

Sprint-4

Train The Model On IBM

Train The Model on IBM Watson

Date	19 Nov 2022
TeamID	PNT2022TMID01315
ProjectName	Classification of Arrhythmia by Using Deep Learning with 2-D ECG Spectral Image Representation

TASK:

Train The Model on IBM Watson:

GO TO WATSON STUDIO SERVICES AND LAUNCH IT:

The screenshot displays the IBM Cloud Watson Studio service page. The browser address bar shows the URL: cloud.ibm.com/services/data-science-experience/cm%3Av1%3Abluemix%3Apublic%3Adata-science-experience%3Aus-south%3Aa%2F572055c066d049898939e363b337545c%3A644b4.... The page header includes the IBM Cloud logo and a search bar. The main content area shows the 'Watson Studio-gm' service, which is 'Active'. A 'Launch in IBM Cloud Pak for Data' button is prominently displayed. To the right, a diagram illustrates the IBM Cloud Pak for Data architecture, showing the relationship between Watson Studio, the Cloud Pak for Data platform, and the underlying base cloud infrastructure. Below the main content, there are three sections: 'Documentation', 'Learning path', and 'Videos', each providing links to further resources.

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The screenshot shows the IBM Watson Studio dashboard. The top navigation bar includes the IBM Watson Studio logo, a search bar, and user account information. The main content area is divided into several sections:

- Quick start:** A list of quickstart guides including 'Create data pipelines with DataStage', 'Build customer profiles with IBM Match 360 with Watson', 'Catalog and govern data with Watson Knowledge Catalog', 'Build and manage ML models with Watson Studio', and 'Query data anywhere with Watson Query'.
- Projects:** A list of projects, including 'Arrhythmia Classification Project' (Nov 12, 2022 03:11 PM).
- Notifications:** A section indicating 'No notifications' and stating 'You will see your most recent notifications here.'
- Deployments:** A list of deployments, including 'image classification' (Nov 12, 2022 04:25 PM).
- New in gallery:** A section titled 'Use AutoAI and Lale to predict credit risk with...' with a description of the notebook and an 'Explore' button.
- What's new:** A section with updates like 'Spark 3.3 replaces Spark 3.2 for Watson Studio and Watson Machine Learning' (Nov 18, 2022), 'Manage settings for data protection rules (Watson Knowledge Catalog)' (Nov 11, 2022), and 'Use new functions in the DataStage Transformer stage' (Nov 11, 2022).

The bottom of the dashboard features a Windows taskbar with various application icons and a system clock showing 07:45 PM on 16-11-2022.

OPEN PROJECTS:

The screenshot shows the 'Assets' page for the 'Arrhythmia Classification Project' in IBM Watson Studio. The page is divided into several sections:

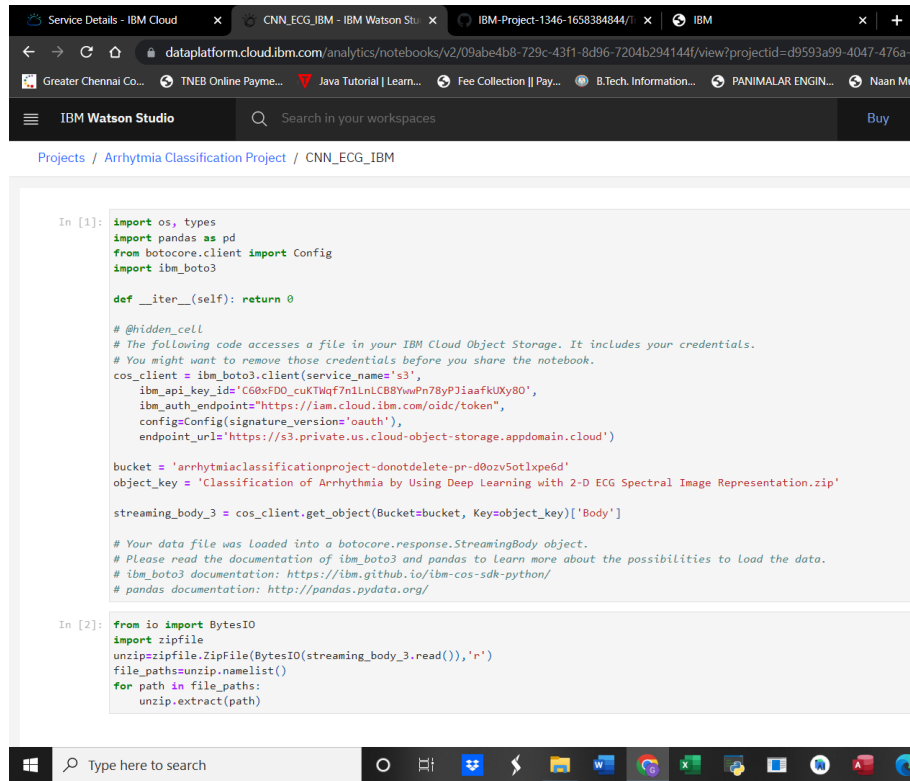
- Navigation:** A top bar with 'Overview', 'Assets', 'Jobs', and 'Manage' tabs. The 'Assets' tab is selected.
- Find assets:** A search bar with the text 'Find assets'.
- Asset types:** A sidebar on the left showing 'Data' (2 items) and 'Notebooks' (1 item).
- All assets:** A table listing the assets in the project:

Name	Last modified
CNN_ECG_IBM Notebook	4 days ago Modified by you
fig_36.png PNG	4 days ago Modified by you
Classification of Arrhythmia by Using Deep Learning w... ZIP	4 days ago Modified by you

At the bottom of the table, it shows 'Items per page: 20' and '1-3 of 3 items'. The right side of the page features a 'Data in this project' section with a dashed box for dropping data files and a link to 'browse for files to upload'.

The bottom of the dashboard features a Windows taskbar with various application icons and a system clock showing 07:49 PM on 16-11-2022.

OPEN CNN-ECG-IBM PROJECT:



The screenshot shows the IBM Watson Studio interface. The browser tabs include 'Service Details - IBM Cloud', 'CNN_ECG_IBM - IBM Watson Stu...', 'IBM-Project-1346-1658384844/...', and 'IBM'. The address bar shows the URL: `dataplatfom.cloud.ibm.com/analytics/notebooks/v2/09abe4b8-729c-43f1-8d96-7204b294144f/view?projectid=d9593a99-4047-476a-...`. The breadcrumb navigation shows 'Projects / Arrhythmia Classification Project / CNN_ECG_IBM'. The notebook contains two code cells:

```
In [1]: import os, types
import pandas as pd
from botocore.client import Config
import ibm_boto3

def __iter__(self): return 0

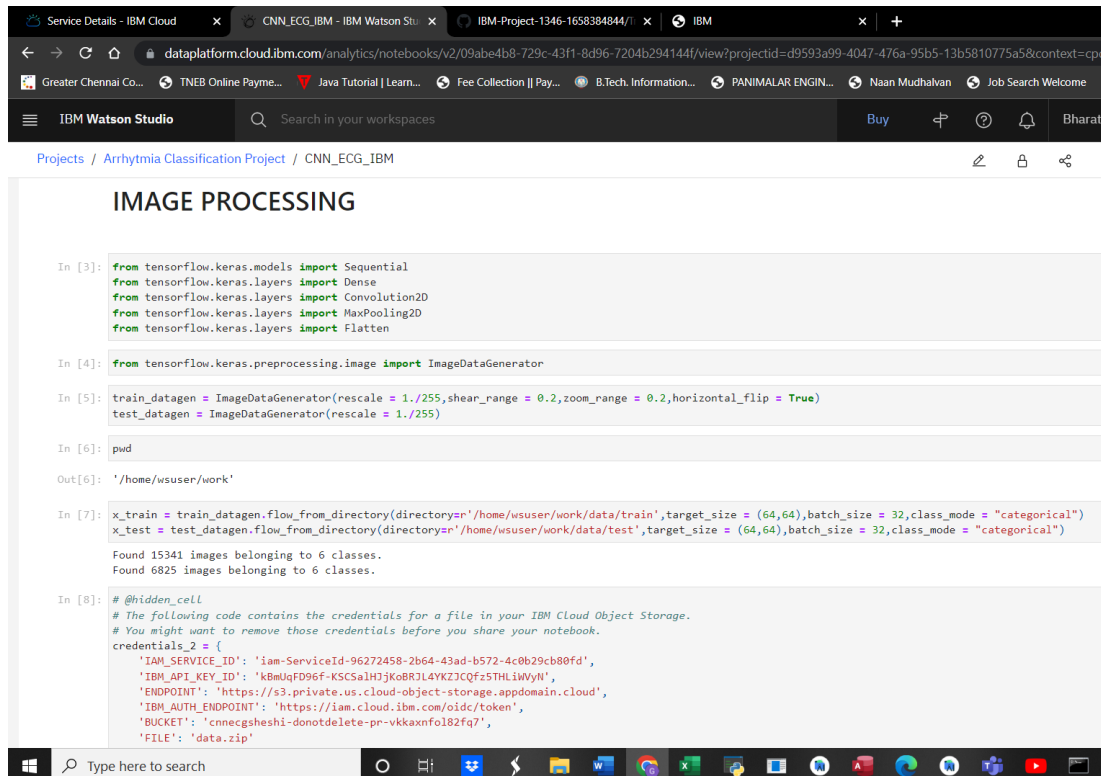
# @hidden_cell
# The following code accesses a file in your IBM Cloud Object Storage. It includes your credentials.
# You might want to remove those credentials before you share the notebook.
cos_client = ibm_boto3.client(service_name='s3',
                              ibm_api_key_id='C60xFO0_cuKTWqf7n1LnLCB8YvWn78yPjiaafkUXy80',
                              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 = 'arrhythmiaClassificationProject-donotdelete-pr-d80zv5otlxpe6d'
object_key = 'Classification of Arrhythmia by Using Deep Learning with 2-D ECG Spectral Image Representation.zip'

streaming_body_3 = 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 [2]: from io import BytesIO
import zipfile
unzip=zipfile.ZipFile(BytesIO(streaming_body_3.read()), 'r')
file_paths=unzip.namelist()
for path in file_paths:
    unzip.extract(path)
```



The screenshot shows the IBM Watson Studio interface. The browser tabs include 'Service Details - IBM Cloud', 'CNN_ECG_IBM - IBM Watson Stu...', 'IBM-Project-1346-1658384844/...', and 'IBM'. The address bar shows the URL: `dataplatfom.cloud.ibm.com/analytics/notebooks/v2/09abe4b8-729c-43f1-8d96-7204b294144f/view?projectid=d9593a99-4047-476a-95b5-13b5810775a5&context=cps...`. The breadcrumb navigation shows 'Projects / Arrhythmia Classification Project / CNN_ECG_IBM'. The notebook title is 'IMAGE PROCESSING'. The notebook contains several code cells:

```
In [3]: 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 [4]: from tensorflow.keras.preprocessing.image import ImageDataGenerator

In [5]: train_datagen = ImageDataGenerator(rescale = 1./255, shear_range = 0.2, zoom_range = 0.2, horizontal_flip = True)
test_datagen = ImageDataGenerator(rescale = 1./255)

In [6]: pwd

Out[6]: '/home/username/work'

In [7]: x_train = train_datagen.flow_from_directory(directory='r'/home/username/work/data/train', target_size = (64,64), batch_size = 32, class_mode = "categorical")
x_test = test_datagen.flow_from_directory(directory='r'/home/username/work/data/test', target_size = (64,64), batch_size = 32, class_mode = "categorical")

Found 15341 images belonging to 6 classes.
Found 6825 images belonging to 6 classes.

In [8]: # @hidden_cell
# The following code contains the credentials for a file in your IBM Cloud Object Storage.
# You might want to remove those credentials before you share your notebook.
credentials_2 = {
    'IAM_SERVICE_ID': 'iam-ServiceId-96272458-2b64-43ad-b572-4c0b29cb80fd',
    'IBM_API_KEY_ID': 'k8mUqFD96f-KSCSa1H3Jko8R3L4YKZ3CQfz5THLiVvYn',
    'ENDPOINT': 'https://s3.private.us.cloud-object-storage.appdomain.cloud',
    'IBM_AUTH_ENDPOINT': 'https://iam.cloud.ibm.com/oidc/token',
    'BUCKET': 'cnnecgsheshi-donotdelete-pr-vkkaxnfo182fq7',
    'FILE': 'data.zip'}
```


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datapatform.cloud.ibm.com/analytics/notebooks/v2/09abe4b8-729c-43f1-8d96-7204b294144f/view?projectid=d9593a99-4047-476a-95b5-13b5810775a5&context=cpdaas

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

flatten (Flatten) (None, 6272) 0

dense (Dense) (None, 128) 802944

dense_1 (Dense) (None, 128) 16512

dense_2 (Dense) (None, 128) 16512

dense_3 (Dense) (None, 128) 16512

dense_4 (Dense) (None, 128) 16512

dense_5 (Dense) (None, 6) 774

=====
Total params: 879,910
Trainable params: 879,910
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, validation_data=x_test, validation_steps = len(x_test))

/tmp/user/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 generators.
  model.fit_generator(generator=x_train, steps_per_epoch = len(x_train), epochs=10, validation_data=x_test, validation_steps = len(x_test))

Epoch 1/10
480/480 [=====] - 91s 189ms/step - loss: 1.4343 - accuracy: 0.4778 - val_loss: 1.7401 - val_accuracy: 0.3193
Epoch 2/10
480/480 [=====] - 94s 196ms/step - loss: 0.9374 - accuracy: 0.6449 - val_loss: 1.3693 - val_accuracy: 0.5134
Epoch 3/10
480/480 [=====] - 94s 196ms/step - loss: 0.4758 - accuracy: 0.8279 - val_loss: 0.8246 - val_accuracy: 0.8029
Epoch 4/10
480/480 [=====] - 91s 190ms/step - loss: 0.2607 - accuracy: 0.9136 - val_loss: 0.6009 - val_accuracy: 0.8488
```

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```
Epoch 4/10
480/480 [=====] - 91s 190ms/step - loss: 0.2607 - accuracy: 0.9136 - val_loss: 0.6009 - val_accuracy: 0.8488
Epoch 5/10
480/480 [=====] - 95s 198ms/step - loss: 0.1869 - accuracy: 0.9412 - val_loss: 0.6648 - val_accuracy: 0.8485
Epoch 6/10
480/480 [=====] - 92s 192ms/step - loss: 0.1222 - accuracy: 0.9602 - val_loss: 0.7053 - val_accuracy: 0.8429
Epoch 8/10
480/480 [=====] - 92s 192ms/step - loss: 0.1009 - accuracy: 0.9693 - val_loss: 0.5899 - val_accuracy: 0.8686
Epoch 9/10
480/480 [=====] - 97s 202ms/step - loss: 0.0945 - accuracy: 0.9710 - val_loss: 0.5824 - val_accuracy: 0.8683
Epoch 10/10
480/480 [=====] - 91s 190ms/step - loss: 0.0797 - accuracy: 0.9752 - val_loss: 0.4579 - val_accuracy: 0.8712

Out[20]: <keras.callbacks.History at 0x7f5a4101d220>

Saving The Model

In [21]: model.save('ECG_IBM.h5')

In [22]: !tar -zcvf ECG-arrhythmia-classification-model_new.tgz ECG_IBM.h5
ECG_IBM.h5

In [23]: ls -l
data/
ECG-arrhythmia-classification-model_new.tgz
ECG_IBM.h5

In [24]: !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 2.4 MB/s eta 0:00:01
```

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```
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: boto3 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from watson-machine-learning-client) (1.18.21)
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 (from watson-machine-learning-client) (0.8.9)
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: tqdm in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from watson-machine-learning-client) (4.62.3)
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: urllib3 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from watson-machine-learning-client) (1.26.7)
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: 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: 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/lib/python3.9/site-packages (from boto3->watson-machine-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->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->watson-machine-learning-client) (1.15.0)
Requirement already satisfied: ibm-cos-sdk-core==2.11.0 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from ibm-cos-sdk->watson-machine-learning-client) (2.11.0)
Requirement already satisfied: ibm-cos-sdk-s3transfer==2.11.0 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from ibm-cos-sdk->watson-machine-learning-client) (2.11.0)
Requirement already satisfied: idna<4,>=2.5 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from requests->watson-machine-learning-client) (3.3)
Requirement already satisfied: charset-normalizer<=2.0.0 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from requests->watson-machine-learning-client) (2.0.4)
Requirement already satisfied: pytz>=2017.3 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from pandas->watson-machine-learning-client) (2021.3)
Requirement already satisfied: numpy>=1.17.3 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from pandas->watson-machine-learning-client) (1.20.3)
Installing collected packages: watson-machine-learning-client
Successfully installed watson-machine-learning-client-1.0.391

In [29]: from ibm_watson_machine_learning import APIClient
wml_credentials={
    "url": "https://us-south.ml.cloud.ibm.com",
    "apikey": "FaUUN_4a8EUzKVRGm5R9181-Nv6IX_FNGeAqf6e9jd6"
}
client=APIClient(wml_credentials)

In [117]: client=APIClient(wml_credentials)

In [118]: 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"]
```

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07:59 PM 16-11-2022

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```
In [119]: space_uid=guid_from_space_name(client, 'image classification')
print("Space UID = " + space_uid)

Space UID = f0221e0e-9916-4b76-add4-b3bfa5b89a8

In [120]: client.set.default_space(space_uid)

Out[120]: 'SUCCESS'

In [121]: client.software_specifications.list()

-----
NAME ASSET_ID TYPE
default_py3.6 0062b8c9-8b7d-44a0-a9b9-46c416adcb9 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 09f4cfff-90a7-5899-b9ed-1ef348aebdee base
pytorch-onnx_rt22.1-py3.9 0b848dd4-e681-5599-be41-b5f6fccc6471 base
ai-function_0.1-py3.6 0cdeb0f1e-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-0ab31bfdd3cb base
scikit-learn_0.22-py3.6 154010fa-5b3b-4ac1-82af-d45ee5abbb05 base
default_r3.6 1b70aec3-ab34-4b87-8aa0-a4a3c8296a36 base
pytorch-onnx_1.3-py3.6 1bc6029a-cc97-56da-b8e0-39c3880dbde7 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-da66306ce558 base
do_py3.8 295addb5-9ef9-547e-9bf4-92ae3563e720 base
autoai-ts_3.8-py3.8 2aa0c932-798f-5ae9-abd6-15e0c2402fb5 base
```

