

EMERGING METHODS FOR EARLY DETECTION OF FOREST FIRES

MODEL BUILDING

TRAINING THE MODEL

Date	04 November 2022
Team ID	PNT2022TMID10153
Project Name	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>