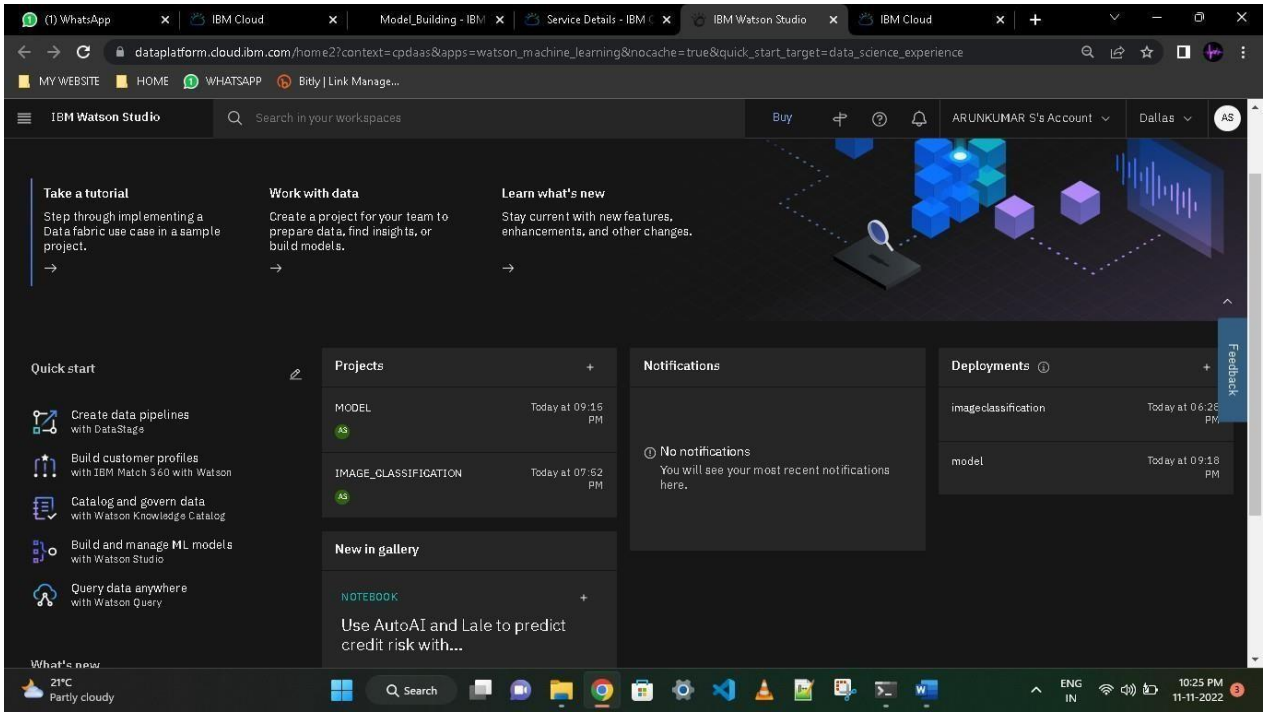
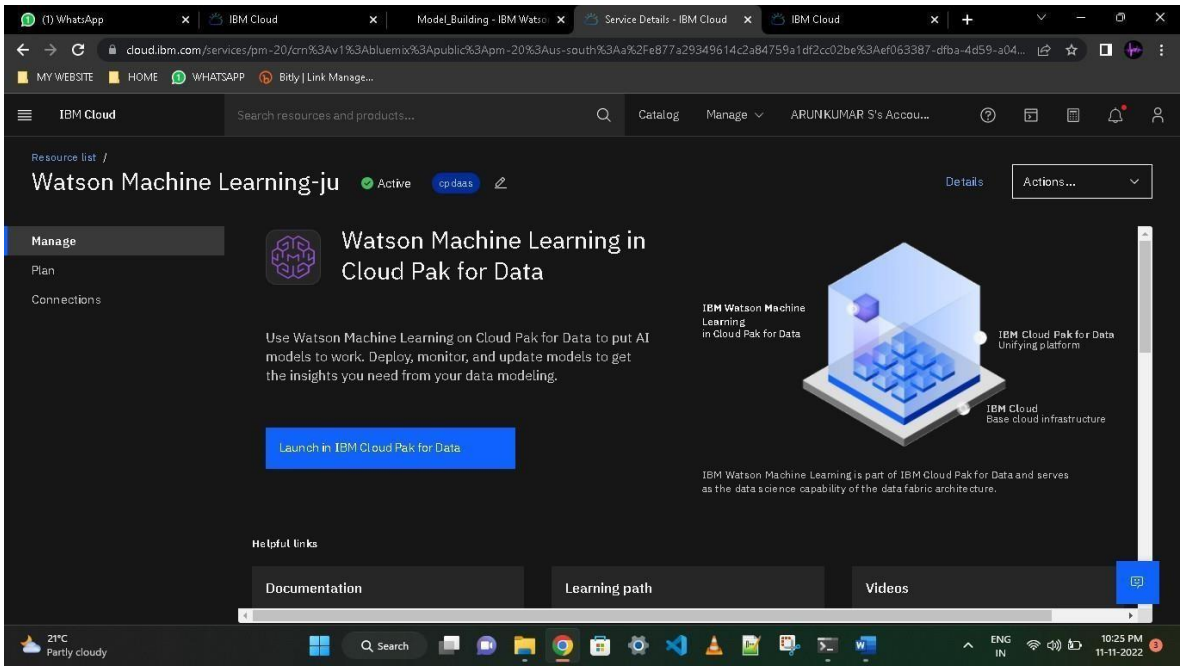
Train Model On IBM

Date	07 November 2022
Team ID	PNT2022TMID35002
Project Name	AI-Powered Nutrition Analyzer for Fitness Enthusiasts

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IBM Watson Machine Learning in Cloud Pak for Data
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Base cloud infrastructure
IBM Watson Machine Learning is part of IBM Cloud Pak for Data and serves as the data science capability of the data fabric architecture.
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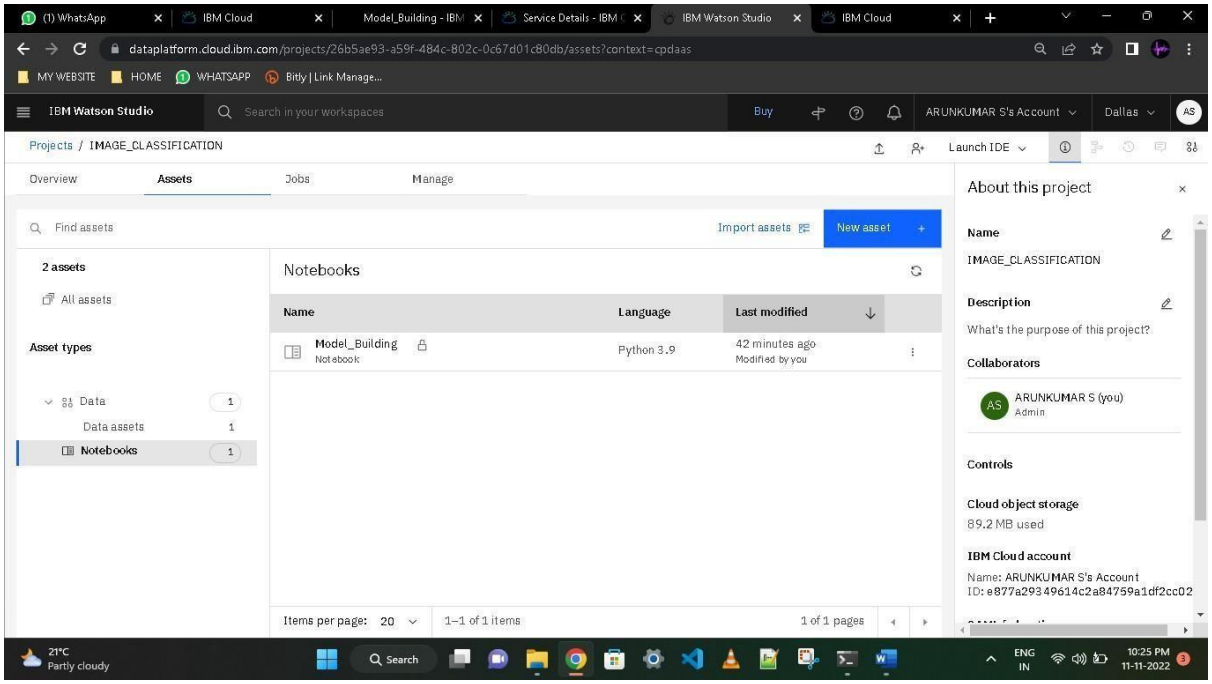
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Data assets 1
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Language
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Python 3.9
42 minutes ago
Modified by you
Items per page: 20
1–1 of 1 items
1 of 1 pages
About this project
Name
IMAGE_CLASSIFICATION
Description
What's the purpose of this project?
