```
import pandas as pd

import numpy as np

from tensorflow.keras.preprocessing.image import ImageDataGenerator

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

test_datagen = ImageDataGenerator(rescale=1./255)

xtrain = train_datagen.flow_from_directory(r'E:\IBM\
Fertilizers_Recommendation_ System_For_Disease_ Prediction\Dataset
Plant Disease\fruit-dataset\fruit-dataset\train',
                                           target_size=(64,64),
                                           class_mode='categorical',
                                           batch_size=100)
```

```
Found 5384 images belonging to 6 classes.
```

```
xtest = test_datagen.flow_from_directory(r'E:\IBM\
Fertilizers_Recommendation_ System_For_Disease_ Prediction\Dataset
Plant Disease\fruit-dataset\fruit-dataset\test',
                                         target_size=(64,64),
                                         class_mode='categorical',
                                         batch_size=100)
```

```
Found 1686 images belonging to 6 classes.
```

```
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Convolution2D, MaxPooling2D,
Flatten, Dense


model = Sequential() # Initializing the model
model.add(Convolution2D(32,
(3,3),activation='relu',input_shape=(64,64,3))) # Covolution layer
model.add(MaxPooling2D(pool_size=(2,2))) # Max pooling layer
model.add(Flatten()) # Flatten layer
model.add(Dense(300,activation='relu')) # Hidden layer 1
model.add(Dense(150,activation='relu')) # Hidden layer 2
model.add(Dense(6,activation='softmax')) # Output layer
model.add(Dense(6,activation='softmax')) # Output layer

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

model.fit_generator(xtrain,
                    steps_per_epoch=len(xtrain),
                    epochs=20,
                    validation_data=xtest,
                    validation_steps=len(xtest))
```

```
Epoch 1/20
54/54 [==============================] - 25s 448ms/step - loss: 1.6823
- accuracy: 0.3317 - val_loss: 1.6977 - val_accuracy: 0.2924
Epoch 2/20
54/54 [==============================] - 22s 402ms/step - loss: 1.6650
- accuracy: 0.3351 - val_loss: 1.6792 - val_accuracy: 0.2924
Epoch 3/20
54/54 [==============================] - 21s 391ms/step - loss: 1.6551
- accuracy: 0.3351 - val_loss: 1.6672 - val_accuracy: 0.2924
Epoch 4/20
54/54 [==============================] - 21s 395ms/step - loss: 1.6492
- accuracy: 0.3351 - val_loss: 1.6598 - val_accuracy: 0.2924
Epoch 5/20
54/54 [==============================] - 21s 392ms/step - loss: 1.6458
- accuracy: 0.3351 - val_loss: 1.6549 - val_accuracy: 0.2924
Epoch 6/20
54/54 [==============================] - 22s 402ms/step - loss: 1.6439
- accuracy: 0.3351 - val_loss: 1.6517 - val_accuracy: 0.2924
Epoch 7/20
54/54 [==============================] - 21s 397ms/step - loss: 1.6428
- accuracy: 0.3351 - val_loss: 1.6494 - val_accuracy: 0.2924
Epoch 8/20
54/54 [==============================] - 21s 394ms/step - loss: 1.6421
- accuracy: 0.3351 - val_loss: 1.6484 - val_accuracy: 0.2924
Epoch 9/20
54/54 [==============================] - 21s 394ms/step - loss: 1.6418
- accuracy: 0.3351 - val_loss: 1.6474 - val_accuracy: 0.2924
Epoch 10/20
54/54 [==============================] - 22s 402ms/step - loss: 1.6416
- accuracy: 0.3351 - val_loss: 1.6469 - val_accuracy: 0.2924
Epoch 11/20
54/54 [==============================] - 21s 395ms/step - loss: 1.6415
- accuracy: 0.3351 - val_loss: 1.6465 - val_accuracy: 0.2924
Epoch 12/20
54/54 [==============================] - 22s 409ms/step - loss: 1.6414
- accuracy: 0.3351 - val_loss: 1.6463 - val_accuracy: 0.2924
Epoch 13/20
54/54 [==============================] - 22s 411ms/step - loss: 1.6414
