

In [8]:

```
!pip install keras==2.7.0
!pip install tensorflow==2.5.0
```

```
Requirement already satisfied: keras==2.7.0 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (2.7.0)
Requirement already satisfied: tensorflow==2.5.0 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (2.5.0)
Requirement already satisfied: termcolor==1.1.0 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from tensorflow==2.5.0) (1.1.0)
Requirement already satisfied: tensorflow-estimator<2.6.0,>=2.5.0rc0 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from tensorflow==2.5.0) (2.5.0)
Requirement already satisfied: astunparse==1.6.3 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from tensorflow==2.5.0) (1.6.3)
Requirement already satisfied: grpcio==1.34.0 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from tensorflow==2.5.0) (1.34.1)
Requirement already satisfied: wheel==0.35 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from tensorflow==2.5.0) (0.37.0)
Requirement already satisfied: keras-nightly==2.5.0.dev in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from tensorflow==2.5.0) (2.5.0.dev2021032900)
Requirement already satisfied: typing-extensions==3.7.4 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from tensorflow==2.5.0) (3.7.4.3)
Requirement already satisfied: google-pasta==0.2 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from tensorflow==2.5.0) (0.2.0)
Requirement already satisfied: h5py==3.1.0 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from tensorflow==2.5.0) (3.1.0)
Requirement already satisfied: keras-preprocessing==1.1.2 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from tensorflow==2.5.0) (1.1.2)
Requirement already satisfied: protobuf==3.9.2 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from tensorflow==2.5.0) (3.19.1)
Requirement already satisfied: gast==0.4.0 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from tensorflow==2.5.0) (0.4.0)
Requirement already satisfied: six==1.15.0 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from tensorflow==2.5.0) (1.15.0)
Requirement already satisfied: tensorboard==2.5 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from tensorflow==2.5.0) (2.7.0)
Requirement already satisfied: opt-einsum==3.3.0 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from tensorflow==2.5.0) (3.3.0)
Requirement already satisfied: absl-py==0.10 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from tensorflow==2.5.0) (0.12.0)
Requirement already satisfied: wrapt==1.12.1 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from tensorflow==2.5.0) (1.12.1)
Requirement already satisfied: numpy==1.19.2 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from tensorflow==2.5.0) (1.19.5)
Requirement already satisfied: flatbuffers==1.12.0 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from tensorflow==2.5.0) (1.12)
Requirement already satisfied: tensorboard-plugin-wit==1.6.0 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from tensorflow==2.5.0) (1.6.0)
Requirement already satisfied: google-auth-oauthlib<0.5,>=0.4.1 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from tensorflow==2.5.0) (0.4.4)
Requirement already satisfied: tensorboard-data-server<0.7.0,>=0.6.0 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from tensorflow==2.5.0) (0.6.1)
Requirement already satisfied: google-auth<3,>=1.6.3 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from tensorflow==2.5.0) (1.23.0)
Requirement already satisfied: setuptools==41.0.0 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from tensorflow==2.5.0) (58.0.4)
Requirement already satisfied: werkzeug==0.11.15 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from tensorflow==2.5.0) (2.0.2)
Requirement already satisfied: requests<3,>=2.21.0 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from tensorflow==2.5.0) (2.26.0)
Requirement already satisfied: markdown==2.6.8 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from tensorflow==2.5.0) (3.3.3)
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->tensorflow==2.5.0) (4.7.2)
Requirement already satisfied: cachetools<5.0,>=2.0.0 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from google-auth<3,>=1.6.3->tensorflow==2.5.0) (4.2.2)
Requirement already satisfied: pyasn1-modules==0.2.1 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from google-auth<3,>=1.6.3->tensorflow==2.5.0) (0.2.8)
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->tensorflow==2.5.0) (1.3.0)
Requirement already satisfied: pyasn1<0.5.0,>=0.4.6 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from pyasn1-modules==0.2.1->google-auth<3,>=1.6.3->tensorflow==2.5.0) (0.4.8)
Requirement already satisfied: idna<4,>=2.5 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from requests<3,>=2.21.0->tensorflow==2.5.0) (3.3)
Requirement already satisfied: charset-normalizer==2.0.0 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from requests<3,>=2.21.0->tensorflow==2.5.0) (2.0.4)
Requirement already satisfied: certifi==2017.4.17 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from requests<3,>=2.21.0->tensorflow==2.5.0) (2022.9.24)
Requirement already satisfied: urllib3<1.27,>=1.21.1 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from requests<3,>=2.21.0->tensorflow==2.5.0) (1.26.7)
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->tensorflow==2.5.0) (3.2.1)
```

