EMERGING METHODS FOR EARLY DETECTION OF FOREST FIRE

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'D:/IBM/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'D:/IBM/archive/Dataset/Dataset/test_set',target_size=(128,128),batch_size=32,
class_mode='binary')
```

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)
```

Save The Model

```
model.save("forest1.h5")
```

Predictions

```
#import load_model from keras.model
from keras.models import load_model
#import image class from keras
from tensorflow.keras.preprocessing import image #import numpy
import numpy as np
#import cv2
import cv2
#load the saved model
model = load_model("forest1.h5")
img=image.load_img(r'D:/IBM/archive/Dataset/Dataset/test_set/forest/0.48007200_1530881924_final_forest.jpg')
x=image.img_to_array(img)
res = cv2.resize(x, dsize=(128, 128), interpolation=cv2.INTER_CUBIC)
#expand the image shape
x=np.expand_dims(res,axis=0)
pred= model.predict(x)
pred
```