Importing Libraries

In [1]:

**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**=**'k3TKMbC6oHJ4xdX69KJ44CcFuWdnECQqZbHju0Yke5KT',

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 **=** 'fooddemandforecaster-donotdelete-pr-ixrfvhkkd9libk'

object\_key **=** 'test.csv'

body **=** cos\_client**.**get\_object(Bucket**=**bucket,Key**=**object\_key)['Body']

*# add missing \_\_iter\_\_ method, so pandas accepts body as file-like object*

**if** **not** hasattr(body, "\_\_iter\_\_"): body**.**\_\_iter\_\_ **=** types**.**MethodType( \_\_iter\_\_, body )

test **=** pd**.**read\_csv(body)

test**.**head()

Out[1]:

|  | **id** | **week** | **center\_id** | **meal\_id** | **checkout\_price** | **base\_price** | **emailer\_for\_promotion** | **homepage\_featured** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **0** | 1028232 | 146 | 55 | 1885 | 158.11 | 159.11 | 0 | 0 |
| **1** | 1127204 | 146 | 55 | 1993 | 160.11 | 159.11 | 0 | 0 |
| **2** | 1212707 | 146 | 55 | 2539 | 157.14 | 159.14 | 0 | 0 |
| **3** | 1082698 | 146 | 55 | 2631 | 162.02 | 162.02 | 0 | 0 |
| **4** | 1400926 | 146 | 55 | 1248 | 163.93 | 163.93 | 0 | 0 |

In [7]:

**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.*

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ibm\_api\_key\_id**=**'k3TKMbC6oHJ4xdX69KJ44CcFuWdnECQqZbHju0Yke5KT',

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 **=** 'fooddemandforecaster-donotdelete-pr-ixrfvhkkd9libk'

object\_key **=** 'train.csv'

body **=** cos\_client**.**get\_object(Bucket**=**bucket,Key**=**object\_key)['Body']

*# add missing \_\_iter\_\_ method, so pandas accepts body as file-like object*

**if** **not** hasattr(body, "\_\_iter\_\_"): body**.**\_\_iter\_\_ **=** types**.**MethodType( \_\_iter\_\_, body )

train **=** pd**.**read\_csv(body)

train**.**head()

Out[7]:

|  | **id** | **week** | **center\_id** | **meal\_id** | **checkout\_price** | **base\_price** | **emailer\_for\_promotion** | **homepage\_featured** | **num\_orders** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **0** | 1379560 | 1 | 55 | 1885 | 136.83 | 152.29 | 0 | 0 | 177 |
| **1** | 1466964 | 1 | 55 | 1993 | 136.83 | 135.83 | 0 | 0 | 270 |
| **2** | 1346989 | 1 | 55 | 2539 | 134.86 | 135.86 | 0 | 0 | 189 |
| **3** | 1338232 | 1 | 55 | 2139 | 339.50 | 437.53 | 0 | 0 | 54 |
| **4** | 1448490 | 1 | 55 | 2631 | 243.50 | 242.50 | 0 | 0 | 40 |

In [3]:

**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.*

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ibm\_api\_key\_id**=**'k3TKMbC6oHJ4xdX69KJ44CcFuWdnECQqZbHju0Yke5KT',

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 **=** 'fooddemandforecaster-donotdelete-pr-ixrfvhkkd9libk'

object\_key **=** 'meal\_info.csv'

body **=** cos\_client**.**get\_object(Bucket**=**bucket,Key**=**object\_key)['Body']

*# add missing \_\_iter\_\_ method, so pandas accepts body as file-like object*

**if** **not** hasattr(body, "\_\_iter\_\_"): body**.**\_\_iter\_\_ **=** types**.**MethodType( \_\_iter\_\_, body )

meal\_info **=** pd**.**read\_csv(body)

meal\_info**.**head()

Out[3]:

|  | **meal\_id** | **category** | **cuisine** |
| --- | --- | --- | --- |
| **0** | 1885 | Beverages | Thai |
| **1** | 1993 | Beverages | Thai |
| **2** | 2539 | Beverages | Thai |
| **3** | 1248 | Beverages | Indian |
| **4** | 2631 | Beverages | Indian |

In [16]:

**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**=**'k3TKMbC6oHJ4xdX69KJ44CcFuWdnECQqZbHju0Yke5KT',

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 **=** 'fooddemandforecaster-donotdelete-pr-ixrfvhkkd9libk'

object\_key **=** 'fulfilment\_center\_info.csv'

body **=** cos\_client**.**get\_object(Bucket**=**bucket,Key**=**object\_key)['Body']