Image Augmentation

In [9]:

```
from tensorflow.keras.preprocessing.image import ImageDataGenerator
```

In [10]:

```
train_datagen=ImageDataGenerator(rescale=1./255, zoom_range=0.2, horizontal_flip=True, vertical_flip=False)
```

In [11]:

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

In [12]:

```
ls
```

Dataset/

In [13]:

```
pwd
```

Out[13]:

```
"/home/ksuser/work"
```

In [14]:

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

def __iter__(self): return 0

# @hidden_cell
# The following code accesses a file in your IBM Cloud Object Storage. It includes your credentials.
# You might want to remove those credentials before you share the notebook.
cos_client = ibm_botocore.client(service_name='s3',
    ibm_api_key_id='bHfE0z3tYuarHV-z0NeNxGqprEFVVR3o08JFhQdxMLD0',
    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 = 'forestfire-detection-donotdelete-pr-kmf7h4pt0wk0fy'
object_key = 'forestfire-sin'
```

```

        ibm_api_key_id="bHfE0z3tYuwrhV-z0neNxGoprEFWVR3o08JFhQdxMLD0",
        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 = 'forestfire-detection-donotdelete-pr-kw7h4pt0wk0fy'
object_key = 'Forest fire.zip'

streaming_body_6 = 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 possibilities to load
# ibm_boto3 documentation: https://ibm.github.io/ibm-cos-sdk-python/
# pandas documentation: http://pandas.pydata.org/

In [15]:
from io import BytesIO
import zipfile
unzip = zipfile.ZipFile(BytesIO(streaming_body_6.read()), "r")
file_paths = unzip.namelist()
for path in file_paths:
    unzip.extract(path)

In [16]:
pwd

Out[16]:
'/home/wsuser/work'

In [17]:
import os
filenames = os.listdir('/home/wsuser/work/Forest fire/forest_fire/Training and Validation')

In [18]:
x_train=train_datagen.flow_from_directory("/home/wsuser/work/Forest fire/forest_fire/Training and Val
Found 1832 images belonging to 2 classes.

In [19]:
x_test=test_datagen.flow_from_directory(r"/home/wsuser/work/Forest fire/forest_fire/Testing",target_s
class_mode="categorical",batch_size=24)

Found 68 images belonging to 2 classes.

In [20]:
x_train.class_indices

Out[20]:
{'fire': 0, 'nofire': 1}

```

CNN

```

In [21]:
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Dense,Convolution2D,MaxPooling2D,Flatten

In [22]:
model=Sequential()

2022-11-21 07:31:32.758191: W tensorflow/stream_executor/platform/default/dso_loader.cc:64] Could not
load dynamic library 'libcuda.so.1': dlopen: libcuda.so.1: cannot open shared object file: No such f
ile or directory: LD_LIBRARY_PATH: /opt/ibm/dsdriver/lib:/opt/oracle/lib:/opt/conda/envs/Python-3.9/1
ib/python3.9/site-packages/tensorflow
2022-11-21 07:31:32.758250: W tensorflow/stream_executor/cuda/cuda_driver.cc:326] failed call to cuIn
it: UNKNOWN ERROR (303)

