

|              |  |
|--------------|--|
| Team ID      | PNT2022TMID09233   |
| Project Name | Real time communication system powered by AI for Specially abled |

In [5]: `pwd`

Out[5]: `'/home/wsuser/work'`

In [64]: `!pip install keras==2.2.4`  
`!pip install tensorflow==2.5.0`

Requirement already satisfied: keras==2.2.4 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (2.2.4)

Requirement already satisfied: scipy>=0.14 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from keras==2.2.4) (1.7.3)

Requirement already satisfied: six>=1.9.0 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from keras==2.2.4) (1.15.0)

Requirement already satisfied: numpy>=1.9.1 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from keras==2.2.4) (1.19.5)

Requirement already satisfied: keras-preprocessing>=1.0.5 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from keras==2.2.4) (1.1.2)

Requirement already satisfied: h5py in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from keras==2.2.4) (3.1.0)

Requirement already satisfied: pyyaml in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from keras==2.2.4) (5.4.1)

Requirement already satisfied: keras-applications>=1.0.6 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from keras==2.2.4) (1.0.8)

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: 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: 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: 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: 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: 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: 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: 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: 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: 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: 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: 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: 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: 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: 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: 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: 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: 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: 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: 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: 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: 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: 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: 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: 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: requests<3,>=2.21.0 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from tensorboard~=2.5->tensorflow==2.5.0) (2.26.0)

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~=2.5->tensorflow==2.5.0) (0.4.4)

Requirement already satisfied: tensorboard-plugin-wit>=1.6.0 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from tensorboard~=2.5->tensorflow==2.5.0) (1.6.0)

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->tensorboard~=2.5->tensorflow==2.5.0) (0.2.8)

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->tensorboard~=2.5->tensorflow==2.5.0) (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~=2.5->tensorflow==2.5.0) (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~=2.5->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->tensorboard~=2.5->tensorflow==2.5.0) (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~=2.5->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->tensorboard~=2.5->tensorflow==2.5.0) (1.26.7)

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~=2.5->tensorflow==2.5.0) (2.0.4)

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~=2.5->tensorflow==2.5.0) (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->tensorboard~=2.5->tensorflow==2.5.0) (3.2.1)

```
In [9]: from tensorflow.keras.preprocessing.image import ImageDataGenerator
train_datagen = ImageDataGenerator(rescale=1/255, zoom_range=0.2, horizontal_flip=True, vertical_flip=True)
test_datagen = ImageDataGenerator(rescale=1/255)
```

```
In [10]: import os, types
import pandas as pd
from boto3.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='PVPkWFkW6iEOXHztR5TA17h-ZiEWrzHAAJhndcHu_cq4',
                              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 = 'realtimecommunicationsystempowere-donotdelete-pr-hqyvwbjkomyjvl'
object_key = 'Dataset.zip'

streaming_body_1 = cos_client.get_object(Bucket=bucket, Key=object_key)['Body']

# Your data file was loaded into a boto3.response.StreamingBody object.
# Please read the documentation of ibm_boto3 and pandas to learn more about the possibilities.
# ibm_boto3 documentation: https://ibm.github.io/ibm-cos-sdk-python/
# pandas documentation: http://pandas.pydata.org/
if not hasattr(streaming_body_1, "__iter__"): streaming_body_1.__iter__ = types.MethodType(__iter__, streaming_body_1)
```

```
In [11]: from io import BytesIO
import zipfile
unzip = zipfile.ZipFile(BytesIO(streaming_body_1.read()), 'r')
file_paths = unzip.namelist()
for path in file_paths:
    unzip.extract(path)
```

```
In [12]: x_train = train_datagen.flow_from_directory('/home/wsuser/work/Dataset/training_set', target_size=(28, 28))
x_test = test_datagen.flow_from_directory('/home/wsuser/work/Dataset/test_set', target_size=(28, 28))

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

```
In [14]: 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 Dropout
from tensorflow.keras.layers import Flatten
```

```
In [15]: model = Sequential()
```

```
2022-11-12 16:11:29.719926: W tensorflow/stream_executor/platform/default/dso_loader.cc:64] Could not load dynamic library 'libcuda.so.1'; dlopen error: 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/Python-3.9/lib/python3.9/site-packages/tensorflow
2022-11-12 16:11:29.720229: W tensorflow/stream_executor/cuda/cuda_driver.cc:326] failed call to cuInit: UNKNOWN ERROR (303)
```

```
In [16]: model.add(Convolution2D(32, (3, 3), input_shape=(64, 64, 1), activation='relu'))
```

