EARLY DETECTION OF FOREST FIRE USING DEEP LEARNING

MODEL BUILDING

ADDING DENSE LAYERS

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

ADDING DENSE LAYERS:

The name suggests that layers are fully connected (dense) by the neurons in a network layer. Each neuron in a layer receives input from all the neurons present in the previous layer. Dense is used to add the layers.

Adding Hidden layers:

This step is to add a dense layer (hidden layer). We flatten the feature map and convert it into a vector or single dimensional array in the Flatten layer. This vector array is fed it as an input to the neural network and applies an activation function, such as sigmoid or other, and returns the output.

Adding output layer:

This step is to add a dense layer (output layer) where you will be specifying the number of classes your dependent variable has, activation function and weight initializer as the arguments. We use add () method to add dense layers. In this layer, no need of mentioning input dimensions as we have mentions them in the above layer itself.
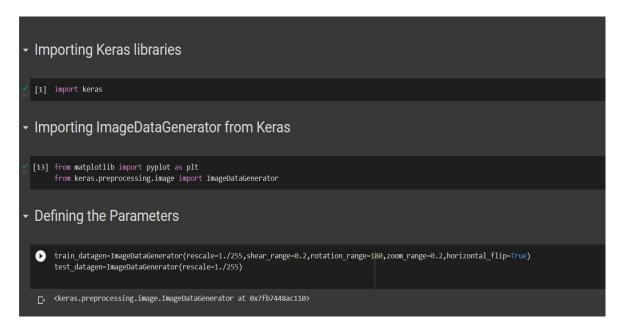
IMPORT LIBRARIES:

▾ 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:

ply**flow_from_directory ( )**methodfor 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/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='binar
```

```
Found 436 images belonging to 2 classes.
```

APPLYING ImageDataGenerator to test dataset:

 Applying the **flow_from_directory ( )** methodfortest 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:

▾ 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'))
```