TEAM ID:PNT2022TMID46648
Model Training for Real Time Communication through AI for Specially Abled

Loading the Dataset & Image Data Generation

n [1]:
```
pwd
```

Out[1]:
```
'/home/wsuser/work'
```

In [2]:
```
!pip install tensorflow==2.7.1
```

```
Collecting tensorflow==2.7.1
  Downloading tensorflow-2.7.1-cp39-cp39-manylinux2010_x86_64.whl (495.2 MB)
     |████████████████████████████████| 495.2 MB 29 kB/s s eta 0:00:01
Requirement already satisfied: h5py>=2.9.0 in
/opt/conda/envs/Python3.9/lib/python3.9/site-packages (from tensorflow==2.7.1)
(3.2.1)
Requirement already satisfied: wheel<1.0,>=0.32.0 in
/opt/conda/envs/Python3.9/lib/python3.9/site-packages (from tensorflow==2.7.1)
(0.37.0)
Requirement already satisfied: numpy>=1.14.5 in /opt/conda/envs/Python-
3.9/lib/python3.9/site-packages (from tensorflow==2.7.1) (1.20.3)
Requirement already satisfied: six>=1.12.0 in
/opt/conda/envs/Python3.9/lib/python3.9/site-packages (from tensorflow==2.7.1)
(1.15.0)
Requirement already satisfied: google-pasta>=0.1.1 in
/opt/conda/envs/Python3.9/lib/python3.9/site-packages (from tensorflow==2.7.1)
(0.2.0)
Requirement already satisfied: typing-extensions>=3.6.6 in
/opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from
tensorflow==2.7.1) (4.1.1)
Requirement already satisfied: astunparse>=1.6.0 in
/opt/conda/envs/Python3.9/lib/python3.9/site-packages (from tensorflow==2.7.1)
(1.6.3)
Requirement already satisfied: keras-preprocessing>=1.1.1 in
/opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from
tensorflow==2.7.1) (1.1.2) Collecting libclang>=9.0.1
  Downloading libclang-14.0.6-py2.py3-none-manylinux2010_x86_64.whl (14.1 MB)
     |████████████████████████████████| 14.1 MB 29.9 MB/s eta 0:00:01
Requirement already satisfied: keras<2.8,>=2.7.0rc0 in /opt/conda/envs/Python-
3.9/lib/python3.9/site-packages (from tensorflow==2.7.1) (2.7.0)
```

```
Requirement already satisfied: termcolor>=1.1.0 in /opt/conda/envs/Python-
3.9/lib/python3.9/site-packages (from tensorflow==2.7.1) (1.1.0) Requirement
already satisfied: absl-py>=0.4.0 in /opt/conda/envs/Python-
3.9/lib/python3.9/site-packages (from tensorflow==2.7.1) (0.12.0)
Requirement already satisfied: tensorflow-estimator<2.8,~=2.7.0rc0 in
/opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from
tensorflow==2.7.1) (2.7.0)
Requirement already satisfied: wrapt>=1.11.0 in
/opt/conda/envs/Python3.9/lib/python3.9/site-packages (from tensorflow==2.7.1)
(1.12.1)
Requirement already satisfied: gast<0.5.0,>=0.2.1 in
/opt/conda/envs/Python3.9/lib/python3.9/site-packages (from tensorflow==2.7.1)
(0.4.0)
Requirement already satisfied: flatbuffers<3.0,>=1.12 in
/opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from
tensorflow==2.7.1) (2.0)
Requirement already satisfied: grpcio<2.0,>=1.24.3 in /opt/conda/envs/Python-
3.9/lib/python3.9/site-packages (from tensorflow==2.7.1) (1.42.0)
Requirement already satisfied: tensorboard~=2.6 in /opt/conda/envs/Python-
3.9/lib/python3.9/site-packages (from tensorflow==2.7.1) (2.7.0)
Requirement already satisfied: opt-einsum>=2.3.2 in /opt/conda/envs/Python-
3.9/lib/python3.9/site-packages (from tensorflow==2.7.1) (3.3.0)
Requirement already satisfied: protobuf>=3.9.2 in /opt/conda/envs/Python-
3.9/lib/python3.9/site-packages (from tensorflow==2.7.1) (3.19.1)
Requirement already satisfied: tensorflow-io-gcs-filesystem>=0.21.0 in
/opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from
tensorflow==2.7.1) (0.23.1)
Requirement already satisfied: werkzeug>=0.11.15 in
/opt/conda/envs/Python3.9/lib/python3.9/site-packages (from tensorboard~=2.6-
>tensorflow==2.7.1) (2.0.2)
Requirement already satisfied: markdown>=2.6.8 in /opt/conda/envs/Python-
3.9/lib/python3.9/site-packages (from tensorboard~=2.6->tensorflow==2.7.1)
(3.3.3)
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~=2.6->tensorflow==2.7.1) (0.4.4)
Requirement already satisfied: requests<3,>=2.21.0 in
/opt/conda/envs/Python3.9/lib/python3.9/site-packages (from tensorboard~=2.6-
>tensorflow==2.7.1)
(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~=2.6-
>tensorflow==2.7.1) (1.6.0)
Requirement already satisfied: google-auth<3,>=1.6.3 in
/opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from
tensorboard~=2.6->tensorflow==2.7.1) (1.23.0)
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 tensorboard~=2.6-
>tensorflow==2.7.1) (0.6.1)
```

```
Requirement already satisfied: setuptools>=41.0.0 in
/opt/conda/envs/Python3.9/lib/python3.9/site-packages (from tensorboard~=2.6-
>tensorflow==2.7.1)
(58.0.4)
Requirement already satisfied: pyasn1-modules>=0.2.1 in
/opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from
googleauth<3,>=1.6.3->tensorboard~=2.6->tensorflow==2.7.1) (0.2.8)
Requirement already satisfied: rsa<5,>=3.1.4 in
/opt/conda/envs/Python3.9/lib/python3.9/site-packages (from google-
auth<3,>=1.6.3>tensorboard~=2.6->tensorflow==2.7.1) (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
googleauth<3,>=1.6.3->tensorboard~=2.6->tensorflow==2.7.1) (4.2.2) Requirement
already satisfied: requests-oauthlib>=0.7.0 in
/opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from google-
authoauthlib<0.5,>=0.4.1->tensorboard~=2.6->tensorflow==2.7.1) (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
pyasn1modules>=0.2.1->google-auth<3,>=1.6.3->tensorboard~=2.6-
>tensorflow==2.7.1) (0.4.8)
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->tensorboard~=2.6-
>tensorflow==2.7.1) (2022.9.24)
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->tensorboard~=2.6->tensorflow==2.7.1) (2.0.4)
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->tensorboard~=2.6->tensorflow==2.7.1) (1.26.7)
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-
>tensorboard~=2.6>tensorflow==2.7.1) (3.3)
Requirement already satisfied: oauthlib>=3.0.0 in
/opt/conda/envs/Python3.9/lib/python3.9/site-packages (from requests-
oauthlib>=0.7.0->google-authoauthlib<0.5,>=0.4.1->tensorboard~=2.6-
>tensorflow==2.7.1) (3.2.1)
Installing collected packages: libclang, tensorflow
  Attempting uninstall: tensorflow
    Found existing installation: tensorflow 2.7.2
    Uninstalling tensorflow-2.7.2:
      Successfully uninstalled tensorflow-2.7.2
Successfully installed libclang-14.0.6 tensorflow-2.7.1
```