```
In [17]: model.add(MaxPooling2D(pool_size=(2, 2)))
```

```
In [18]: model.add(Flatten())
```

```
In [19]: model.add(Dense(units=512, activation='relu'))
model.add(Dense(units=9, activation='softmax'))
```

```
In [20]: model.compile(loss='categorical_crossentropy', optimizer='adam', metrics=['accuracy'])
```

```
In [21]: model.fit_generator(x_train, steps_per_epoch=24, epochs=10, validation_data=x_test, validation_steps=2)

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

```
/opt/conda/envs/Python-3.9/lib/python3.9/site-packages/tensorflow/python/keras/engine/training.py:1940: UserWarning: `Model.fit_generator` is deprecated and will be removed in a future version. Please use `Model.fit`, which supports generators.
warnings.warn("`Model.fit_generator` is deprecated and "
```

```

Epoch 1/10
24/24 [=====] - ETA: 0s - loss: 1.4448 - accuracy: 0.6103WARNING:
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, 40 ba
tches). You may need to use the repeat() function when building your dataset.
24/24 [=====] - 36s 1s/step - loss: 1.4448 - accuracy: 0.6103 - v
al_loss: 0.4908 - val_accuracy: 0.8969
Epoch 2/10
24/24 [=====] - 32s 1s/step - loss: 0.3372 - accuracy: 0.9053
Epoch 3/10
24/24 [=====] - 32s 1s/step - loss: 0.1780 - accuracy: 0.9511
Epoch 4/10
24/24 [=====] - 31s 1s/step - loss: 0.1037 - accuracy: 0.9742
Epoch 5/10
24/24 [=====] - 32s 1s/step - loss: 0.0677 - accuracy: 0.9829
Epoch 6/10
24/24 [=====] - 31s 1s/step - loss: 0.0518 - accuracy: 0.9887
Epoch 7/10
24/24 [=====] - 34s 1s/step - loss: 0.0350 - accuracy: 0.9928
Epoch 8/10
24/24 [=====] - 35s 1s/step - loss: 0.0279 - accuracy: 0.9943
Epoch 9/10
24/24 [=====] - 32s 1s/step - loss: 0.0238 - accuracy: 0.9954
Epoch 10/10
24/24 [=====] - 33s 1s/step - loss: 0.0194 - accuracy: 0.9971

```

```
In [57]: !tar -zcvf RealtimeModel.tgz signlanguage.h5
```

```
signlanguage.h5
```

```
In [22]: !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 18.4 MB/s eta 0:00:01

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: tqdm in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from watson-machine-learning-client) (4.62.3)

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: 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: urllib3 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from watson-machine-learning-client) (1.26.7)

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: certifi in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from watson-machine-learning-client) (2022.9.24)

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: 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: 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: 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/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) (1.19.5)

Installing collected packages: watson-machine-learning-client

Successfully installed watson-machine-learning-client-1.0.391

```
In [23]: from ibm_watson_machine_learning import APIClient
        wml_credentials = {
            "url": "https://us-south.ml.cloud.ibm.com",
            "apikey": "GMWASXVsnkiFntXNKe_3ddzCruwAIJX7liRp6vx2Khc7"
        }
        client = APIClient(wml_credentials)
```

```
In [26]: 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))
```

```
In [51]: space_uid = guid_from_space_name(client, 'RealtimeModel')
        print("Space UID : ", space_uid)
```

Space UID : 028cc4f6-7af4-4f1b-a0af-8ae4b7cbdfdf9

```
In [52]: client.set.default_space(space_uid)
```

Out[52]: 'SUCCESS'

In [53]: 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 [54]: software\_spec\_uid = client.software\_specifications.get\_uid\_by\_name("tensorflow\_rt22.1-py3.

In [55]: software\_spec\_uid

Out[55]: 'acd9c798-6974-5d2f-a657-ce06e986df4d'

```
In [58]: model_details = client.repository.store_model(model='RealtimeModel.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 [59]: model_id
```

```
Out[59]: 'e6eb7cf5-7cce-45c2-b1c8-7250e2b8e9aa'
```

```
In [62]: client.repository.download(model_id, 'signlanguage1.tar.gz')
```

```
Successfully saved model content to file: 'signlanguage1.tar.gz'
Out[62]: '/home/wsuser/work/signlanguage1.tar.gz'
```

```
In [63]: ls
```

```
Dataset/          signlanguage1.tar.gz  signlanguage.tar.gz
RealtimeModel.tgz  signlanguage.h5
```