Import required libraries

```
from keras.datasets import mnist
import matplotlib.pyplot as plt
from keras.utils import np_utils
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Conv2D,Dense,Flatten
from tensorflow.keras.optimizers import Adam
```

Loading the dataset

```
(X_train,y_train),(X_test,y_test) =mnist.load_data()
print(X_train.shape)
print(X_test.shape)
print(y_test.shape)
print(y_train.shape)
```

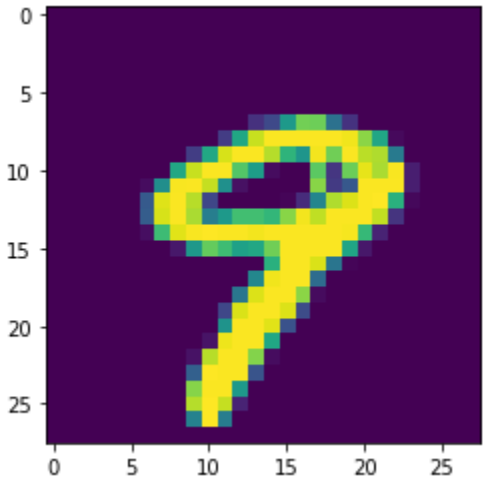
```
Downloading data from https://storage.googleapis.com/tensorflow/tf-keras-datasets/mnist.npz
11490434/11490434 [==============================] - 0s 0us/step
(60000, 28, 28)
(10000, 28, 28)
(10000,)
(60000,)
```

Fetch the data from the dataset

```
print("The label value is ",y_test[9]) #Value in y_test
```

plt.imshow(X_test[9])

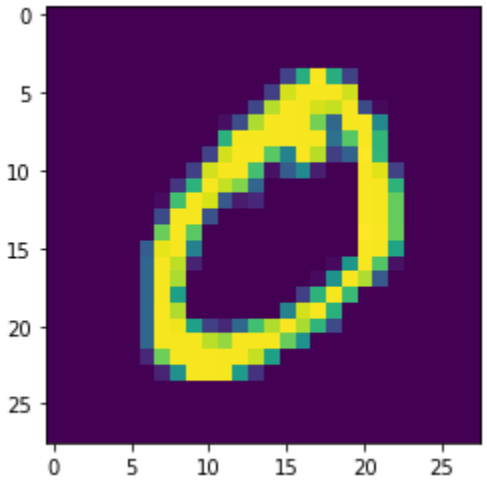
The label value is 9



print("The label value is ",y_test[10]) #Value in y_test

plt.imshow(X_test[10])

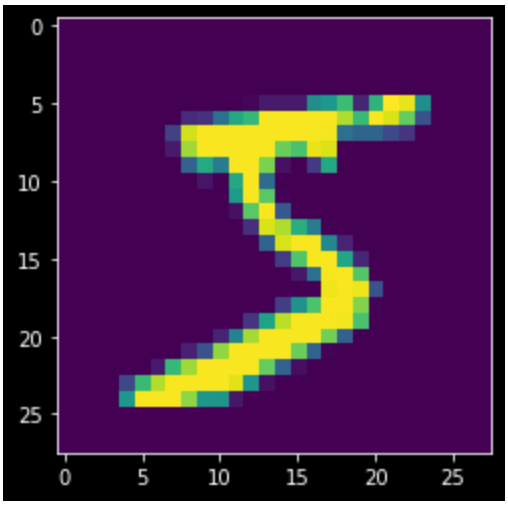
The label value is 0



print("The label value is ",y_test[23]) #Value in y_test

plt.imshow(X_test[23])

The label value is 5



Applying one hot encoding

X_train.shape

(60000, 28, 28)

X_test.shape

(10000, 28, 28)

X_train1 = X_train.reshape(60000, 28, 28, 1).astype('float32')

X_test1 = X_test.reshape(10000, 28, 28, 1).astype('float32')

number_of_classes= 12

y_train1 = np_utils.to_categorical(y_train,number_of_classes)

y_test1 = np_utils.to_categorical(y_test,number_of_classes)

Encoding the value

print("After encoding the value",y_test[9] ,"become", y_test1[9])

After encoding the value 9 become [0. 0. 0. 0. 0. 0. 0. 0. 0. 1. 0. 0.]

print("After encoding the value",y_test[10] ,"become", y_test1[10])

After encoding the value 0 become [1. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.]

print("After encoding the value",y_test[23] ,"become", y_test1[23])

After encoding the value 5 become [0. 0. 0. 0. 0. 1. 0. 0. 0. 0. 0. 0.]