Collaborators
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Admin
Controls
Cloud object storage
89.2 MB used
IBM Cloud account
Name: ARUNKUMAR S's Account
ID: e877a29349614c2a84759a1df2cc02
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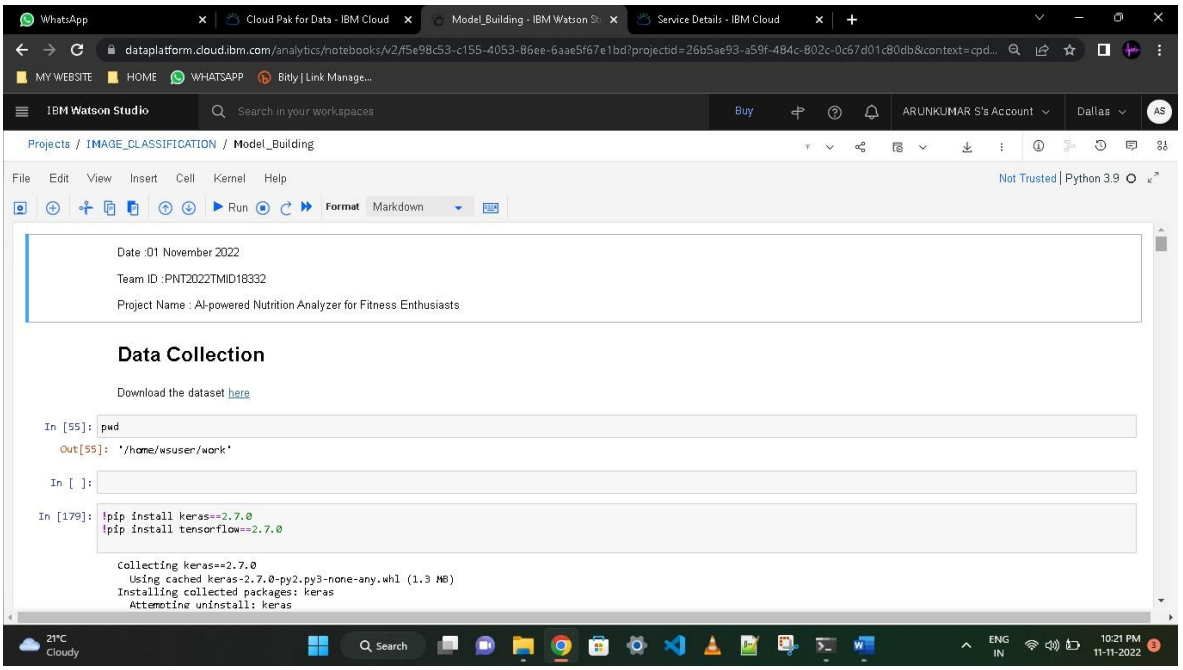
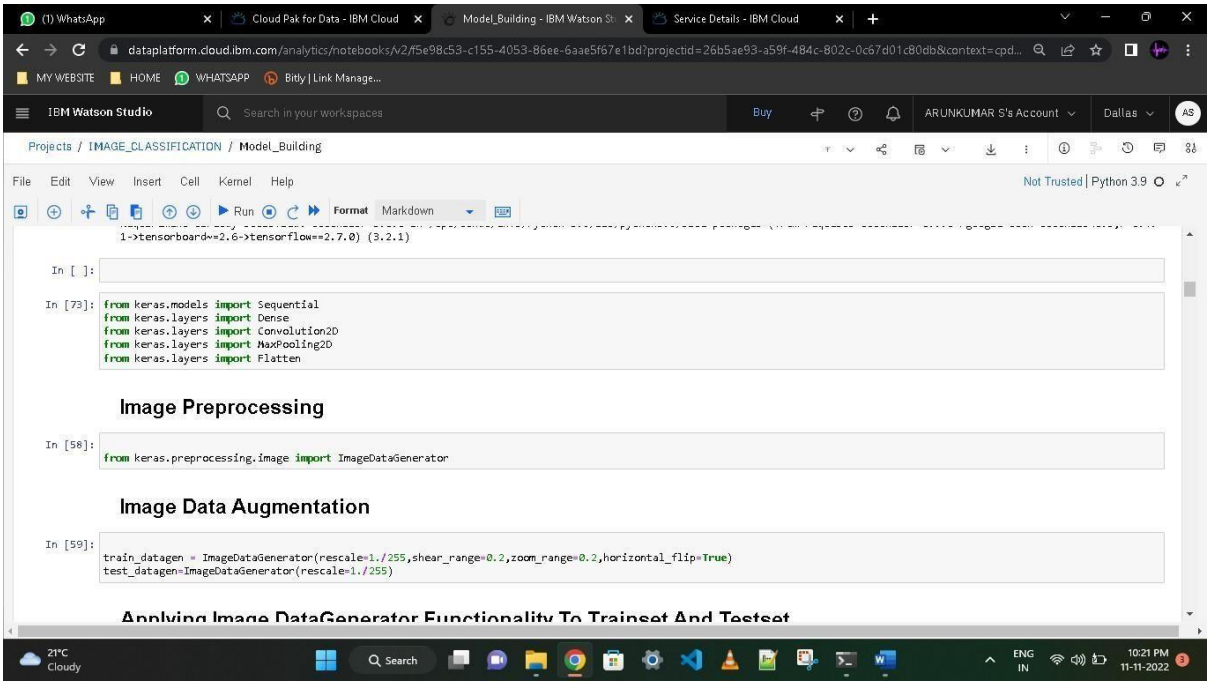
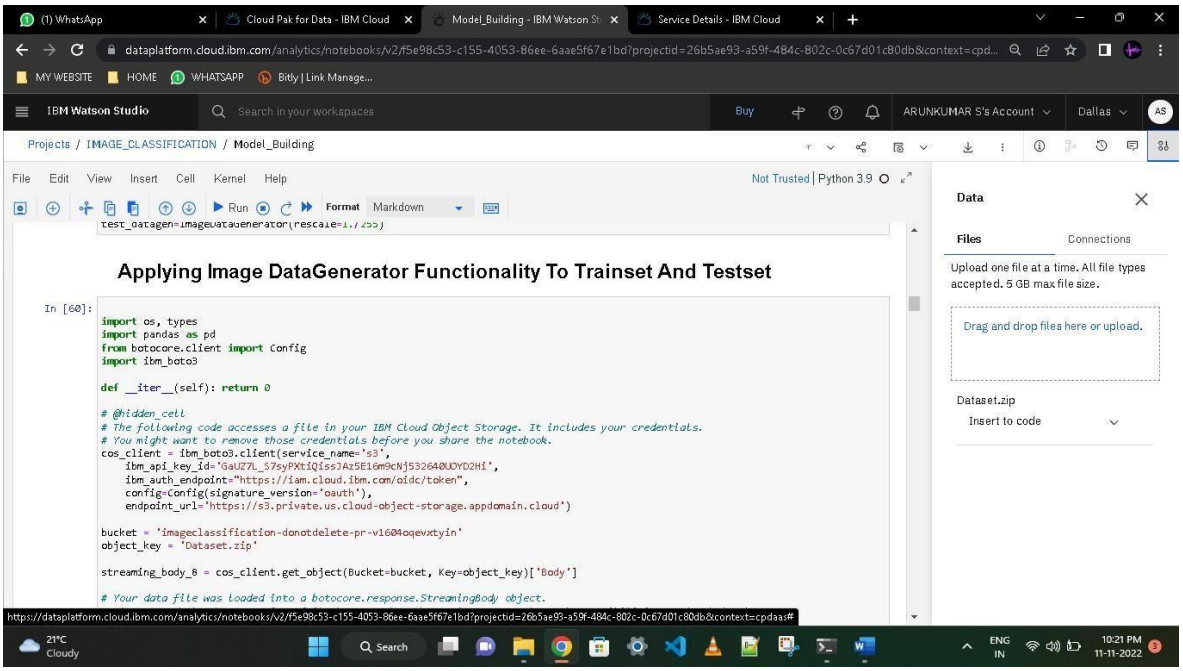

Date :01 November 2022
Team ID :PNT2022TMID18332
Project Name : AI-powered Nutrition Analyzer for Fitness Enthusiasts
Data Collection
Download the dataset here
In [55]: pwd
Out[55]: '/home/wsuser/work'
In [ ]:
In [179]: !pip install keras==2.7.0
!pip install tensorflow==2.7.0
Collecting keras==2.7.0
Using cached keras-2.7.0-py2.py3-none-any.whl (1.3 MB)
Installing collected packages: keras
Attempting uninstall: keras


In [ ]:
In [73]: from keras.models import Sequential
from keras.layers import Dense
from keras.layers import Convolution2D
from keras.layers import MaxPooling2D
from keras.layers import Flatten
Image Preprocessing
In [58]: from keras.preprocessing.image import ImageDataGenerator
Image Data Augmentation
In [59]: train_datagen = ImageDataGenerator(rescale=1./255,shear_range=0.2,zoom_range=0.2,horizontal_flip=True)
test_datagen=ImageDataGenerator(rescale=1./255)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test_datagen=ImageDataGenerator(rescale=1./255)
Applying Image DataGenerator Functionality To Trainset And Testset
In [60]:
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='GaUZ7L_S7syPXtiQissJAzSE16m9cNj532640UOYD2Hi',
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 = 'imageclassification-donotdelete-pr-v1604oqevxtyin'
object_key = 'Dataset.zip'
streaming_body_8 = cos_client.get_object(Bucket=bucket, Key=object_key)['Body']
# Your data file was loaded into a botocore.response.StreamingBody object.
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Dataset.zip
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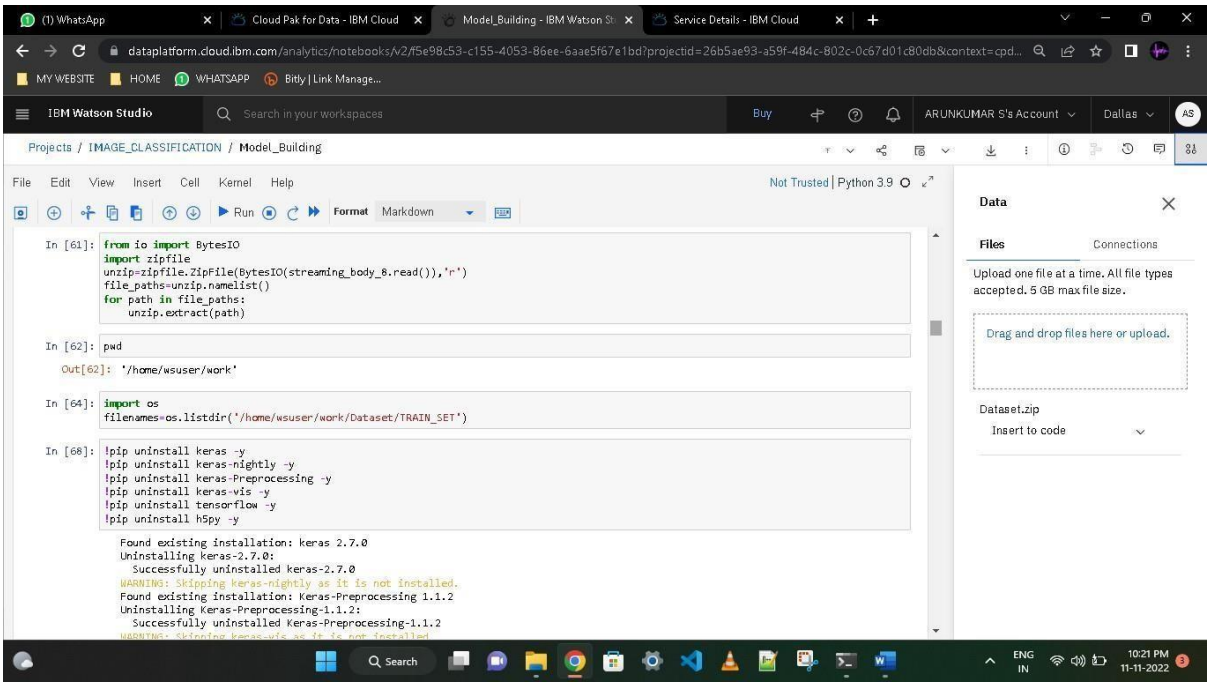
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In [61]:
from io import BytesIO
import zipfile
unzip=zipfile.ZipFile(BytesIO(streaming_body_8.read()),'r')
file_paths=unzip.namelist()
for path in file_paths:
unzip.extract(path)
In [62]:
pwd
Out[62]: '/home/wsuser/work'
In [64]:
import os
filenames=os.listdir('/home/wsuser/work/Dataset/TRAIN_SET')
In [68]:
!pip uninstall keras -y
!pip uninstall keras-nightly -y
!pip uninstall keras-Preprocessing -y
!pip uninstall keras-vis -y
!pip uninstall tensorflow -y
!pip uninstall h5py -y
Found existing installation: keras 2.7.0
Uninstalling keras-2.7.0:
Successfully uninstalled keras-2.7.0
WARNING: Skipping keras-nightly as it is not installed.
