In [131]:

```
pwd
```

Out[131]:

```
'/home/wsuser/work'
```

In [132]:

```
!pip install keras
!pip install tensorflow
```

```
Requirement already satisfied: keras in /opt/conda/envs/Python-3.9/lib/python3.9/site-pac
kages (2.7.0)
Requirement already satisfied: tensorflow in /opt/conda/envs/Python-3.9/lib/python3.9/sit
e-packages (2.7.2)
Requirement already satisfied: gast<0.5.0,>=0.2.1 in /opt/conda/envs/Python-3.9/lib/pytho
n3.9/site-packages (from tensorflow) (0.4.0)
Requirement already satisfied: wheel<1.0,>=0.32.0 in /opt/conda/envs/Python-3.9/lib/pytho
n3.9/site-packages (from tensorflow) (0.37.0)
Requirement already satisfied: wrapt>=1.11.0 in /opt/conda/envs/Python-3.9/lib/python3.9/
site-packages (from tensorflow) (1.12.1)
Requirement already satisfied: tensorflow-io-gcs-filesystem>=0.21.0 in /opt/conda/envs/Py
thon-3.9/lib/python3.9/site-packages (from tensorflow) (0.23.1)
Requirement already satisfied: grpcio<2.0,>=1.24.3 in /opt/conda/envs/Python-3.9/lib/pyth
on3.9/site-packages (from tensorflow) (1.42.0)
Requirement already satisfied: typing-extensions>=3.6.6 in /opt/conda/envs/Python-3.9/lib
/python3.9/site-packages (from tensorflow) (4.1.1)
Requirement already satisfied: keras<2.8,>=2.7.0 in /opt/conda/envs/Python-3.9/lib/python
3.9/site-packages (from tensorflow) (2.7.0)
Requirement already satisfied: six>=1.12.0 in /opt/conda/envs/Python-3.9/lib/python3.9/si
te-packages (from tensorflow) (1.15.0)
Requirement already satisfied: absl-py>=0.4.0 in /opt/conda/envs/Python-3.9/lib/python3.9
/site-packages (from tensorflow) (0.12.0)
Requirement already satisfied: flatbuffers<3.0,>=1.12 in /opt/conda/envs/Python-3.9/lib/p
ython3.9/site-packages (from tensorflow) (2.0)
Requirement already satisfied: opt-einsum>=2.3.2 in /opt/conda/envs/Python-3.9/lib/python
3.9/site-packages (from tensorflow) (3.3.0)
Requirement already satisfied: keras-preprocessing>=1.1.1 in /opt/conda/envs/Python-3.9/l
ib/python3.9/site-packages (from tensorflow) (1.1.2)
Requirement already satisfied: numpy>=1.14.5 in /opt/conda/envs/Python-3.9/lib/python3.9/
site-packages (from tensorflow) (1.20.3)
Requirement already satisfied: h5py>=2.9.0 in /opt/conda/envs/Python-3.9/lib/python3.9/si
te-packages (from tensorflow) (3.2.1)
Requirement already satisfied: termcolor>=1.1.0 in /opt/conda/envs/Python-3.9/lib/python3
.9/site-packages (from tensorflow) (1.1.0)
Requirement already satisfied: protobuf>=3.9.2 in /opt/conda/envs/Python-3.9/lib/python3.
9/site-packages (from tensorflow) (3.19.1)
Requirement already satisfied: tensorflow-estimator<2.8,~=2.7.0 in /opt/conda/envs/Python
-3.9/lib/python3.9/site-packages (from tensorflow) (2.7.0)
Requirement already satisfied: google-pasta>=0.1.1 in /opt/conda/envs/Python-3.9/lib/pyth
on3.9/site-packages (from tensorflow) (0.2.0)
Requirement already satisfied: tensorboard~=2.7 in /opt/conda/envs/Python-3.9/lib/python3
.9/site-packages (from tensorflow) (2.7.0)
Requirement already satisfied: astunparse>=1.6.0 in /opt/conda/envs/Python-3.9/lib/python
3.9/site-packages (from tensorflow) (1.6.3)
Requirement already satisfied: setuptools>=41.0.0 in /opt/conda/envs/Python-3.9/lib/pytho
