Project Development Phase
SPRINT 2

Date	03.11.2022
Team ID	PNT2022TMID17719
Project Name	Project - Emerging methods for the early detection of forest fires

Executable Program

Model Building:

```
model.add(Dense(150,activation='relu'))
model.add(Dense(1,activation='sigmoid'))
model.compile(loss='binary_crossentropy',optimizer='adam',metrics=['accuracy'])
len(x_train)
len(x_test)
model.fit_generator(x_train,steps_per_epoch=len(x_train),epochs=10,
                    validation_data=x_test,validation_steps=len(x_test))
import tensorflow as tf
from keras.models import load_model
from tensorflow.keras.preprocessing import image
import numpy as np
import cv2
model.save('forestfire.h5')
model=load_model('forestfire.h5')
testImg =
image.load_img(r'C:\Users\win\Desktop\Project_NT\test_set\forest\_101542074_g
ettyimages_956391468.jpg')
testImgarrayImg = image.img_to_array(testImg)
arrayImg
x = np.expand_dims(arrayImg , axis = 0)
X
images = np.vstack([x])
pred=model.predict(images)
Pred
x_train.class_indices
if (pred[0] > 0.5):
   print("forest with fire")
else:
   print("forest without fire")
```

```
Epoch 1/10
14/14 [==============================] - 46s 3s/step - loss: 3.7642 - accuracy: 0.5550 - val_loss: 0.9342 - val_accuracy: 0.595
0
Epoch 2/10
14/14 [==============================] - 21s 2s/step - loss: 0.4257 - accuracy: 0.8050 - val_loss: 0.1760 - val_accuracy: 0.925
6
Epoch 3/10
14/14 [==============================] - 22s 2s/step - loss: 0.2191 - accuracy: 0.9083 - val_loss: 0.1141 - val_accuracy: 0.958
7
Epoch 4/10
14/14 [==============================] - 22s 2s/step - loss: 0.2520 - accuracy: 0.8991 - val_loss: 0.1058 - val_accuracy: 0.975
2
Epoch 5/10
14/14 [==============================] - 22s 2s/step - loss: 0.2192 - accuracy: 0.9014 - val_loss: 0.1065 - val_accuracy: 0.966
9
Epoch 6/10
14/14 [==============================] - 22s 2s/step - loss: 0.1942 - accuracy: 0.9106 - val_loss: 0.0938 - val_accuracy: 0.975
2
Epoch 7/10
14/14 [==============================] - 21s 2s/step - loss: 0.1684 - accuracy: 0.9358 - val_loss: 0.1383 - val_accuracy: 0.942
1
Epoch 8/10
14/14 [==============================] - 22s 2s/step - loss: 0.1872 - accuracy: 0.9266 - val_loss: 0.1577 - val_accuracy: 0.900
8
Epoch 9/10
14/14 [==============================] - 25s 2s/step - loss: 0.1643 - accuracy: 0.9312 - val_loss: 0.0874 - val_accuracy: 0.983
5
Epoch 10/10
14/14 [==============================] - 62s 5s/step - loss: 0.1640 - accuracy: 0.9220 - val_loss: 0.0809 - val_accuracy: 0.975
2
```

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

In [20]:
```
model.save('forestfire.h5')
```

In [21]:
```
model=load_model('forestfire.h5')
```

In [22]:
```
#testImg = image.load_img(r'C:\Users\win\Desktop\Project_NT\test_set\forest\_101542074_gettyimages_956391468.jpg', target_size =
#testImg
testImg = image.load_img(r'C:\Users\win\Desktop\Project_NT\test_set\forest\_101542074_gettyimages_956391468.jpg')
testImg
```

Out[22]:

In [23]:
```
arrayImg = image.img_to_array(testImg)
arrayImg
```

```
[[217., 226., 179.],
 [ 79.,  87.,  28.],
 [ 48.,  58.,   0.],
 ...,
 [ 16.,  72.,   0.],
 [  1.,  39.,   0.],
 [221., 223., 212.]]], dtype=float32)
```

In [25]:
```
images = np.vstack([x])
```

In [26]:
```
pred=model.predict(images)
pred
```

```
1/1 [==============================] - 1s 1s/step
```

Out[26]:
```
array([[0.]], dtype=float32)
```

In [27]:
```
x_train.class_indices
```

Out[27]:
```
{'forest': 0, 'with fire': 1}
```

In [28]:
```
if (pred[0] > 0.5):
    print("forest with fire")
else:
    print("forest without fire")
```

```
forest without fire
```