In [23]:
model.add(Convolution2D(32,(3,3),input_shape=(128,128,3),activation='relu'))

In [24]:
model.add(MaxPooling2D(pool_size=(2,2)))

In [25]:
model.add(Flatten())

In [26]:
model.summary()

Model: "sequential"
Layer (type) Output Shape Param #
-----
conv2d (Conv2D) (None, 126, 126, 32) 896
max_pooling2d (MaxPooling2D) (None, 63, 63, 32) 0
flatten (Flatten) (None, 127008) 0
-----
Total params: 896
Trainable params: 896
Non-trainable params: 0

In [27]:
32*(3*3*3*1)

Out[27]:
896

```

Hidden Layers

```

In [28]:
model.add(Dense(300,activation='relu'))
model.add(Dense(150,activation='relu'))

```

Output Layer

```

In [29]:
model.add(Dense(2,activation='softmax'))

In [30]:
model.compile(loss='categorical_crossentropy',optimizer='adam',metrics=['accuracy'])

In [31]:
len(x_train)

Out[31]:
77

In [32]:
1238/24

```



```

model.fit_generator(x_train, steps_per_epoch=len(x_train), validation_data=x_test, validation_steps=len
/opt/conda/envs/Python-3.9/lib/python3.9/site-packages/tensorflow/python/keras/engine/training.py:194
0: UserWarning: 'Model.fit_generator' is deprecated and will be removed in a future version. Please u
se 'Model.fit', which supports generators.
warnings.warn('Model.fit_generator' is deprecated and
Epoch 1/10
77/77 [=====] - 58s 741ms/step - loss: 0.9698 - accuracy: 0.8657 - val_loss:
0.5529 - val_accuracy: 0.8971
Epoch 2/10
77/77 [=====] - 55s 717ms/step - loss: 0.1668 - accuracy: 0.9383 - val_loss:
0.3615 - val_accuracy: 0.8824
Epoch 3/10
77/77 [=====] - 56s 722ms/step - loss: 0.1439 - accuracy: 0.9520 - val_loss:
0.3120 - val_accuracy: 0.8971
Epoch 4/10
77/77 [=====] - 57s 736ms/step - loss: 0.1347 - accuracy: 0.9509 - val_loss:
0.3402 - val_accuracy: 0.9118
Epoch 5/10
77/77 [=====] - 58s 755ms/step - loss: 0.1265 - accuracy: 0.9552 - val_loss:
0.3401 - val_accuracy: 0.9412
Epoch 6/10
77/77 [=====] - 54s 700ms/step - loss: 0.1274 - accuracy: 0.9552 - val_loss:
0.3368 - val_accuracy: 0.8971
Epoch 7/10
77/77 [=====] - 53s 686ms/step - loss: 0.0914 - accuracy: 0.9678 - val_loss:
0.4035 - val_accuracy: 0.9118
Epoch 8/10
77/77 [=====] - 53s 696ms/step - loss: 0.1096 - accuracy: 0.9607 - val_loss:
0.3181 - val_accuracy: 0.9265
Epoch 9/10
77/77 [=====] - 54s 699ms/step - loss: 0.0759 - accuracy: 0.9743 - val_loss:
0.3875 - val_accuracy: 0.9118
Epoch 10/10
77/77 [=====] - 56s 726ms/step - loss: 0.1005 - accuracy: 0.9651 - val_loss:
0.3555 - val_accuracy: 0.9265

```

Out[33]:

Saving Model

```

In [41]: ls

Dataset/  forest13.h5  'Forest fire'/  modell.h5  Train-model_new.tgz

In [38]: model.save('forest13.h5')

In [40]: !tar -czvf Train-model_new.tgz forest13.h5

forest13.h5

In [42]: ls -l

Dataset/
forest13.h5
'Forest fire'/
modell.h5
Train-model_new.tgz

```

IBM Cloud Deployment Model