- accuracy: 0.3351 - val_loss: 1.6460 - val_accuracy: 0.2924
Epoch 14/20
54/54 [==============================] - 22s 409ms/step - loss: 1.6414
- accuracy: 0.3351 - val_loss: 1.6461 - val_accuracy: 0.2924
Epoch 15/20
54/54 [==============================] - 21s 396ms/step - loss: 1.6414
- accuracy: 0.3351 - val_loss: 1.6457 - val_accuracy: 0.2924
Epoch 16/20
54/54 [==============================] - 22s 401ms/step - loss: 1.6414
- accuracy: 0.3351 - val_loss: 1.6460 - val_accuracy: 0.2924
Epoch 17/20
54/54 [==============================] - 21s 390ms/step - loss: 1.6413
```

```
- accuracy: 0.3351 - val_loss: 1.6457 - val_accuracy: 0.2924
Epoch 18/20
54/54 [==============================] - 21s 397ms/step - loss: 1.6414
- accuracy: 0.3351 - val_loss: 1.6457 - val_accuracy: 0.2924
Epoch 19/20
54/54 [==============================] - 21s 392ms/step - loss: 1.6414
- accuracy: 0.3351 - val_loss: 1.6454 - val_accuracy: 0.2924
Epoch 20/20
54/54 [==============================] - 22s 401ms/step - loss: 1.6414
- accuracy: 0.3351 - val_loss: 1.6458 - val_accuracy: 0.2924

<tensorflow.python.keras.callbacks.History at 0x28400372130>

model.save('fruit.h5')

!tar -zcvf Train-model_new.tgz fruit.h5

a fruit.h5

!pip install watson-machine-learning-client

Requirement already satisfied: watson-machine-learning-client in c:\
users\krishnapriya\anaconda3\lib\site-packages (1.0.391)
Requirement already satisfied: requests in c:\users\krishnapriya\
anaconda3\lib\site-packages (from watson-machine-learning-client)
(2.28.1)
Requirement already satisfied: pandas in c:\users\krishnapriya\
anaconda3\lib\site-packages (from watson-machine-learning-client)
(1.4.4)
Requirement already satisfied: certifi in c:\users\krishnapriya\
anaconda3\lib\site-packages (from watson-machine-learning-client)
(2022.9.14)
Requirement already satisfied: tabulate in c:\users\krishnapriya\
anaconda3\lib\site-packages (from watson-machine-learning-client)
(0.8.10)
Requirement already satisfied: boto3 in c:\users\krishnapriya\
anaconda3\lib\site-packages (from watson-machine-learning-client)
(1.24.28)
Requirement already satisfied: tqdm in c:\users\krishnapriya\
anaconda3\lib\site-packages (from watson-machine-learning-client)
(4.64.1)
Requirement already satisfied: urllib3 in c:\users\krishnapriya\
anaconda3\lib\site-packages (from watson-machine-learning-client)
(1.26.11)
Requirement already satisfied: ibm-cos-sdk in c:\users\krishnapriya\
anaconda3\lib\site-packages (from watson-machine-learning-client)
(2.11.0)
Requirement already satisfied: lomond in c:\users\krishnapriya\
anaconda3\lib\site-packages (from watson-machine-learning-client)
(0.3.3)
Requirement already satisfied: s3transfer<0.7.0,>=0.6.0 in c:\users\
```

```
krishnapriya\anaconda3\lib\site-packages (from boto3->watson-machine-
learning-client) (0.6.0)
Requirement already satisfied: botocore<1.28.0,>=1.27.28 in c:\users\
krishnapriya\anaconda3\lib\site-packages (from boto3->watson-machine-
learning-client) (1.27.28)
Requirement already satisfied: jmespath<2.0.0,>=0.7.1 in c:\users\
krishnapriya \anaconda3\lib\site-packages (from boto3->watson-
machine-learning-client) (0.10.0)
Requirement already satisfied: ibm-cos-sdk-s3transfer==2.11.0 in c:\
users\ krishnapriya \anaconda3\lib\site-packages (from ibm-cos-sdk-
>watson-machine-learning-client) (2.11.0)
Requirement already satisfied: ibm-cos-sdk-core==2.11.0 in c:\users\
krishnapriya \anaconda3\lib\site-packages (from ibm-cos-sdk->watson-
machine-learning-client) (2.11.0)
Requirement already satisfied: python-dateutil<3.0.0,>=2.1 in c:\
users\ krishnapriya \anaconda3\lib\site-packages (from ibm-cos-sdk-
core==2.11.0->ibm-cos-sdk->watson-machine-learning-client) (2.8.2)