Found existing installation: Keras-Preprocessing 1.1.2
Uninstalling Keras-Preprocessing-1.1.2:
Successfully uninstalled Keras-Preprocessing-1.1.2
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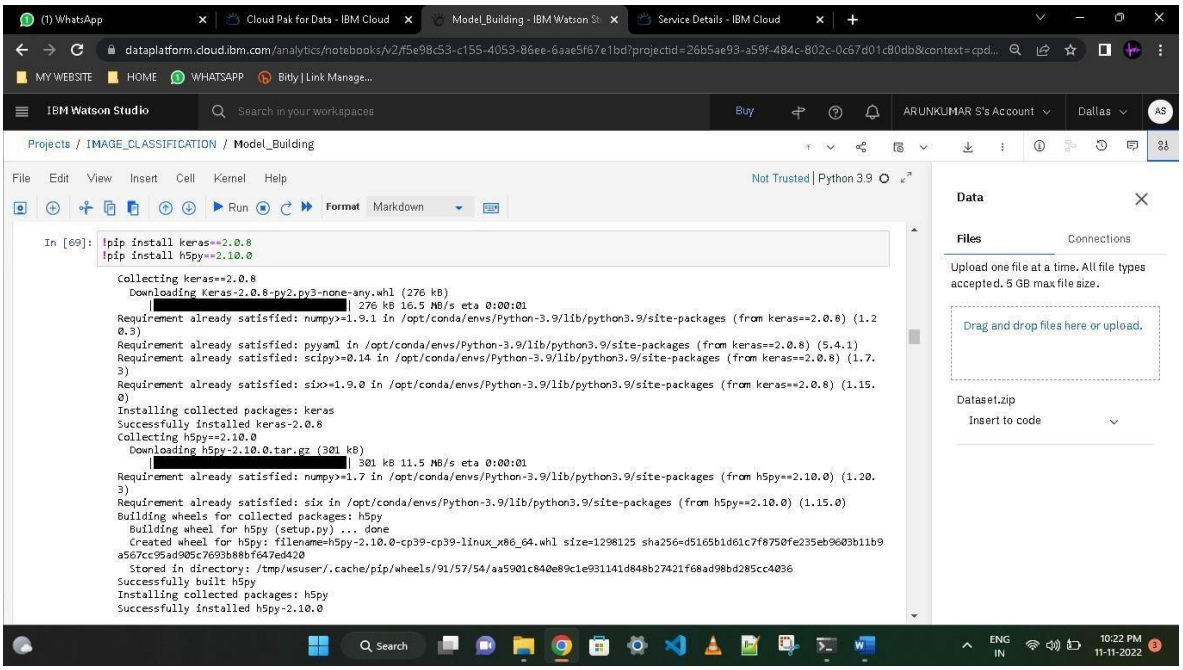
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In [69]:
!pip install keras==2.0.8
!pip install h5py==2.10.0
Collecting keras==2.0.8
Downloading Keras-2.0.8-py2.py3-none-any.whl (276 kB)
276 kB 16.5 MB/s eta 0:00:01
Requirement already satisfied: numpy>=1.9.1 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from keras==2.0.8) (1.20.3)
Requirement already satisfied: pyyaml in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from keras==2.0.8) (5.4.1)
Requirement already satisfied: scipy>=0.14 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from keras==2.0.8) (1.7.3)
Requirement already satisfied: six>=1.9.0 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from keras==2.0.8) (1.15.0)
Installing collected packages: keras
Successfully installed keras-2.0.8
Collecting h5py==2.10.0
Downloading h5py-2.10.0.tar.gz (301 kB)
301 kB 11.5 MB/s eta 0:00:01
Requirement already satisfied: numpy>=1.7 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from h5py==2.10.0) (1.20.3)
Requirement already satisfied: six in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from h5py==2.10.0) (1.15.0)
Building wheels for collected packages: h5py
Building wheel for h5py (setup.py) ... done
Created wheel for h5py: filename=h5py-2.10.0-cp39-cp39-linux_x86_64.whl size=1298125 sha256=d5165b1d61c7f8750fe235eb9603b11b9a567cc95ad905c7693b88bf647ed420
Stored in directory: /tmp/wsuser/.cache/pip/wheels/91/57/54/aa5901c840e89c1e931141d848b27421f68ad98bd285cc4036
Successfully built h5py
Installing collected packages: h5py
Successfully installed h5py-2.10.0
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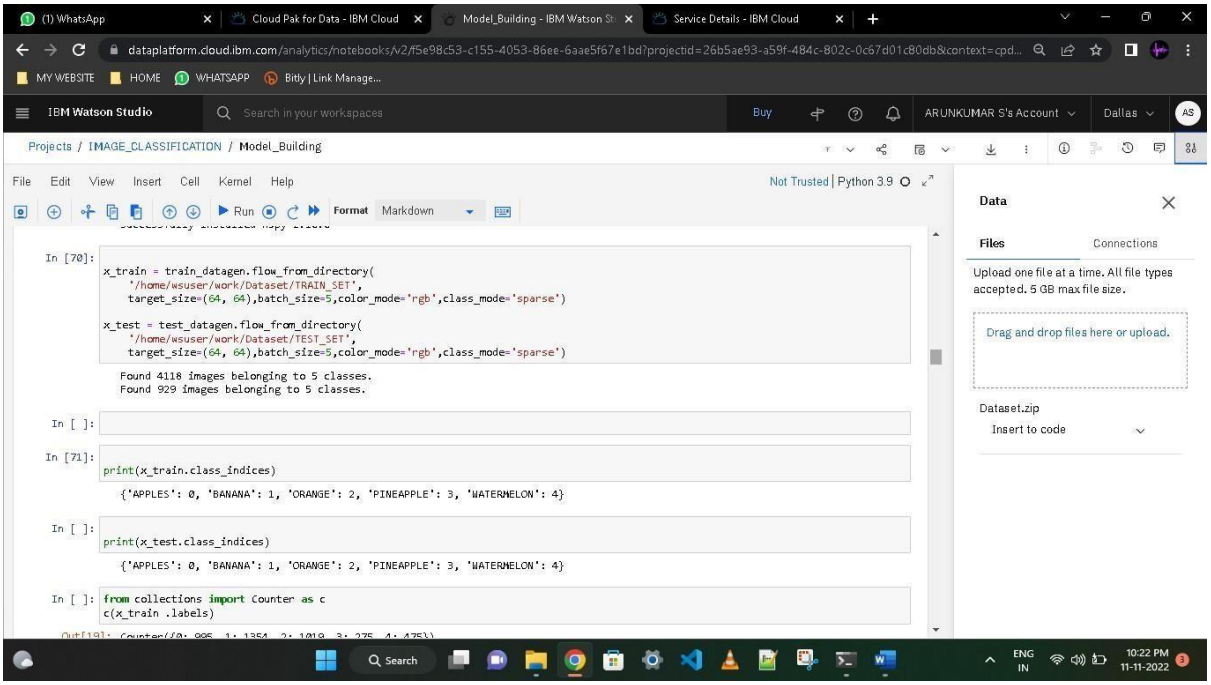
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In [70]:
x_train = train_datagen.flow_from_directory(
'/home/wsuser/work/Dataset/TRAIN_SET',
target_size=(64, 64),batch_size=5,color_mode='rgb',class_mode='sparse')
x_test = test_datagen.flow_from_directory(
'/home/wsuser/work/Dataset/TEST_SET',
target_size=(64, 64),batch_size=5,color_mode='rgb',class_mode='sparse')
Found 4118 images belonging to 5 classes.
Found 929 images belonging to 5 classes.