Add CNN layers

```
model = Sequential()

model.add(Conv2D(64, (3, 3), input_shape=(28, 28, 1), activation="relu"))

model.add(Conv2D(32, (3, 3), activation="relu"))

model.add(Flatten())

model.add(Dense(number_of_classes, activation="softmax"))
```

Compile the model

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

Train the model

```
model.fit(X_train1, y_train1, batch_size=32, epochs=10, validation_data=(X_test1,y_test1))
```

Epoch 1/10

1875/1875 [==============================] - 194s 103ms/step - loss: 0.2549 - accuracy: 0.9504 - val_loss: 0.0902 - val_accuracy: 0.9730

Epoch 2/10

1875/1875 [==============================] - 194s 104ms/step - loss: 0.0726 - accuracy: 0.9782 - val_loss: 0.0820 - val_accuracy: 0.9742

Epoch 3/10

1875/1875 [==============================] - 194s 103ms/step - loss: 0.0496 - accuracy: 0.9848 - val_loss: 0.0817 - val_accuracy: 0.9759

Epoch 4/10

1875/1875 [==============================] - 195s 104ms/step - loss: 0.0383 - accuracy: 0.9880 -

val_loss: 0.0899 - val_accuracy: 0.9785

Epoch 5/10

1875/1875 [==============================] - 195s 104ms/step - loss: 0.0313 - accuracy: 0.9907 - val_loss: 0.1074 - val_accuracy: 0.9761

Epoch 6/10

1875/1875 [==============================] - 194s 104ms/step - loss: 0.0244 - accuracy: 0.9928 - val_loss: 0.1156 - val_accuracy: 0.9773

Epoch 7/10

1875/1875 [==============================] - 193s 103ms/step - loss: 0.0218 - accuracy: 0.9936 - val_loss: 0.1221 - val_accuracy: 0.9771

Epoch 8/10

1875/1875 [==============================] - 192s 102ms/step - loss: 0.0196 - accuracy: 0.9946 - val_loss: 0.1727 - val_accuracy: 0.9778

Epoch 9/10

1875/1875 [==============================] - 192s 103ms/step - loss: 0.0171 - accuracy: 0.9953 - val_loss: 0.1468 - val_accuracy: 0.9785

Epoch 10/10

1875/1875 [==============================] - 193s 103ms/step - loss: 0.0144 - accuracy: 0.9962 - val_loss: 0.1704 - val_accuracy: 0.9777

Observing the metrics

```
metrics = model.evaluate(X_test1, y_test1, verbose=0)
print("Checking the Metrics (Test Loss & Test Accuracy): ")
print(metrics)
```

Checking the Metrics (Test Loss & Test Accuracy):

[11.306961059570312, 0.12229999899864197]

Test the model

```
prediction = model.predict(X_test1[:4])

print(prediction)

1/1 [==============================] - 0s 112ms/step

[[5.0968147e-06 3.2904151e-08 2.4547335e-08 3.8771137e-09 9.9999297e-01
  2.1400561e-12 9.0379384e-09 1.9089430e-06 2.7502803e-10 2.1564152e-10
  1.3407317e-11 2.5973085e-08]
 [1.0000000e+00 2.0193573e-12 1.2437545e-10 3.0768805e-12 1.9168457e-14
  6.3709477e-10 1.7837687e-10 2.4965596e-14 3.3803925e-13 1.5835364e-13
  1.1105061e-16 9.6047545e-12]
 [2.0305255e-05 1.8551295e-04 2.5913024e-03 1.0359057e-05 1.3580263e-04
  2.6764979e-05 1.2820570e-02 6.5554171e-03 8.3878607e-02 8.9356083e-01
  3.7450151e-05 1.7707223e-04]
 [7.9626665e-07 2.8583373e-09 1.5453403e-09 3.7636035e-04 8.5368520e-06
  9.6965458e-08 9.9961424e-01 1.3939068e-12 9.4559267e-09 9.6343879e-14
  7.8885800e-18 1.2240818e-09]]

import numpy as np

print(np.argmax(prediction, axis=1))

print(y_test1[:4])

[4 0 9 6]

[[0. 0. 0. 0. 0. 0. 0. 1. 0. 0. 0. 0.]
 [0. 0. 1. 0. 0. 0. 0. 0. 0. 0. 0. 0.]
 [0. 1. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.]
 [1. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.]]
```

