fire

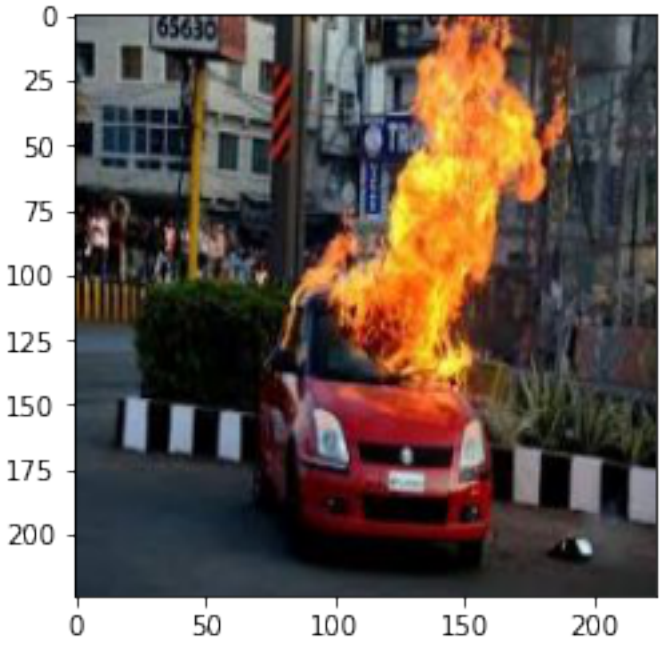
April 18, 2021

[1]:
```
import numpy as np
import matplotlib.pyplot as plt
from tensorflow.keras.preprocessing.image import ImageDataGenerator
from tensorflow.keras.preprocessing import image
from tensorflow.keras.optimizers import RMSprop
import tensorflow as tf
import os
```

[2]:
```
img = image.load_img(r'/home/akash/Desktop/Capstone-project/Train/Fire/
↪dayroad263.jpg')
```

[3]:
```
plt.imshow(img)
```

[3]:
```
<matplotlib.image.AxesImage at 0x7f16fc5c5a60>
```



[4]:
```
train = ImageDataGenerator(rescale=1/255)
validation = ImageDataGenerator(rescale=1/255)
```

[5]:
```
train_dataset = train.flow_from_directory(r'/home/akash/Desktop/
 ↪Capstone-project/Train',target_size=(50,50),batch_size=3,class_mode='binary')

validation_dataset = validation.flow_from_directory(r'/home/akash/Desktop/
 ↪Capstone-project/
 ↪Validation',target_size=(50,50),batch_size=3,class_mode='binary')
```

```
Found 6003 images belonging to 2 classes.
Found 2000 images belonging to 2 classes.
```

[6]:
```
input_shape = (50, 50, 3)

model = tf.keras.models.Sequential([

        tf.keras.layers.Conv2D(filters = 64,
                               kernel_size = 3,
                               activation='relu',
                               input_shape=input_shape),
        tf.keras.layers.MaxPool2D(2),

        tf.keras.layers.Conv2D(filters= 64,
                               kernel_size = 3,
                               activation='relu'),
        tf.keras.layers.MaxPool2D(2),

        tf.keras.layers.Conv2D(filters= 64,
                               kernel_size = 3,
                               activation='relu'),
        tf.keras.layers.MaxPool2D(2),

        tf.keras.layers.Conv2D(filters= 64,
                               kernel_size = 3,
                               activation='relu'),
        tf.keras.layers.MaxPool2D(2),

        tf.keras.layers.Flatten(),

        tf.keras.layers.Dropout(0.2),

        tf.keras.layers.Dense(1,activation='sigmoid')
        ])
```

[7]:
```
model.compile(loss='binary_crossentropy',optimizer =␣
 ↪'adam',metrics=['accuracy'])
```

[8]:
```
model_fit = model.fit(train_dataset,epochs=18␣
↪,validation_data=validation_dataset)
```

```
Epoch 1/18
2001/2001 [==============================] - 22s 11ms/step - loss: 0.6137 -
accuracy: 0.6676 - val_loss: 0.4334 - val_accuracy: 0.8090
Epoch 2/18
2001/2001 [==============================] - 21s 10ms/step - loss: 0.4004 -
accuracy: 0.8415 - val_loss: 0.3308 - val_accuracy: 0.8575
Epoch 3/18
2001/2001 [==============================] - 21s 10ms/step - loss: 0.2962 -
accuracy: 0.8863 - val_loss: 0.2458 - val_accuracy: 0.8860
Epoch 4/18
2001/2001 [==============================] - 20s 10ms/step - loss: 0.2332 -
accuracy: 0.9028 - val_loss: 0.2991 - val_accuracy: 0.8855
Epoch 5/18
2001/2001 [==============================] - 21s 10ms/step - loss: 0.2126 -
accuracy: 0.9136 - val_loss: 0.2208 - val_accuracy: 0.9120
Epoch 6/18
2001/2001 [==============================] - 21s 10ms/step - loss: 0.1862 -
accuracy: 0.9277 - val_loss: 0.2154 - val_accuracy: 0.9095
Epoch 7/18
2001/2001 [==============================] - 21s 10ms/step - loss: 0.1468 -
accuracy: 0.9424 - val_loss: 0.2977 - val_accuracy: 0.8975
Epoch 8/18
2001/2001 [==============================] - 20s 10ms/step - loss: 0.1381 -
accuracy: 0.9493 - val_loss: 0.3392 - val_accuracy: 0.8765
Epoch 9/18
2001/2001 [==============================] - 20s 10ms/step - loss: 0.1236 -
accuracy: 0.9493 - val_loss: 0.2719 - val_accuracy: 0.9105
Epoch 10/18
2001/2001 [==============================] - 21s 11ms/step - loss: 0.1044 -
accuracy: 0.9619 - val_loss: 0.2111 - val_accuracy: 0.9185
Epoch 11/18
2001/2001 [==============================] - 20s 10ms/step - loss: 0.0825 -
accuracy: 0.9718 - val_loss: 0.2861 - val_accuracy: 0.9160
Epoch 12/18
2001/2001 [==============================] - 21s 10ms/step - loss: 0.0712 -
accuracy: 0.9727 - val_loss: 0.2827 - val_accuracy: 0.9105
Epoch 13/18
2001/2001 [==============================] - 21s 10ms/step - loss: 0.0806 -
accuracy: 0.9733 - val_loss: 0.2560 - val_accuracy: 0.9265
Epoch 14/18
2001/2001 [==============================] - 21s 10ms/step - loss: 0.0603 -
accuracy: 0.9789 - val_loss: 0.3736 - val_accuracy: 0.9090
Epoch 15/18
2001/2001 [==============================] - 21s 10ms/step - loss: 0.0491 -
accuracy: 0.9823 - val_loss: 0.5568 - val_accuracy: 0.8970
```

```
Epoch 16/18
2001/2001 [==============================] - 21s 11ms/step - loss: 0.0672 -
accuracy: 0.9780 - val_loss: 0.3990 - val_accuracy: 0.9145
Epoch 17/18
2001/2001 [==============================] - 21s 10ms/step - loss: 0.0510 -
accuracy: 0.9821 - val_loss: 0.4361 - val_accuracy: 0.9035
Epoch 18/18
2001/2001 [==============================] - 21s 10ms/step - loss: 0.0448 -
accuracy: 0.9831 - val_loss: 0.4559 - val_accuracy: 0.9130
```

[9]:
```
validation_dataset.class_indices
```

[9]:
```
{'Fire': 0, 'Non-Fire': 1}
```

[10]:
```
dir_path = r'/home/akash/Desktop/Capstone-project/Test/Non-Fire'

fire,nonfire = 0,0
for i in os.listdir(dir_path):
    img = image.load_img(dir_path+'/'+i,target_size=(50,50))

    X = image.img_to_array(img)
    X = np.expand_dims(X,axis=0)
    images = np.vstack([X])
    val = model.predict(images)
    if val==0:
        fire+=1
        print(0,end=' ')
    else:
        nonfire+=1
        print(1,end=' ')
```

```
0 0 0 1 1 1 0 0 1 0 0 1 1 0 1 1 1 0 0 0 0 0 0 0 0 1 0 1 0 0 0 0 0 0 1 0 0 0 0 0
0 0 0 0 0 1 1 1 1 0 0 0 0 0 0 1 0 0 0 1 0 0 1 0 1 0 1 0 1 0 1 0 0 1 0 0 0 0 0 0 1
0 0 1 1 0 0 0 1 1 1 0 1 1 0 0 0 0 1 1 1 0 0 0 0 0 1 0 0 0 0 0 1 0 0 0 0 0 1 1 1
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1 0 1 0 1 1 0 0 1 0 0 1 0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 0 0 0 1 0 0 0
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```
0 0 0 0 0 0 0 0 1 1 0 1 0 1 0 0 1 0 1 1 0 1 0 0 0 0 0 0 1 0 1 1 0 0 0 1 1 0 0 0
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0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 1 1 0 0 0 0 1 0
```

[11]:
```
print(fire,nonfire)
```

```
667 333
```

[12]:
```
dir_path = r'/home/akash/Desktop/Capstone-project/Test/Fire'

fire,nonfire = 0,0
for i in os.listdir(dir_path):
    img = image.load_img(dir_path+'/'+i,target_size=(50,50))

    X = image.img_to_array(img)
    X = np.expand_dims(X,axis=0)
    images = np.vstack([X])
    val = model.predict(images)
    if val==0:
        fire+=1
        print(0,end=' ')
    else:
        nonfire+=1
        print(1,end=' ')
```

```
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 1 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0
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0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0
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0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0
0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 1 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 0
0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1
```

```
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
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1 0 0 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0
```

[13]:
```
print(fire,nonfire)
```

```
955 45
```