In [ ]:
In [71]:
print(x_train.class_indices)
{'APPLES': 0, 'BANANA': 1, 'ORANGE': 2, 'PINEAPPLE': 3, 'WATERMELON': 4}
In [ ]:
print(x_test.class_indices)
{'APPLES': 0, 'BANANA': 1, 'ORANGE': 2, 'PINEAPPLE': 3, 'WATERMELON': 4}
In [ ]:
from collections import Counter as c
c(x_train .labels)
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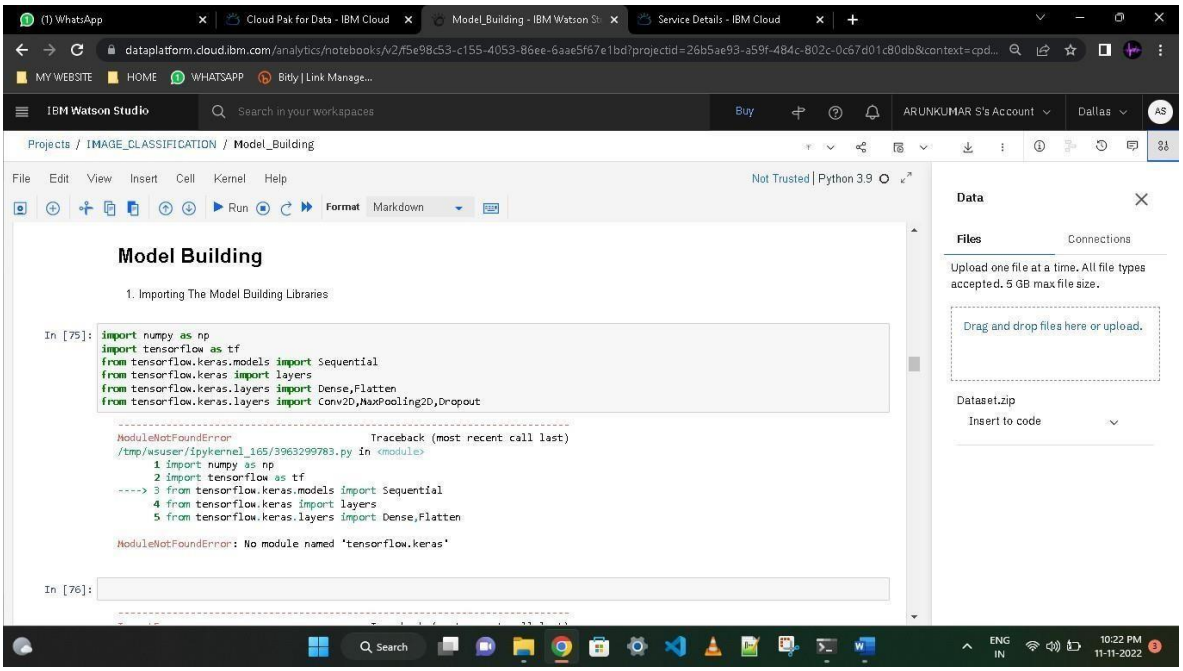
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Model Building
1. Importing The Model Building Libraries
In [75]:
import numpy as np
import tensorflow as tf
from tensorflow.keras.models import Sequential
from tensorflow.keras import layers
from tensorflow.keras.layers import Dense,Flatten
from tensorflow.keras.layers import Conv2D,MaxPooling2D,Dropout
ModuleNotFoundError Traceback (most recent call last)
/tmp/wsuser/ipykernel_165/3963299783.py in <module>
1 import numpy as np
2 import tensorflow as tf
----> 3 from tensorflow.keras.models import Sequential
4 from tensorflow.keras import layers
5 from tensorflow.keras.layers import Dense,Flatten
ModuleNotFoundError: No module named 'tensorflow.keras'
In [76]:
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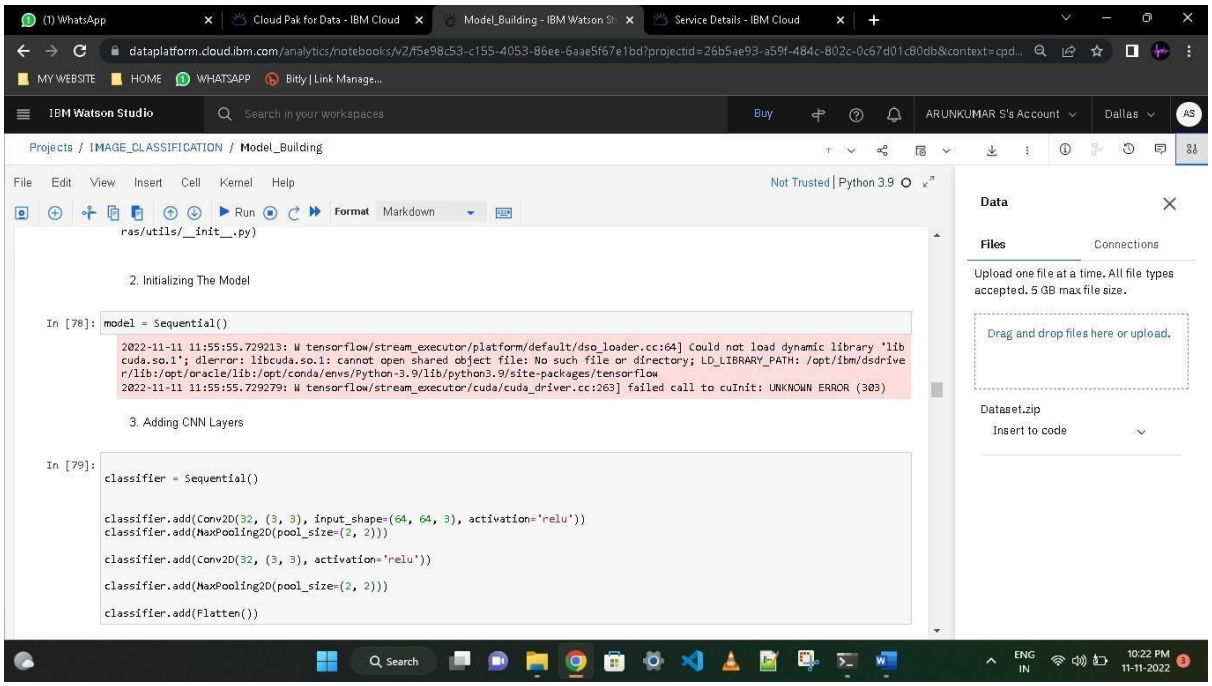
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ras/utils/__init__.py)
2. Initializing The Model
In [78]:
model = Sequential()
2022-11-11 11:55:55.729213: W tensorflow/stream_executor/platform/default/dso_loader.cc:64] Could not load dynamic library 'libcuda.so.1'; dlerror: libcuda.so.1: cannot open shared object file: No such file or directory; LD_LIBRARY_PATH: /opt/ibm/dsdriver/lib:/opt/oracle/lib:/opt/conda/envs/Python-3.9/lib/python3.9/site-packages/tensorflow
2022-11-11 11:55:55.729279: W tensorflow/stream_executor/cuda/cuda_driver.cc:263] failed call to cuInit: UNKNOWN ERROR (303)
3. Adding CNN Layers
In [79]:
classifier = Sequential()
classifier.add(Conv2D(32, (3, 3), input_shape=(64, 64, 3), activation='relu'))
classifier.add(MaxPooling2D(pool_size=(2, 2)))
classifier.add(Conv2D(32, (3, 3), activation='relu'))
classifier.add(MaxPooling2D(pool_size=(2, 2)))
classifier.add(Flatten())
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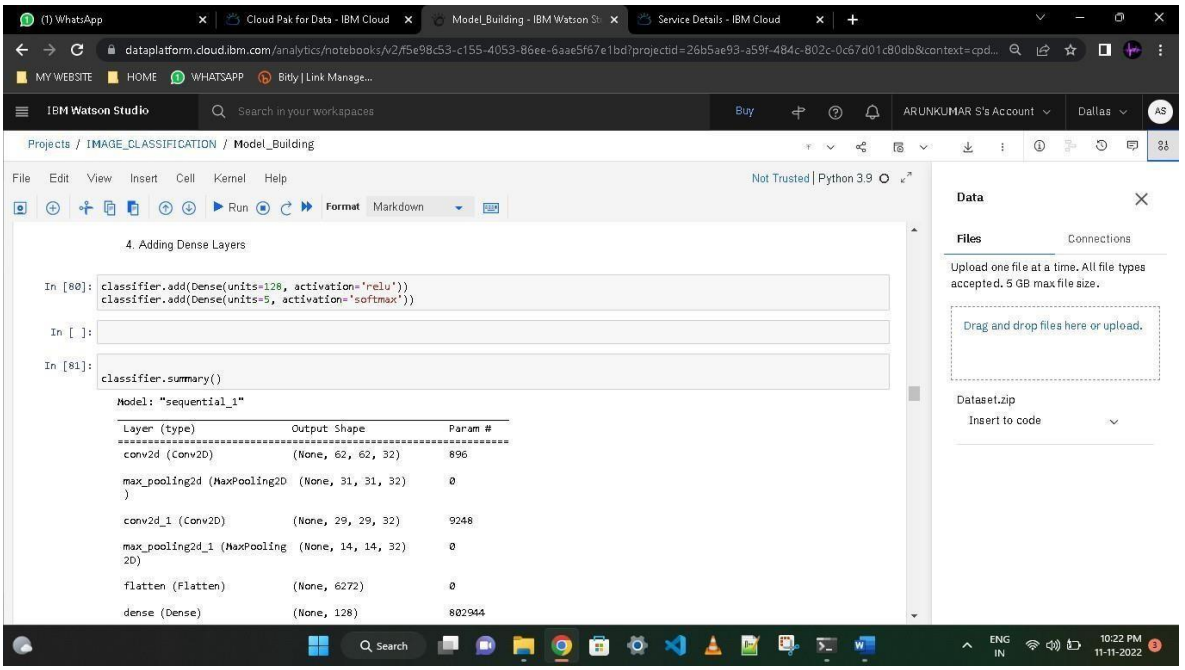
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4. Adding Dense Layers
In [80]:
classifier.add(Dense(units=128, activation='relu'))
classifier.add(Dense(units=5, activation='softmax'))
In [ ]:
In [81]:
classifier.summary()
Model: "sequential_1"
Layer (type) Output Shape Param #
conv2d (Conv2D) (None, 62, 62, 32) 896
max_pooling2d (MaxPooling2D (None, 31, 31, 32) 0
)
conv2d_1 (Conv2D) (None, 29, 29, 32) 9248
max_pooling2d_1 (MaxPooling (None, 14, 14, 32) 0
2D)
flatten (Flatten) (None, 6272) 0
dense (Dense) (None, 128) 802944
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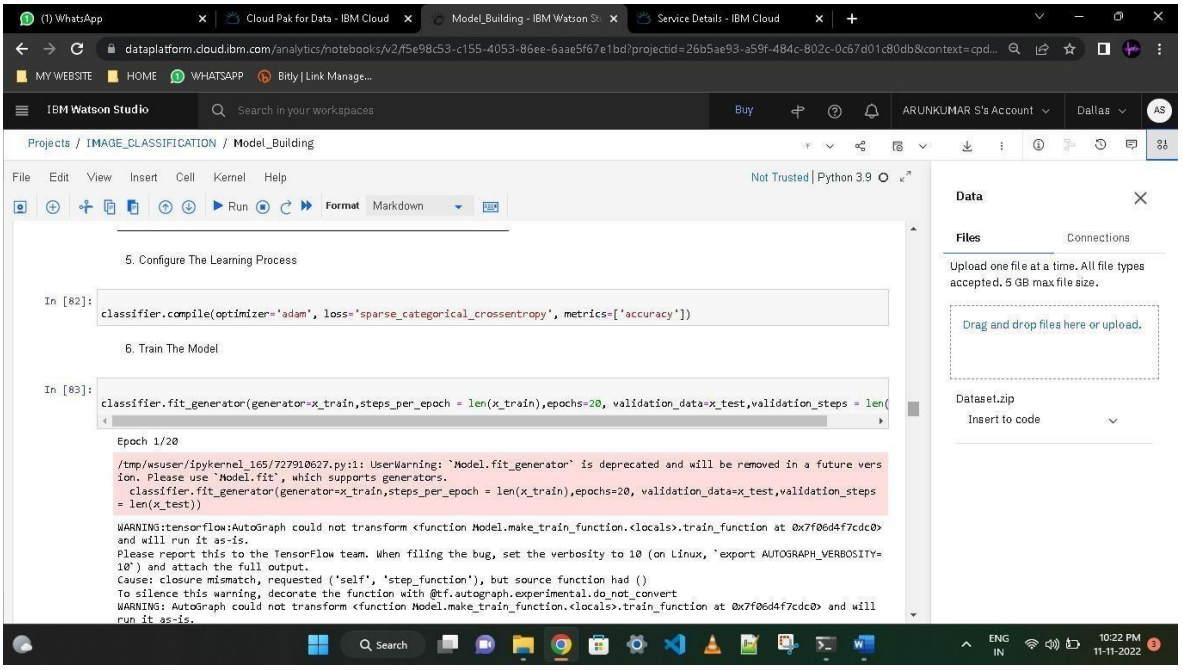
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5. Configure The Learning Process
In [82]:
classifier.compile(optimizer='adam', loss='sparse_categorical_crossentropy', metrics=['accuracy'])
6. Train The Model
In [83]:
classifier.fit_generator(generator=x_train,steps_per_epoch = len(x_train),epochs=20, validation_data=x_test,validation_steps = len(
Epoch 1/20
/tmp/wsuser/ipykernel_165/727910627.py:1: UserWarning: `Model.fit_generator` is deprecated and will be removed in a future version. Please use `Model.fit`, which supports generators.
classifier.fit_generator(generator=x_train,steps_per_epoch = len(x_train),epochs=20, validation_data=x_test,validation_steps = len(x_test))
WARNING:tensorflow:AutoGraph could not transform <function Model.make_train_function.<locals>.train_function at 0x7f06d4f7cdc0> and will run it as-is.