n3.9/site-packages (from tensorboard~=2.7->tensorflow) (58.0.4)
Requirement already satisfied: markdown>=2.6.8 in /opt/conda/envs/Python-3.9/lib/python3.
9/site-packages (from tensorboard~=2.7->tensorflow) (3.3.3)
Requirement already satisfied: tensorboard-data-server<0.7.0,>=0.6.0 in /opt/conda/envs/P
ython-3.9/lib/python3.9/site-packages (from tensorboard~=2.7->tensorflow) (0.6.1)
Requirement already satisfied: werkzeug>=0.11.15 in /opt/conda/envs/Python-3.9/lib/python
3.9/site-packages (from tensorboard~=2.7->tensorflow) (2.0.2)
Requirement already satisfied: requests<3,>=2.21.0 in /opt/conda/envs/Python-3.9/lib/pyth
on3.9/site-packages (from tensorboard~=2.7->tensorflow) (2.26.0)
Requirement already satisfied: tensorboard-plugin-wit>=1.6.0 in /opt/conda/envs/Python-3.
9/lib/python3.9/site-packages (from tensorboard~=2.7->tensorflow) (1.6.0)
Requirement already satisfied: google-auth<3,>=1.6.3 in /opt/conda/envs/Python-3.9/lib/py
```

```
Requirement already satisfied: google-auth<3,>=1.6.3 in /opt/conda/envs/Python-3.9/lib/py
thon3.9/site-packages (from tensorboard~=2.7->tensorflow) (1.23.0)
Requirement already satisfied: google-auth-oauthlib<0.5,>=0.4.1 in /opt/conda/envs/Python
-3.9/lib/python3.9/site-packages (from tensorboard~=2.7->tensorflow) (0.4.4)
Requirement already satisfied: pyasn1-modules>=0.2.1 in /opt/conda/envs/Python-3.9/lib/py
thon3.9/site-packages (from google-auth<3,>=1.6.3->tensorboard~=2.7->tensorflow) (0.2.8)
Requirement already satisfied: cachetools<5.0,>=2.0.0 in /opt/conda/envs/Python-3.9/lib/p
ython3.9/site-packages (from google-auth<3,>=1.6.3->tensorboard~=2.7->tensorflow) (4.2.2)
Requirement already satisfied: rsa<5,>=3.1.4 in /opt/conda/envs/Python-3.9/lib/python3.9/
site-packages (from google-auth<3,>=1.6.3->tensorboard~=2.7->tensorflow) (4.7.2)
Requirement already satisfied: requests-oauthlib>=0.7.0 in /opt/conda/envs/Python-3.9/lib
/python3.9/site-packages (from google-auth-oauthlib<0.5,>=0.4.1->tensorboard~=2.7->tensor
flow) (1.3.0)
Requirement already satisfied: pyasn1<0.5.0,>=0.4.6 in /opt/conda/envs/Python-3.9/lib/pyt
hon3.9/site-packages (from pyasn1-modules>=0.2.1->google-auth<3,>=1.6.3->tensorboard~=2.7
->tensorflow) (0.4.8)
Requirement already satisfied: certifi>=2017.4.17 in /opt/conda/envs/Python-3.9/lib/pytho
n3.9/site-packages (from requests<3,>=2.21.0->tensorboard~=2.7->tensorflow) (2022.9.24)
Requirement already satisfied: urllib3<1.27,>=1.21.1 in /opt/conda/envs/Python-3.9/lib/py
thon3.9/site-packages (from requests<3,>=2.21.0->tensorboard~=2.7->tensorflow) (1.26.7)
Requirement already satisfied: charset-normalizer~=2.0.0 in /opt/conda/envs/Python-3.9/li
b/python3.9/site-packages (from requests<3,>=2.21.0->tensorboard~=2.7->tensorflow) (2.0.4
)
Requirement already satisfied: idna<4,>=2.5 in /opt/conda/envs/Python-3.9/lib/python3.9/s
ite-packages (from requests<3,>=2.21.0->tensorboard~=2.7->tensorflow) (3.3)
Requirement already satisfied: oauthlib>=3.0.0 in /opt/conda/envs/Python-3.9/lib/python3.
9/site-packages (from requests-oauthlib>=0.7.0->google-auth-oauthlib<0.5,>=0.4.1->tensorb
oard~=2.7->tensorflow) (3.2.1)
```