Requirement already satisfied: charset-normalizer<3,>=2 in c:\users\
krishnapriya \anaconda3\lib\site-packages (from requests->watson-
machine-learning-client) (2.0.4)
Requirement already satisfied: idna<4,>=2.5 in c:\users\
krishnapriya\anaconda3\lib\site-packages (from requests->watson-
machine-learning- client) (3.3)
Requirement already satisfied: six>=1.10.0 in c:\users\
krishnapriya\anaconda3\lib\site-packages (from lomond->watson-
machine-learning- client) (1.15.0)
Requirement already satisfied: pytz>=2020.1 in c:\users\ krishnapriya
\anaconda3\lib\site-packages (from pandas->watson-machine-learning-
client) (2022.1)
Requirement already satisfied: numpy>=1.18.5 in c:\users\
krishnapriya\anaconda3\lib\site-packages (from pandas->watson-machine-
learning- client) (1.19.5)
Requirement already satisfied: colorama in c:\users\
krishnapriya\anaconda3\lib\site-packages (from tqdm->watson-
machine-learning- client) (0.4.5)
```

```
!pip install ibm_watson_machine_learning
```

```
Requirement already satisfied: ibm_watson_machine_learning in c:\
users\ krishnapriya\anaconda3\lib\site-packages (1.0.256)
Requirement already satisfied: requests in c:\users\
krishnapriya\anaconda3\lib\site-packages (from
ibm_watson_machine_learning) (2.28.1)
Requirement already satisfied: tabulate in c:\users\
krishnapriya\anaconda3\lib\site-packages (from
ibm_watson_machine_learning) (0.8.10)
Requirement already satisfied: ibm-cos-sdk==2.11.* in c:\users\
krishnapriya\anaconda3\lib\site-packages (from
ibm_watson_machine_learning) (2.11.0)
Requirement already satisfied: pandas<1.5.0,>=0.24.2 in c:\users\
krishnapriya\anaconda3\lib\site-packages (from
```

```
ibm_watson_machine_learning) (1.4.4)
Requirement already satisfied: certifi in c:\users\
krishnapriya\anaconda3\lib\site-packages (from
ibm_watson_machine_learning) (2022.9.14)
Requirement already satisfied: urllib3 in c:\users\
krishnapriya\anaconda3\lib\site-packages (from
ibm_watson_machine_learning) (1.26.11)
Requirement already satisfied: packaging in c:\users\ krishnapriya\
anaconda3\lib\site-packages (from ibm_watson_machine_learning) (21.3)
Requirement already satisfied: importlib-metadata in c:\users\
krishnapriya\anaconda3\lib\site-packages (from
ibm_watson_machine_learning) (4.11.3)
Requirement already satisfied: lomond in c:\users\ krishnapriya\
anaconda3\lib\site-packages (from ibm_watson_machine_learning) (0.3.3)
Requirement already satisfied: ibm-cos-sdk-core==2.11.0 in c:\users\
krishnapriya\anaconda3\lib\site-packages (from ibm-cos-sdk==2.11.*-
>ibm_watson_machine_learning) (2.11.0)
Requirement already satisfied: ibm-cos-sdk-s3transfer==2.11.0 in c:\
users\ krishnapriya\anaconda3\lib\site-packages (from ibm-cos-
sdk==2.11.*->ibm_watson_machine_learning) (2.11.0)
Requirement already satisfied: jmespath<1.0.0,>=0.7.1 in c:\users\
krishnapriya\anaconda3\lib\site-packages (from ibm-cos-sdk==2.11.*-
>ibm_watson_machine_learning) (0.10.0)
Requirement already satisfied: python-dateutil<3.0.0,>=2.1 in c:\
users\ krishnapriya\anaconda3\lib\site-packages (from ibm-cos-
sdk-core==2.11.0->ibm-cos-sdk==2.11.*-
>ibm_watson_machine_learning) (2.8.2)
Requirement already satisfied: pytz>=2020.1 in c:\users\
krishnapriya\anaconda3\lib\site-packages (from pandas<1.5.0,>=0.24.2-
>ibm_watson_machine_learning) (2022.1)
Requirement already satisfied: numpy>=1.18.5 in c:\users\
krishnapriya\anaconda3\lib\site-packages (from pandas<1.5.0,>=0.24.2-
>ibm_watson_machine_learning) (1.19.5)
Requirement already satisfied: charset-normalizer<3,>=2 in c:\users\
krishnapriya\anaconda3\lib\site-packages (from requests-
>ibm_watson_machine_learning) (2.0.4)
Requirement already satisfied: idna<4,>=2.5 in c:\users\
krishnapriya\anaconda3\lib\site-packages (from requests-