Save the model

```
model.save("digit.h5")

from tensorflow.keras.models import load_model

model=load_model("digit.h5")

model.summary()
```

Model: "sequential"

Layer (type)	Output Shape	Param #
conv2d (Conv2D)	(None, 26, 26, 64)	640
conv2d_1 (Conv2D)	(None, 24, 24, 32)	18464
flatten (Flatten)	(None, 18432)	0
dense (Dense)	(None, 12)	221196

Total params: 240,300

Trainable params: 240,300

Non-trainable params: 0

```
# Saving in tar


!tar -zcvf digit_recognition.tgz digit.h5
```

digit.h5

```
!pip install watson-machine-learning-client

Looking in indexes: https://pypi.org/simple, https://us-python.pkg.dev/colab-wheels/public/simple/

Collecting watson-machine-learning-client

  Downloading watson_machine_learning_client-1.0.391-py3-none-any.whl (538 kB)

     |████████████████████████████████| 538 kB 4.4 MB/s

Requirement already satisfied: tabulate in /usr/local/lib/python3.7/dist-packages (from watson-machine-learning-client) (0.8.10)

Requirement already satisfied: tqdm in /usr/local/lib/python3.7/dist-packages (from watson-machine-learning-client) (4.64.1)

Collecting lomond

  Downloading lomond-0.3.3-py2.py3-none-any.whl (35 kB)

Requirement already satisfied: requests in /usr/local/lib/python3.7/dist-packages (from watson-machine-learning-client) (2.23.0)

Requirement already satisfied: urllib3 in /usr/local/lib/python3.7/dist-packages (from watson-machine-learning-client) (1.24.3)

Collecting ibm-cos-sdk

  Downloading ibm-cos-sdk-2.12.0.tar.gz (55 kB)

     |████████████████████████████████| 55 kB 3.5 MB/s

Requirement already satisfied: pandas in /usr/local/lib/python3.7/dist-packages (from watson-machine-learning-client) (1.3.5)

Requirement already satisfied: certifi in /usr/local/lib/python3.7/dist-packages (from watson-machine-learning-client) (2022.9.24)

Collecting boto3

  Downloading boto3-1.26.9-py3-none-any.whl (132 kB)

     |████████████████████████████████| 132 kB 53.2 MB/s

Collecting s3transfer<0.7.0,>=0.6.0

  Downloading s3transfer-0.6.0-py3-none-any.whl (79 kB)

     |████████████████████████████████| 79 kB 6.4 MB/s
```

Collecting jmespath<2.0.0,>=0.7.1

Downloading jmespath-1.0.1-py3-none-any.whl (20 kB)

Collecting botocore<1.30.0,>=1.29.9

Downloading botocore-1.29.9-py3-none-any.whl (9.9 MB)

9.9 MB 45.8 MB/s

Requirement already satisfied: python-dateutil<3.0.0,>=2.1 in /usr/local/lib/python3.7/dist-packages (from botocore<1.30.0,>=1.29.9->boto3->watson-machine-learning-client) (2.8.2)

Collecting urllib3

Downloading urllib3-1.26.12-py2.py3-none-any.whl (140 kB)

140 kB 45.8 MB/s

Requirement already satisfied: six>=1.5 in /usr/local/lib/python3.7/dist-packages (from python-dateutil<3.0.0,>=2.1->botocore<1.30.0,>=1.29.9->boto3->watson-machine-learning-client) (1.15.0)

Collecting ibm-cos-sdk-core==2.12.0

Downloading ibm-cos-sdk-core-2.12.0.tar.gz (956 kB)

956 kB 55.8 MB/s

Collecting ibm-cos-sdk-s3transfer==2.12.0

Downloading ibm-cos-sdk-s3transfer-2.12.0.tar.gz (135 kB)