*# add missing \_\_iter\_\_ method, so pandas accepts body as file-like object*

**if** **not** hasattr(body, "\_\_iter\_\_"): body**.**\_\_iter\_\_ **=** types**.**MethodType( \_\_iter\_\_, body )

center\_info**=** pd**.**read\_csv(body)

center\_info**.**head()

Out[16]:

|  | **center\_id** | **city\_code** | **region\_code** | **center\_type** | **op\_area** |
| --- | --- | --- | --- | --- | --- |
| **0** | 11 | 679 | 56 | TYPE\_A | 3.7 |
| **1** | 13 | 590 | 56 | TYPE\_B | 6.7 |
| **2** | 124 | 590 | 56 | TYPE\_C | 4.0 |
| **3** | 66 | 648 | 34 | TYPE\_A | 4.1 |
| **4** | 94 | 632 | 34 | TYPE\_C | 3.6 |

KNN **=** DecisionTreeRegressor()

KNN**.**fit(X\_train, Y\_train)

y\_pred **=** KNN**.**predict(X\_val)

y\_pred[y\_pred**<**0] **=** 0

**from** sklearn **import** metrics

print('RMSLE:', 100**\***np**.**sqrt(metrics**.**mean\_squared\_log\_error(Y\_val, y\_pred)))

RMSLE: 89.31549041512689

In [48]:

GB **=** DecisionTreeRegressor()

GB**.**fit(X\_train, Y\_train)

y\_pred **=** GB**.**predict(X\_val)

y\_pred[y\_pred**<**0] **=** 0

**from** sklearn **import** metrics

print('RMSLE:', 100**\***np**.**sqrt(metrics**.**mean\_squared\_log\_error(Y\_val, y\_pred)))

RMSLE: 89.2334399436971

Save the model

In [53]:

**import** pickle

pickle**.**dump(DT,open('fdemand.pkl','wb'))

Predicting the output using the model

In [38]:

testfinal **=** pd**.**merge(test, meal\_info, on**=**"meal\_id", how**=**"outer")

testfinal **=** pd**.**merge(testfinal, center\_info, on**=**"center\_id", how**=**"outer")

testfinal **=** testfinal**.**drop(['meal\_id', 'center\_id'], axis**=**1)

tcols **=** testfinal**.**columns**.**tolist()

tcols **=** tcols[:2] **+** tcols[8:] **+** tcols[6:8] **+** tcols[2:6]

testfinal **=** testfinal[tcols]

Ib1 **=** LabelEncoder()

testfinal['center\_type'] **=** Ib1**.**fit\_transform(testfinal['center\_type'])

Ib2 **=** LabelEncoder()

testfinal['category'] **=** Ib1**.**fit\_transform(testfinal['category'])

Ib3 **=** LabelEncoder()

testfinal['cuisine'] **=** Ib1**.**fit\_transform(testfinal['cuisine'])

X\_test **=** testfinal[features]**.**values

pred **=** DT**.**predict(X\_test)

pred[pred**<**0] **=** 0

submit **=** pd**.**DataFrame({

'id' : testfinal['id'],

'num\_orders' : pred

})

In [39]:

submit**.**to\_csv("submission.csv", index**=False**)

submit**.**describe()

Out[39]:

|  | **id** | **num\_orders** |
| --- | --- | --- |
| **count** | 3.257300e+04 | 32573.000000 |
| **mean** | 1.248476e+06 | 254.163684 |
| **std** | 1.441580e+05 | 351.584819 |
| **min** | 1.000085e+06 | 13.000000 |
| **25%** | 1.123969e+06 | 55.000000 |
| **50%** | 1.247296e+06 | 136.000000 |
| **75%** | 1.372971e+06 | 323.000000 |
| **max** | 1.499996e+06 | 7073.000000 |

In [40]:

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

pip install watson-machine-learning-client

Collecting watson-machine-learning-client

Downloading watson\_machine\_learning\_client-1.0.391-py3-none-any.whl (538 kB)

|████████████████████████████████| 538 kB 16.1 MB/s eta 0:00:01

Requirement already satisfied: requests in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from watson-machine-learning-client) (2.26.0)

Requirement already satisfied: pandas in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from watson-machine-learning-client) (1.3.4)

