

# **EMERGING METHODS FOR EARLY DETECTION OF FOREST FIRES**

## **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'/content/drive/MyDrive/Dataset/train_set', target_size=(128,128), batch_size=32,  
class_mode='binary')
```

Found 436 images belonging to 2 classes.

## Applying ImageDataGenerator functionality to testset

```
x_test=test_datagen.flow_from_directory(r'/content/drive/MyDrive  
/ Dataset/test_set',target_size=(128,128),batch_size=32,  
class_mode='binary')
```

Found 121 images belonging to 2 classes.

## Import model building libraries

```
#To define Linear initialisation import Sequential  
from keras.models import Sequential  
#To add layers import Dense  
from keras.layers import Dense  
#To create Convolution 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

```
model=Sequential()
```

## Add CNN Layer

```
model.add(Convolution2D(32,  
(3,3),input_shape=(128,128,3),activation='relu'))  
#add maxpooling layer
```

```
model.add(MaxPooling2D(pool_size=(2,2)))
```

```
#add flatten layer
```

```
model.add(Flatten())
```

### Add Hidden Layer

```
#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"])
```

### Train 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 [=====] - 97s 7s/step - loss: 1.3060 -

accuracy: 0.7775 - val\_loss: 0.5513 - val\_accuracy: 0.8512

Epoch 2/10

14/14 [=====] - 26s 2s/step - loss: 0.3178 -

accuracy: 0.8807 - val\_loss: 0.1299 - val\_accuracy: 0.9421

Epoch 3/10

14/14 [=====] - 26s 2s/step - loss: 0.2226 -

accuracy: 0.9106 - val\_loss: 0.1311 - val\_accuracy: 0.9421

Epoch 4/10

14/14 [=====] - 31s 2s/step - loss: 0.1836 -

accuracy: 0.9174 - val\_loss: 0.1129 - val\_accuracy: 0.9339

Epoch 5/10

14/14 [=====] - 30s 2s/step - loss: 0.1675 -

accuracy: 0.9243 - val\_loss: 0.0925 - val\_accuracy: 0.9669

Epoch 6/10

14/14 [=====] - 26s 2s/step - loss: 0.1884 -

accuracy: 0.9289 - val\_loss: 0.1287 - val\_accuracy: 0.9339

Epoch 7/10

14/14 [=====] - 28s 2s/step - loss: 0.1724 -

accuracy: 0.9335 - val\_loss: 0.0926 - val\_accuracy: 0.9752

Epoch 8/10

14/14 [=====] - 26s 2s/step - loss: 0.1510 -

accuracy: 0.9404 - val\_loss: 0.0757 - val\_accuracy: 0.9752

Epoch 9/10

14/14 [=====] - 26s 0.173 -  
2s/step - loss: 2

accuracy: 0.9174 - val\_loss: 0.0537 - val\_accuracy: 0.9835

Epoch 10/10

14/14 [=====] - 26s 0.154 -  
2s/step - loss: 6

accuracy: 0.9312 - val\_loss: 0.0573 - val\_accuracy: 0.9835

<keras.callbacks.History at 0x7f05d66a9c90>