>ibm_watson_machine_learning) (3.3)
Requirement already satisfied: zipp>=0.5 in c:\users\
krishnapriya\anaconda3\lib\site-packages (from importlib-metadata-
>ibm_watson_machine_learning) (3.8.0)
Requirement already satisfied: six>=1.10.0 in c:\users\ krishnapriya\
anaconda3\lib\site-packages (from lomond->ibm_watson_machine_learning)
(1.15.0)
Requirement already satisfied: pyparsing!=3.0.5,>=2.0.2 in c:\users\
krishnapriya\anaconda3\lib\site-packages (from packaging-
>ibm_watson_machine_learning) (3.0.9)
```

```
from ibm_watson_machine_learning import APIClient

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

"apikey":"lxG8u1Z4LCtAiOn_gDLZiKeWP4i5xM7uxjf1jN_dTOIn"
                  }

client = APIClient(wml_credentials)
client
```

```
<ibm_watson_machine_learning.client.APIClient at 0x284003491f0>
```

```
client.spaces.get_details()
```

```
{'resources': [{'entity': {'compute': [{'crn':
'crn:v1:bluemix:public:pm-20:eu-gb:a/4a0270c0147d426b982521c64f4a2ec6:
908253ac-7efb-42af-a4f3-e611a1412a58::',
      'guid': '908253ac-7efb-42af-a4f3-e611a1412a58',
      'name': 'Watson Machine Learning-cr',
      'type': 'machine_learning'}],
    'description': '',
    'name': 'B3_Deployment',
    'scope': {'bss_account_id': '4a0270c0147d426b982521c64f4a2ec6'},
    'stage': {'production': False},
    'status': {'state': 'active'},
    'storage': {'properties': {'bucket_name': 'af629179-979d-4dac-
b7b9-c7d2aabcab1d',
      'bucket_region': 'eu-gb-standard',
      'credentials': {'admin': {'access_key_id':
'df1faea884dd45b283fef7be01aac1b2',
        'api_key': 'om3Lv-q8O1DB3olEqxaEPwM6SnKFeVXRRPcbqqCOHdRW',
        'secret_access_key':
'5729ab01d3a59cee950fde2506441109ec9e13b1914afe62',
        'service_id': 'ServiceId-3f536d2e-0607-41fd-85da-
a9852fa200f1'},
       'editor': {'access_key_id': '724f1cf3af7f4b20b64be87740632cc4',
        'api_key': 'Npdgsz3XeegnhU-WvBeGKqYbyOGVxGRg-J1qpeFvosDE',
        'resource_key_crn': 'crn:v1:bluemix:public:cloud-object-
storage:global:a/4a0270c0147d426b982521c64f4a2ec6:7caf41b3-9f6e-47ad-
b25d-e164337547dc::',
        'secret_access_key':
'a5daab4f66c9bcdd16b443194cf2a72c0eb6b605c94d9b7f',
        'service_id': 'ServiceId-833f9663-81d0-49d0-8450-
fc278693abed'},
       'viewer': {'access_key_id': '9c243a8286c746fc81e56dec8eeb64b7',
        'api_key': 'NLL9blKgr64yuC8LI5FSio5LnOnVd2jio8UZH-q2gR_E',
        'resource_key_crn': 'crn:v1:bluemix:public:cloud-object-
storage:global:a/4a0270c0147d426b982521c64f4a2ec6:7caf41b3-9f6e-47ad-
b25d-e164337547dc::',
```

```
        'secret_access_key':
'db5731d076047e356cfa3dc63336170fa4f4499c4b484a2e',
        'service_id': 'ServiceId-214bd382-4a1a-463b-83ed-
1e504a12e1b3'}},
      'endpoint_url': 'https://s3.eu-gb.cloud-object-
storage.appdomain.cloud',
      'guid': '7caf41b3-9f6e-47ad-b25d-e164337547dc',
      'resource_crn': 'crn:v1:bluemix:public:cloud-object-
storage:global:a/4a0270c0147d426b982521c64f4a2ec6:7caf41b3-9f6e-47ad-
b25d-e164337547dc::'},
     'type': 'bmcos_object_storage'}},
   'metadata': {'created_at': '2022-11-11T02:34:50.603Z',
    'creator_id': 'IBMid-665002I48N',
    'id': '1c802168-cee8-4cf2-9c03-9d2d713a49a6',
    'updated_at': '2022-11-11T02:35:08.939Z',
    'url': '/v2/spaces/1c802168-cee8-4cf2-9c03-9d2d713a49a6'}}]}

client.spaces.list()

Note: 'limit' is not provided. Only first 50 records will be displayed
if the number of records exceed 50
------------------------------------  -------------
------------------------------------
ID                                    NAME           CREATED
1c802168-cee8-4cf2-9c03-9d2d713a49a6  B3_Deployment  2022-11-
11T02:34:50.603Z
------------------------------------  -------------