Please report this to the TensorFlow team. When filing the bug, set the verbosity to 10 (on Linux, `export AUTOGRAPH_VERBOSITY=10`) and attach the full output.
Cause: closure mismatch, requested ('self', 'step_function'), but source function had ()
To silence this warning, decorate the function with @tf.autograph.experimental.do_not_convert
WARNING: AutoGraph could not transform <function Model.make_train_function.<locals>.train_function at 0x7f06d4f7cdc0> and will run it as-is.
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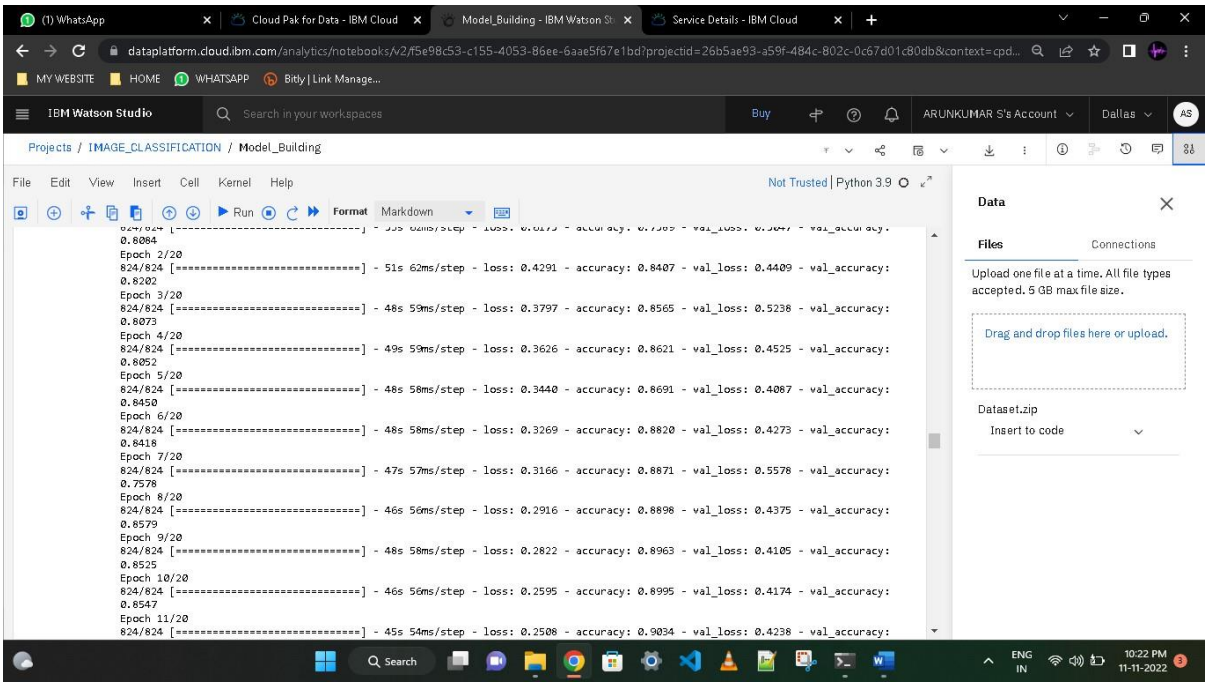
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dataplatform.cloud.ibm.com/analytics/notebooks/v2/f5e98c53-c155-4053-86ee-6aae5f67e1bd?projectid=26b5ae93-a59f-484c-802c-0c67d01c80db&context=cpd...
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Run
Format
Markdown
0.8084
Epoch 2/20
824/824 [==============================] - 51s 62ms/step - loss: 0.4291 - accuracy: 0.8407 - val_loss: 0.4409 - val_accuracy:
0.8202
Epoch 3/20
824/824 [==============================] - 48s 59ms/step - loss: 0.3797 - accuracy: 0.8565 - val_loss: 0.5238 - val_accuracy:
0.8073
Epoch 4/20
824/824 [==============================] - 49s 59ms/step - loss: 0.3626 - accuracy: 0.8621 - val_loss: 0.4525 - val_accuracy:
0.8052
Epoch 5/20
824/824 [==============================] - 48s 58ms/step - loss: 0.3440 - accuracy: 0.8691 - val_loss: 0.4087 - val_accuracy:
0.8450
Epoch 6/20
824/824 [==============================] - 48s 58ms/step - loss: 0.3269 - accuracy: 0.8820 - val_loss: 0.4273 - val_accuracy:
0.8418
Epoch 7/20
824/824 [==============================] - 47s 57ms/step - loss: 0.3166 - accuracy: 0.8871 - val_loss: 0.5578 - val_accuracy:
0.7578
Epoch 8/20
824/824 [==============================] - 46s 56ms/step - loss: 0.2916 - accuracy: 0.8898 - val_loss: 0.4375 - val_accuracy:
0.8579
Epoch 9/20
824/824 [==============================] - 48s 58ms/step - loss: 0.2822 - accuracy: 0.8963 - val_loss: 0.4105 - val_accuracy:
0.8525
Epoch 10/20
824/824 [==============================] - 46s 56ms/step - loss: 0.2595 - accuracy: 0.8995 - val_loss: 0.4174 - val_accuracy:
0.8547
Epoch 11/20
824/824 [==============================] - 45s 54ms/step - loss: 0.2508 - accuracy: 0.9034 - val_loss: 0.4238 - val_accuracy:
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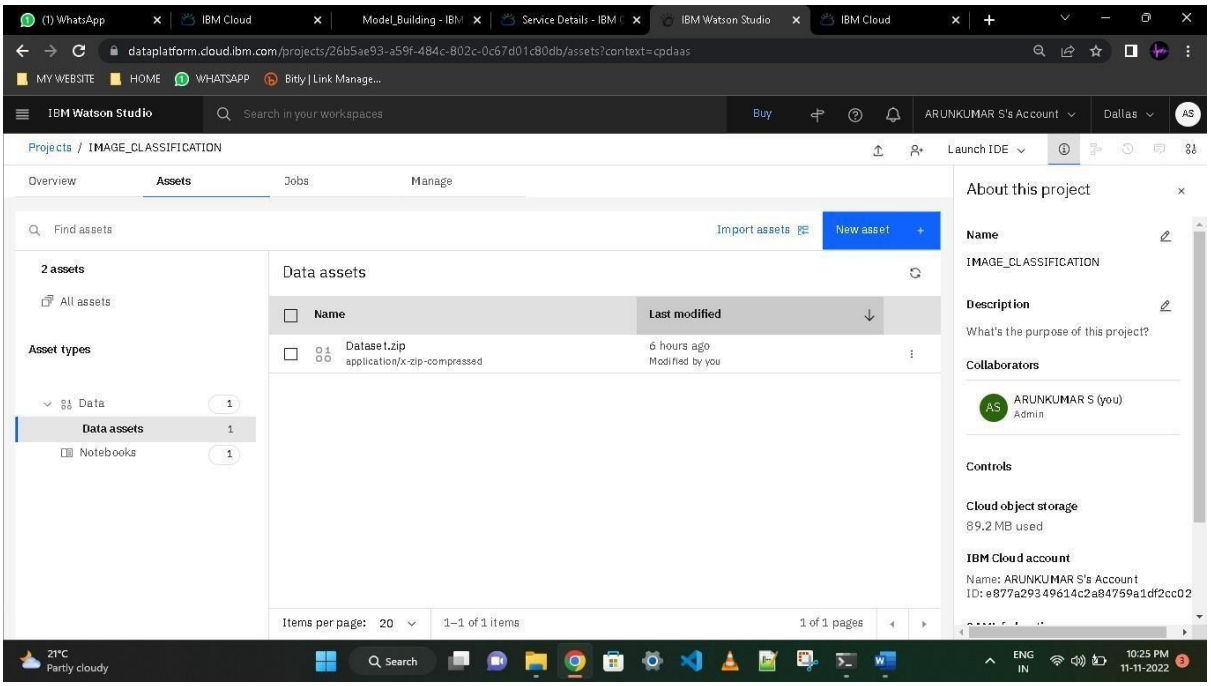
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2 assets
All assets
Asset types
Data 1
Data assets 1
Notebooks 1
Data assets
Name
Last modified
Dataset.zip
application/x-zip-compressed
6 hours ago
Modified by you
Items per page: 20
1–1 of 1 items
1 of 1 pages
About this project
Name
IMAGE_CLASSIFICATION
Description
What's the purpose of this project?
Collaborators
ARUNKUMAR S (you)
Admin
Controls
Cloud object storage
89.2 MB used
IBM Cloud account
Name: ARUNKUMAR S's Account
ID: e877a29349614c2a84759a1df2cc02
21°C
Partly cloudy
Search
ENG
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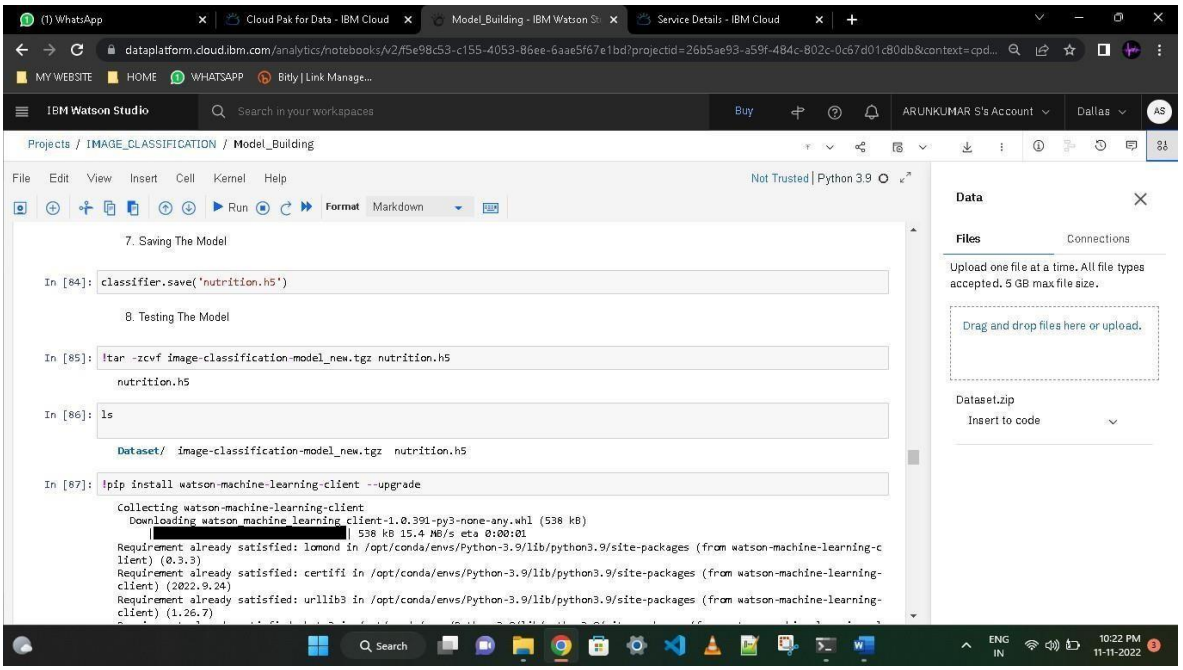
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7. Saving The Model
In [84]: classifier.save('nutrition.h5')
8. Testing The Model
In [85]: !tar -zcvf image-classification-model_new.tgz nutrition.h5
nutrition.h5
In [86]: ls
Dataset/ image-classification-model_new.tgz nutrition.h5
In [87]: !pip install 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 15.4 MB/s eta 0:00:01
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: certifi in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from watson-machine-learning-client) (2022.9.24)
Requirement already satisfied: urllib3 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from watson-machine-learning-client) (1.26.7)
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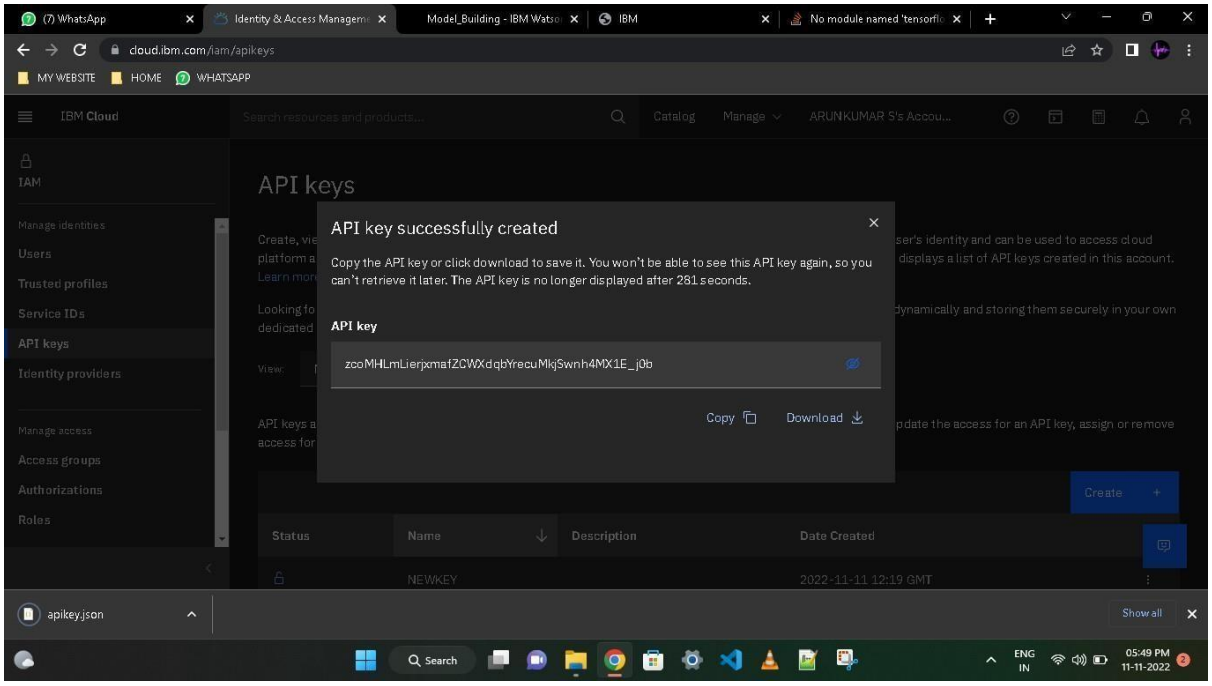
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API key
zcoMHLmLierjxmafZCWXdqbYrecuMkjSwnh4MX1E_j0b
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displays a list of API keys created in this account.
Create
Status
Name
Description
Date Created
NEWKEY
2022-11-11 12:19 GMT
apikey.json
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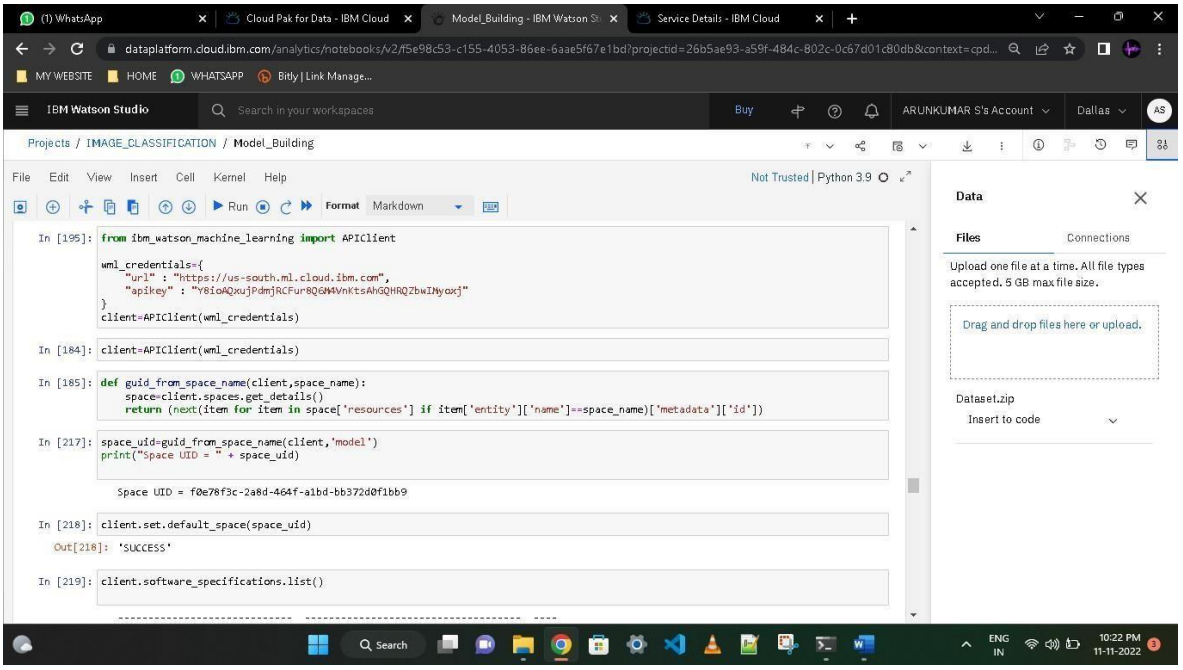
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In [195]:
from ibm_watson_machine_learning import APIClient
wml_credentials={
"url" : "https://us-south.ml.cloud.ibm.com",
"apikey" : "Y8ioAQxujPdmjRCFur8Q6M4VnKtsAhGQHRQZbwINyoxj"
}
client=APIClient(wml_credentials)
In [184]:
client=APIClient(wml_credentials)
In [185]:
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'])
In [217]:
space_uid=guid_from_space_name(client,'model')
print("Space UID = " + space_uid)
Space UID = f0e78f3c-2a8d-464f-a1bd-bb372d0f1bb9
In [218]:
client.set.default_space(space_uid)
Out[218]: 'SUCCESS'
In [219]:
client.software_specifications.list()
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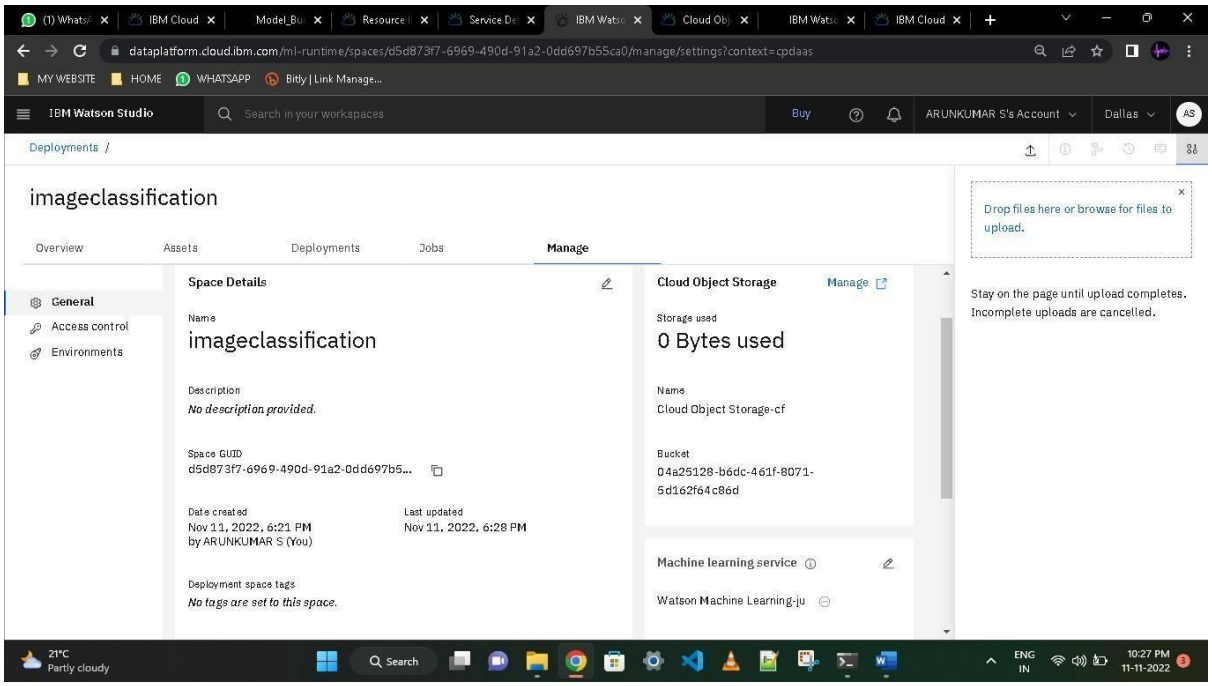
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Name
imageclassification
Description
No description provided.