```

In [43]: !pip install watson-machine-learning-client --upgrade

```

```

Collecting watson-machine-learning-client
  Downloading watson-machine-learning-client-1.0.391-py3-none-any.whl (538 kB)
    538 kB 9.0 MB/s eta 0:00:01
Requirement already satisfied: requests in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (fr
om watson-machine-learning-client) (2.26.0)
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: boto3 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from
 watson-machine-learning-client) (1.18.21)
Requirement already satisfied: pandas in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from
 watson-machine-learning-client) (1.3.4)
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: tabulate in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (fr
om watson-machine-learning-client) (0.8.9)
Requirement already satisfied: certifi in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (fro
m watson-machine-learning-client) (2022.9.24)
Requirement already satisfied: urllib3 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (fro
m watson-machine-learning-client) (1.26.7)
Requirement already satisfied: tqdm in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from w
atson-machine-learning-client) (4.62.3)
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/s
ite-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/sit
e-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 (fr
om 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/s
ite-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/pytho
n3.9/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-package
s (from pandas->watson-machine-learning-client) (1.19.5)
Installing collected packages: watson-machine-learning-client
Successfully installed watson-machine-learning-client-1.0.391

```

```

In [47]: from ibm_watson_machine_learning import APIClient

wml_credentials = {
    "url": "https://us-south.ml.cloud.ibm.com",
    "apikey": "Cr7tVxz63aEng9jQaz_ynRfJ-x871BxhokrZDESUG4SO"
}

client = APIClient(wml_credentials)

```

```

from ibm_watson_machine_learning import APIClient

wml_credentials = {
    "url": "https://us-south.ml.cloud.ibm.com",
    "apikey": "Cr7tVxz63aEng9jQaz_ynRfJ-x871BxhokrZDESUG450"
}

client = APIClient(wml_credentials)

In [48]: client = APIClient(wml_credentials)

In [49]: 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'])

In [60]: space_uid = guid_from_space_name(client, 'model')
        print("Space UID = " + space_uid)

Space UID = c010e556-1f97-4d5d-b8c0-03a3d92f06d3

In [61]: client.set_default_space(space_uid)

Out[61]: 'SUCCESS'

In [62]: client.software_specifications.list()

-----
NAME                               ASSET_ID                               TYPE
default_py3.6                      0062b8c9-8b7d-44a0-a9b9-46c416adc9d9 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-4f24-8ae9-62d4cc2148306 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-b6a5-3fbd1f665666 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-da6306ce6588 base
do_py3.8                           295adbb5-9ef9-547e-9bf4-92ae3563e720 base
autoai-ts_3.8-py3.8                2aa0c932-798f-5ae9-abd6-15e0c2402f65 base
tensorflow_1.15-py3.6              2b73a275-7c0f-420b-a912-eae7f436e0bc base
kernel-spark3.3-py3.9              2b7961e2-e3b1-5a8c-a491-482c8368839a base
pytorch_1.2-py3.6                  2c8ef57d-2687-4b7d-acc6-01f94976dac1 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-288a-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                 4ff846c2-1343-4c18-85e1-689c96530443 base
pytorch-onnx_1.1-py3.6             50f95b2a-bc16-43cb-bc94-b0bed208c60b base
autoai-ts_3.9-py3.8                52c57136-80fa-572e-8728-a5e7cbb42cde base
spark-mllib_2.4-scala_2.11         55a70f99-7320-4be5-9fb9-9ed5a443af5 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-5dff-a2cd-7bb870a1cd4e base
runtime-22.2-py3.10-xc              5e8cddff-db4a-5a6a-b8aa-2d4af9864dab base
autoai-kb_3.1-py3.7                632d4b22-10aa-5180-88f0-f52dfb6444d7 base
-----

Note: Only first 50 records were displayed. To display more use 'limit' parameter.