In [3]:

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

```
2022-11-09 13:34:01.056483: W
tensorflow/stream_executor/platform/default/dso_loader.cc:64] Could not load
dynamic library 'libcudart.so.11.0'; dlerror: libcudart.so.11.0: cannot open
shared object file: No such file or directory; LD_LIBRARY_PATH:
/opt/ibm/dsdriver/lib:/opt/oracle/lib:/opt/conda/envs/Python-
3.9/lib/python3.9/site-packages/tensorflow
```

In [4]:

```
# Training Datagen train_datagen
=
ImageDataGenerator(rescale=1/255,zoom_range=0.2,horizontal_flip=True,vertical
_flip=False) #
Testing Datagen
test_datagen = ImageDataGenerator(rescale=1/255)
```

In [5]:

```
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='mT4yG1S3H9nBBV3UAwsgkb5FH89r-koWMhH4gnnWTjhN',
ibm_auth_endpoint="https://iam.cloud.ibm.com/oidc/token",
config=Config(signature_version='oauth'),
endpoint_url='https://s3.private.us.cloud-objectstorage.appdomain.cloud')

bucket = 'imageclassification-donotdelete-pr-u5ptdjnvogkjw6' object_key
= 'Dataset.zip'

streaming_body_2 = 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 the data.
# ibm_boto3 documentation: https://ibm.github.io/ibm-cos-sdk-python/
# pandas documentation: http://pandas.pydata.org/
```

