

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

Mounted at /content/drive

Data Collection

In [10]: #Dataset Link - <https://www.kaggle.com/arbethi/forest-fire?select=Dataset> is stored as FFD in google drive
!unzip '/content/drive/MyDrive/dataset/archive (2).zip'

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Archive: /content/drive/MyDrive/dataset/archive (2).zip
inflating: Dataset/Dataset/test_set/forest/0.48007200_1530881924_final_forest.jpg
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inflating: Dataset/Dataset/test_set/forest/0.72918000_1559733279_forests1_gettyimages_.jpg
inflating: Dataset/Dataset/test_set/forest/0.98884800_1554454572_spin.jpg
inflating: Dataset/Dataset/test_set/forest/01_NeilBurnell_Mystical_photovertical.jpg
inflating: Dataset/Dataset/test_set/forest/091318_LH_forest_loss_main_FREE.jpg
inflating: Dataset/Dataset/test_set/forest/1009821.jpg
inflating: Dataset/Dataset/test_set/forest/111188170_river_in_the_mountain_forest.jpg
inflating: Dataset/Dataset/test_set/forest/1170x500_Ireland_web.jpg
inflating: Dataset/Dataset/test_set/forest/1200px_Mountainarea.jpg
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inflating: Dataset/Dataset/test_set/forest/1_chimp.jpg
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inflating: Dataset/Dataset/test_set/forest/2017_10_12_09_01_56.jpg
inflating: Dataset/Dataset/test_set/forest/220px_The_forest_near_Blatets__Vinitsa.JPG
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_rfif1zh_thumbnail_.png
inflating: Dataset/Dataset/test_set/forest/5325.jpg
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```

Image Pre-processing

In [16]:

```
from keras.preprocessing.image import ImageDataGenerator
train_datagen = ImageDataGenerator(rescale=1./255,
                                    shear_range=0.2,
```

```
IBM-Project-2915-1658486320/MODEL.ipynb at main · IBM-EPBL/IBM-Project-2915-1658486320
rotation_range=180,
zoom_range=0.2,
horizontal_flip=True)
test_datagen = ImageDataGenerator(rescale=1./255)
train = train_datagen.flow_from_directory('/content/Dataset/Dataset/test_set',
                                         target_size=(128,128),
                                         batch_size=32,
                                         class_mode='binary')
test = train_datagen.flow_from_directory('/content/Dataset/Dataset/train_set',
                                         target_size=(128,128),
                                         batch_size=32,
                                         class_mode='binary')
```

Found 121 images belonging to 2 classes.
 Found 436 images belonging to 2 classes.

Sprint 2

In [12]:

```
#Model Building
from keras.models import Sequential
from keras.layers import Convolution2D,MaxPooling2D,Dense,Flatten
import warnings
warnings.filterwarnings('ignore')
```

In [13]:

```
#Initializing the model and adding CNN and Dense Layers
model = Sequential()
model.add(Convolution2D(32,(3,3),input_shape=(128,128,3),activation='relu'))
model.add(MaxPooling2D(pool_size=(2,2)))
model.add(Flatten())
model.add(Dense(units=256,activation='relu'))
model.add(Dense(units=1,activation='sigmoid'))
model.summary()
```

Model: "sequential"

Layer (type)	Output Shape	Param #
<hr/>		
conv2d (Conv2D)	(None, 126, 126, 32)	896
<hr/>		
max_pooling2d (MaxPooling2D	(None, 63, 63, 32)	0
)		
flatten (Flatten)	(None, 127008)	0
<hr/>		
dense (Dense)	(None, 256)	32514304

dense_1 (Dense)	(None, 1)	257
-----------------	-----------	-----

```
=====
Total params: 32,515,457
Trainable params: 32,515,457
Non-trainable params: 0
```

In [14]:

```
# Compiling the Model
model.compile(optimizer='adam', loss='binary_crossentropy', metrics=['accuracy', 'mse'])
```

In [15]:

```
#Training the model
y = model.fit_generator(train, steps_per_epoch=14, epochs=15, validation_data=test, validation_steps=4)
```

Epoch 1/15
11/14 [=====>.....] - ETA: 20s - loss: 4.8645 - accuracy: 0.6180 - mse: 0.3567
WARNING:tensorflow:Your input ran out of data; interrupting training. Make sure that your dataset or generator can generate at least `steps_per_epoch * epochs` batches (in this case, 210 batches). You may need to use the repeat() function when building your dataset.
WARNING:tensorflow:Your input ran out of data; interrupting training. Make sure that your dataset or generator can generate at least `steps_per_epoch * epochs` batches (in this case, 4 batches). You may need to use the repeat() function when building your dataset.
14/14 [=====] - 89s 6s/step - loss: 4.8645 - accuracy: 0.6180 - mse: 0.3567 - val_loss: 0.0122 - val_accuracy: 1.0000 - val_mse: 0.0011

In [17]:

```
#Saving the model
model.save('ffd_model.h5')
```

In [24]:

```
#Testing the model
from keras.models import load_model
import cv2
import numpy as np
from PIL import Image
from keras.utils import img_to_array
model = load_model('/content/ffd_model.h5')
def prediction(img_path):
    i = cv2.imread(img_path)
    i = cv2.cvtColor(i, cv2.COLOR_BGR2RGB)
    img = Image.open(img_path)
    img = img.resize((128,128))
    x = img_to_array(img)
    x = np.expand_dims(x, axis=0)
    pred = model.predict(x)
```

```
plt.imshow(i)
print("%s"%( "FOREST FIRE DETECTED! SMS SENT!" if pred==[[1.]] else "NO FOREST FIRE DETECTED"))
```

In [25]:

```
prediction(r'/content/wildfire.jpg')
```

1/1 [=====] - 0s 151ms/step

FOREST FIRE DETECTED! SMS SENT!

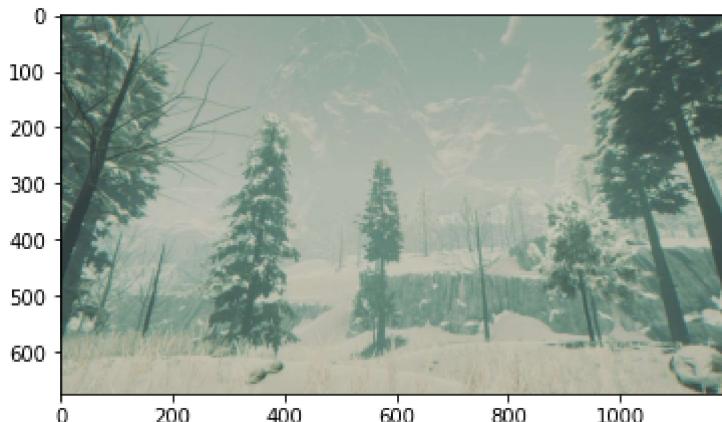


In [27]:

```
prediction(r'/content/Dataset/Dataset/test_set/forest/1200px_Mountainarea.jpg')
```

1/1 [=====] - 0s 49ms/step

NO FOREST FIRE DETECTED



In [29]:

```
prediction(r'/content/Dataset/Dataset/test_set/with_fire/Fire_2_696x392.jpg')
```

1/1 [=====] - 0s 40ms/step

FOREST FIRE DETECTED! SMS SENT!