135 kB 53.0 MB/s

Collecting jmespath<2.0.0,>=0.7.1

Downloading jmespath-0.10.0-py2.py3-none-any.whl (24 kB)

Collecting requests

Downloading requests-2.28.1-py3-none-any.whl (62 kB)

62 kB 1.2 MB/s

Requirement already satisfied: charset-normalizer<3,>=2 in /usr/local/lib/python3.7/dist-packages (from requests->watson-machine-learning-client) (2.1.1)

Requirement already satisfied: idna<4,>=2.5 in /usr/local/lib/python3.7/dist-packages (from requests->watson-machine-learning-client) (2.10)

Requirement already satisfied: numpy>=1.17.3 in /usr/local/lib/python3.7/dist-packages (from pandas->watson-machine-learning-client) (1.21.6)

Requirement already satisfied: pytz>=2017.3 in /usr/local/lib/python3.7/dist-packages (from pandas->watson-machine-learning-client) (2022.6)

Building wheels for collected packages: ibm-cos-sdk, ibm-cos-sdk-core, ibm-cos-sdk-s3transfer

Building wheel for ibm-cos-sdk (setup.py) ... done

Created wheel for ibm-cos-sdk: filename=ibm_cos_sdk-2.12.0-py3-none-any.whl size=73931 sha256=828cd7ebe3989eb3f0f89d8aa8b2672fdfedbacff67110754e1186bc114462b3

Stored in directory: /root/.cache/pip/wheels/ec/94/29/2b57327cf00664b6614304f7958abd29d77ea0e5bbece2ea57

Building wheel for ibm-cos-sdk-core (setup.py) ... done

Created wheel for ibm-cos-sdk-core: filename=ibm_cos_sdk_core-2.12.0-py3-none-any.whl size=562962 sha256=e3e83fbd43e20a5e9f729519f4f078ad1ddd5e749e91026173e51feee7d799e8

Stored in directory: /root/.cache/pip/wheels/64/56/fb/5cd6f4f40406c828a5289b95b2752a4d142a9afb359244ed8d

Building wheel for ibm-cos-sdk-s3transfer (setup.py) ... done

Created wheel for ibm-cos-sdk-s3transfer: filename=ibm_cos_sdk_s3transfer-2.12.0-py3-none-any.whl size=89778 sha256=45c0dc69fa9821741f923f81f07af8872d68c74bf9cbc2ee0dd7a6237a07a3d2

Stored in directory: /root/.cache/pip/wheels/57/79/6a/ffe3370ed7ebc00604f9f76766e1e0348dcdcad2b2e32df9e1

Successfully built ibm-cos-sdk ibm-cos-sdk-core ibm-cos-sdk-s3transfer

Installing collected packages: urllib3, requests, jmespath, ibm-cos-sdk-core, botocore, s3transfer, ibm-cos-sdk-s3transfer, lomond, ibm-cos-sdk, boto3, watson-machine-learning-client

Attempting uninstall: urllib3

Found existing installation: urllib3 1.24.3

Uninstalling urllib3-1.24.3:

Successfully uninstalled urllib3-1.24.3

Attempting uninstall: requests

Found existing installation: requests 2.23.0

Uninstalling requests-2.23.0:

Successfully uninstalled requests-2.23.0

Successfully installed boto3-1.26.9 botocore-1.29.9 ibm-cos-sdk-2.12.0 ibm-cos-sdk-core-2.12.0 ibm-cos-sdk-s3transfer-2.12.0 jmespath-0.10.0 lomond-0.3.3 requests-2.28.1 s3transfer-0.6.0 urllib3-1.26.12 watson-machine-learning-client-1.0.391

!pip install ibm_watson_machine_learning

Looking in indexes: https://pypi.org/simple, https://us-python.pkg.dev/colab-wheels/public/simple/

Collecting ibm_watson_machine_learning

Downloading ibm_watson_machine_learning-1.0.257-py3-none-any.whl (1.8 MB)

Requirement already satisfied: pandas<1.5.0,>=0.24.2 in /usr/local/lib/python3.7/dist-packages (from ibm_watson_machine_learning) (1.3.5)

Requirement already satisfied: packaging in /usr/local/lib/python3.7/dist-packages (from ibm_watson_machine_learning) (21.3)

Requirement already satisfied: requests in /usr/local/lib/python3.7/dist-packages (from ibm_watson_machine_learning) (2.28.1)

Requirement already satisfied: certifi in /usr/local/lib/python3.7/dist-packages (from ibm_watson_machine_learning) (2022.9.24)

Collecting ibm-cos-sdk==2.7.*

Downloading ibm-cos-sdk-2.7.0.tar.gz (51 kB)

Requirement already satisfied: urllib3 in /usr/local/lib/python3.7/dist-packages (from ibm_watson_machine_learning) (1.26.12)

Requirement already satisfied: tabulate in /usr/local/lib/python3.7/dist-packages (from ibm_watson_machine_learning) (0.8.10)

Requirement already satisfied: importlib-metadata in /usr/local/lib/python3.7/dist-packages (from ibm_watson_machine_learning) (4.13.0)

Requirement already satisfied: lomond in /usr/local/lib/python3.7/dist-packages (from ibm_watson_machine_learning) (0.3.3)

Collecting ibm-cos-sdk-core==2.7.0

Downloading ibm-cos-sdk-core-2.7.0.tar.gz (824 kB)

| 824 kB 46.8 MB/s

Collecting ibm-cos-sdk-s3transfer==2.7.0

Downloading ibm-cos-sdk-s3transfer-2.7.0.tar.gz (133 kB)

| 133 kB 39.6 MB/s

Requirement already satisfied: jmespath<1.0.0,>=0.7.1 in /usr/local/lib/python3.7/dist-packages (from ibm-cos-sdk==2.7.*->ibm_watson_machine_learning) (0.10.0)

Collecting docutils<0.16,>=0.10

Downloading docutils-0.15.2-py3-none-any.whl (547 kB)

| 547 kB 54.5 MB/s

Requirement already satisfied: python-dateutil<3.0.0,>=2.1 in /usr/local/lib/python3.7/dist-packages (from ibm-cos-sdk-core==2.7.0->ibm-cos-sdk==2.7.*->ibm_watson_machine_learning) (2.8.2)

Requirement already satisfied: pytz>=2017.3 in /usr/local/lib/python3.7/dist-packages (from pandas<1.5.0,>=0.24.2->ibm_watson_machine_learning) (2022.6)

Requirement already satisfied: numpy>=1.17.3 in /usr/local/lib/python3.7/dist-packages (from pandas<1.5.0,>=0.24.2->ibm_watson_machine_learning) (1.21.6)

Requirement already satisfied: six>=1.5 in /usr/local/lib/python3.7/dist-packages (from python-dateutil<3.0.0,>=2.1->ibm-cos-sdk-core==2.7.0->ibm-cos-sdk==2.7.*->ibm_watson_machine_learning) (1.15.0)

Requirement already satisfied: charset-normalizer<3,>=2 in /usr/local/lib/python3.7/dist-packages (from requests->ibm_watson_machine_learning) (2.1.1)

Requirement already satisfied: idna<4,>=2.5 in /usr/local/lib/python3.7/dist-packages (from requests->ibm_watson_machine_learning) (2.10)

Requirement already satisfied: zipp>=0.5 in /usr/local/lib/python3.7/dist-packages (from importlib-metadata->ibm_watson_machine_learning) (3.10.0)

Requirement already satisfied: typing-extensions>=3.6.4 in /usr/local/lib/python3.7/dist-packages (from importlib-metadata->ibm_watson_machine_learning) (4.1.1)

Requirement already satisfied: pyparsing!=3.0.5,>=2.0.2 in /usr/local/lib/python3.7/dist-packages (from packaging->ibm_watson_machine_learning) (3.0.9)

Building wheels for collected packages: ibm-cos-sdk, ibm-cos-sdk-core, ibm-cos-sdk-s3transfer

Building wheel for ibm-cos-sdk (setup.py) ... done

Created wheel for ibm-cos-sdk: filename=ibm_cos_sdk-2.7.0-py2.py3-none-any.whl size=72563 sha256=659267c434e8e7c27acc7dda571c4454f1a639f6511dd150da1952a79c21e6cf

Stored in directory: /root/.cache/pip/wheels/47/22/bf/e1154ff0f5de93cc477acd0ca69abfbb8b799c5b28a66b44c2