In [7]:

```
# Unzip the Dataset Zip File from io import BytesIO import
zipfile unzip =
zipfile.ZipFile(BytesIO(streaming_body_2.read()), 'r')
file_paths = unzip.namelist() for path in file_paths:
unzip.extract(path)
```

In [8]:

```
%%bash ls
Dataset
test_set
training_set
```

In [9]:

```
# Training Dataset
x_train=train_datagen.flow_from_directory(r'/home/wsuser/work/Dataset/trainin
g_set',target_size=(64,64), class_mode='categorical',batch_size=900)
```

```
# Testing Dataset
x_test=test_datagen.flow_from_directory(r'/home/wsuser/work/Dataset/test_set'
,target_size=(64,64), class_mode='categorical',batch_size=900)
```

```
Found 15750 images belonging to 9 classes.
Found 2250 images belonging to 9 classes.
```

In [10]:

```
print("Len x-train : ", len(x_train)) print("Len x-test : ", len(x_test))
```

```
Len x-train :  18
Len x-test :  3
```

In [11]:

```
# The Class Indices in Training Dataset x_train.class_indices
```

Out[11]:

```
{'A': 0, 'B': 1, 'C': 2, 'D': 3, 'E': 4, 'F': 5, 'G': 6, 'H': 7, 'I': 8}
```

Model Creation

In [12]:

```
# Importing Libraries
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Convolution2D,MaxPooling2D,Flatten,Dense
```

In [13]:

```
# Creating Model model=Sequential()
```

```
2022-11-09 13:34:42.826857: W
tensorflow/stream_executor/platform/default/dso_loader.cc:64] Could not load
dynamic library 'libcuda.so.1'; dlerror: libcuda.so.1: cannot open shared
object file: No such file or directory; LD_LIBRARY_PATH:
/opt/ibm/dsdriver/lib:/opt/oracle/lib:/opt/conda/envs/Python3.9/lib/python
3.9/site-packages/tensorflow 2022-11-09 13:34:42.826944: W
tensorflow/stream_executor/cuda/cuda_driver.cc:269] failed call to cuInit:
UNKNOWN ERROR (303)
```

In[14]:

```
# Adding Layers
model.add(Convolution2D(32,(3,3),activation='relu',input_shape=(64,64,3)))
model.add(MaxPooling2D(pool_size=(2,2))) model.add(Flatten())

# Adding Hidden Layers
model.add(Dense(300,activation='relu'))
model.add(Dense(150,activation='relu'))

# Adding Output Layer
model.add(Dense(9,activation='softmax'))
```

In [15]:

```
# Compiling the Model
model.compile(loss='categorical_crossentropy',optimizer='adam',metrics=['accu
racy'])
```

In [16]:
```
# Fitting the Model Generator
model.fit_generator(x_train,steps_per_epoch=len(x_train),epochs=10,validation
_data=x_test,validation_steps=len(x_test))
```

```
/tmp/wsuser/ipykernel_164/1042518445.py:2: UserWarning: `Model.fit_generator`
is deprecated and will be removed in a future version. Please use `Model.fit`,
which supports generators.

model.fit_generator(x_train,steps_per_epoch=len(x_train),epochs=10,validation
_data=x_test,validation_steps=len(x_test))
Epoch 1/10
18/18 [==============================] - 74s 4s/step - loss: 1.3704 -
accuracy: 0.5568 - val_loss: 0.4835 - val_accuracy: 0.8809
Epoch 2/10
18/18 [==============================] - 74s 4s/step - loss: 0.3403 -
accuracy: 0.8987 - val_loss: 0.2734 - val_accuracy: 0.9187
Epoch 3/10
18/18 [==============================] - 74s 4s/step - loss: 0.1527 -
accuracy: 0.9580 - val_loss: 0.2531 - val_accuracy: 0.9444
Epoch 4/10
18/18 [==============================] - 75s 4s/step - loss: 0.0862 -
accuracy: 0.9771 - val_loss: 0.2031 - val_accuracy: 0.9622
Epoch 5/10
18/18 [==============================] - 73s 4s/step - loss: 0.0526 -
accuracy: 0.9865 - val_loss: 0.2335 - val_accuracy: 0.9640
Epoch 6/10
18/18 [==============================] - 75s 4s/step - loss: 0.0343 -
accuracy: 0.9923 - val_loss: 0.2349 - val_accuracy: 0.9724
Epoch 7/10
18/18 [==============================] - 73s 4s/step - loss: 0.0252 -
accuracy: 0.9944 - val_loss: 0.2387 - val_accuracy: 0.9738
Epoch 8/10
18/18 [==============================] - 74s 4s/step - loss: 0.0176 -
accuracy: 0.9962 - val_loss: 0.2614 - val_accuracy: 0.9693
Epoch 9/10
18/18 [==============================] - 74s 4s/step - loss: 0.0152 -
accuracy: 0.9968 - val_loss: 0.2669 - val_accuracy: 0.9724
Epoch 10/10
18/18 [==============================] - 74s 4s/step - loss: 0.0145 -
accuracy: 0.9970 - val_loss: 0.2757 - val_accuracy: 0.9747
```