Requirement already satisfied: ibm-cos-sdk in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from watson-machine-learning-client) (2.11.0)

Requirement already satisfied: boto3 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from watson-machine-learning-client) (1.18.21)

Requirement already satisfied: urllib3 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from watson-machine-learning-client) (1.26.7)

Requirement already satisfied: tabulate in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from watson-machine-learning-client) (0.8.9)

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: tqdm in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from watson-machine-learning-client) (4.62.3)

Requirement already satisfied: s3transfer<0.6.0,>=0.5.0 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from boto3->watson-machine-learning-client) (0.5.0)

Requirement already satisfied: botocore<1.22.0,>=1.21.21 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from boto3->watson-machine-learning-client) (1.21.41)

Requirement already satisfied: jmespath<1.0.0,>=0.7.1 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from boto3->watson-machine-learning-client) (0.10.0)

Requirement already satisfied: python-dateutil<3.0.0,>=2.1 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from botocore<1.22.0,>=1.21.21->boto3->watson-machine-learning-client) (2.8.2)

Requirement already satisfied: six>=1.5 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from python-dateutil<3.0.0,>=2.1->botocore<1.22.0,>=1.21.21->boto3->watson-machine-learning-client) (1.15.0)

Requirement already satisfied: ibm-cos-sdk-s3transfer==2.11.0 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from ibm-cos-sdk->watson-machine-learning-client) (2.11.0)

Requirement already satisfied: ibm-cos-sdk-core==2.11.0 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from ibm-cos-sdk->watson-machine-learning-client) (2.11.0)

Requirement already satisfied: idna<4,>=2.5 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from requests->watson-machine-learning-client) (3.3)

Requirement already satisfied: charset-normalizer~=2.0.0 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from requests->watson-machine-learning-client) (2.0.4)

Requirement already satisfied: pytz>=2017.3 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from pandas->watson-machine-learning-client) (2021.3)

Requirement already satisfied: numpy>=1.17.3 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from pandas->watson-machine-learning-client) (1.20.3)

Installing collected packages: watson-machine-learning-client

Successfully installed watson-machine-learning-client-1.0.391

In [41]:

**from** ibm\_watson\_machine\_learning **import** APIClient

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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-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

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Note: Only first 50 records were displayed. To display more use 'limit' parameter.

In [52]:

software\_space\_uid **=** client**.**software\_specifications**.**get\_uid\_by\_name('tensorflow\_rt22.1-py3.9')

software\_space\_uid

Out[52]:

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

In [54]:

**!**tar -zcvf Food\_Demand.tgz fdemand.pkl

fdemand.pkl

In [56]:

model\_details **=** client**.**repository**.**store\_model(model**=**'Food\_Demand.tgz',meta\_props**=**{

client**.**repository**.**ModelMetaNames**.**NAME:"Food Demand Forecaster",

client**.**repository**.**ModelMetaNames**.**TYPE:"tensorflow\_2.7",

client**.**repository**.**ModelMetaNames**.**SOFTWARE\_SPEC\_UID:software\_space\_uid

})

In [57]:

model\_details

Out[57]:

{'entity': {'hybrid\_pipeline\_software\_specs': [],

'software\_spec': {'id': 'acd9c798-6974-5d2f-a657-ce06e986df4d',

'name': 'tensorflow\_rt22.1-py3.9'},

'type': 'tensorflow\_2.7'},

'metadata': {'created\_at': '2022-11-15T06:46:01.462Z',

'id': 'cccd228c-108c-49f3-be4b-c2126bd76b68',

'modified\_at': '2022-11-15T06:46:04.958Z',

'name': 'Food Demand Forecaster',

'owner': 'IBMid-66100401OR',

'resource\_key': 'de13f293-698a-44d9-b4f1-73f8a0077e88',

'space\_id': '9c853358-237d-4e88-afd0-0b09952a45e7'},

'system': {'warnings': []}}

In [58]:

model\_id **=** client**.**repository**.**get\_model\_id(model\_details)

model\_id

Out[58]:

'cccd228c-108c-49f3-be4b-c2126bd76b68'

In [60]:

client**.**repository**.**download(model\_id,'Food Demand Forecaster.tar.gb')

Successfully saved model content to file: 'Food Demand Forecaster.tar.gb'

Out[60]:

'/home/wsuser/work/Food Demand Forecaster.tar.gb'

In [ ]: