Emerging Methods for Early Detection of Forest Fire

Results:

Here. We are predicting using an image whether it contains fire or not. So after loading the image, the image should be converted into an array and array is used to predict the output using our model named "forest1.h5".

Prediction

```
In [19]: from keras.models import load_model
         from keras.preprocessing import image
         import numpy as np
         import cv2
```

```
In [20]: model = load_model("forest1.h5")
```

```
In [21]: img = image.load_img(r'C:\Users\shekh\OneDrive\Desktop\Smart Externship\Project\AI_Project\Dataset\test_set\with fire\Untitled_de
         x = image.img_to_array(img)
         x = np.expand_dims(x,axis = 0)
```

```
In [22]: img
```

Out[22]:


```
In [23]: pred = model.predict_classes(x)
```

```
In [24]: pred
```

```
Out[24]: array([[1]])
```

```
In [29]: print(x_train.class_indices)
```

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

Here, we are predicting using opencv which uses local machines camera and through the camera it predicts the output. If it detects fire then it sends sms to the user through twilio.
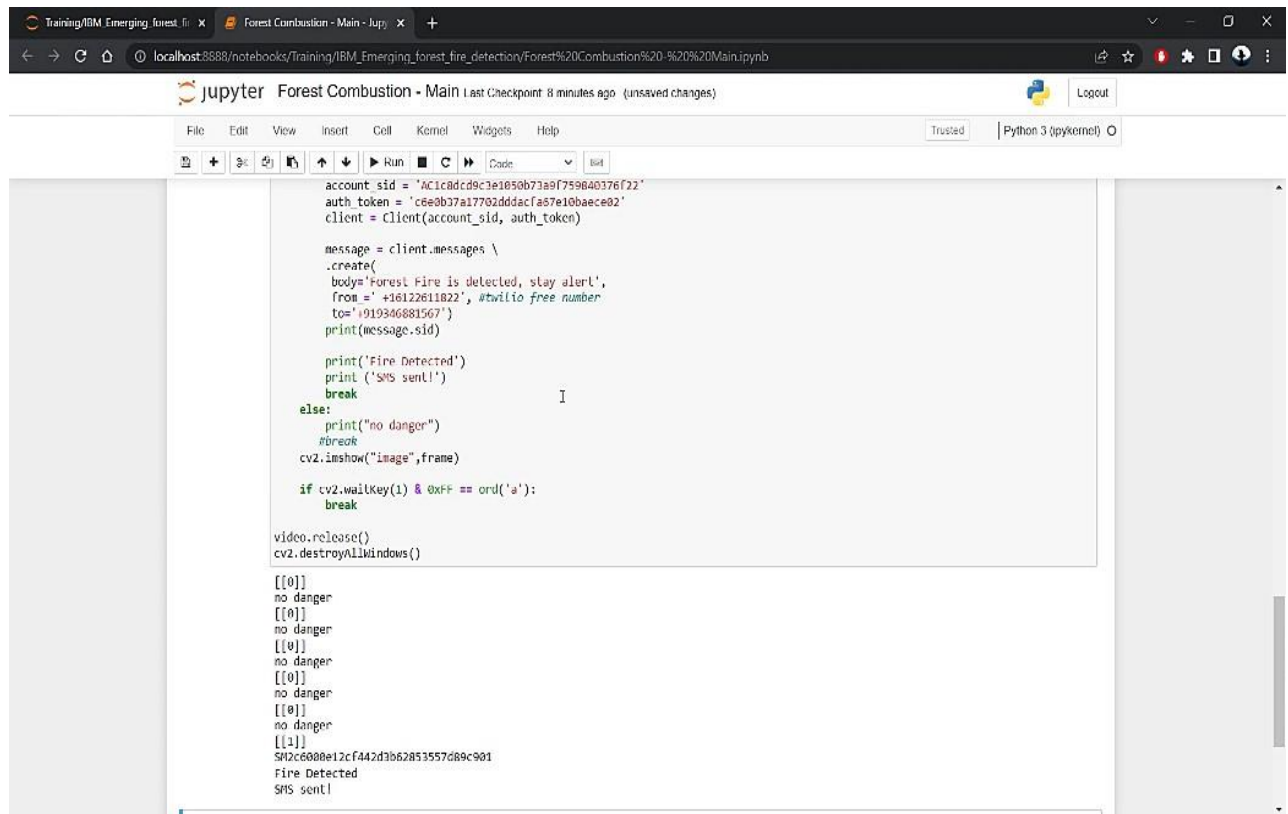
opencv prediction

```
In [10]: import cv2 #to import openCV
         print(cv2.__version__) #to know OpenCV version

         4.5.4-dev
```

```
In [11]: import cv2
         import numpy as np
         import smtplib
         from keras.preprocessing import image
         from keras.models  import load_model
         from twilio.rest import Client
         model = load_model(r'forestfire.h5')
         video = cv2.VideoCapture(0)
         name = ['forest','with fire']
         while(1):
             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_classes(x)
             p = pred[0][0]
             print(pred)
             cv2.putText(frame, "predicted  class = "+str(name[p]), (100,100), cv2.FONT_HERSHEY_SIMPLEX, 1, (0,0,0), 1)
             pred = model.predict_classes(x)
             if pred[0]==1:
                 account_sid = 'AC1c8dcd9c3e1050b73a9f759840376f22'
                 auth_token = 'c6e0b37a17702dddacfa67e10baece02'
                 client = Client(account_sid, auth_token)
                 message = client.messages \
                 .create(
                  body='Forest Fire is detected, stay alert',
                  from_=' +16122611822', #twilio free number
                  to='+919346881567')
                 print(message.sid)
                 print('Fire Detected')
                 print ('SMS sent!')
                 break
             else:
                 print("no danger")
                 #break
             cv2.imshow("image",frame)

             if cv2.waitKey(1) & 0xFF == ord('a'):
                 break
         video.release()
         cv2.destroyAllWindows()
```
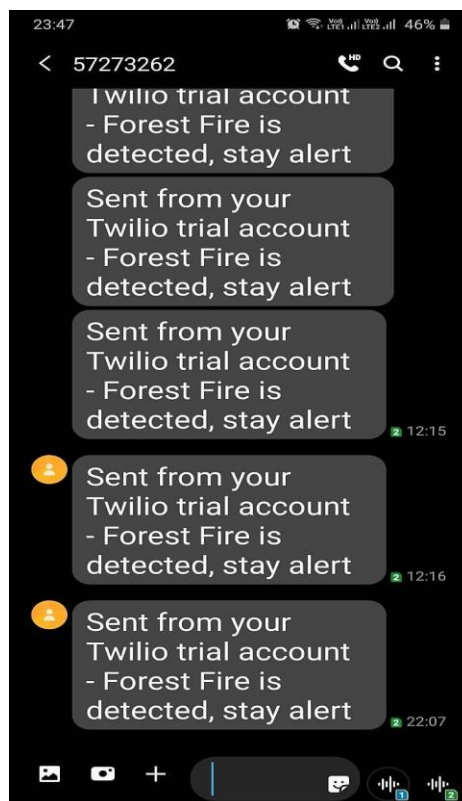
SMS message through Twilio:

GT 1, Pred 1.00 GT 0, Pred 0.13 GT 0, Pred 0.04 GT 0, Pred 0.00

GT 1, Pred 0.05 GT 1, Pred 1.00 GT 1, Pred 0.98 GT 0, Pred 0.03

GT 0, Pred 0.00 GT 0, Pred 0.00 GT 0, Pred 0.00 GT 1, Pred 0.99

GT 1, Pred 1.00 GT 1, Pred 1.00 GT 0, Pred 0.00 GT 0, Pred 0.00