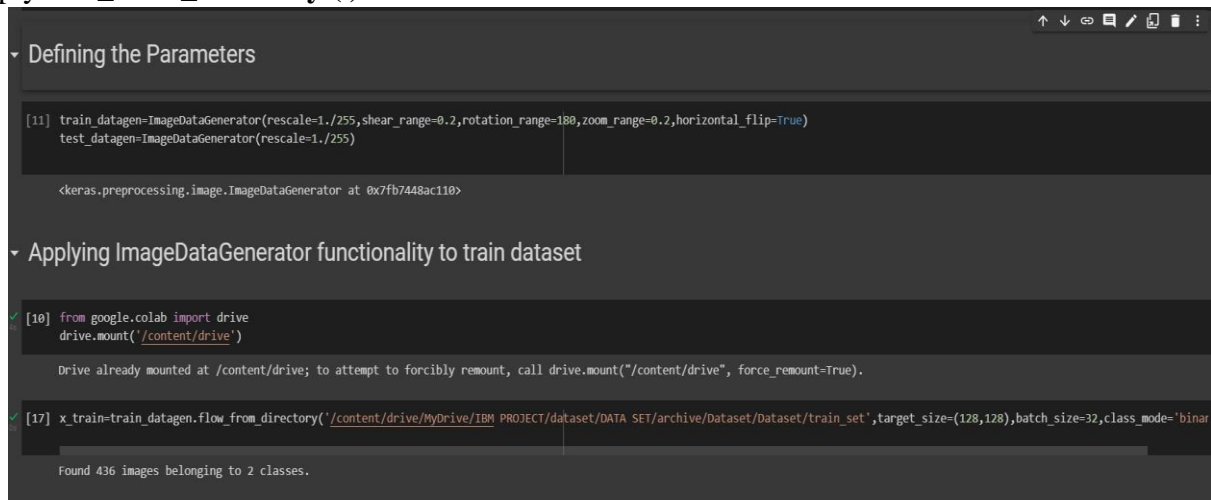
▾ Defining the Parameters

```
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:

plyflow_from_directory ()methodfor Train folder.



The screenshot shows a Jupyter Notebook with two sections. The first section, 'Defining the Parameters', contains code to create ImageDataGenerator objects for training and testing. The second section, 'Applying ImageDataGenerator functionality to train dataset', shows the mounting of Google Drive and the use of flow_from_directory to load training data.

```
[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')

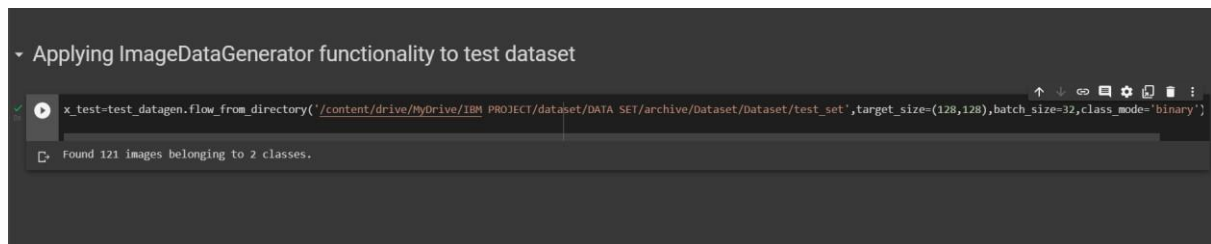
Drive already mounted at /content/drive; to attempt to forcibly remount, call drive.mount("/content/drive", force_remount=True).
```

```
[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 () methodfortest folder.



The screenshot shows a Jupyter Notebook with a section titled 'Applying ImageDataGenerator functionality to test dataset'. It contains code to load the test data using flow_from_directory.

```
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: 0.9286
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")
```

PREDICTIONS:

▼ Predictions

```
#import load model from keras.model
from keras.models import load_model
#import image from keras
from tensorflow.keras.preprocessing import image
import numpy as np
#import cv2
import cv2
#load the saved model
model=load_model('forest.h5')
img=image.load_img('/content/drive/MyDrive/IBM PROJECT/dataset/DATASET/archive/Dataset/Data')
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)
```

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Main code - Colaboratory

```
pred=model.predict(x)
```

```
1/1 [=====] - 0s 118ms/step
```

```
pred
```

```
array([[0.]], dtype=float32)
```