In [133]:

```
from keras.preprocessing.image import ImageDataGenerator
train_datagen = ImageDataGenerator (rescale = 1./255, shear_range = 0.2, zoom_range = 0.
2, horizontal_flip = True)
test_datagen = ImageDataGenerator (rescale = 1./255)
```

In [134]:

```
import os, types
import pandas as pd
from botocore.client import Config
import ibm_boto3

def __iter__(self): return 0

# @hidden_cell
# The following code accesses a file in your IBM Cloud Object Storage. It includes your c
redentials.
# You might want to remove those credentials before you share the notebook.
cos_client = ibm_boto3.client(service_name='s3',
    ibm_api_key_id='IyC4hWKlZ9teRhnvGIAhEEVailtnqXbdhHICDn8DE5OZ',
    ibm_auth_endpoint="https://iam.cloud.ibm.com/oidc/token",
    config=Config(signature_version='oauth'),
    endpoint_url='https://s3.private.us.cloud-object-storage.appdomain.cloud')

bucket = 'imageclassification-donotdelete-pr-j1138lt7m39req'
object_key = 'archive.zip'

streaming_body_7 = cos_client.get_object(Bucket=bucket, Key=object_key)['Body']

# Your data file was loaded into a botocore.response.StreamingBody object.
# Please read the documentation of ibm_boto3 and pandas to learn more about the possibili
ties to load the data.
# ibm_boto3 documentation: https://ibm.github.io/ibm-cos-sdk-python/
# pandas documentation: http://pandas.pydata.org/
```

In [135]:

```
import io
from io import BytesIO
import zipfile
```

```
unzip = zipfile.ZipFile(BytesIO(streaming_body_7.read()), 'r')
file_paths = unzip.namelist()
for path in file_paths:
    unzip.extract(path)
```

In [136]:

```
pwd
```

Out[136]:

```
'/home/wsuser/work'
```

In [137]:

```
import os
filenames=os.listdir('/home/wsuser/work')
```

Image Preprocessing

In [138]:

```
# import keras library
import keras
#import ImageDataGenerator from keras.preprocessing.image
from keras.preprocessing.image import ImageDataGenerator
```

In [139]:

```
import tensorflow as tf
import numpy as np
import matplotlib.pyplot as plt
from tensorflow import keras
from tensorflow.keras.preprocessing import image_dataset_from_directory
```

In [140]:

```
train_datagen = ImageDataGenerator(
                                   rotation_range=180,
                                   brightness_range=None,
                                   shear_range=0.4,
                                   zoom_range=0.3,
                                   horizontal_flip=True,
                                   vertical_flip=True,
                                   rescale=1./255,)
```

In [141]:

```
test_datagen = ImageDataGenerator(rescale=1./255)
```

In [142]:

```
xtrain = train_datagen.flow_from_directory('//home/wsuser/work/Dataset/Dataset/train_set'
,
                                           target_size=(64,64),
                                           class_mode='binary',
                                           batch_size=100)
```

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

In [143]:

```
xtest = train_datagen.flow_from_directory('//home/wsuser/work/Dataset/Dataset/test_set',
                                          target_size=(64,64),
                                          class_mode='binary',
                                          batch_size=100)
```

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

Model Building

1. Import the Model Builing Libraries

In [144]:

```
import warnings
warnings.filterwarnings('ignore')
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Dense
from tensorflow.keras.layers import Convolution2D
from tensorflow.keras.layers import MaxPooling2D
from tensorflow.keras.layers import Flatten
```

1. Initialize the Model

In [145]:

```
model = Sequential()
```

1. Adding CNN Layers

In [146]:

```
#Convolution Layer
model.add(Convolution2D(32,(3,3),activation='relu',input_shape=(64,64,3)))
```

In [147]:

```
#MaxPooling Layer
model.add(MaxPooling2D(pool_size=(2, 2)))
```

In [148]:

```
#Flatten Layer
model.add(Flatten())
```

1. Adding Dense Layer

In [149]:

```
#Hidden Layer
model.add(Dense(350,activation='relu')) # Hidden layer 1
model.add(Dense(200,activation='relu')) # Hidden layer 2
```

In [150]:

```
#Output Layer
model.add(Dense(1,activation='softmax'))
```

1. Configuring The Learning Process

In [151]:

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

1. Training the Model

In [152]:

```
model.fit_generator(xtrain,
                    steps_per_epoch=len(xtrain),
                    epochs=10,
                    validation_data=xtest,
```

```
                    validation_steps=len(xtest))
```

```
Epoch 1/10
5/5 [==============================] - 20s 4s/step - loss: 1.3503 - accuracy: 0.3555 - va
l_loss: 0.5218 - val_accuracy: 0.4050
Epoch 2/10
5/5 [==============================] - 16s 3s/step - loss: 0.6692 - accuracy: 0.3555 - va
l_loss: 0.4354 - val_accuracy: 0.4050
Epoch 3/10
5/5 [==============================] - 16s 3s/step - loss: 0.4893 - accuracy: 0.3555 - va
l_loss: 0.3198 - val_accuracy: 0.4050
Epoch 4/10
5/5 [==============================] - 16s 3s/step - loss: 0.4236 - accuracy: 0.3555 - va
l_loss: 0.2719 - val_accuracy: 0.4050
Epoch 5/10
5/5 [==============================] - 16s 3s/step - loss: 0.2920 - accuracy: 0.3555 - va
l_loss: 0.1523 - val_accuracy: 0.4050
Epoch 6/10
5/5 [==============================] - 16s 3s/step - loss: 0.2623 - accuracy: 0.3555 - va
l_loss: 0.1195 - val_accuracy: 0.4050
Epoch 7/10
5/5 [==============================] - 16s 3s/step - loss: 0.2282 - accuracy: 0.3555 - va
l_loss: 0.1379 - val_accuracy: 0.4050
Epoch 8/10
5/5 [==============================] - 16s 4s/step - loss: 0.2047 - accuracy: 0.3555 - va
l_loss: 0.0951 - val_accuracy: 0.4050
Epoch 9/10
5/5 [==============================] - 16s 4s/step - loss: 0.1842 - accuracy: 0.3555 - va
l_loss: 0.1037 - val_accuracy: 0.4050
Epoch 10/10
5/5 [==============================] - 17s 3s/step - loss: 0.1709 - accuracy: 0.3555 - va
l_loss: 0.0917 - val_accuracy: 0.4050
```

Out[152]:

```
<keras.callbacks.History at 0x7fad24ce8490>
```

1. Saving the Model

In [153]:

```
model.save('Forest_fire.h5')
```

In [154]:

```
!tar -zcvf image-classification-model_new.tgz Forest_fire.h5
```

```
Forest_fire.h5
```

In [155]:

```
ls -1
```

```
Dataset/
forest1.h5
Forest_fire.h5
image-classification-model_new.tgz
my_model1.tar.gz
my_model.tar.gz
```

In [156]:

```
!pip install watson-machine-learning-client --upgrade
```

```
Requirement already satisfied: watson-machine-learning-client in /opt/conda/envs/Python-3
.9/lib/python3.9/site-packages (1.0.391)
Requirement already satisfied: pandas in /opt/conda/envs/Python-3.9/lib/python3.9/site-pa
ckages (from watson-machine-learning-client) (1.3.4)
Requirement already satisfied: requests in /opt/conda/envs/Python-3.9/lib/python3.9/site-
packages (from watson-machine-learning-client) (2.26.0)
Requirement already satisfied: certifi in /opt/conda/envs/Python-3.9/lib/python3.9/site-p
```

```
ackages (from watson-machine-learning-client) (2022.9.24)
Requirement already satisfied: tabulate in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from watson-machine-learning-client) (0.8.9)
Requirement already satisfied: boto3 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from watson-machine-learning-client) (1.18.21)
Requirement already satisfied: urllib3 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from watson-machine-learning-client) (1.26.7)
Requirement already satisfied: tqdm in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from watson-machine-learning-client) (4.62.3)
Requirement already satisfied: ibm-cos-sdk in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from watson-machine-learning-client) (2.11.0)
Requirement already satisfied: lomond in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from watson-machine-learning-client) (0.3.3)
Requirement already satisfied: botocore<1.22.0,>=1.21.21 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from boto3->watson-machine-learning-client) (1.21.41)
Requirement already satisfied: s3transfer<0.6.0,>=0.5.0 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from boto3->watson-machine-learning-client) (0.5.0)
Requirement already satisfied: jmespath<1.0.0,>=0.7.1 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from boto3->watson-machine-learning-client) (0.10.0)
Requirement already satisfied: python-dateutil<3.0.0,>=2.1 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from botocore<1.22.0,>=1.21.21->boto3->watson-machine-learning-client) (2.8.2)
Requirement already satisfied: six>=1.5 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from python-dateutil<3.0.0,>=2.1->botocore<1.22.0,>=1.21.21->boto3->watson-machine-learning-client) (1.15.0)
Requirement already satisfied: ibm-cos-sdk-core==2.11.0 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from ibm-cos-sdk->watson-machine-learning-client) (2.11.0)
Requirement already satisfied: ibm-cos-sdk-s3transfer==2.11.0 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from ibm-cos-sdk->watson-machine-learning-client) (2.11.0)
Requirement already satisfied: idna<4,>=2.5 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from requests->watson-machine-learning-client) (3.3)
Requirement already satisfied: charset-normalizer~=2.0.0 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from requests->watson-machine-learning-client) (2.0.4)
Requirement already satisfied: pytz>=2017.3 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from pandas->watson-machine-learning-client) (2021.3)
Requirement already satisfied: numpy>=1.17.3 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from pandas->watson-machine-learning-client) (1.20.3)
```