Space GUID
d5d873f7-6969-490d-91a2-0dd697b5...
Date created
Nov 11, 2022, 6:21 PM
by ARUNKUMAR S (You)
Last updated
Nov 11, 2022, 6:28 PM
Deployment space tags
No tags are set to this space.
Cloud Object Storage
Manage
Storage used
0 Bytes used
Name
Cloud Object Storage-cf
Bucket
04a25128-b6dc-461f-8071-5d162f64c86d
Machine learning service
Watson Machine Learning-ju
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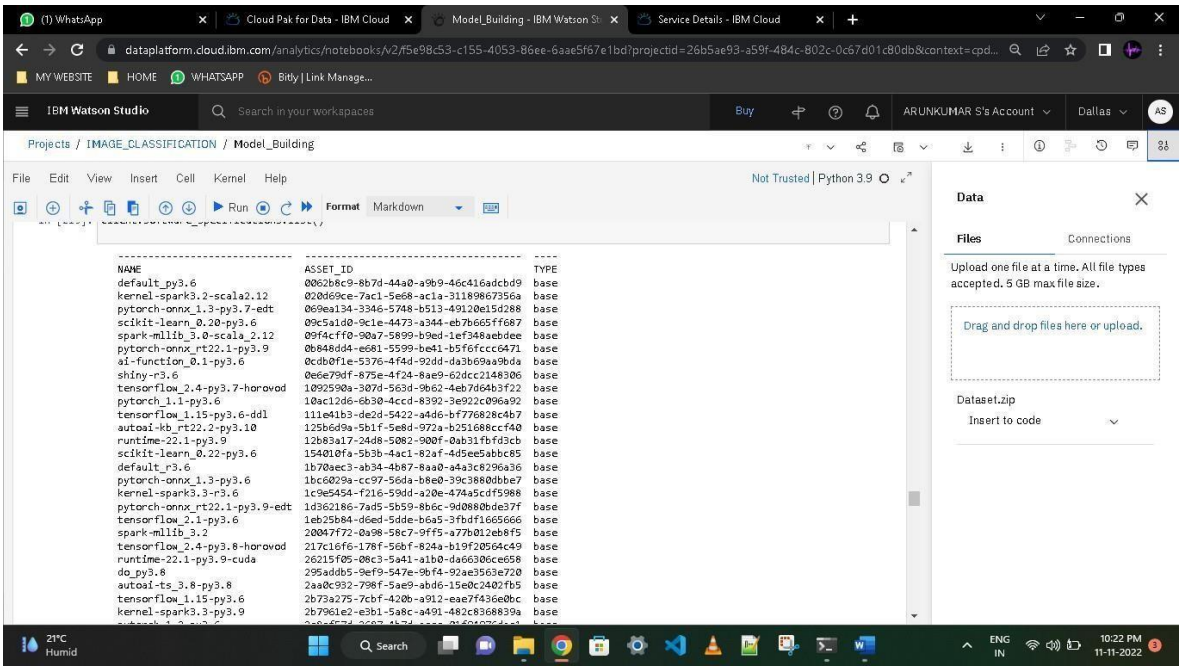
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NAME ASSET_ID TYPE
default_py3.6 0062b8c9-8b7d-44a0-a9b9-46c416adcbd9 base
kernel-spark3.2-scala2.12 020d69ce-7ac1-5e68-ac1a-31189867356a base
pytorch-onnx_1.3-py3.7-edt 069ea134-3346-5748-b513-49120e15d288 base
scikit-learn_0.20-py3.6 09c5a1d0-9c1e-4473-a344-eb7b665ff687 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-a7fb012eb8f5 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
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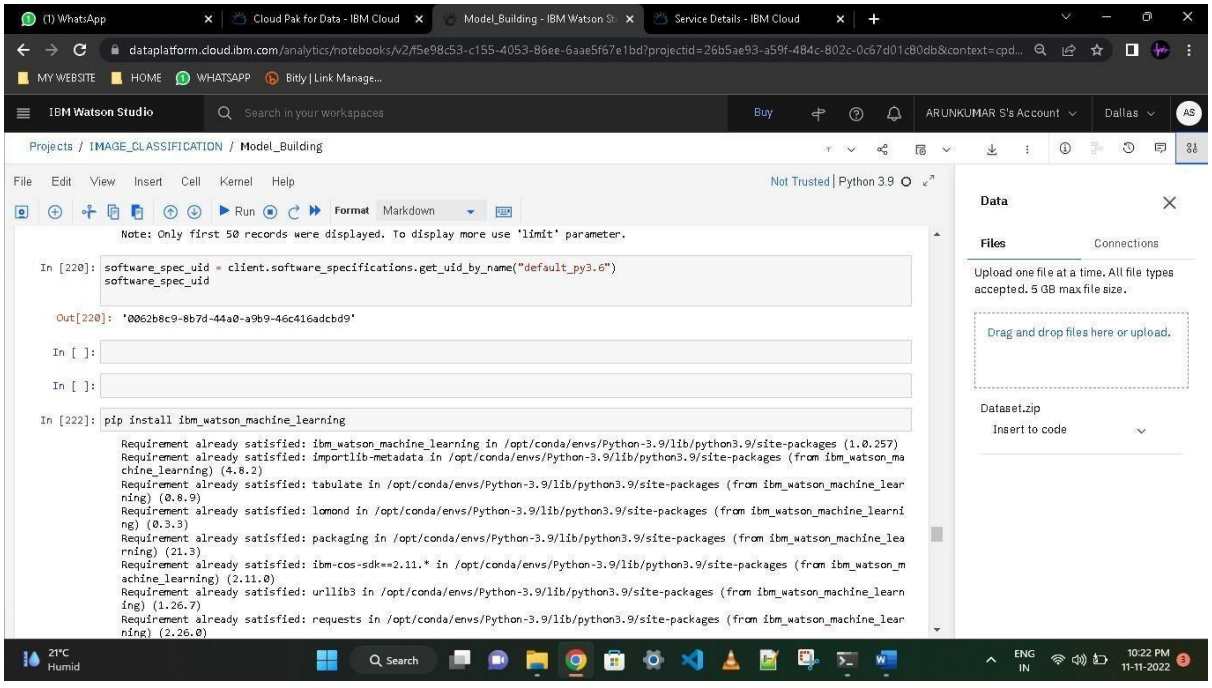
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Note: Only first 50 records were displayed. To display more use 'limit' parameter.
In [220]:
software_spec_uid = client.software_specifications.get_uid_by_name("default_py3.6")
software_spec_uid
Out[220]: '0062b8c9-8b7d-44a0-a9b9-46c416adcbd9'
In [ ]:
In [ ]:
In [222]:
pip install ibm_watson_machine_learning
Requirement already satisfied: ibm_watson_machine_learning in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (1.0.257)
Requirement already satisfied: importlib-metadata in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from ibm_watson_machine_learning) (4.8.2)
Requirement already satisfied: tabulate in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from ibm_watson_machine_learning) (0.8.9)
Requirement already satisfied: lomond in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from ibm_watson_machine_learning) (0.3.3)
Requirement already satisfied: packaging in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from ibm_watson_machine_learning) (21.3)
Requirement already satisfied: ibm-cos-sdk==2.11.* in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from ibm_watson_machine_learning) (2.11.0)
Requirement already satisfied: urllib3 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from ibm_watson_machine_learning) (1.26.7)
Requirement already satisfied: requests in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from ibm_watson_machine_learning) (2.26.0)
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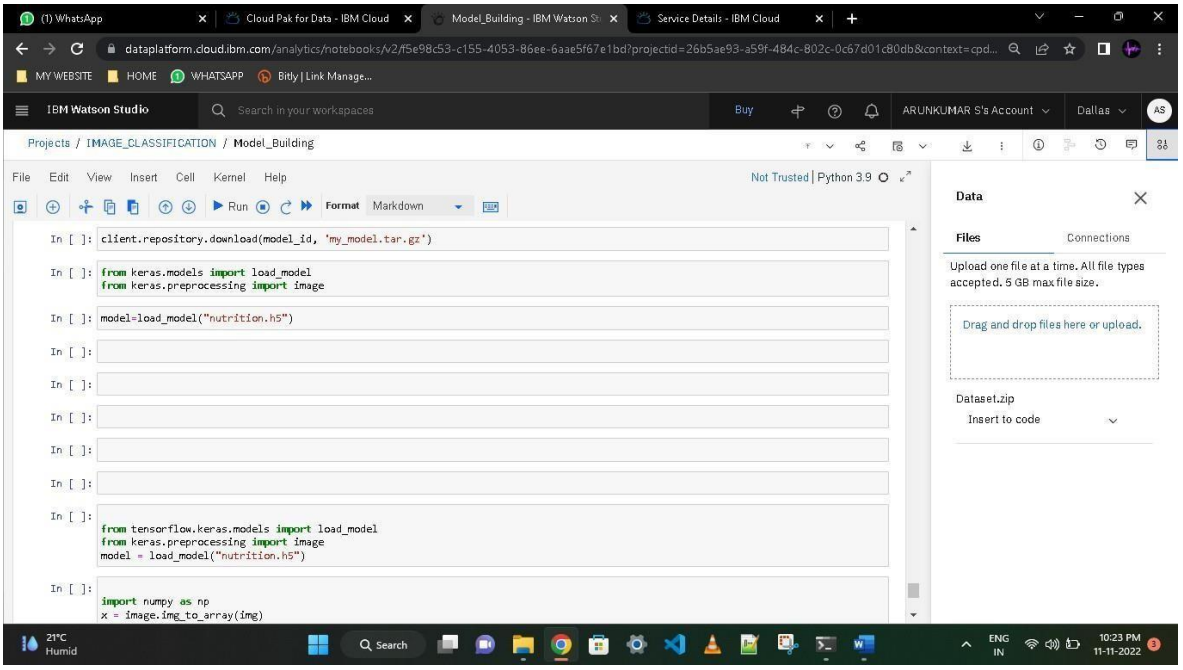
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In [ ]: client.repository.download(model_id, 'my_model.tar.gz')
