

# MODEL BUILDING

## Training the Model

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<b>Project Name</b>	Emerging Methods for Early Detection of Forest Fires.

### ##Importing The ImageDataGenerator Library

```
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:\archive\Dataset\Dataset\train_set',
target_size=(128,128), batch_size=32, class_mode='binary')
```

### ###Applying ImageDataGenerator Functionality to testset

```
x_test=test_datagen.flow_from_directory(r'C:\archive\Dataset\Dataset\test_set',
target_size=(128,128), batch_size=32, class_mode='binary')
```

### ##Import model building libraries

**#To Define linear initialization import Sequential**

from keras.models import Sequential

**#To add layers import Dense**

from keras.layers import Dense

**#To create Convolution kernel import Convolution 2D**

from keras.layers import Convolution2D

**#import maxpooling layers**

from keras.layers import MaxPooling2D

**#import flatten Layer**

from keras.layers import Flatten import

warnings

warnings.filterwarnings('ignore')

**#Initializing the Model**

model=Sequential()

**##adding CNN layers**

model.add(Convolution2D(32,(3,3),input\_shape=(128,128,3),activation='relu'))

**##adding maxpooling layer**

model.add(MaxPooling2D(pool\_size=(2,2)))

**##adding 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_steps=4)
```

```
Epoch 1/10
14/14 [=====] - 65s 4s/step - loss: 3.5263 - accuracy: 0.6445 - val_loss: 0.2863 - val_accuracy: 0.884
3
Epoch 2/10
14/14 [=====] - 39s 3s/step - loss: 0.3504 - accuracy: 0.8555 - val_loss: 0.1233 - val_accuracy: 0.950
4
Epoch 3/10
14/14 [=====] - 41s 3s/step - loss: 0.2072 - accuracy: 0.9083 - val_loss: 0.1185 - val_accuracy: 0.958
7
Epoch 4/10
14/14 [=====] - 49s 4s/step - loss: 0.1969 - accuracy: 0.9243 - val_loss: 0.1069 - val_accuracy: 0.975
2
Epoch 5/10
14/14 [=====] - 39s 3s/step - loss: 0.1679 - accuracy: 0.9381 - val_loss: 0.0966 - val_accuracy: 0.975
2
Epoch 6/10
14/14 [=====] - 30s 2s/step - loss: 0.1608 - accuracy: 0.9312 - val_loss: 0.0865 - val_accuracy: 0.975
2
Epoch 7/10
14/14 [=====] - 28s 2s/step - loss: 0.1668 - accuracy: 0.9266 - val_loss: 0.0880 - val_accuracy: 0.975
2
Epoch 8/10
14/14 [=====] - 28s 2s/step - loss: 0.1717 - accuracy: 0.9197 - val_loss: 0.0901 - val_accuracy: 0.975
2
Epoch 9/10
14/14 [=====] - 28s 2s/step - loss: 0.1622 - accuracy: 0.9404 - val_loss: 0.0688 - val_accuracy: 0.975
2
Epoch 10/10
14/14 [=====] - 33s 2s/step - loss: 0.1456 - accuracy: 0.9450 - val_loss: 0.0718 - val_accuracy: 0.975
2
```

```
Out[14]: <keras.callbacks.History at 0x1ab5f462548>
```