In [157]:

```
from ibm_watson_machine_learning import APIClient
wml_credentials = {
"url": "https://us-south.ml.cloud.ibm.com",
"apikey":"m4-xXEK8_bmzcb-5YEf11ai2gFIAL-L84TI6LRNeo3K1"
}
client= APIClient (wml_credentials)
```

In [158]:

```
client= APIClient (wml_credentials)
```

In [159]:

```
def guid_from_space_name(client, space_name):
    space = client.spaces.get_details()
    return(next(item for item in space['resources'] if item['entity']["name"] == space_name)['metadata']['id'])
```

In [160]:

```
space_uid = guid_from_space_name (client, 'image-classification')
print("Space UID = "+ space_uid)
```

```
Space UID = 02cde4c6-ce63-4709-90ee-abbd57c0cda0
```

In [161]:

```
client.set.default_space (space_uid)
```

Out[161]:

'SUCCESS'

In [162]:

```
client.software_specifications.list()
```

```
------------------------------  ------------------------------------  ----
NAME                            ASSET_ID                              TYPE
default_py3.6                   0062b8c9-8b7d-44a0-a9b9-46c416adcbd9  base
kernel-spark3.2-scala2.12       020d69ce-7ac1-5e68-ac1a-31189867356a  base
pytorch-onnx_1.3-py3.7-edt      069ea134-3346-5748-b513-49120e15d288  base
scikit-learn_0.20-py3.6         09c5a1d0-9c1e-4473-a344-eb7b665ff687  base
spark-mllib_3.0-scala_2.12      09f4cff0-90a7-5899-b9ed-1ef348aebdee  base
pytorch-onnx_rt22.1-py3.9       0b848dd4-e681-5599-be41-b5f6fccc6471  base
ai-function_0.1-py3.6           0cdb0f1e-5376-4f4d-92dd-da3b69aa9bda  base
shiny-r3.6                      0e6e79df-875e-4f24-8ae9-62dcc2148306  base
tensorflow_2.4-py3.7-horovod    1092590a-307d-563d-9b62-4eb7d64b3f22  base
pytorch_1.1-py3.6               10ac12d6-6b30-4ccd-8392-3e922c096a92  base
tensorflow_1.15-py3.6-ddl       111e41b3-de2d-5422-a4d6-bf776828c4b7  base
autoai-kb_rt22.2-py3.10         125b6d9a-5b1f-5e8d-972a-b251688ccf40  base
runtime-22.1-py3.9              12b83a17-24d8-5082-900f-0ab31fbfd3cb  base
scikit-learn_0.22-py3.6         154010fa-5b3b-4ac1-82af-4d5ee5abbc85  base
default_r3.6                    1b70aec3-ab34-4b87-8aa0-a4a3c8296a36  base
pytorch-onnx_1.3-py3.6          1bc6029a-cc97-56da-b8e0-39c3880dbbe7  base
kernel-spark3.3-r3.6            1c9e5454-f216-59dd-a20e-474a5cdf5988  base
pytorch-onnx_rt22.1-py3.9-edt   1d362186-7ad5-5b59-8b6c-9d0880bde37f  base
tensorflow_2.1-py3.6            1eb25b84-d6ed-5dde-b6a5-3fbdf1665666  base
spark-mllib_3.2                 20047f72-0a98-58c7-9ff5-a77b012eb8f5  base
tensorflow_2.4-py3.8-horovod    217c16f6-178f-56bf-824a-b19f20564c49  base
runtime-22.1-py3.9-cuda         26215f05-08c3-5a41-a1b0-da66306ce658  base
do_py3.8                        295addb5-9ef9-547e-9bf4-92ae3563e720  base
autoai-ts_3.8-py3.8             2aa0c932-798f-5ae9-abd6-15e0c2402fb5  base
tensorflow_1.15-py3.6           2b73a275-7cbf-420b-a912-eae7f436e0bc  base