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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-0e089a291431	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	42b9e218-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	6324db22-10aa-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 [122]: software_spec_uid = client.software_specifications.get_uid_by_name("tensorflow_rt22.1-py3.9")
software_spec_uid

Out[122]: 'acd9c798-6974-5d2f-a657-ce06e986df4d'
```

```
In [123]: model_details = client.repository.store_model(model='ECG-arrhythmia-classification-model_new.tgz',meta_props={
client.repository.ModelMetaNames.NAME:"CNN_SHESHI",
client.repository.ModelMetaNames.TYPE:"tensorflow_2.7",
```

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dataplatform.cloud.ibm.com/analytics/notebooks/v2/09abe4b8-729c-43f1-8d96-7204b294144f/view?projectId=d9593a99-4047-476a-95b5-13b5810775a5&context=cpdaas

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```
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 [124]: model_id

Out[124]: '12e95e45-27a1-4c2c-bb98-57d4c332a219'
```

```
In [125]: client.repository.download(model_id,'my_model.tar.gz')

Successfully saved model content to file: 'my_model.tar.gz'

Out[125]: '/home/username/work/my_model.tar.gz'
```

```
In [ ]: from keras.models import load_model
from keras.preprocessing import image

In [ ]: model = load_model("ECG_IBM.h5")

In [213]: streaming_body_4 = cos_client.get_object(Bucket='arrhythmiaclassificationproject-donotdelete-pr-d0ozv5otlxpe6d', Keys='fig_25.png')
# add missing __iter__ method, so pandas accepts body as file-like object
if not hasattr(streaming_body_4, "__iter__"): streaming_body_4.__iter__ = types.MethodType( __iter__, streaming_body_4 )

In [216]: from tensorflow.keras import Sequential
import numpy as np
model=load_model('/home/username/work/ECG_IBM.h5')
img=image.load_img('/home/username/work/data/test/Premature Atrial Contraction/fig_36.png',target_size=(64,64))
x = image.img_to_array(img)
x = np.expand_dims(x,axis = 0)
pred = model.predict(x)
y_pred = np.argmax(pred)
y_pred

Out[216]: 2
```



```
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In [213]: streaming_body_4 = cos_client.get_object(Buckets['arrhythmiaclassificationproject-donotdelete-pr-d0zv5otlxpe6d'], Key='fig_25.png')
# add missing __iter__ method, so pandas accepts body as file-like object
if not hasattr(streaming_body_4, "__iter__"): streaming_body_4.__iter__ = types.MethodType( __iter__, streaming_body_4 )

In [216]: from tensorflow.keras import Sequential
import numpy as np
model=load_model('/home/wuser/work/ECG_IBM.h5')
img=image.load_img('/home/wuser/work/data/test/Premature Atrial Contraction/fig_36.png',target_size=(64,64))
x = image.img_to_array(img)
x = np.expand_dims(x,axis = 0)
pred = model.predict(x)
y_pred = np.argmax(pred)
y_pred

Out[216]: 2

In [217]: index=['left Bundle Branch block','Normal','Premature Atrial Contraction','Premature Ventricular Contraction','Right Bundle Branch Block','Ventricular Fibrillation']
result = str(index[y_pred])
result

Out[217]: 'Premature Atrial Contraction'

In [ ]:
```

DEPLOYMENTS:

IBM Cloud x IBM Watson Studio x IBM

dataplatfom.cloud.ibm.com/ml-runtime/spaces/f0221e0e-9916-4b76-add4-b3bfa5b89a8/manage?context=cpdaas

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image classification

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- Environments

General

Space Details

Name

image classification

Description

No description provided.

Space GUID

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Date created

Nov 12, 2022, 4:19 PM

by Bharathi Ganesan (You)

Last updated

Nov 12, 2022, 4:25 PM

Deployment space tags

Cloud Object Storage

Storage used

7.52 MB used

Name

Cloud Object Storage-xp

Bucket

d11f0c72-779a-4100-b188-5b8fca2413a6

Machine learning service

Watson Machine Learning-ja

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Asset types

Models 1

Assets

Name	Last modified	
 CNN_SHESHI Model	4 days ago Service	

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