In [63]: software_space_uid = client.software_specifications.get_uid_by_name("tensorflow_rt22.1-py3.9")

In [64]: software_space_uid

Out[64]: 'acd9c798-6974-5d2f-a657-ce06e986df4d'

In [65]: ls

Dataset/ forest13.h5 'Forest fire/' model1.h5 Train-model_new.tgz

In [66]: model_details = client.repository.store_model(model='Train-model_new.tgz',
        meta_props={
            client.repository.ModelMetaNames.NAME:"CNN",
            client.repository.ModelMetaNames.TYPE:"tensorflow_2.7",
            client.repository.ModelMetaNames.SOFTWARE_SPEC_UID:software_space_uid)
        )

In [67]: model_id = client.repository.get_model_id(model_details)

In [68]: model_id

Out[68]: 'bf4d141e-955d-46f1-a601-918d99da572a'

In [69]: ls

Dataset/ forest13.h5 'Forest fire/' model1.h5 Train-model_new.tgz

In [70]: import numpy as np
        from tensorflow.keras.models import load_model
        from tensorflow.keras.preprocessing import image

```


pytorch-onnx_rt22.1-py3.9-edt	1d362186-7ad5-5b59-8b6c-9d0880bde37f	base
tensorflow_2.1-py3.6	1eb25b84-d6ed-5dde-b6a5-3fbd1665666	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-cbm_3.0	42b92e18-d9ab-567f-988a-4240ba1ed5f7	base
pml-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	55a70f99-7320-4be5-9fb9-9ed5a143af5	base
spark-mllib_3.0	5c1b0ca2-4977-5c2e-9439-ffd44ea8ffe9	base
autoai-cbm_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
runtime-22.2-py3.10-xc	5e8cddff-db4a-5a6a-b8aa-2d4af9864dab	base
autoai-kb_3.1-py3.7	632d4b22-10aa-5180-88f0-f52dfb6444d7	base
-----	-----	----

Note: Only first 50 records were displayed. To display more use 'limit' parameter.

```
In [63]: software_space_uid = client.software_specifications.get_uid_by_name("tensorflow_rt22.1-py3.9")
```

```
In [64]: software_space_uid
```

```
Out[64]: 'acd9c798-6974-5d2f-a657-ce06e986df4d'
```

```
In [65]:
```

```
ls
Dataset/ forest13.h5 'Forest fire'/ modell.h5 Train-model_new.tgz
```

```
In [66]: model_details = client.repository.store_model(model='Train-model_new.tgz',
             meta_props={
                 client.repository.ModelMetaNames.NAME:"CNN",
                 client.repository.ModelMetaNames.TYPE:"tensorflow_2.7",
                 client.repository.ModelMetaNames.SOFTWARE_SPEC_UID:software_space_uid
             })
```

```
In [67]: model_id = client.repository.get_model_id(model_details)
```

```
In [68]: model_id
```

```
Out[68]: 'bf4d141e-955d-46f1-a601-918d99da572a'
```

```
In [69]:
```

```
ls
Dataset/ forest13.h5 'Forest fire'/ modell.h5 Train-model_new.tgz
```

```
In [70]: import numpy as np
             from tensorflow.keras.models import load_model
             from tensorflow.keras.preprocessing import image
```

```
In [80]: model=load_model('forest13.h5')
```

```
In [78]: import os, types
             import pandas as pd
             from botocore.client import Config
             import ibm_boto3
             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 credentials.
             # You might want to remove those credentials before you share the notebook.
             cos_client = ibm_boto3.client(service_name='s3',
                 ibm_api_key_id='bHfE0z3tYumrhV-z0neNxGqprEFMVR3o08JFhqdMLD0',
                 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 = 'forestfire-detection-donotdelete-pr-kwf7h4pt0wk0fy'
             object_key = 'Forest fire.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 possibilities to load
             # ibm_boto3 documentation: https://ibm.github.io/ibm-cos-sdk-python/
             # pandas documentation: http://pandas.pydata.org/
             def __iter__(self): return 0
```

```
In [ ]:
```