Building wheel for ibm-cos-sdk-core (setup.py) ... done

Created wheel for ibm-cos-sdk-core: filename=ibm_cos_sdk_core-2.7.0-py2.py3-none-any.whl size=501013 sha256=4df31bb57b8cc5edbe1054ca45f259583c0bedd53a63f1bdffa5b6207432b6e9

Stored in directory: /root/.cache/pip/wheels/6c/a2/e4/c16d02f809a3ea998e17cfd02c13369281f3d232aaf5902c19

Building wheel for ibm-cos-sdk-s3transfer (setup.py) ... done

Created wheel for ibm-cos-sdk-s3transfer: filename=ibm_cos_sdk_s3transfer-2.7.0-py2.py3-none-any.whl size=88622 sha256=b0c77e9f333bbc5f59f67f5d8f87551684769077c751076e77c542812d38847e

Stored in directory: /root/.cache/pip/wheels/5f/b7/14/fbe02bc1ef1af890650c7e51743d1c83890852e598d164b9da

Successfully built ibm-cos-sdk ibm-cos-sdk-core ibm-cos-sdk-s3transfer

Installing collected packages: docutils, ibm-cos-sdk-core, ibm-cos-sdk-s3transfer, ibm-cos-sdk, ibm-watson-machine-learning

Attempting uninstall: docutils

Found existing installation: docutils 0.17.1

Uninstalling docutils-0.17.1:

Successfully uninstalled docutils-0.17.1

Attempting uninstall: ibm-cos-sdk-core

Found existing installation: ibm-cos-sdk-core 2.12.0

Uninstalling ibm-cos-sdk-core-2.12.0:

Successfully uninstalled ibm-cos-sdk-core-2.12.0

Attempting uninstall: ibm-cos-sdk-s3transfer

Found existing installation: ibm-cos-sdk-s3transfer 2.12.0

Uninstalling ibm-cos-sdk-s3transfer-2.12.0:

Successfully uninstalled ibm-cos-sdk-s3transfer-2.12.0

Attempting uninstall: ibm-cos-sdk

Found existing installation: ibm-cos-sdk 2.12.0

Uninstalling ibm-cos-sdk-2.12.0:

Successfully uninstalled ibm-cos-sdk-2.12.0

Successfully installed docutils-0.15.2 ibm-cos-sdk-2.7.0 ibm-cos-sdk-core-2.7.0 ibm-cos-sdk-s3transfer-2.7.0 ibm-watson-machine-learning-1.0.257

Cloud deployment

```
from ibm_watson_machine_learning import APIClient


wml_credentials = {
                    "url": "https://us-south.ml.cloud.ibm.com",    # example: "https://eu-gb.ml.cloud.ibm.com"
                    "apikey":"Dt-EkyRgxXR--1mhO8JnCjRGR_AvzoUpJQqbzFnWklU1"
                   }


client = APIClient(wml_credentials)
```

client

Python 3.7 and 3.8 frameworks are deprecated and will be removed in a future release. Use Python 3.9 framework instead.

client.spaces.get_details()

{'resources': [{'entity': {'compute': [{'crn': 'crn:v1:bluemix:public:pm-20:us-south:a/d74a81b5072a47ea932088f3c95b3d8d:ab0faf12-e097-475c-b555-79f9a13b440d::',

'guid': 'ab0faf12-e097-475c-b555-79f9a13b440d',

```
    'name': 'Watson Machine Learning-lz',
    'type': 'machine_learning'}],
  'description': '',
  'name': 'digit_deploy',
  'scope': {'bss_account_id': 'd74a81b5072a47ea932088f3c95b3d8d'},
  'stage': {'production': False},
  'status': {'state': 'active'},
  'storage': {'properties': {'bucket_name': 'dede02b9-9740-4319-881c-f10ec6202dce',
    'bucket_region': 'us-south',
    'credentials': {'admin': {'access_key_id': '9bfe67bd39f14cf5a8666e6188b02143',
      'api_key': '50PMGAm3eSnX_G1VpNG6_XJkwa-veWNCSyyru5ksZsWB',
      'secret_access_key': 'b63dd4e1b1ecefdbdb32478174a66d411cd7a98519c8565b',
      'service_id': 'ServiceId-cf7956f9-5d6e-4fde-9bf9-c2d7d324d3d3'},
     'editor': {'access_key_id': '9e76c7cc5b2c438396b834aaeda87df4',
      'api_key': 'EzZkGCey-46EuCVz3IztC8mnBFtuaD40Srufvm_hFBUz',
      'resource_key_crn': 'crn:v1:bluemix:public:cloud-object-
storage:global:a/d74a81b5072a47ea932088f3c95b3d8d:b81cecb9-1689-4f8e-87d7-c70c72300b4e::',
      'secret_access_key': '00cbee74cb48d75ca43d688108297703eea7ec26903a04cd',
      'service_id': 'ServiceId-725da56e-c4c0-4ecb-9d36-ea58872bbcf3'},
     'viewer': {'access_key_id': '238ea99d20354b55b78c557fdb973972',
      'api_key': 'im-71co9LWBLEb295LCJlWx4AOejZgzJAxpq1SB9P5N9',
      'resource_key_crn': 'crn:v1:bluemix:public:cloud-object-
storage:global:a/d74a81b5072a47ea932088f3c95b3d8d:b81cecb9-1689-4f8e-87d7-c70c72300b4e::',
      'secret_access_key': 'e3ca34240ce3757c166469ac364c6df4e20f464cbbad5d7a',
      'service_id': 'ServiceId-ca7069ff-0f0b-479e-af7f-4127e8cd1703'}},
    'endpoint_url': 'https://s3.us-south.cloud-object-storage.appdomain.cloud',
```

```
          'guid': 'b81cecb9-1689-4f8e-87d7-c70c72300b4e',
          'resource_crn': 'crn:v1:bluemix:public:cloud-object-
storage:global:a/d74a81b5072a47ea932088f3c95b3d8d:b81cecb9-1689-4f8e-87d7-c70c72300b4e::'},
         'type': 'bmcos_object_storage'}},
     'metadata': {'created_at': '2022-11-13T07:31:19.376Z',
       'creator_id': 'IBMid-666002J5U4',
       'id': '0d542d58-0e93-4b26-a2c6-156ce46c2f36',
       'updated_at': '2022-11-13T07:31:32.819Z',
       'url': '/v2/spaces/0d542d58-0e93-4b26-a2c6-156ce46c2f36'}}]}
def guid_space_name(client,digit_deploy):
       space = client.spaces.get_details()
       return(next(item for item in space['resources'] if
item['entity']['name']==digit_deploy)['metadata']['id'])
space_uid = guid_space_name(client,'digit_deploy')
space_uid
'0d542d58-0e93-4b26-a2c6-156ce46c2f36'
client.set.default_space(space_uid)
'SUCCESS'
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.

software_space_uid = client.software_specifications.get_uid_by_name('tensorflow_rt22.1-py3.9')

software_space_uid

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

```
model_details = client.repository.store_model(model='digit_recognition.tgz',meta_props={
        client.repository.ModelMetaNames.NAME:"DigitRecognition Model",
        client.repository.ModelMetaNames.TYPE:"tensorflow_2.7",
        client.repository.ModelMetaNames.SOFTWARE_SPEC_UID:software_space_uid
})
model_details
{'entity': {'hybrid_pipeline_software_specs': [],
    'software_spec': {'id': 'acd9c798-6974-5d2f-a657-ce06e986df4d',
      'name': 'tensorflow_rt22.1-py3.9'},
    'type': 'tensorflow_2.7'},
  'metadata': {'created_at': '2022-11-15T06:32:10.093Z',
    'id': '892f9dba-862a-4094-8701-f063b6fd66da',
    'modified_at': '2022-11-15T06:32:14.285Z',
    'name': 'DigitRecognition Model',
    'owner': 'IBMid-666002J5U4',
    'resource_key': '0961989d-65f0-4052-9429-70ed03c421fb',
    'space_id': '0d542d58-0e93-4b26-a2c6-156ce46c2f36'},
  'system': {'warnings': []}}
model_id = client.repository.get_model_id(model_details)
model_id
'892f9dba-862a-4094-8701-f063b6fd66da'
client.repository.download(model_id,'Digit_Recognition_Model.tar.gb')
Successfully saved model content to file: 'Digit_Recognition_Model.tar.gb'
'/content/Digit_Recognition_Model.tar.gb'
```

----------THE END----------