Project Development Phase
SPRINT 2

Date	05 November 2022
Team ID	PNT2022TMID23611
Project Name	Emerging Methods For t Early Detection Of Forest Fires

```
In [1]: import keras from keras.preprocessing.image import
        ImageDataGenerator
```

```
In [2]: #Define the parameters/arguments for ImageDataGenerator class
        train_datagen=ImageDataGenerator(rescale=1./255,shear_range=0.2
        ,rotation_range=180,

    test_datagen=ImageDataGenerator(rescale=1./255)
```

```
In [3]: x_train=train_datagen.flow_from_directory(r'C:\Users\sanjay\Downloads\IBM-
        Project-1 target_size=(128,128), batch_size=32, class_mode='binary')
```

```
Found 436 images belonging to 2 classes.
```

```
In [4]: x_test=test_datagen.flow_from_directory(r'C:\Users\sanjay\Downloads\IBM-Project-
        133 target_size=(128,128), batch_size=32, class_mode='binary')
```

```
Found 121 images belonging to 2 classes.
```

```
In [6]: #initializing the model
        model=Sequential()
```

```
In [7]: #add convolutional 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())
```

```
In [8]: #add hidden layer
        model.add(Dense(150,activation='relu'))
#add output layer model.add(Dense(1,activation='sigmoid'))
```

```
In [9]: #configure the learning process
        model.compile(loss='binary_crossentropy',optimizer="adam",metrics=["accuracy"])
```

```
In [10]: #Training the model
         model.fit_generator(x_train,steps_per_epoch=14,epochs=1
         0, validation_data=x_test,validation_steps=4)
```

```
Epoch 1/10
14/14 [==============================] - 23s 2s/step - loss: 4.0098 - accuracy:
0.
6697 - val_loss: 0.2112 - val_accuracy: 0.9091
Epoch 2/10
14/14 [==============================] - 17s 1s/step - loss: 0.8357 - accuracy:
0.
7477 - val_loss: 0.5303 - val_accuracy: 0.8512
Epoch 3/10
14/14 [==============================] - 16s 1s/step - loss: 0.4288 - accuracy:
0.
8394 - val_loss: 0.3021 - val_accuracy: 0.8760
Epoch 4/10
14/14 [==============================] - 19s 1s/step - loss: 0.2928 - accuracy:
0.
8601 - val_loss: 0.1751 - val_accuracy: 0.9421
Epoch 5/10
```

```
14/14 [==============================] - 17s 1s/step - loss: 0.2408 - accuracy:
0.
8899 - val_loss: 0.0737 - val_accuracy: 0.9752
Epoch 6/10
14/14 [==============================] - 17s 1s/step - loss: 0.1809 - accuracy:
0.
9358 - val_loss: 0.0685 - val_accuracy: 0.9752
Epoch 7/10
14/14 [==============================] - 16s 1s/step - loss: 0.1780 - accuracy:
0.
9312 - val_loss: 0.0867 - val_accuracy: 0.9752
Epoch 8/10
14/14 [==============================] - 17s 1s/step - loss: 0.1800 - accuracy:
0.
9289 - val_loss: 0.0567 - val_accuracy: 0.9752
Epoch 9/10
14/14 [==============================] - 16s 1s/step - loss: 0.1622 - accuracy:
0.
9289 - val_loss: 0.0532 - val_accuracy: 0.9835
Epoch 10/10
14/14 [==============================] - 16s 1s/step - loss: 0.1653 - accuracy:
0.
9266 - val_loss: 0.0542 - val_accuracy: 0.9835
<keras.callbacks.History at 0x21cc6192130>
```

Out[10]:

In [11]:
```
model.save("forest1.h5")
```

In [12]:
```
#import load_model fromkeras.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
```

In [13]:
```
model = load_model("forest1.h5")
```

In [14]:
```
img=image.load_img(r'C:\Users\sanjay\Downloads\IBM-Project-1338-1658384583-
main\IBM 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)
```

In [15]:
```
pred=model.predict(x)
```

```
1/1 [==============================] - 0s 141ms/step
```

In [16]:
```
pred
```

```
array([[1.]],
dtype=float32)
```

Out[16]:

In [17]:
```
x_train.class_indices
```

```
{'Forest': 0, 'Forest with fire': 1}
```

Out[17]:

In [18]:
```
if (pred[0]>0.5):
    print("forest with fire")
else:
    print("forest without fire")
```

```
forest with fire
```

In [ ]:
```

```