

```
from google.colab import drive
drive.mount('/content/drive')
```

Mounted at /content/drive

```
!pip install tensorflow
!pip install opencv-python
!pip install opencv-contrib-python
import tensorflow as tf
import numpy as np
from tensorflow import keras
import os
import cv2
from tensorflow.keras.preprocessing.image import ImageDataGenerator
from tensorflow.keras.preprocessing import image
```

```
Looking in indexes: https://pypi.org/simple, https://us-python.pkg.dev/colab-wheels/public
Requirement already satisfied: tensorflow in /usr/local/lib/python3.7/dist-packages (2.9.0)
Requirement already satisfied: keras<2.10.0,>=2.9.0rc0 in /usr/local/lib/python3.7/dist-packages (2.9.0)
Requirement already satisfied: astunparse>=1.6.0 in /usr/local/lib/python3.7/dist-packages (1.6.0)
Requirement already satisfied: libclang>=13.0.0 in /usr/local/lib/python3.7/dist-packages (13.0.0)
Requirement already satisfied: typing-extensions>=3.6.6 in /usr/local/lib/python3.7/dist-packages (3.7.4)
Requirement already satisfied: wrapt>=1.11.0 in /usr/local/lib/python3.7/dist-packages (1.12.1)
Requirement already satisfied: protobuf<3.20,>=3.9.2 in /usr/local/lib/python3.7/dist-packages (3.19.6)
Requirement already satisfied: termcolor>=1.1.0 in /usr/local/lib/python3.7/dist-packages (1.1.0)
Requirement already satisfied: grpcio<2.0,>=1.24.3 in /usr/local/lib/python3.7/dist-packages (1.24.3)
Requirement already satisfied: numpy>=1.20 in /usr/local/lib/python3.7/dist-packages (1.21.6)
Requirement already satisfied: tensorflow-io-gcs-filesystem>=0.23.1 in /usr/local/lib/python3.7/dist-packages (0.23.1)
Requirement already satisfied: six>=1.12.0 in /usr/local/lib/python3.7/dist-packages (1.16.0)
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Requirement already satisfied: keras-preprocessing>=1.1.1 in /usr/local/lib/python3.7/dist-packages (1.1.1)
Requirement already satisfied: setuptools in /usr/local/lib/python3.7/dist-packages (57.0.0)
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Requirement already satisfied: tensorboard-plugin-wit>=1.6.0 in /usr/local/lib/python3.7/dist-packages (1.6.0)
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```

```

train=ImageDataGenerator(rescale=1./255,
                          shear_range=0.2,
                          rotation_range=180,
                          zoom_range=0.2,
                          horizontal_flip=True)

train = ImageDataGenerator(rescale=1/255)
test = ImageDataGenerator(rescale=1/255)

train_dataset = train.flow_from_directory("/content/drive/MyDrive/Dataset/train_set",
                                          target_size=(128,128),
                                          batch_size = 32,
                                          class_mode = 'binary' )

Found 436 images belonging to 2 classes.

test_dataset = test.flow_from_directory("/content/drive/MyDrive/Dataset/test_set",
                                       target_size=(128,128),
                                       batch_size = 32,
                                       class_mode = 'binary' )

Found 121 images belonging to 2 classes.

```

```
test_dataset.class_indices
```

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

```

#to define linear initialisation import sequential
from keras.models import Sequential
#to add layer import Dense
from keras.layers import Dense
#to create convolution kernel import convolution2D

```



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```
print(len(predictions))
```

```
121
```

