In [1]:

```
!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: 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: wrapt>=1.11.0 in /opt/conda/envs/Python-3.9/lib/python3.9/
site-packages (from tensorflow) (1.12.1)
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: 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: 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: 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: 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: 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: 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: 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: 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: 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: protobuf>=3.9.2 in /opt/conda/envs/Python-3.9/lib/python3.
9/site-packages (from tensorflow) (3.19.1)
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: termcolor>=1.1.0 in /opt/conda/envs/Python-3.9/lib/python3
.9/site-packages (from tensorflow) (1.1.0)
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: tensorboard~=2.7 in /opt/conda/envs/Python-3.9/lib/python3
.9/site-packages (from tensorflow) (2.7.0)
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: 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: 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: 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: 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-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: 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: 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: 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: 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: 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: 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: 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: 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: 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: 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: 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)
```

IMAGE PREPROCESSING

In [2]:

```
# 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
```

In [3]:

```
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='H118gyqPie94forcf8S88nwhWCnKYTbHrk5L_aTQaPxo',
    ibm_auth_endpoint="https://iam.cloud.ibm.com/oidc/token",
    config=Config(signature_version='oauth'),
    endpoint_url='https://s3.private.eu.cloud-object-storage.appdomain.cloud')

bucket = 'arrhythmiaclassification-donotdelete-pr-afnighsy3hw2ca'
object_key = 'Classification of Arrhythmia by Using Deep Learning with 2-D ECG Spectral I
mage Representation.zip'

streaming_body_1 = 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 [4]:

```
#unzipping your data file
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 [5]:

```
pwd
```

Out[5]:

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

In [7]:

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

In [8]:

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

In [9]:

```
# setting parameters for data augmentation for training data
train_datagen=ImageDataGenerator(rescale=1./255,shear_range=0.2,zoom_range=0.2,horizontal
_flip=True)
```

In [10]:

```
# data augmentation to the testing data
test_datagen=ImageDataGenerator(rescale=1./255)
```

In [11]:

```
#performing data augmentation to train data
x_train=train_datagen.flow_from_directory(directory=r'/home/wsuser/work/data/train',targe
t_size=(64,64),batch_size=32,class_mode='categorical')
```

```
Found 15341 images belonging to 6 classes.
```

In [12]:

```
x_test=test_datagen.flow_from_directory(directory=r'/home/wsuser/work/data/test',target_s
ize=(64,64),batch_size=32,class_mode='categorical')
```

```
Found 6825 images belonging to 6 classes.
```

In [13]:

```
#Lets see the classes the different types of arrythmia is stored in
x_train.class_indices
```

Out[13]:

```
{'Left Bundle Branch Block': 0,
 'Normal': 1,
 'Premature Atrial Contraction': 2,
 'Premature Ventricular Contractions': 3,
 'Right Bundle Branch Block': 4,
 'Ventricular Fibrillation': 5}
```

MODEL BUILDING

In [14]:

```
import numpy as np
import tensorflow
from tensorflow.keras.models import Sequential
from tensorflow.keras import layers
```

```
from tensorflow.keras.layers import Dense,Flatten

from tensorflow.keras.layers import Conv2D,MaxPooling2D
import tensorflow.keras
```

In [15]:

```
model=Sequential()
```

Adding CNN Layers

In [16]:

```
model.add(Conv2D(32,(3,3),input_shape=(64,64,3),activation='relu')) #Activation Function
model.add(MaxPooling2D(pool_size=(2,2))) #Downsampling Purposes
model.add(Conv2D(32,(3,3),activation='relu'))
model.add(MaxPooling2D(pool_size=(2,2)))
model.add(Flatten()) #Flatten the dimensions of the image
```

In [17]:

```
model.add(Dense(32))# Deeply connected neural network layers
model.add(Dense(6,activation='softmax'))#Output layer with 6 neurons
```

In [18]:

```
#Summary of the model
model.summary()
```

```
Model: "sequential"
_________________________________________________________________
 Layer (type)                Output Shape              Param #
=================================================================
 conv2d (Conv2D)             (None, 62, 62, 32)        896

 max_pooling2d (MaxPooling2D  (None, 31, 31, 32)       0
 )

 conv2d_1 (Conv2D)           (None, 29, 29, 32)        9248

 max_pooling2d_1 (MaxPooling  (None, 14, 14, 32)       0
 2D)

 flatten (Flatten)           (None, 6272)              0

 dense (Dense)               (None, 32)                200736

 dense_1 (Dense)             (None, 6)                 198

=================================================================
Total params: 211,078
Trainable params: 211,078
Non-trainable params: 0
_________________________________________________________________
```

In [19]:

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

In [20]:

```
model.fit_generator(generator=x_train,steps_per_epoch = len(x_train), epochs=10, validat
ion_data=x_test,validation_steps = len(x_test))
```

```
/tmp/wsuser/ipykernel_164/53529210.py:1: UserWarning: `Model.fit_generator` is deprecated
and will be removed in a future version. Please use `Model.fit`, which supports generator
s.
  model.fit_generator(generator=x_train,steps_per_epoch = len(x_train), epochs=10, valida
tion_data=x_test,validation_steps = len(x_test))
```

```
Epoch 1/10
480/480 [==============================] - 90s 186ms/step - loss: 0.8845 - accuracy: 0.69
83 - val_loss: 0.6509 - val_accuracy: 0.7622
Epoch 2/10
480/480 [==============================] - 87s 181ms/step - loss: 0.3313 - accuracy: 0.90
06 - val_loss: 0.4420 - val_accuracy: 0.8738
Epoch 3/10
480/480 [==============================] - 85s 177ms/step - loss: 0.2590 - accuracy: 0.92
38 - val_loss: 0.3705 - val_accuracy: 0.8951
Epoch 4/10
480/480 [==============================] - 86s 178ms/step - loss: 0.2152 - accuracy: 0.93
98 - val_loss: 0.3378 - val_accuracy: 0.8941
Epoch 5/10
480/480 [==============================] - 86s 178ms/step - loss: 0.1823 - accuracy: 0.94
73 - val_loss: 0.3742 - val_accuracy: 0.8762
Epoch 6/10
480/480 [==============================] - 88s 184ms/step - loss: 0.1550 - accuracy: 0.95
25 - val_loss: 0.3282 - val_accuracy: 0.8948
Epoch 7/10
480/480 [==============================] - 85s 178ms/step - loss: 0.1478 - accuracy: 0.95
57 - val_loss: 0.2508 - val_accuracy: 0.9266
Epoch 8/10
480/480 [==============================] - 85s 177ms/step - loss: 0.1289 - accuracy: 0.96
10 - val_loss: 0.2474 - val_accuracy: 0.9392
Epoch 9/10
480/480 [==============================] - 91s 190ms/step - loss: 0.1164 - accuracy: 0.96
48 - val_loss: 0.3029 - val_accuracy: 0.9241
Epoch 10/10
480/480 [==============================] - 92s 192ms/step - loss: 0.1151 - accuracy: 0.96
41 - val_loss: 0.2754 - val_accuracy: 0.9370
```

Out[20]:

```
<keras.callbacks.History at 0x7fb28d092ee0>
```

SAVING THE MODEL

In [21]:

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

In [22]:

```
!tar -zcvf arrhythmia-classification-model_new.tgz ECG.h5
```

```
ECG.h5
```

In [23]:

```
ls -1
```

```
arrhythmia-classification-model_new.tgz
data/
ECG.h5
```

In [24]:

```
#Installing amchine learning service
!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 11.2 MB/s eta 0:00:01
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: urllib3 in /opt/conda/envs/Python-3.9/lib/python3.9/site-p
ackages (from watson-machine-learning-client) (1.26.7)
Requirement already satisfied: tqdm in /opt/conda/envs/Python-3.9/lib/python3.9/site-pack
```

```
ages (from watson-machine-learning-client) (4.62.3)
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: ibm-cos-sdk in /opt/conda/envs/Python-3.9/lib/python3.9/si
te-packages (from watson-machine-learning-client) (2.11.0)
Requirement already satisfied: boto3 in /opt/conda/envs/Python-3.9/lib/python3.9/site-pac
kages (from watson-machine-learning-client) (1.18.21)
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: lomond in /opt/conda/envs/Python-3.9/lib/python3.9/site-pa
ckages (from watson-machine-learning-client) (0.3.3)
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: botocore<1.22.0,>=1.21.21 in /opt/conda/envs/Python-3.9/li
b/python3.9/site-packages (from boto3->watson-machine-learning-client) (1.21.41)
Requirement already satisfied: jmespath<1.0.0,>=0.7.1 in /opt/conda/envs/Python-3.9/lib/p
ython3.9/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-learni
ng-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-mach
ine-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: charset-normalizer~=2.0.0 in /opt/conda/envs/Python-3.9/li
b/python3.9/site-packages (from requests->watson-machine-learning-client) (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->watson-machine-learning-client) (3.3)
Requirement already satisfied: pytz>=2017.3 in /opt/conda/envs/Python-3.9/lib/python3.9/s
ite-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 [41]:

```
from ibm_watson_machine_learning import APIClient

wml_credentials = {
    "url":"https://eu-gb.ml.cloud.ibm.com",
    "apikey":"G565mbpJlA5S9JVSVNwpBuQMhgBaRnVA-iOy3xiQKTAE"
}

client = APIClient(wml_credentials)
```

In [42]:

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

In [43]:

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

In [44]:

```
space_uid=guid_from_space_name(client, 'Classificatio_of_Arrhythmia')
print("space UID="+ space_uid)
```

```
space UID=cd354d14-8e58-44b8-b1b6-5ac25a90305a
```

In [45]:

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

Out[45]:

```
'SUCCESS'
```

In [46]:

```
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 [47]:

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

Out[47]:

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

In [48]:

```
model_details = client.repository.store_model(model='arrhythmia-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()
```

```
/opt/conda/envs/Python-3.9/lib/python3.9/site-packages/ibm_watson_machine_learning/repository.py:1453: UserWarning: This method is deprecated, please use get_model_id()
  warn("This method is deprecated, please use get_model_id()")
```

In [49]:

```
model_id
```

Out[49]:

'2e1b92c9-53d0-4368-b090-c4b3559e4d16'

In [51]:

```
client.repository.download(model_id,'my_model2.tar2.gz')
```

```
Successfully saved model content to file: 'my_model2.tar2.gz'
```

Out[51]:

'/home/wsuser/work/my_model2.tar2.gz'