kernel-spark3.3-py3.9           2b7961e2-e3b1-5a8c-a491-482c8368839a  base
pytorch_1.2-py3.6               2c8ef57d-2687-4b7d-acce-01f94976dac1  base
spark-mllib_2.3                 2e51f700-bca0-4b0d-88dc-5c6791338875  base
pytorch-onnx_1.1-py3.6-edt      32983cea-3f32-4400-8965-dde874a8d67e  base
spark-mllib_3.0-py37            36507ebe-8770-55ba-ab2a-eafe787600e9  base
spark-mllib_2.4                 390d21f8-e58b-4fac-9c55-d7ceda621326  base
autoai-ts_rt22.2-py3.10         396b2e83-0953-5b86-9a55-7ce1628a406f  base
xgboost_0.82-py3.6              39e31acd-5f30-41dc-ae44-60233c80306e  base
pytorch-onnx_1.2-py3.6-edt      40589d0e-7019-4e28-8daa-fb03b6f4fe12  base
pytorch-onnx_rt22.2-py3.10      40e73f55-783a-5535-b3fa-0c8b94291431  base
default_r36py38                 41c247d3-45f8-5a71-b065-8580229facf0  base
autoai-ts_rt22.1-py3.9          4269d26e-07ba-5d40-8f66-2d495b0c71f7  base
autoai-obm_3.0                  42b92e18-d9ab-567f-988a-4240ba1ed5f7  base
pmml-3.0_4.3                    493bcb95-16f1-5bc5-bee8-81b8af80e9c7  base
spark-mllib_2.4-r_3.6           49403dff-92e9-4c87-a3d7-a42d0021c095  base
xgboost_0.90-py3.6              4ff8d6c2-1343-4c18-85e1-689c965304d3  base
pytorch-onnx_1.1-py3.6          50f95b2a-bc16-43bb-bc94-b0bed208c60b  base
autoai-ts_3.9-py3.8             52c57136-80fa-572e-8728-a5e7cbb42cde  base
spark-mllib_2.4-scala_2.11      55a70f99-7320-4be5-9fb9-9edb5a443af5  base
spark-mllib_3.0                 5c1b0ca2-4977-5c2e-9439-ffd44ea8ffe9  base
autoai-obm_2.0                  5c2e37fa-80b8-5e77-840f-d912469614ee  base
spss-modeler_18.1               5c3cad7e-507f-4b2a-a9a3-ab53a21dee8b  base
cuda-py3.8                      5d3232bf-c86b-5df4-a2cd-7bb870a1cd4e  base
autoai-kb_3.1-py3.7             632d4b22-10aa-5180-88f0-f52dfb6444d7  base
pytorch-onnx_1.7-py3.8          634d3cdc-b562-5bf9-a2d4-ea90a478456b  base
------------------------------  ------------------------------------  ----
Note: Only first 50 records were displayed. To display more use 'limit' parameter.
```

In [163]:

```
software_spec_uid = client.software_specifications.get_uid_by_name("tensorflow_rt22.1-py3
.9")
software_spec_uid
```

Out[163]:

```
'acd9c798-6974-5d2f-a657-ce06e986df4d'
```

In [164]:

```
model_details = client.repository.store_model (model='image-classification-model_new.tgz'
,meta_props={
    client.repository. ModelMetaNames.NAME: "CNN",
    client.repository.ModelMetaNames.TYPE: "tensorflow_2.7",
    client.repository.ModelMetaNames.SOFTWARE_SPEC_UID: software_spec_uid
    })
model_id = client.repository.get_model_uid (model_details)
```

```
This method is deprecated, please use get_model_id()
```

In [165]:

```
model_id
```

Out[165]:

```
'aab649db-b904-46c0-a679-c41d60fe8faf'
```

In [167]:

```
client.repository.download (model_id, 'my_model2.tar.gz')
```

```
Successfully saved model content to file: 'my_model2.tar.gz'
```