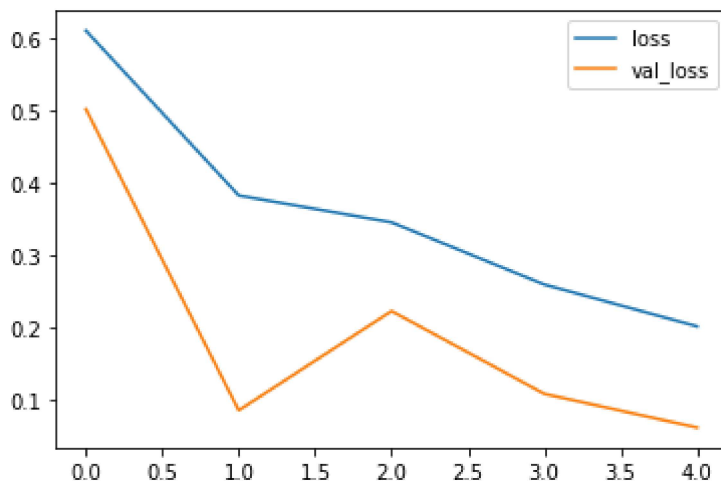
```
model.save("/content/forest1.h5")
```

```
#import load_model from keras.model
from keras.models import load_model
#import image class from keras
import tensorflow as tf
from tensorflow.keras.preprocessing import image
#import numpy
import numpy as np
#import cv2
import cv2
```

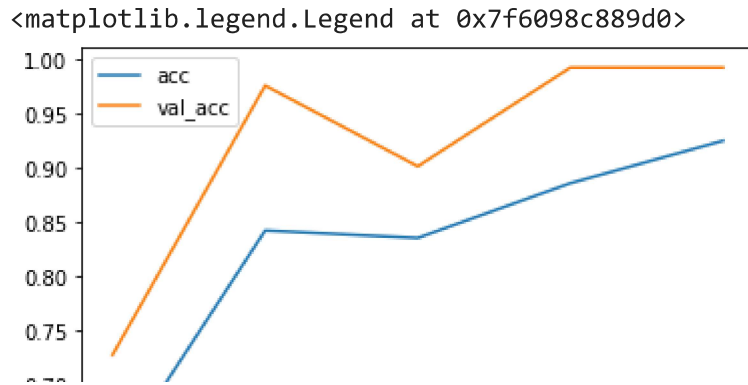
```
model = load_model("/content/forest1.h5")
```

```
import matplotlib.pyplot as plt
plt.plot(r.history['loss'],label='loss')
plt.plot(r.history['val_loss'],label='val_loss')
plt.legend()
```

<matplotlib.legend.Legend at 0x7f6098d0bd10>



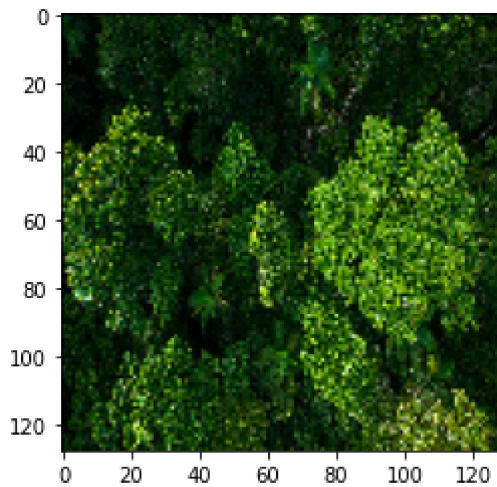
```
plt.plot(r.history['accuracy'],label='acc')
plt.plot(r.history['val_accuracy'],label='val_acc')
plt.legend()
```



```
def predictImage(filename):
    img1=image.load_img(filename,target_size=(128,128))
    plt.imshow(img1)
    y=image.img_to_array(img1)
    x=np.expand_dims(y,axis=0)
    val=model.predict(x)
    print(val)
    if val==0:
        plt.xlabel(" NO fire",fontsize=30)
    elif val==1:
        plt.xlabel("fire",fontsize=30)
```

```
predictImage("/content/drive/MyDrive/forest-1.jpg")
```

```
1/1 [=====] - 0s 93ms/step
[[0.]]
```



NO fire

```
predictImage("/content/drive/MyDrive/forest-fire-1.jpg")
```

1/1 [=====] - 0s 20ms/step

[[1.]]



