

TRAIN THE MODEL ON IBM

TEAM NO	PNT2022TMID13948
PROJECT NAME	Project – Natural Disaster Intensity Analysis and Classification Using Artificial Intelligence

```
In [1]: from google.colab import drive
drive.mount('/content/drive')

Drive already mounted at /content/drive; to attempt to forcibly remount, call drive.mount("/content/drive", force_remount=True).

In [2]: ls

drive/  sample_data/

In [3]: cd /content/drive/MyDrive/dataset

/content/drive/MyDrive/dataset

In [4]: ls

model-bw.json          naturaldisaster.h5  test_set/
naturaldisaster-classification-model.tgz  readme.txt         train_set/

In [5]: pwd

/content/drive/MyDrive/dataset

Out[5]: '/content/drive/MyDrive/dataset'

In [6]: # importing imagedatagenerator library

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

Image Data Agumentation

```
In [7]: #Configuring image Data Generator Class
#Setting Parameter for Image Augmentation for training data

train_datagen=ImageDataGenerator(rescale=1./255,horizontal_flip=True,vertical_flip=True, zoom_range=0.2)

In [8]: #Image Data Augmentation for testing data

test_datagen= ImageDataGenerator(rescale=1./255)
```

Apply ImageDataGenerator Functionality To Train And Test Dataset

```
In [9]: x_train = train_datagen.flow_from_directory('/content/drive/MyDrive/dataset/train_set', target_size = (64,64), batch_size = 5, color_mode = 'rgb', cla

Found 744 images belonging to 4 classes.
```

```
In [10]: #performing data augmentation to test data
x_test = test_datagen.flow_from_directory('/content/drive/MyDrive/dataset/test_set', target_size = (64,64), batch_size = 5, color_mode = 'rgb', class_

Found 198 images belonging to 4 classes.
```

```
In [11]: #importing neccessary libraries

import numpy as np
import tensorflow
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Dense,Conv2D,MaxPooling2D,Flatten
```

```
In [12]: # initialising the model and adding CNN layers

model = Sequential()

# First convolution Layer and pooling

model.add(Conv2D(32,(3,3),input_shape=(64,64,3),activation='relu'))
model.add(MaxPooling2D(pool_size=(2,2)))

#Second convolution Layer and pooling

model.add(Conv2D(32,(3,3),activation='relu'))
model.add(MaxPooling2D(pool_size=(2,2)))

#Flattening the Layers

model.add(Flatten())
```

```
model.add(Dense(300,activation='relu'))
model.add(Dense(4,activation='softmax'))
```

```
In [13]: # Summary of our 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 (MaxPooling2D)	(None, 14, 14, 32)	0
flatten (Flatten)	(None, 6272)	0
dense (Dense)	(None, 300)	1881900
dense_1 (Dense)	(None, 4)	1204
=====		
Total params: 1,893,248		
Trainable params: 1,893,248		
Non-trainable params: 0		

```
In [16]: # Save the model

model.save('naturaldisaster.h5')
model_json = model.to_json()
with open("model-bw.json", "w") as json_file:
    json_file.write(model_json)
```

```
In [17]: # Load the saved model

from tensorflow.keras.models import load_model
from tensorflow.keras.preprocessing import image
model = load_model('naturaldisaster.h5')
```

```
In [18]: # zipping the Model

!tar -zcvf naturaldisaster-classification-model.tgz naturaldisaster.h5

naturaldisaster.h5
```

```
In [19]: # connecting with IBM Cloud

!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 5.0 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)
Requirement already satisfied: tabulate in /usr/local/lib/python3.7/dist-packages (from watson-machine-learning-client) (0.8.10)
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 3.1 MB/s
Collecting boto3
  Downloading boto3-1.26.4-py3-none-any.whl (132 kB)
    |#####| 132 kB 52.9 MB/s
Collecting boto3
  Downloading boto3-1.26.4-py3-none-any.whl (132 kB)
    |#####| 132 kB 52.9 MB/s
Collecting lomond
  Downloading lomond-0.3.3-py2.py3-none-any.whl (35 kB)
Requirement already satisfied: tqdm in /usr/local/lib/python3.7/dist-packages (from watson-machine-learning-client) (4.64.1)
Collecting botocore<1.30.0,>=1.29.4
  Downloading botocore-1.29.4-py3-none-any.whl (9.8 MB)
    |#####| 9.8 MB 48.7 MB/s
Collecting s3transfer<0.7.0,>=0.6.0
  Downloading s3transfer-0.6.0-py3-none-any.whl (79 kB)
    |#####| 79 kB 6.3 MB/s
Collecting jmespath<2.0.0,>=0.7.1
  Downloading jmespath-1.0.1-py3-none-any.whl (20 kB)
Requirement already satisfied: python-dateutil<3.0.0,>=2.1 in /usr/local/lib/python3.7/dist-packages (from botocore<1.30.0,>=1.29.4->boto3->watson-machine-learning-client) (2.8.2)
Collecting urllib3
  Downloading urllib3-1.26.12-py2.py3-none-any.whl (140 kB)
    |#####| 140 kB 53.7 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,>=1.29.4->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 54.6 MB/s
Collecting ibm-cos-sdk-s3transfer==2.12.0
  Downloading ibm-cos-sdk-s3transfer-2.12.0.tar.gz (135 kB)
    |#####| 135 kB 52.8 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 1.5 MB/s
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: charset-normalizer<3,>=2 in /usr/local/lib/python3.7/dist-packages (from requests->watson-machine-learning-client) (2.1.1)
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) (2022.5)
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=73930 sha256=e429043fbb75f37468a1a657062378abd48d13e62c0a789c926efbe1c2719c57
    Stored in directory: /root/.cache/pip/wheels/ec/94/29/2b57327cf00664b6614304f7958abd29d77ea0e5bbece2ea57
```

```
In [20]: !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)
    ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 1.8 MB 5.5 MB/s
Requirement already satisfied: tabulate in /usr/local/lib/python3.7/dist-packages (from ibm_watson_machine_learning) (0.8.10)
Requirement already satisfied: certifi in /usr/local/lib/python3.7/dist-packages (from ibm_watson_machine_learning) (2022.9.24)
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: importlib-metadata in /usr/local/lib/python3.7/dist-packages (from ibm_watson_machine_learning) (4.13.0)
Requirement already satisfied: requests in /usr/local/lib/python3.7/dist-packages (from ibm_watson_machine_learning) (2.28.1)
Requirement already satisfied: packaging in /usr/local/lib/python3.7/dist-packages (from ibm_watson_machine_learning) (21.3)
Requirement already satisfied: urllib3 in /usr/local/lib/python3.7/dist-packages (from ibm_watson_machine_learning) (1.26.12)
Requirement already satisfied: lomond in /usr/local/lib/python3.7/dist-packages (from ibm_watson_machine_learning) (0.3.3)
Collecting ibm-cos-sdk==2.7.*
  Downloading ibm-cos-sdk-2.7.0.tar.gz (51 kB)
    ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 51 kB 699 kB/s
Collecting ibm-cos-sdk-core==2.7.0
  Downloading ibm-cos-sdk-core-2.7.0.tar.gz (824 kB)
    ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 824 kB 41.5 MB/s
Collecting ibm-cos-sdk-s3transfer==2.7.0
  Downloading ibm-cos-sdk-s3transfer-2.7.0.tar.gz (133 kB)
    ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 133 kB 51.4 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 63.9 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: 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: pytz>=2017.3 in /usr/local/lib/python3.7/dist-packages (from pandas<1.5.0,>=0.24.2->ibm_watson_machine_learning) (2022.5)
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: 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: zipp>=0.5 in /usr/local/lib/python3.7/dist-packages (from importlib-metadata->ibm_watson_machine_learning) (3.10.0)

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: 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=72564 sha256=6d973438356404c8cb2d47a49ad095241ef62e00cec0f11b122865b2bb7428aa
  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=4dde424ca01f763b0b20f8623a8005683241051c2b59e823e75650fe94aa28f3
  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=88619 sha256=9ff2be68476a118dd2c8e4b7c7fdde52e2ed187cb3f3ceaa8cb44e36b20cfc27
  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
```

```
In [39]: from ibm_watson_machine_learning import APIClient

In [42]: wml_credentials = {
    "url" : "https://us-south.ml.cloud.ibm.com",
    "apikey" : "vC0hu09WFiLVMO5OTra99pdVQR17n1GFSpgQv8epP9J"
}

In [43]: wml_client=APIClient(wml_credentials)
wml_client.spaces.list()

Python 3.7 and 3.8 frameworks are deprecated and will be removed in a future release. Use Python 3.9 framework instead.
Note: 'limit' is not provided. Only first 50 records will be displayed if the number of records exceed 50
-----
ID                NAME                CREATED
c147dde1-e498-4151-bcf8-7b82eebf2ee3 NaturalDisasterIntensityClassification 2022-11-08T14:27:07.638Z
-----

In [45]: space_id="c147dde1-e498-4151-bcf8-7b82eebf2ee3"

In [47]: wml_client.set.default_space(space_id)

Out[47]: 'SUCCESS'

In [48]: wml_client.software_specifications.list(500)
```

NAME	ASSET_ID	TYPE
default_py3.6	0062b8c9-8b7d-44a0-a9b9-46c416adcdb9	base
kernel-spark3.2-scala2.12	020d69ce-7ac1-5e68-ac1a-3118967356a	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	09f4c-ff0-90a7-5899-b9ed-1ef348aebdee	base
pytorch-onnx_rt22.1-py3.9	0b848dd4-e681-5599-be41-b5f6fccc6471	base
ai-function_0.1-py3.6	0cdb0f1e-5376-4f4d-92dd-da3b69aa9bda	base
shiny-r3.6	0e6e79df-875e-4f24-8ae9-62dcc2148306	base
tensorflow_2.4-py3.7-horovod	1092590a-307d-563d-9b62-4eb7d64b3f22	base
pytorch_1.1-py3.6	10ac12d6-6b30-4ccd-8392-3e922c096a92	base
tensorflow_1.15-py3.6-ddl	111e41b3-de2d-5422-a4d6-bf776828c4b7	base
runtime-22.1-py3.9	12b83a17-24d8-5082-900f-0ab31fbfd3cb	base
scikit-learn_0.22-py3.6	154010fa-5b3b-4ac1-82af-4d5ee5abbc85	base
default_r3.6	1b70aec3-ab34-4b87-8aa0-a4a3c8296a36	base
pytorch-onnx_1.3-py3.6	1bc6029a-cc97-56da-b8e0-39c3880dbbe7	base
kernel-spark3.3-r3.6	1c9e5454-f216-59dd-a20e-474a5cdf5988	base
pytorch-onnx_rt22.1-py3.9-edt	1d362186-7ad5-5b59-8b6c-9d0880bde37f	base
tensorflow_2.1-py3.6	1eb25b84-d6ed-5dde-b6a5-3fbd1665666	base
spark-mllib_3.2	20047f72-0a98-58c7-9ff5-a77b012eb8f5	base
tensorflow_2.4-py3.8-horovod	217c16f6-178f-56bf-824a-b19f20564c49	base
runtime-22.1-py3.9-cuda	26215f05-08c3-5a41-a1b0-da66306ce658	base
do_py3.8	295addb5-9ef9-547e-9bf4-92ae3563e720	base
autoai-ts_3.8-py3.8	2aa0c932-798f-5ae9-abd6-15e0c2402fb5	base
tensorflow_1.15-py3.6	2b73a275-7cbf-420b-a912-eae7f436e0bc	base
kernel-spark3.3-py3.9	2b7961e2-e3b1-5a8c-a491-482c8368839a	base
pytorch_1.2-py3.6	2c8ef57d-2687-4b7d-acce-01f94976dac1	base
spark-mllib_2.3	2e51f700-bca0-4b0d-88dc-5c6791338875	base
pytorch-onnx_1.1-py3.6-edt	32983cea-3f32-4400-8965-dde874a8d67e	base
spark-mllib_3.0-py37	36507ebe-8770-55ba-ab2a-eafe787600e9	base
spark-mllib_2.4	390d21f8-e58b-4fac-9c55-d7ceda621326	base
xgboost_0.82-py3.6	39e31acd-5f30-41dc-ae44-60233c80306e	base
pytorch-onnx_1.2-py3.6-edt	40589d0e-7019-4e28-8daa-fb03b6f4fe12	base
default_r36py38	41c247d3-45f8-5a71-b065-8580229facf0	base
autoai-ts_rt22.1-py3.9	4269d26e-07ba-5d40-8f66-2d495b0c71f7	base
autoai-obm_3.0	42b92e18-d9ab-567f-988a-4240ba1ed5f7	base
pmml-3.0_4.3	493bcb95-16f1-5bc5-bee8-81b8af80e9c7	base
spark-mllib_2.4-r_3.6	49403dff-92e9-4c87-a3d7-a42d0021c095	base

spark-mllib_2.4-py37	7abc992b-b685-532b-a122-a396a3cdbaab	base
caffe_1.0-py3.6	7bb3dbe2-da6e-4145-918d-b6d84aa93b6b	base
pytorch-onnx_1.7-py3.7	812c6631-42b7-5613-982b-02098e6c909c	base
cuda-py3.6	82c79ece-4d12-40e6-8787-a7b9e0f62770	base
tensorflow_1.15-py3.6-horovod	8964680e-d5e4-5bb8-919b-8342c6c0dfdf	base
hybrid_0.1	8c1a58c6-62b5-4dc4-987a-df751c2756b6	base
pytorch-onnx_1.3-py3.7	8d5d8a87-a912-54cf-81ec-3914adaa988d	base
caffe-ibm_1.0-py3.6	8d863266-7927-4d1e-97d7-56a7f4c0a19b	base
spss-modeler_17.1	902d0051-84bd-4af6-ab6b-8f6aa6fdeabb	base
do_12.10	9100fd72-8159-4eb9-8a0b-a87e12eeffa36	base
do_py3.7	9447fa8b-2051-4d24-9eef-5acbb0e3c59f8	base
spark-mllib_3.0-r_3.6	94bb6052-c837-589d-83f1-f4142f219e32	base
cuda-py3.7-opence	94e9652b-7f2d-59d5-ba5a-23a414ea488f	base
nlp-py3.8	96e60351-99d4-5a1c-9cc0-473ac1b5a864	base
cuda-py3.7	9a44990c-1aa1-4c7d-baf8-c4099011741c	base
hybrid_0.2	9b3f9040-9cee-4ead-8d7a-780600f542f7	base
spark-mllib_3.0-py38	9f7a8fc1-4d3c-5e65-ab90-41fa8de2d418	base
autoai-kb_3.3-py3.7	a545cca3-02df-5c61-9e88-998b09dc79af	base
spark-mllib_3.0-py39	a6082a27-5acc-5163-b02c-6b96916eb5e0	base
runtime-22.1-py3.9-do	a7e7dbf1-1d03-5544-994d-e5ec845ce99a	base
default_py3.8	ab9e1b80-f2ce-592c-a7d2-4f2344f77194	base
tensorflow_rt22.1-py3.9	acd9c798-6974-5d2f-a657-ce06e986df4d	base
kernel-spark3.2-py3.9	ad7033ee-794e-58cf-812e-a95f4b64b207	base
autoai-obm_2.0 with Spark 3.0	af10f35f-69fa-5d66-9bf5-acb58432463a	base
default_py3.7_opence	c2057dd4-f42c-5f77-a02f-72bdbc3282c9	base
tensorflow_2.1-py3.7	c4032338-2a40-500a-beef-b01ab2667e27	base
do_py3.7_opence	cc8f8976-b74a-551a-bb66-6377f8d865b4	base
spark-mllib_3.3	d11f2434-4fc7-58b7-8a62-755da64fda8f	base
autoai-kb_3.0-py3.6	d139f196-e04b-5d8b-9140-9a10ca1fa91a	base
spark-mllib_3.0-py36	d82546d5-dd78-5fbb-9131-2ec309bc56ed	base
autoai-kb_3.4-py3.8	da9b39c3-758c-5a4f-9cfd-457dd4d8c395	base
kernel-spark3.2-r_3.6	db2fe4d6-d641-5d05-9972-73c654c60e0a	base
autoai-kb_rt22.1-py3.9	db6afe93-665f-5910-b117-d879897404d9	base
tensorflow_rt22.1-py3.9-horovod	dda170cc-ca67-5da7-9b7a-cf84c6987fae	base
autoai-ts_1.0-py3.7	deef04f0-0c42-5147-9711-89f9904299db	base
tensorflow_2.1-py3.7-horovod	e384fce5-fdd1-53f8-bc71-11326c9c635f	base
default_py3.7	e4429883-c883-42b6-87a8-f419d64088cd	base
do_22.1	e51999ba-6452-5f1f-8287-17228b88b652	base
autoai-obm_3.2	eae86aab-da30-5229-a6a6-1d0d4e368983	base
do_20.1	f686cdd9-7904-5f9d-a732-01b0d6b10dc5	base
scikit-learn_0.19-py3.6	f963fa9d-4bb7-5652-9c5d-8d9289ef6ad9	base
tensorflow_2.4-py3.8	fe185c44-9a99-5425-986b-59bd1d2eda46	base
-----	-----	-----

```
In [58]: software_spec_uid=wml_client.software_specifications.get_uid_by_name("tensorflow_rt22.1-py3.9")
```

```
In [59]: software_spec_uid
```

```
Out[59]: 'acd9c798-6974-5d2f-a657-ce06e986df4d'
```

```
In [66]: model_details = wml_client.repository.store_model(model="naturaldisaster-classification-model.tgz",meta_props={
    wml_client.repository.ModelMetaNames.NAME : "CNN model",
    wml_client.repository.ModelMetaNames.TYPE : "tensorflow_2.7",
    wml_client.repository.ModelMetaNames.SOFTWARE_SPEC_UID: software_spec_uid
})
```

```
In [67]: model_id = wml_client.repository.get_model_id(model_details)
```

```
In [68]: model_id
```

```
Out[68]: '4557f719-8098-4f5d-9580-9fa833e7a0cc'
```

```
In [70]: wml_client.repository.download(model_id,'naturaldisaster.tar.gb')
```

```
Successfully saved model content to file: 'naturaldisaster.tar.gb'
```

```
Out[70]: '/content/drive/MyDrive/dataset/naturaldisaster.tar.gb'
```

In [75]: `model_details`

```
Out[75]: {'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': '2022-11-08T15:20:53.376Z',
    'id': '4557f719-8098-4f5d-9580-9fa833e7a0cc',
    'modified_at': '2022-11-08T15:20:57.953Z',
    'name': 'CNN model',
    'owner': 'IBMid-6630043HKX',
    'resource_key': 'ddc1d12c-300e-4cff-b63a-4ee630ac4f6d',
    'space_id': 'c147dde1-e498-4151-bcf8-7b82eebf2ee3'},
  'system': {'warnings': []}}
```