-------------------------

space_uid = "1c802168-cee8-4cf2-9c03-9d2d713a49a6"
space_uid

'1c802168-cee8-4cf2-9c03-9d2d713a49a6'

client.set.default_space(space_uid)

'SUCCESS'

client.software_specifications.list(200)

--------------------------------  ------------------------------------
-----
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
spark-mllib_2.3-r_3.6           6586b9e3-ccd6-4f92-900f-0f8cb2bd6f0c
base
tensorflow_2.4-py3.7            65e171d7-72d1-55d9-8ebb-f813d620c9bb
base
spss-modeler_18.2               687eddc9-028a-4117-b9dd-e57b36f1efa5
base
pytorch-onnx_1.2-py3.6          692a6a4d-2c4d-45ff-a1ed-b167ee55469a
base
```

```
spark-mllib_2.3-scala_2.11      7963efe5-bbec-417e-92cf-0574e21b4e8d
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-8342c6c0dfd8
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-a87e12eefa36
base
do_py3.7                        9447fa8b-2051-4d24-9eef-5acb0e3c59f8
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-acb58434263a
base
```

```
default_py3.7_opence              c2057dd4-f42c-5f77-a02f-72bdbd3282c9
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                   d11f2434-4fc7-58b7-8a62-755da64fdaf8
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-r3.6              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
tensorflow_rt22.2-py3.10          f65bd165-f057-55de-b5cb-f97cf2c0f393
base
do_20.1                           f686cdd9-7904-5f9d-a732-01b0d6b10dc5
base
pytorch-onnx_rt22.2-py3.10-edt    f8a05d07-e7cd-57bb-a10b-23f1d4b837ac
base
scikit-learn_0.19-py3.6           f963fa9d-4bb7-5652-9c5d-8d9289ef6ad9
base
tensorflow_2.4-py3.8              fe185c44-9a99-5425-986b-59bd1d2eda46
base
--------------------------------- ------------------------------------
-----
```

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

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

```
ls
```

```
 Volume in drive C is Local disk :
 Volume Serial Number is EE22-D61B

 Directory of C:\Users\

 krishnapriya

11/11/2022  08:55 AM    <DIR>          .
07/30/2022  09:28 AM    <DIR>          ..
10/25/2022  01:24 PM             6,329 .bash_history
10/25/2022  12:29 AM               212 .gitconfig
11/11/2022  08:44 AM    <DIR>          .ipynb_checkpoints
11/03/2022  01:16 AM    <DIR>          .ipython
11/03/2022  03:35 AM    <DIR>          .jupyter
11/03/2022  01:12 AM    <DIR>          .keras
09/22/2022  11:10 PM                20 .lesshst
11/03/2022  01:06 AM    <DIR>          .matplotlib
11/03/2022  05:28 PM                 5 .node_repl_history
11/02/2022  09:06 PM    <DIR>          .node-red
11/06/2022  01:25 PM    <DIR>          .spyder-py3
09/30/2022  07:10 PM    <DIR>          .ssh
11/03/2022  12:57 AM    <DIR>          anaconda3
11/11/2022  07:21 AM       111,325,688 animal.h5
11/11/2022  07:22 AM        96,975,602 animal-classification.tgz
05/14/2022  09:14 PM    <DIR>          Contacts
11/11/2022  08:55 AM            31,434 Deployment.ipynb
08/14/2022  10:41 PM    <DIR>          Documents
09/21/2022  02:05 PM    <DIR>          Dropbox
09/18/2022  10:51 PM    <DIR>          Favorites
11/03/2022  01:16 AM       339,185,106 Fertilizers_Recommendation_
System_For_Disease_ Prediction (2).zip
11/11/2022  08:26 AM       111,325,688 fruit.h5
11/11/2022  07:23 AM        96,975,602 fruit-classification.tgz
11/03/2022  01:29 AM             2,951 ImagePreProcessing for Fruit
and veg dataset.ipynb
09/18/2022 10:51 PM     <DIR>          Links
11/03/2022  08:23 PM            34,547 Model Building For Fruit
Disease Prediction.ipynb
11/04/2022  11:12 PM           123,281 Model Building For Fruit
Disease Prediction-Copy1.ipynb
11/03/2022  04:15 AM           398,368 Model Building For Vegetable
Disease Prediction.ipynb
08/12/2022  09:36 PM    <DIR>          Music
09/20/2022  09:20 PM    <DIR>          OneDrive
05/14/2022  09:14 PM    <DIR>          Saved Games
09/24/2022  08:15 PM    <DIR>          Searches
11/03/2022  10:49 PM             7,848 Tested For FruitData.ipynb
11/11/2022  08:15 AM        96,975,602 Train-model_new.tgz
11/03/2022  01:28 AM             2,951 Untitled.ipynb
11/03/2022  04:21 AM            11,970 Untitled1.ipynb
11/03/2022  05:24 PM             6,898 Untitled2.ipynb
11/03/2022  05:29 PM               589 Untitled3.ipynb
```

```
11/04/2022  11:38 PM            53,967 Untitled4.ipynb
11/10/2022  07:59 AM            10,811 Untitled5.ipynb
11/03/2022  03:56 AM       152,619,128 vegetable.h5
11/10/2022  08:47 PM    <DIR>          Videos
              23 File(s)  1,006,074,597 bytes
              21 Dir(s)  203,364,065,280 bytes free
```

```
model_details = client.repository.store_model(model= 'fruit-
classification.tgz',
    meta_props={
        client.repository.ModelMetaNames.NAME:"CNN",
        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': '2022-11-11T03:52:25.303Z',
  'id': 'c0d9f780-a638-4390-8ff4-4b031a06344d',
  'modified_at': '2022-11-11T03:56:18.751Z',
  'name': 'CNN',
  'owner': 'IBMid-665002I48N',
  'resource_key': 'bec51603-cefa-4767-9bc3-107409cc4377',
  'space_id': '1c802168-cee8-4cf2-9c03-9d2d713a49a6'},
 'system': {'warnings': []}}
```

```
model_id = client.repository.get_model_id(model_details)
```

```
model_id
```

```
'c0d9f780-a638-4390-8ff4-4b031a06344d'
```

```
 ls
```

```
 Volume in drive C is Local disk :
 Volume Serial Number is EE22-D61B

 Directory of C:\Users\LonelyDinesh

11/11/2022  09:53 AM    <DIR>          .
07/30/2022  09:28 AM    <DIR>          ..
10/25/2022  01:24 PM             6,329 .bash_history
10/25/2022  12:29 AM               212 .gitconfig
11/11/2022  08:44 AM    <DIR>          .ipynb_checkpoints
11/03/2022  01:16 AM    <DIR>          .ipython
```

```
11/03/2022  03:35 AM    <DIR>          .jupyter
11/03/2022  01:12 AM    <DIR>          .keras
09/22/2022  11:10 PM                20 .lesshst
11/03/2022  01:06 AM    <DIR>          .matplotlib
11/03/2022  05:28 PM                 5 .node_repl_history
11/02/2022  09:06 PM    <DIR>          .node-red
11/06/2022  01:25 PM    <DIR>          .spyder-py3
09/30/2022  07:10 PM    <DIR>          .ssh
11/03/2022  12:57 AM    <DIR>          anaconda3
11/11/2022  07:21 AM       111,325,688 animal.h5
11/11/2022  07:22 AM        96,975,602 animal-classification.tgz
05/14/2022  09:14 PM    <DIR>          Contacts
11/11/2022  09:53 AM            38,005 Deployment.ipynb
08/14/2022  10:41 PM    <DIR>          Documents
09/21/2022  02:05 PM    <DIR>          Dropbox
09/18/2022  10:51 PM    <DIR>          Favorites
11/03/2022  01:16 AM       339,185,106 Fertilizers_Recommendation_
System_For_Disease_ Prediction (2).zip
11/11/2022  08:26 AM       111,325,688 fruit.h5
11/11/2022  07:23 AM        96,975,602 fruit-classification.tgz
11/03/2022  01:29 AM             2,951 ImagePreProcessing for Fruit
and veg dataset.ipynb
09/18/2022 10:51 PM     <DIR>          Links
11/03/2022  08:23 PM            34,547 Model Building For Fruit
Disease Prediction.ipynb
11/04/2022  11:12 PM           123,281 Model Building For Fruit
Disease Prediction-Copy1.ipynb
11/03/2022  04:15 AM           398,368 Model Building For Vegetable
Disease Prediction.ipynb
08/12/2022  09:36 PM    <DIR>          Music
09/20/2022  09:20 PM    <DIR>          OneDrive
05/14/2022  09:14 PM    <DIR>          Saved Games
09/24/2022  08:15 PM    <DIR>          Searches
11/03/2022  10:49 PM             7,848 Tested For FruitData.ipynb
11/11/2022  08:15 AM        96,975,602 Train-model_new.tgz
11/03/2022  01:28 AM             2,951 Untitled.ipynb
11/03/2022  04:21 AM            11,970 Untitled1.ipynb
11/03/2022  05:24 PM             6,898 Untitled2.ipynb
11/03/2022  05:29 PM               589 Untitled3.ipynb
11/04/2022  11:38 PM            53,967 Untitled4.ipynb
11/10/2022  07:59 AM            10,811 Untitled5.ipynb
11/03/2022  03:56 AM       152,619,128 vegetable.h5
11/10/2022  08:47 PM    <DIR>          Videos
              23 File(s)  1,006,081,168 bytes
              21 Dir(s)  202,814,742,528 bytes free
```

Test The Model

```
import numpy as np
from tensorflow.keras.models import load_model
from tensorflow.keras.preprocessing import image

model=load_model('fruit.h5')

img=image.load_img(r"E:\IBM\Fertilizers_Recommendation_
System_For_Disease_ Prediction\Dataset Plant Disease\fruit-dataset\
fruit-dataset\test\Apple___healthy\0adc1c5b-8958-47c0-a152-
f28078c214f1___RS_HL 7825.JPG")

img
```

```
img=image.load_img(r"E:\IBM\Fertilizers_Recommendation_
System_For_Disease_ Prediction\Dataset Plant Disease\fruit-dataset\
fruit-dataset\test\Apple___healthy\0eceac69-c7bf-4e9e-a249-
7ae23dcf065f___RS_HL 5888.JPG")

img
```

```
x=image.img_to_array(img)

x

array([[[145., 143., 144.],
        [145., 143., 144.],
        [146., 144., 145.],
        ...,
        [147., 146., 151.],
        [146., 145., 150.],
        [149., 148., 153.]],

       [[146., 144., 145.],
        [146., 144., 145.],
        [145., 143., 144.],
        ...,
        [150., 149., 154.],
        [149., 148., 153.],
        [151., 150., 155.]],

       [[149., 147., 148.],
        [148., 146., 147.],
        [147., 145., 146.],
        ...,
        [151., 150., 155.],
        [150., 149., 154.],
        [150., 149., 154.]],

       ...,
```

```
        [[115., 109., 111.],
         [115., 109., 111.],
         [116., 110., 112.],
         ...,
         [117., 112., 118.],
         [120., 115., 121.],
         [122., 117., 123.]],

        [[115., 109., 111.],
         [115., 109., 111.],
         [116., 110., 112.],
         ...,
         [120., 115., 121.],
         [121., 116., 122.],
         [122., 117., 123.]],

        [[115., 109., 111.],
         [115., 109., 111.],
         [116., 110., 112.],
         ...,
         [120., 115., 121.],
         [119., 114., 120.],
         [119., 114., 120.]]], dtype=float32)
```

```
x=np.expand_dims(x,axis=0)
```

```
x
```

```
array([[[[145., 143., 144.],
         [145., 143., 144.],
         [146., 144., 145.],
         ...,
         [147., 146., 151.],
         [146., 145., 150.],
         [149., 148., 153.]],

        [[146., 144., 145.],
         [146., 144., 145.],
         [145., 143., 144.],
         ...,
         [150., 149., 154.],
         [149., 148., 153.],
         [151., 150., 155.]],

        [[149., 147., 148.],
         [148., 146., 147.],
         [147., 145., 146.],
         ...,
         [151., 150., 155.],
```

```
          [150., 149., 154.],
          [150., 149., 154.]],

         ...,

         [[115., 109., 111.],
          [115., 109., 111.],
          [116., 110., 112.],
          ...,
          [117., 112., 118.],
          [120., 115., 121.],
          [122., 117., 123.]],

         [[115., 109., 111.],
          [115., 109., 111.],
          [116., 110., 112.],
          ...,
          [120., 115., 121.],
          [121., 116., 122.],
          [122., 117., 123.]],

         [[115., 109., 111.],
          [115., 109., 111.],
          [116., 110., 112.],
          ...,
          [120., 115., 121.],
          [119., 114., 120.],
          [119., 114., 120.]]], dtype=float32)
```

```
import os
from tensorflow.keras.models import load_model
from tensorflow.keras.preprocessing import image
from flask import Flask,render_template,request

app=Flask(__name__)

model=load_model("fruit.h5")

@app.route('/')
def index():
    return render_template("index.html")

@app.route('/predict',methods=['GET','POST'])
def upload():
    if request.method=='POST':
        f=request.files['image']
        basepath=os.path.dirname('__file__')
        filepath=os.path.join(basepath,'uploads',f.filename)
        f.save(filepath)
        img=image.load_img(filepath,target_size=(128,128))
```

```
        x=image.img_to_array(img)
        x=np.expand_dims(x,axis=0)
        pred=np.argmax(model.predict(x),axis=1)

index=['Apple___Black_rot','Apple___healthy','Corn_(maize)___Northern_
Leaf_Blight','Corn_(maize)___healthy','Peach___Bacterial_spot','Peach_
__healthy']
        text="The Classified Fruit disease is : " +str(index[pred[0]])
    return text
if__name__=='__main__':
    app.run(debug=False)
```

```
 * Serving Flask app "__main__" (lazy loading)
 * Environment: production
   WARNING: This is a development server. Do not use it in a
production deployment.
   Use a production WSGI server instead.
 * Debug mode: off
```

```
 * Running on http://127.0.0.1:5000/ (Press CTRL+C to quit)
[2022-11-17 17:41:08,465] ERROR in app: Exception on / [GET]
Traceback (most recent call last):
  File "C:\Users\ krishnapriya\anaconda3\lib\site-packages\flask\
app.py", line 2447, in wsgi_app
    response = self.full_dispatch_request()
  File "C:\Users\ krishnapriya\anaconda3\lib\site-packages\flask\
app.py", line 1952, in full_dispatch_request
    rv = self.handle_user_exception(e)
  File "C:\Users\ krishnapriya\anaconda3\lib\site-packages\flask\
app.py", line 1821, in handle_user_exception
    reraise(exc_type, exc_value, tb)
  File "C:\Users\ krishnapriya\anaconda3\lib\site-packages\flask\
_compat.py", line 39, in reraise
    raise value
  File "C:\Users\ krishnapriya\anaconda3\lib\site-packages\flask\
app.py", line 1950, in full_dispatch_request
    rv = self.dispatch_request()
  File "C:\Users\ krishnapriya\anaconda3\lib\site-packages\flask\
app.py", line 1936, in dispatch_request
    return self.view_functions[rule.endpoint](**req.view_args)
  File "C:\Users\ krishnapriya\AppData\Local\Temp\
ipykernel_14348\945920450.py", line 7, in index
    return render_template("index.html")
  File "C:\Users\ krishnapriya\anaconda3\lib\site-packages\flask\
templating.py", line 138, in render_template
    ctx.app.jinja_env.get_or_select_template(template_name_or_list),
  File "C:\Users\ krishnapriya\anaconda3\lib\site-packages\jinja2\
environment.py", line 930, in get_or_select_template
    return self.get_template(template_name_or_list, parent, globals)
  File "C:\Users\ krishnapriya\anaconda3\lib\site-packages\jinja2\
```

```
environment.py", line 883, in get_template
    return self._load_template(name, self.make_globals(globals))
  File "C:\Users\ krishnapriya\anaconda3\lib\site-packages\jinja2\
environment.py", line 857, in _load_template
    template = self.loader.load(self, name, globals)
  File "C:\Users\ krishnapriya\anaconda3\lib\site-packages\jinja2\
loaders.py", line 115, in load
    source, filename, uptodate = self.get_source(environment, name)
  File "C:\Users\ krishnapriya\anaconda3\lib\site-packages\flask\
templating.py", line 60, in get_source
    return self._get_source_fast(environment, template)
  File "C:\Users\ krishnapriya\anaconda3\lib\site-packages\flask\
templating.py", line 89, in _get_source_fast
    raise TemplateNotFound(template)
jinja2.exceptions.TemplateNotFound: index.html
127.0.0.1 - - [17/Nov/2022 17:41:08] "GET / HTTP/1.1" 500 -
127.0.0.1 - - [17/Nov/2022 17:41:08] "GET /favicon.ico HTTP/1.1" 404 -
```