Out[16]:

Saving the Model

In [17]:
```
model.save('aslpng1.h5')
# Current accuracy is 0.8154
```

In [18]:
```
# Convert the Saved Model to a Tar Compressed Format
```

```
!tar -zcvf trainedModel.tgz aslpng1.h5 aslpng1.h5
```

In [19]:

```
%%bash ls -
ll total
210184
-rw-rw---- 1 wsuser wscommon 111324760 Nov  9 13:49 aslpng1.h5
drwxrwx--- 4 wsuser wscommon      4096 Nov  9 13:34 Dataset -rw-rw----
1 wsuser wscommon 103895281 Nov  9 13:49 trainedModel.tgz
```

Watson Machine Learning

In [20]:

```
!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 17.4 MB/s eta 0:00:01
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: 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: tqdm in /opt/conda/envs/Python-
3.9/lib/python3.9/site-packages (from watson-machine-learning-client)
(4.62.3)
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: tabulate in /opt/conda/envs/Python-
3.9/lib/python3.9/site-packages (from watson-machine-learning-client) (0.8.9)
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-packages (from watson-machine-learning-client)
(2022.9.24)
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: jmespath<1.0.0,>=0.7.1 in
/opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from boto3-
>watsonmachine-learning-client) (0.10.0)
Requirement already satisfied: s3transfer<0.6.0,>=0.5.0 in
/opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from boto3-
>watsonmachine-learning-client) (0.5.0)
Requirement already satisfied: botocore<1.22.0,>=1.21.21 in
/opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from boto3-
>watsonmachine-learning-client) (1.21.41)
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-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: 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: idna<4,>=2.5 in
/opt/conda/envs/Python3.9/lib/python3.9/site-packages (from requests->watson-
machine-learningclient) (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)
Installing collected packages: watson-machine-learning-client
Successfully installed watson-machine-learning-client-1.0.391
```

In [22]:

```
from ibm_watson_machine_learning import APIClient wml_credentials = {
    "url": "https://us-south.ml.cloud.ibm.com",
    "apikey": "4y7eNmzaeDsCxie0E5b-PACwiQldF2Ock7lM6VAd28Fb"
}  client =
APIClient(wml_credentials)
```

Save to Deployment Space

In [23]:

```
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 [24]:

```
space_uid = guid_from_space_name(client, 'model') print("Space UID : ",
space_uid)
```

```
Space UID :  7ea8348c-8baa-4f9a-bac8-f21015c4bc86
```

In [25]:

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

Out[25]:

```
'SUCCESS'
```

In [26]: `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 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 xgboost_0.82-py3.6
39e31acd-5f30-41dc-ae44-60233c80306e  base pytorch-onnx_1.2-py3.6-edt
40589d0e-7019-4e28-8daa-fb03b6f4fe12  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 spark-mllib_2.3-r_3.6
6586b9e3-ccd6-4f92-900f-0f8cb2bd6f0c  base tensorflow_2.4-py3.7
65e171d7-72d1-55d9-8ebb-f813d620c9bb  base spss-modeler_18.2
687eddc9-028a-4117-b9dd-e57b36f1efa5  base ------------------------------  ----
```

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

In[27]:

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

Out[27]:

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

In[31]:

```
model_details     =     client.repository.store_model(model='trainedModel.tgz',
meta_props={                   client.repository.ModelMetaNames.NAME:    "CNN",
client.repository.ModelMetaNames.SOFTWARE_SPEC_UID:          software_spec_uid,
client.repository.ModelMetaNames.TYPE:     "tensorflow_2.7"})     model_id     =
client.repository.get_model_id(model_details)
```

In [32]:

```
model_id
```

Out[32]:

```
'eec72d86-8ba8-46cc-8588-c9ff4bf89c85'
```

In [35]:

```
client.repository.download(model_id,'aslpng1.tar.gz')
Successfully saved model content to file: 'aslpng1.tar.gz'
```

Out[35]:

```
'/home/wsuser/work/aslpng1.tar.gz'
```

In [ ]: