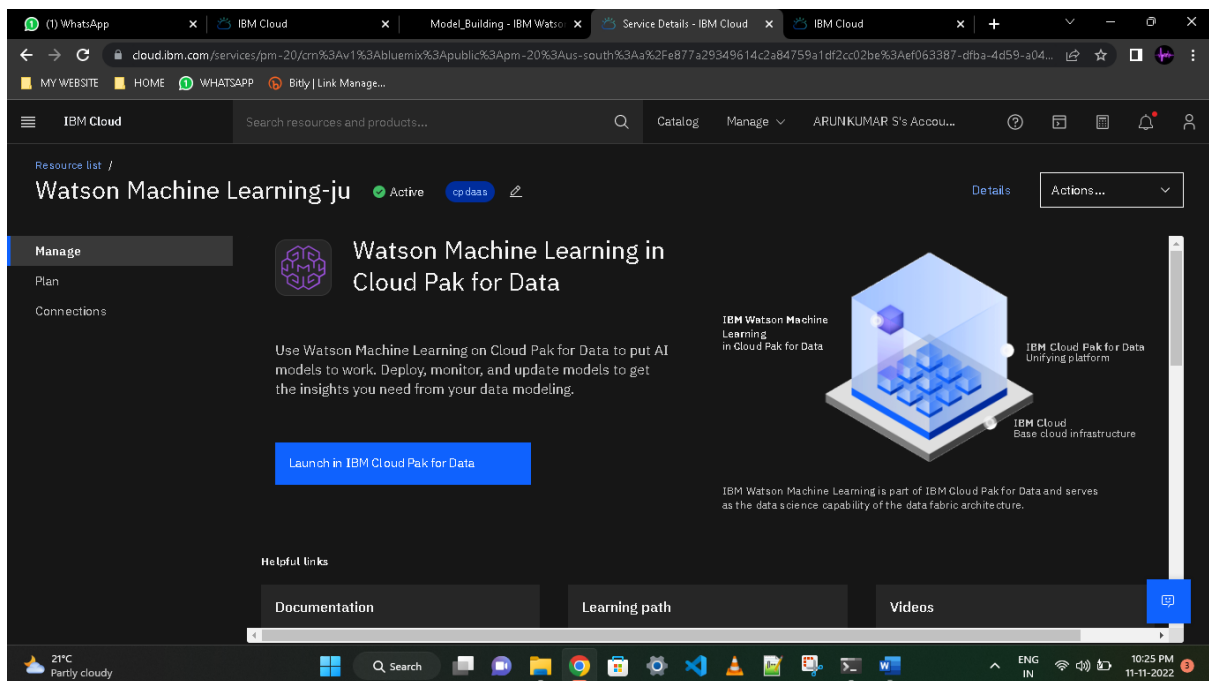
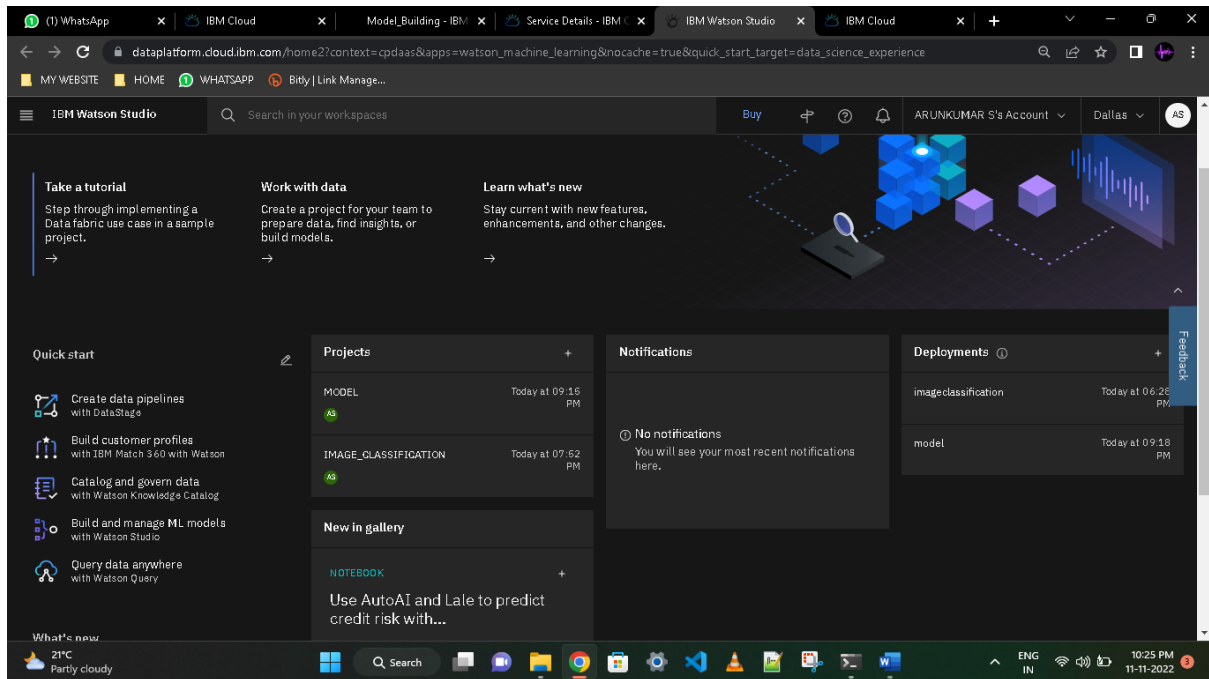


Train Model On IBM

TEAM ID : PNT2022TMID18332

PROJECT NAME : AI-powered Nutrition Analyzer for Fitness Enthusiasts



IBM Watson Studio interface showing the **IMAGE_CLASSIFICATION** project. The **Assets** tab is active, displaying a list of assets under the **Notebooks** type. The **Model_Building** notebook is listed, created 42 minutes ago.

About this project sidebar:

- 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

IBM Watson Studio interface showing the **Model_Building** notebook. The notebook content includes:

Date :01 November 2022
Team ID :PNT2022TMD18332
Project Name : AI-powered Nutrition Analyzer for Fitness Enthusiasts

Data Collection

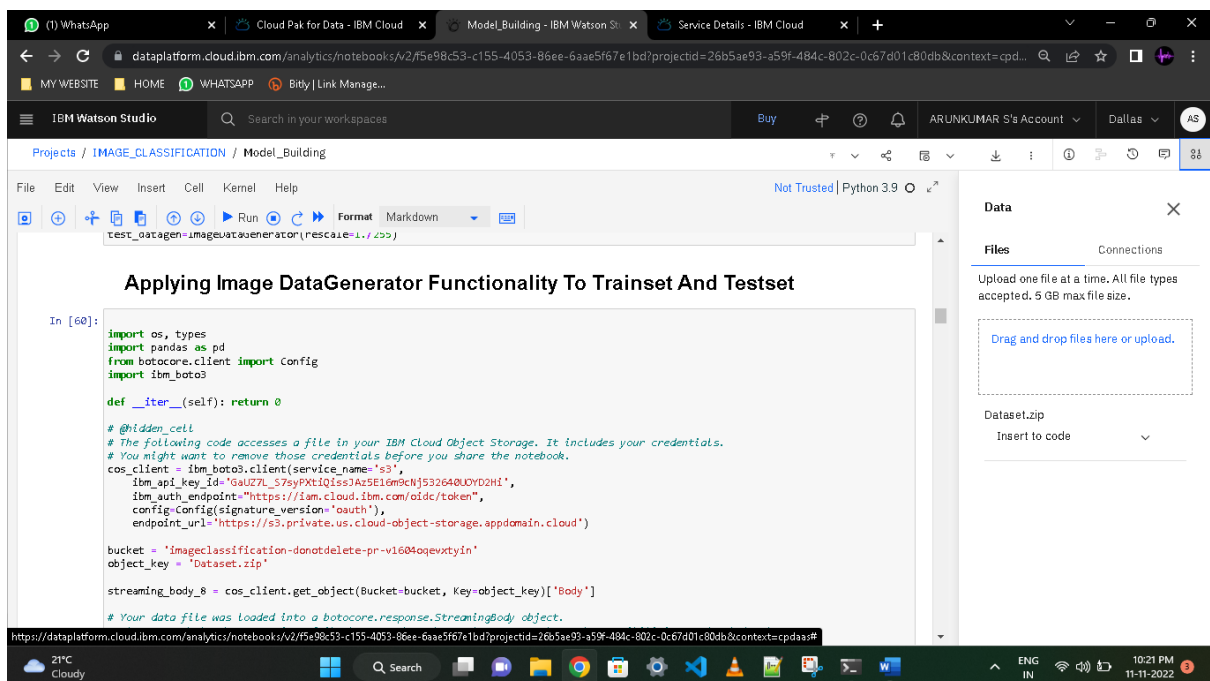
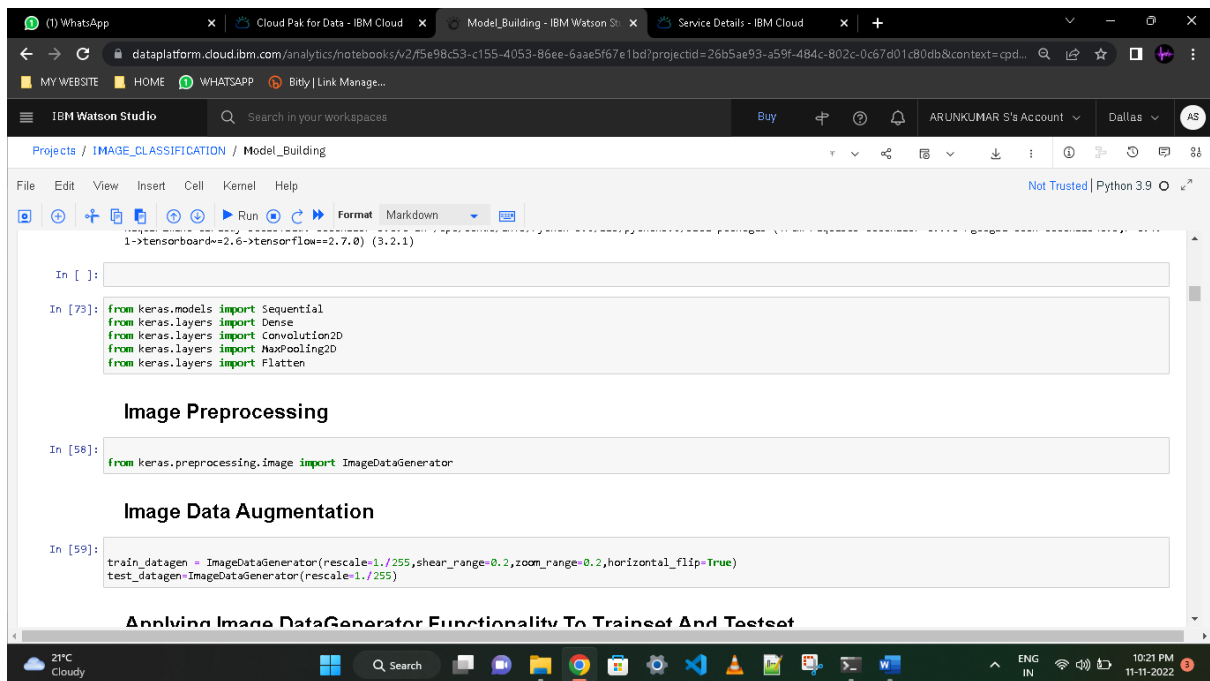
Download the dataset [here](#)

```
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
Attempted to uninstall: keras



IBM Watson Studio interface showing a Jupyter Notebook session. The notebook is titled "Model_Building" and is part of a project named "IMAGE_CLASSIFICATION". The code in the notebook is as follows:

```
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
WARNING: Skipping keras-vis as it is not installed.
```

The right sidebar shows the "Data" section with a "Files" tab. It indicates that a file named "Dataset.zip" has been uploaded and provides a link to "Insert to code".

IBM Watson Studio interface showing the continuation of the Jupyter Notebook session. The code in the notebook is as follows:

```
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)
    [REDACTED] 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)
    [REDACTED] 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
```

The right sidebar shows the "Data" section with a "Files" tab. It indicates that a file named "Dataset.zip" has been uploaded and provides a link to "Insert to code".

IBM Watson Studio interface showing a Jupyter Notebook for Image Classification. The notebook is titled "Model_Building" and is part of a project named "IMAGE_CLASSIFICATION". The code in the notebook is as follows:

```
In [70]: x_train = train_datagen.flow_from_directory(
        '/home/wuser/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/wuser/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)
```

The output of the code shows the class indices for both training and testing datasets, indicating 5 classes: APPLES, BANANA, ORANGE, PINEAPPLE, and WATERMELON.

The right sidebar shows the "Data" section with a "Files" tab. It prompts the user to "Upload one file at a time. All file types accepted. 5 GB max file size." and provides a "Dataset.zip" option to "Insert to code".

IBM Watson Studio interface showing a Jupyter Notebook for Model Building. The notebook is titled "Model Building" and is part of a project named "IMAGE_CLASSIFICATION". The code in the notebook is as follows:

```
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/wuser/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'
```

The output of the code shows a `ModuleNotFoundError` indicating that the `tensorflow.keras` module is not found. This suggests that the required dependencies are not installed in the environment.

The right sidebar shows the "Data" section with a "Files" tab. It prompts the user to "Upload one file at a time. All file types accepted. 5 GB max file size." and provides a "Dataset.zip" option to "Insert to code".

IBM Watson Studio interface showing a Jupyter Notebook titled "Model_Building". The notebook is in the "IMAGE_CLASSIFICATION" project. The code in the notebook is as follows:

```
ras/utls/_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 'lib
cuda.so.1'; dlderror: libcuda.so.1: cannot open shared object file: No such file or directory; LD_LIBRARY_PATH: /opt/ibm/dsdrive
r/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())
```

The right sidebar shows the "Data" panel with "Files" and "Connections" tabs. The "Files" tab is active, showing a message: "Upload one file at a time. All file types accepted. 5 GB max file size." and a button: "Drag and drop files here or upload." Below this, there is a "Dataset.zip" section with a dropdown menu set to "Insert to code".

IBM Watson Studio interface showing the same Jupyter Notebook "Model_Building". The code in the notebook is as follows:

```
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
```

The right sidebar shows the "Data" panel with "Files" and "Connections" tabs. The "Files" tab is active, showing a message: "Upload one file at a time. All file types accepted. 5 GB max file size." and a button: "Drag and drop files here or upload." Below this, there is a "Dataset.zip" section with a dropdown menu set to "Insert to code".

IBM Watson Studio interface showing a Jupyter Notebook titled "Model_Building". The notebook displays training progress for an image classification model over 11 epochs. The output shows loss and accuracy metrics for both training and validation sets.

```
Epoch 1/20  
824/824 [=====] - 51s 62ms/step - loss: 0.4291 - accuracy: 0.8407 - val_loss: 0.4409 - val_accuracy: 0.8202  
Epoch 2/20  
824/824 [=====] - 48s 59ms/step - loss: 0.3797 - accuracy: 0.8565 - val_loss: 0.5238 - val_accuracy: 0.8052  
Epoch 3/20  
824/824 [=====] - 49s 59ms/step - loss: 0.3626 - accuracy: 0.8621 - val_loss: 0.4525 - val_accuracy: 0.8052  
Epoch 4/20  
824/824 [=====] - 48s 58ms/step - loss: 0.3440 - accuracy: 0.8691 - val_loss: 0.4087 - val_accuracy: 0.8450  
Epoch 5/20  
824/824 [=====] - 48s 58ms/step - loss: 0.3269 - accuracy: 0.8820 - val_loss: 0.4273 - val_accuracy: 0.8418  
Epoch 6/20  
824/824 [=====] - 47s 57ms/step - loss: 0.3166 - accuracy: 0.8871 - val_loss: 0.5578 - val_accuracy: 0.7576  
Epoch 7/20  
824/824 [=====] - 46s 56ms/step - loss: 0.2916 - accuracy: 0.8898 - val_loss: 0.4375 - val_accuracy: 0.8579  
Epoch 8/20  
824/824 [=====] - 48s 58ms/step - loss: 0.2822 - accuracy: 0.8963 - val_loss: 0.4105 - val_accuracy: 0.8525  
Epoch 9/20  
824/824 [=====] - 46s 56ms/step - loss: 0.2595 - accuracy: 0.8995 - val_loss: 0.4174 - val_accuracy: 0.8547  
Epoch 10/20  
824/824 [=====] - 45s 54ms/step - loss: 0.2508 - accuracy: 0.9034 - val_loss: 0.4238 - val_accuracy: 0.8547
```

IBM Watson Studio interface showing a Jupyter Notebook titled "Model_Building". The notebook displays the configuration of the learning process and the training of the model. The output shows a warning message from TensorFlow regarding the deprecated `Model.fit_generator` method.

```
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(x_test))  
Epoch 1/20  
WARNING:tensorflow: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.  
Cause: closure mismatch, requested ('self', 'step_function'), but source function had ()  
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.
```

IBM Watson Studio interface showing the **Assets** tab for a project named **IMAGE_CLASSIFICATION**. The interface includes a sidebar with **Asset types** (Data, Data assets, Notebooks) and a main area displaying a table of **Data assets**.

Name	Last modified
Dataset.t.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

IBM Watson Studio interface showing the **Model_Building** notebook. The notebook contains code for saving and testing a model, and installing the Watson Machine Learning client.

```
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: lmond 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)
```

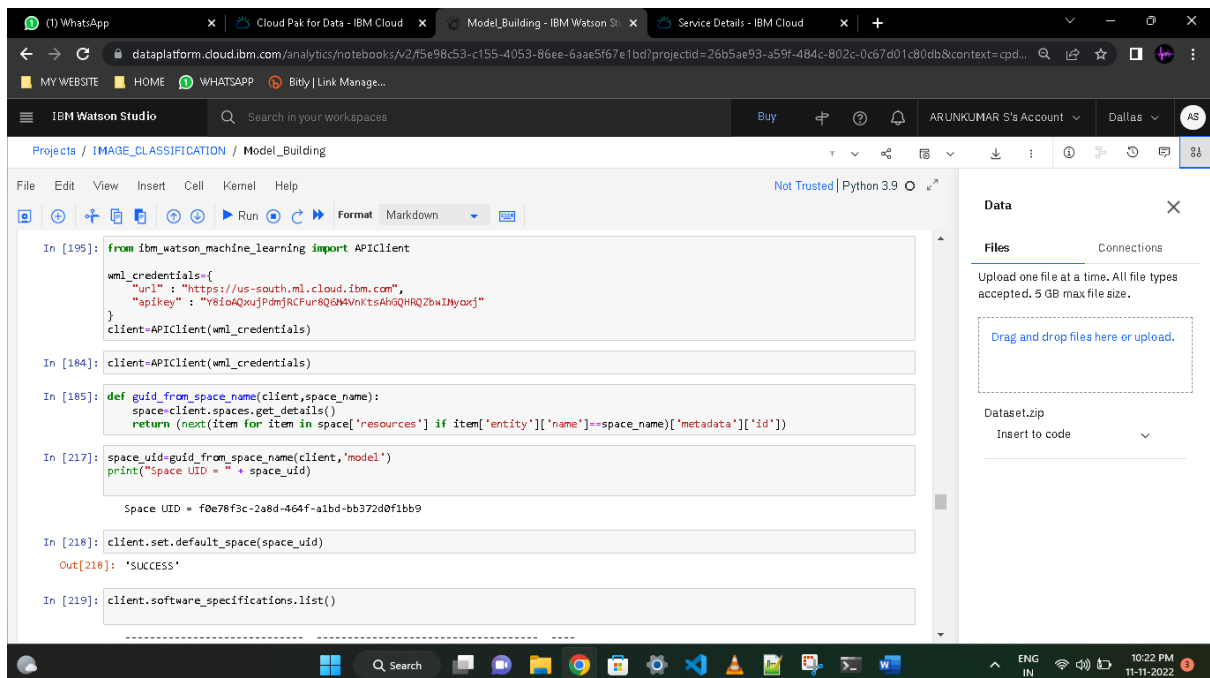
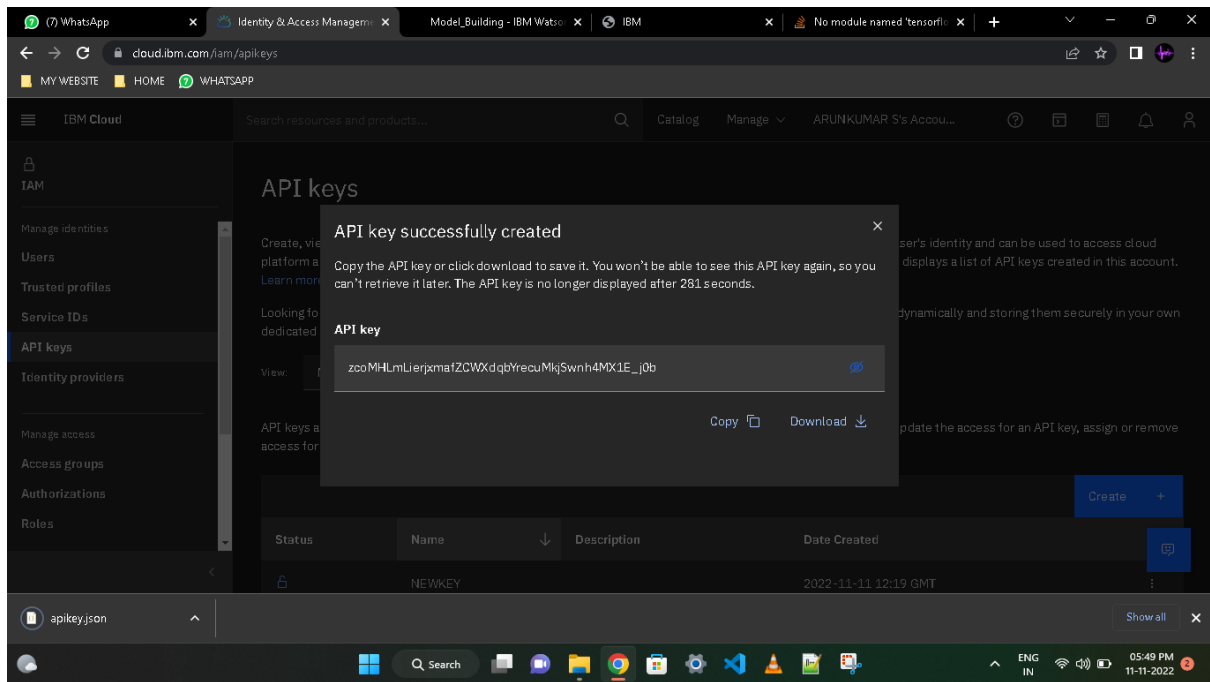
Data

Files

Upload one file at a time. All file types accepted. 5 GB max file size.

Drag and drop files here or upload.

Dataset.zip
Insert to code



IBM Watson Studio interface showing the 'imageclassification' space details. The space is managed by ARUNKUMAR S and is currently empty (0 Bytes used). The interface includes tabs for Overview, Assets, Deployments, Jobs, and Manage. The 'Manage' tab is active, displaying the space's GUID, creation date, and deployment tags. A 'Cloud Object Storage' section shows the storage used and bucket information. A 'Machine learning service' section lists the Watson Machine Learning job.

imageclassification

Overview Assets Deployments Jobs **Manage**

Space Details

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

Storage used: 0 Bytes used

Name: Cloud Object Storage-cf

Bucket: 04a25128-b6dc-461f-8071-5d162f64c86d

Machine learning service

Watson Machine Learning-ju

Drop files here or browse for files to upload.

Stay on the page until upload completes. Incomplete uploads are cancelled.

IBM Watson Studio interface showing the 'IMAGE_CLASSIFICATION' project details. The project is managed by ARUNKUMAR S and is currently empty (0 Bytes used). The interface includes tabs for Overview, Assets, Deployments, Jobs, and Manage. The 'Manage' tab is active, displaying the project's GUID, creation date, and deployment tags. A 'Cloud Object Storage' section shows the storage used and bucket information. A 'Machine learning service' section lists the Watson Machine Learning job.

IMAGE_CLASSIFICATION

Overview Assets Deployments Jobs **Manage**

Space Details

Name: IMAGE_CLASSIFICATION

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

Storage used: 0 Bytes used

Name: Cloud Object Storage-cf

Bucket: 04a25128-b6dc-461f-8071-5d162f64c86d

Machine learning service

Watson Machine Learning-ju

Drop files here or browse for files to upload.

Stay on the page until upload completes. Incomplete uploads are cancelled.

IBM Watson Studio interface showing a Jupyter Notebook session. The browser tabs include WhatsApp, Cloud Pak for Data - IBM Cloud, Model_Building - IBM Watson Studio, and Service Details - IBM Cloud. The URL is `dataplatform.cloud.ibm.com/analytics/notebooks/v2/f5e98c53-c155-4053-86ee-6aae5f67e1bd/projectid=26b5ae93-a59f-484c-802c-0c67d01c80db&context=cpd...`. The IBM Watson Studio header shows the user ARUNKUMAR S's Account and location Dallas.

The notebook is titled "Model_Building" and is in the "IMAGE_CLASSIFICATION" project. The code in the notebook is as follows:

```
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)
```

The right sidebar shows the "Data" section with "Files" and "Connections" tabs. The "Files" tab is active, showing a message: "Upload one file at a time. All file types accepted. 5 GB max file size." Below this is a dashed box with the text "Drag and drop files here or upload." and a "Dataset.zip" section with a dropdown menu set to "Insert to code".

IBM Watson Studio interface showing a Jupyter Notebook session. The browser tabs include WhatsApp, Cloud Pak for Data - IBM Cloud, Model_Building - IBM Watson Studio, and Service Details - IBM Cloud. The URL is `dataplatform.cloud.ibm.com/analytics/notebooks/v2/f5e98c53-c155-4053-86ee-6aae5f67e1bd/projectid=26b5ae93-a59f-484c-802c-0c67d01c80db&context=cpd...`. The IBM Watson Studio header shows the user ARUNKUMAR S's Account and location Dallas.

The notebook is titled "Model_Building" and is in the "IMAGE_CLASSIFICATION" project. The code in the notebook is as follows:

```
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 [ ]:
```

```
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)
```

The right sidebar shows the "Data" section with "Files" and "Connections" tabs. The "Files" tab is active, showing a message: "Upload one file at a time. All file types accepted. 5 GB max file size." Below this is a dashed box with the text "Drag and drop files here or upload." and a "Dataset.zip" section with a dropdown menu set to "Insert to code".

IBM Watson Studio interface showing a Jupyter Notebook for image classification. The notebook code uses TensorFlow Keras to load a model and predict classes for an image.

```
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
```

The right sidebar shows the 'Data' section with 'Files' and 'Connections' tabs. The 'Files' tab indicates that files can be uploaded or dragged and dropped.

IBM Cloud interface showing the 'Cloud Pak for Data services' page. The page displays a table of services and their status.

Name	Group	Location	Product	Status	Tags
Cloud Object Storage-cf	Default	Global	Cloud Object Storage	Active	
Watson Studio-ot	Default	Dallas	Watson Studio	Active	
Watson Machine Learning-ju	Default	Dallas	Watson Machine Learning	Active	

The page also includes a search bar, filters for Group and Location, and a 'Launch Cloud Pak for Data' button.