pip install twilio

Looking in indexes: <https://pypi.org/simple>, <https://us-python.pkg.dev/colab-wheels/public>  
 Collecting twilio  
 Downloading twilio-7.15.2-py2.py3-none-any.whl (1.4 MB)  
 | 1.4 MB 13.9 MB/s  
 Requirement already satisfied: pytz in /usr/local/lib/python3.7/dist-packages (from twilio)  
 Collecting PyJWT<3.0.0,>=2.0.0  
 Downloading PyJWT-2.6.0-py3-none-any.whl (20 kB)  
 Requirement already satisfied: requests>=2.0.0 in /usr/local/lib/python3.7/dist-packages  
 Requirement already satisfied: chardet<4,>=3.0.2 in /usr/local/lib/python3.7/dist-packages  
 Requirement already satisfied: urllib3!=1.25.0,!1.25.1,<1.26,>=1.21.1 in /usr/local/lib/python3.7/dist-packages  
 Requirement already satisfied: certifi>=2017.4.17 in /usr/local/lib/python3.7/dist-packages  
 Requirement already satisfied: idna<3,>=2.5 in /usr/local/lib/python3.7/dist-packages (from requests>=2.0.0)  
 Installing collected packages: PyJWT, twilio  
 Successfully installed PyJWT-2.6.0 twilio-7.15.2

pip install playsound

Looking in indexes: <https://pypi.org/simple>, <https://us-python.pkg.dev/colab-wheels/public>  
 Collecting playsound  
 Downloading playsound-1.3.0.tar.gz (7.7 kB)  
 Building wheels for collected packages: playsound  
 Building wheel for playsound (setup.py) ... done  
 Created wheel for playsound: filename=playsound-1.3.0-py3-none-any.whl size=7035 sha256=...  
 Stored in directory: /root/.cache/pip/wheels/ba/f8/bb/ea57c0146b664dca3a0ada4199b0ecb5...  
 Successfully built playsound  
 Installing collected packages: playsound  
 Successfully installed playsound-1.3.0

pip install opencv-python

Looking in indexes: <https://pypi.org/simple>, <https://us-python.pkg.dev/colab-wheels/public>  
 Requirement already satisfied: opencv-python in /usr/local/lib/python3.7/dist-packages (from opencv-python==4.5.1.20220615)  
 Requirement already satisfied: numpy>=1.14.5 in /usr/local/lib/python3.7/dist-packages (from opencv-python==4.5.1.20220615)

```
#import opencv librariy
import cv2
#import numpy
import numpy as np
#import image function from keras
from keras.preprocessing import image
#import load_model from keras
from keras.models import load_model
#import client from twilio API
from twilio.rest import Client
#imort playsound package
from playsound import playsound
```

WARNING:playsound:playsound is relying on another python subprocess. Please use `pip ins



```
#load the saved model
model = load_model(r'/content/forest1.h5')
#define video
video = cv2.VideoCapture('/content/drive/MyDrive/forest-fire-video.mp4')
#define the features
name = ['forest', 'with forest']
```

```
video.isOpened()
```

```
True
```

```
from tensorflow.keras.preprocessing import image
```

```
from IPython.display import Audio
```

```
while(video.isOpened()):
    success,frame=video.read()
    cv2.imwrite("image.jpg",frame)
    img=image.load_img("image.jpg",target_size=(128,128))
    x=image.img_to_array(img)
    x=np.expand_dims(x,axis=0)
    pred=model.predict(x)
    p=pred[0]
    print(pred)
    cv2.putText(frame,"predicted class = ",(100,100),cv2.FONT_HERSHEY_SIMPLEX, 1, (0,0,0), 1)
    if pred[0]==1:
        account_sid='AC2eb1ef0f60792aa19ad09be1f89a8dba'
        auth_token='a428f3fd3bd8ded0d44a6c4cbdd1945f'
        client=Client(account_sid,auth_token)
        message=client.messages \
            .create(
```



```
        body="Forest fire is detected ,stay alert",
        from_='+1 314 948 5657',
        to='+91 9344099941')
    print(message.sid)
    print('Fire detected')
    print('SMS sent')
    wn=Audio('/content/drive/MyDrive/alarm-sound.mp3',autoplay=True)
    display(wn)
    break
else:
    print('No danger')
    break
if cv2.waitKey(1) & 0xFF==ord('a'):
    break
video.release()
cv2.destroyAllWindows()
```

```
1/1 [=====] - 0s 81ms/step
[[1.]]
SMc9da8fc345a2ce13c7e598ce055ad8fa
Fire detected
SMS sent
```