

**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: 0.5950
Epoch 2/10
14/14 [=====] - 21s 2s/step - loss: 0.4257 - accuracy: 0.8050 - val_loss: 0.1760 - val_accuracy: 0.9256
Epoch 3/10
14/14 [=====] - 22s 2s/step - loss: 0.2191 - accuracy: 0.9083 - val_loss: 0.1141 - val_accuracy: 0.9587
Epoch 4/10
14/14 [=====] - 22s 2s/step - loss: 0.2520 - accuracy: 0.8991 - val_loss: 0.1058 - val_accuracy: 0.9752
Epoch 5/10
14/14 [=====] - 22s 2s/step - loss: 0.2192 - accuracy: 0.9014 - val_loss: 0.1065 - val_accuracy: 0.9669
Epoch 6/10
14/14 [=====] - 22s 2s/step - loss: 0.1942 - accuracy: 0.9106 - val_loss: 0.0938 - val_accuracy: 0.9752
Epoch 7/10
14/14 [=====] - 21s 2s/step - loss: 0.1684 - accuracy: 0.9358 - val_loss: 0.1383 - val_accuracy: 0.9421
Epoch 8/10
14/14 [=====] - 22s 2s/step - loss: 0.1872 - accuracy: 0.9266 - val_loss: 0.1577 - val_accuracy: 0.9008
Epoch 9/10
14/14 [=====] - 25s 2s/step - loss: 0.1643 - accuracy: 0.9312 - val_loss: 0.0874 - val_accuracy: 0.9835
Epoch 10/10
14/14 [=====] - 62s 5s/step - loss: 0.1640 - accuracy: 0.9220 - val_loss: 0.0809 - val_accuracy: 0.9752

```

```

[[217., 226., 179.],
 [ 79.,  87., 218.],
 [ 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
```