

# Emerging methods for early detection of forest fire

## MODEL BUILDING

### ADDING CNN LAYERS

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Project Name	Emerging methods for Early detection of forest fire

### ADDING CNN LAYERS:

We will be adding three layers for CNN

- Convolution layer
- Pooling layer
- Flattening layer

#### Adding Convolutional Layer:

The convolutional layer is the first and core layer of CNN. It is one of the building blocks of a CNN and is used for extracting important features from the image.

In the Convolution operation, the input image will be convolved with the feature detector/filters to get a feature map. The important role of the feature detector is to extract the features from the image. The group of feature maps is called a feature layer.

#### Adding Pooling Layer

**Max Pooling** selects the maximum element from the region of the feature map covered by the filter. Thus, the output after max-pooling layer would be a feature map containing the most prominent features of the previous feature map.

After the convolution layer, a pooling layer is added. Max pooling layer can be added using MaxPooling2D class. It takes the pool size as a parameter. Efficient size of the pooling matrix is (2,2). It returns the pooled feature maps. (Note:Any number of convolution layers, pooling and dropout layers can be added)

#### Task 3: Adding Flatten Layer

Now the pooled feature map from the pooling layer will be converted into one single dimension matrix or map, where each pixel in one single column, nothing but flattening. The flattening layer converts the multi-dimension matrix to one single dimension layer.

## IMPORT LIBRARIES:

### ▾ Importing Keras libraries

```
import keras
```

### ▾ Importing ImageDataGenerator from Keras

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

## IMPORT DataGenerator 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
```

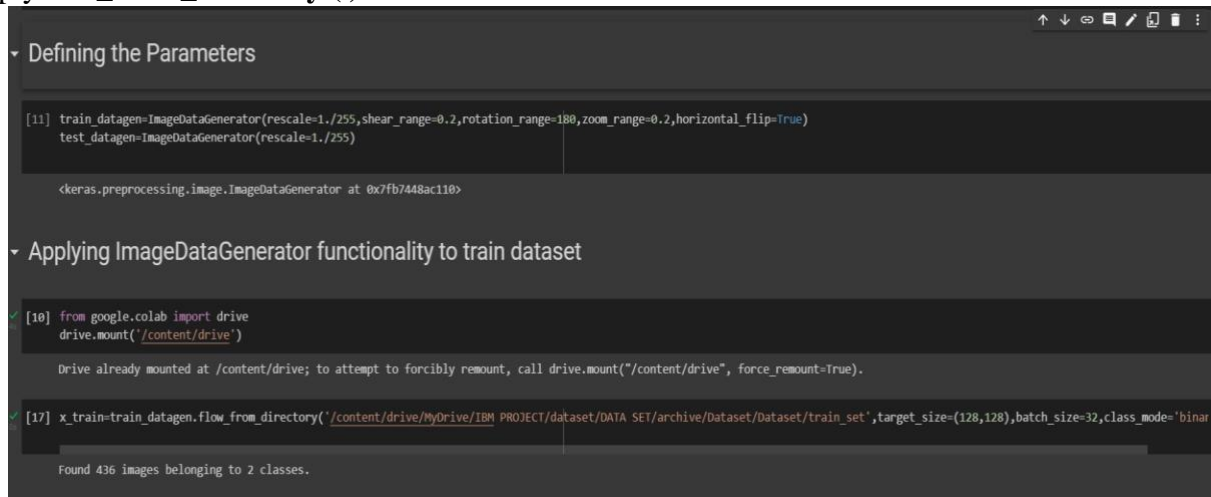
### ▾ Defining the Parameters

```
▶ 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 ( )** method for Train folder.



The screenshot shows a Jupyter Notebook with two sections. The first section, 'Defining the Parameters', contains code to create ImageDataGenerators 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')

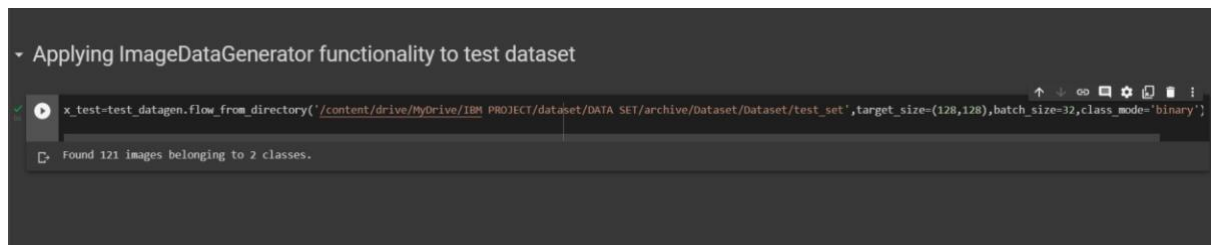
Drive already mounted at /content/drive; to attempt to forcibly remount, call drive.mount("/content/drive", force_remount=True).
```

```
[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 ( )** method for test 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:

### ▼ 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())
```