In [ ]: from keras.models import load_model
from keras.preprocessing import image
In [ ]: model=load_model("nutrition.h5")
In [ ]:
In [ ]:
In [ ]:
In [ ]:
In [ ]:
In [ ]: from tensorflow.keras.models import load_model
from keras.preprocessing import image
model = load_model("nutrition.h5")
In [ ]: import numpy as np
x = image.img_to_array(img)
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Files
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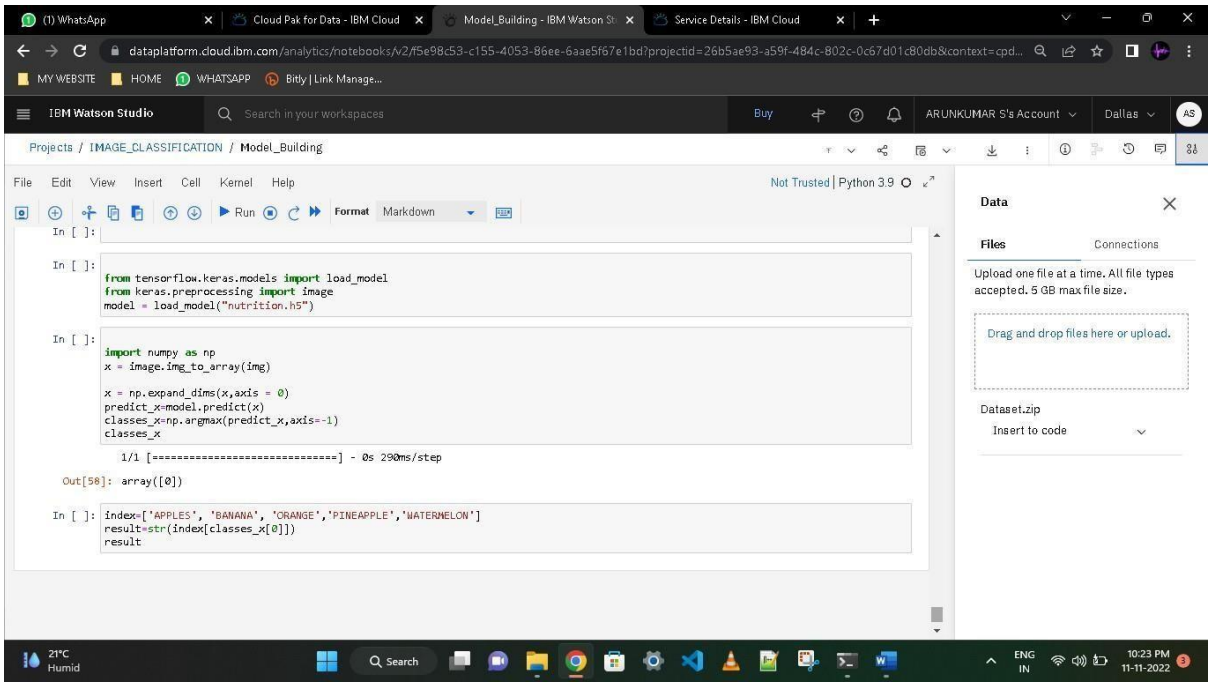
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In [ ]:
from tensorflow.keras.models import load_model
from keras.preprocessing import image
model = load_model("nutrition.h5")
In [ ]:
import numpy as np
x = image.img_to_array(img)
x = np.expand_dims(x,axis = 0)
predict_x=model.predict(x)
classes_x=np.argmax(predict_x,axis=-1)
classes_x
1/1 [==============================] - 0s 290ms/step
Out[58]: array([0])
In [ ]:
index=['APPLES', 'BANANA', 'ORANGE','PINEAPPLE','WATERMELON']
result=str(index[classes_x[0]])
result
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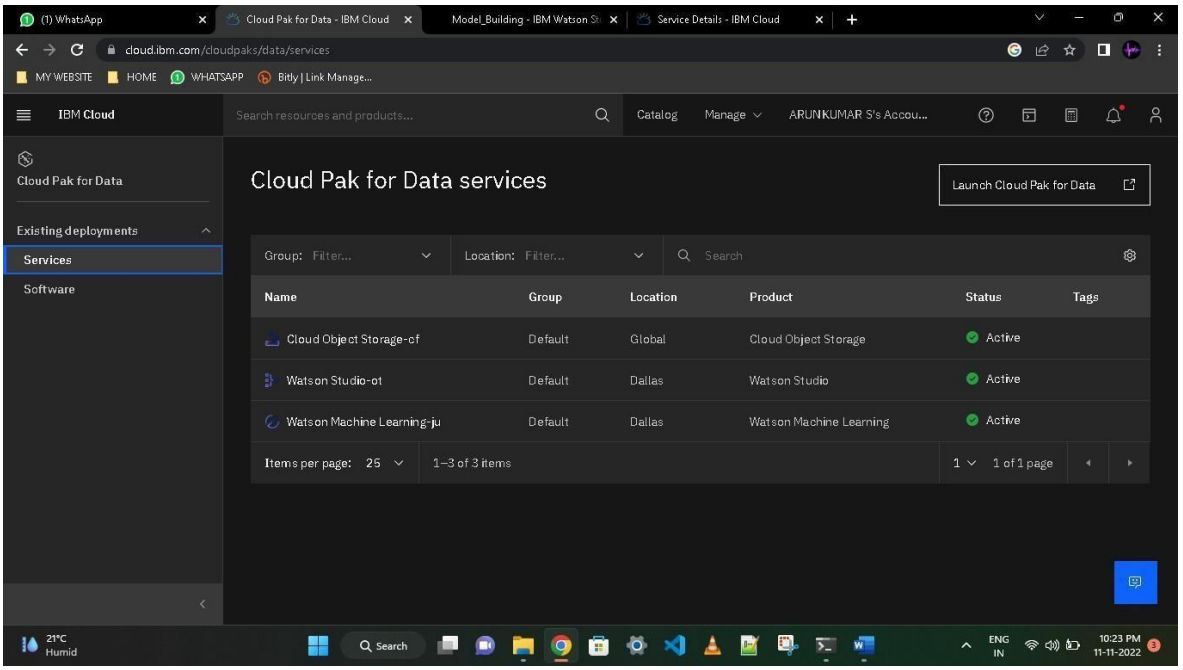
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Search
Name
Group
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Product
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Tags
Cloud Object Storage-cf
Default
Global
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Watson Studio-ot
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Active
Watson Machine Learning-ju
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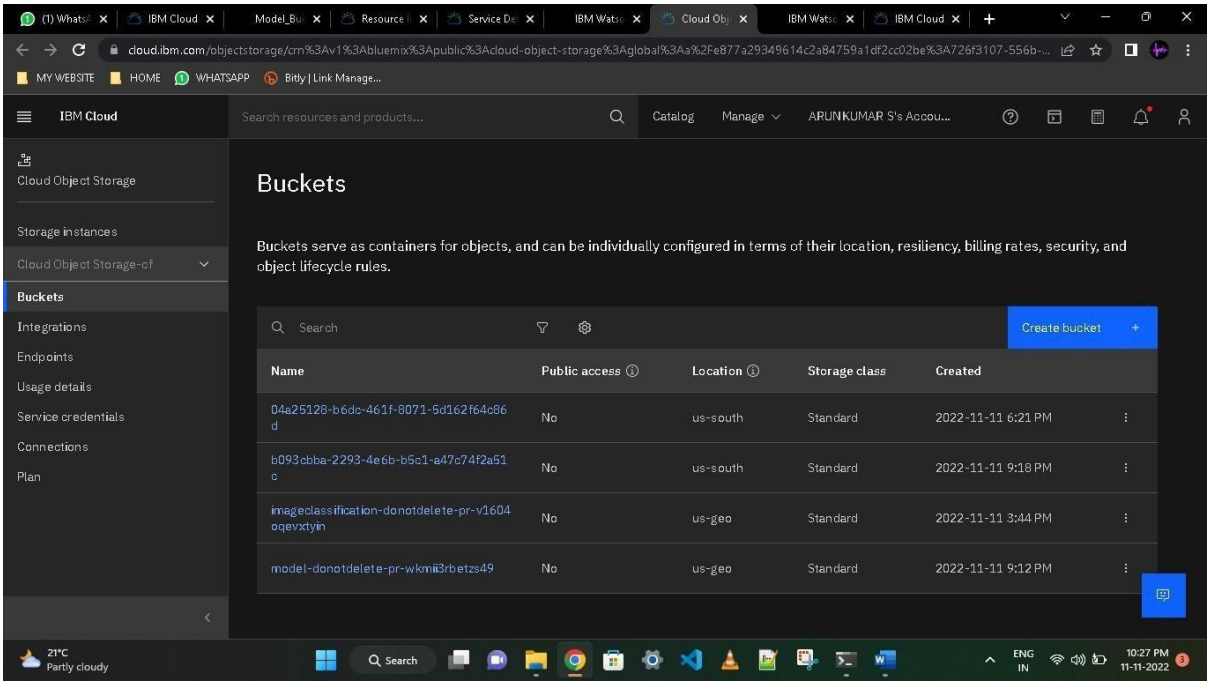
cloud.ibm.com/objectstorage/crn%3Av1%3Abluemix%3Apublic%3Acloud-object-storage%3Aglobal%3Aa%2Fe877a29349614c2a84759a1df2cc02be%3A726f3107-556b-...
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Cloud Object Storage
Storage instances
Cloud Object Storage-cf
Buckets
Integrations
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Usage details
Service credentials
Connections
Plan
Buckets
Buckets serve as containers for objects, and can be individually configured in terms of their location, resiliency, billing rates, security, and object lifecycle rules.
Search
Create bucket
Name
Public access
Location
Storage class
Created
04a25128-b6dc-461f-8071-5d162f64c86d
No
us-south
Standard
2022-11-11 6:21 PM
b093cbba-2293-4e6b-b5c1-a47c74f2a51c
No
us-south
Standard
2022-11-11 9:18 PM
imageclassification-donotdelete-pr-v1604oqevxtyin
No
us-geo
Standard
2022-11-11 3:44 PM
model-donotdelete-pr-wkmii3rbetzs49
No
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