PROJECT DEVOLPMENT PHASE
DELIVERY OF SPRINT-2

Date	07 November 2022
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Project Name	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 imageimport
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_indicesif (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
```

```
       [[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
```