Out[167]:

```
'/home/wsuser/work/my_model2.tar.gz'
```

In [168]:

```
from keras.models import load_model
from keras.preprocessing import image
```

In [169]:

```
model = load_model("Forest_fire.h5")
```

In [170]:

```
from tensorflow.keras.models import load_model
from tensorflow.keras.preprocessing import image
```

In [171]:

```
import os, types
import pandas as pd
from botocore.client import Config
import ibm_boto3

def __iter__(self): return 0

# @hidden_cell
# The following code accesses a file in your IBM Cloud Object Storage. It includes your c
redentials.
# You might want to remove those credentials before you share the notebook.
cos_client = ibm_boto3.client(service_name='s3',
    ibm_api_key_id='m4-xXEK8_bmzcb-5YEf11ai2gFIAL-L84TI6LRNeo3K1',
    ibm_auth_endpoint="https://iam.cloud.ibm.com/oidc/token",
    config=Config(signature_version='oauth'),
    endpoint_url='https://s3.private.us.cloud-object-storage.appdomain.cloud')

bucket = 'imageclassification-donotdelete-pr-j1138lt7m39req'
object_key = 'Fire-Forest.jpg'

streaming_body_8 = cos_client.get_object(Bucket=bucket, Key=object_key)['Body']

# Your data file was loaded into a botocore.response.StreamingBody object.
# Please read the documentation of ibm_boto3 and pandas to learn more about the possibili
ties to load the data.
# ibm_boto3 documentation: https://ibm.github.io/ibm-cos-sdk-python/
# pandas documentation: http://pandas.pydata.org/
```

In [172]:

```
streaming_body_8
```

Out[172]:

```
<ibm_botocore.response.StreamingBody at 0x7fad71e88f40>
```

In [173]:

```
!pip install load
```

```
Requirement already satisfied: load in /opt/conda/envs/Python-3.9/lib/python3.9/site-pack
ages (2020.12.3)
```

In [174]:

```
img = image.load_img(streaming_body_8,target_size = (128,128))
```

```
---------------------------------------------------------------------------
TypeError                                 Traceback (most recent call last)
/tmp/wsuser/ipykernel_164/2189728808.py in <module>
----> 1 img = image.load_img(streaming_body_8,target_size = (128,128))

/opt/conda/envs/Python-3.9/lib/python3.9/site-packages/keras/preprocessing/image.py in lo
ad_img(path, grayscale, color_mode, target_size, interpolation)
    311       ValueError: if interpolation method is not supported.
    312   """
--> 313   return image.load_img(path, grayscale=grayscale, color_mode=color_mode,
    314                        target_size=target_size, interpolation=interpolation)
    315

/opt/conda/envs/Python-3.9/lib/python3.9/site-packages/keras_preprocessing/image/utils.py
in load_img(path, grayscale, color_mode, target_size, interpolation)
    111         raise ImportError('Could not import PIL.Image. '
    112                           'The use of `load_img` requires PIL.')
--> 113     with open(path, 'rb') as f:
    114         img = pil_image.open(io.BytesIO(f.read()))
    115         if color_mode == 'grayscale':

TypeError: expected str, bytes or os.PathLike object, not StreamingBody
```

In [ ]:

```
pred=model.predict(x)
```

In [ ]:

```
print (pred)
```

Video Analysis

OpenCV For Video Processing

1: Capture Video from Camera

In [ ]:

```
import cv2
import numpy as np
from keras.preprocessing import image
from keras.models import load_model
```

In [ ]:

```
pip install twilio
```

In [ ]:

```
from twilio.rest import Client
```

In [ ]:

```
pip install playsound
```

In [ ]:

```
pip install pygobject
```

In [ ]:

```
from playsound import playsound
```

3: Loading our saved model file using load_model from Keras library

In [ ]:

```
model = load_model(r'forest1.h5')
```

In [ ]:

```
video = cv2.VideoCapture(0)
```

In [ ]:

```
name = ['forest', 'with fire']
```

openCV intergeration

In [ ]:

```
account_sid = 'ACe316932976f5aff487f6cdcab9a13579'
auth_token= '2388b1f10e88371fd6ebeabc00fd3ebf'
client = Client (account_sid, auth_token)
message = client.messages\
.create(
    body='Forest Fire is detected, stay alert',
    from_= '+12183043886',
    to='+916374835017')
print(message.sid)
```