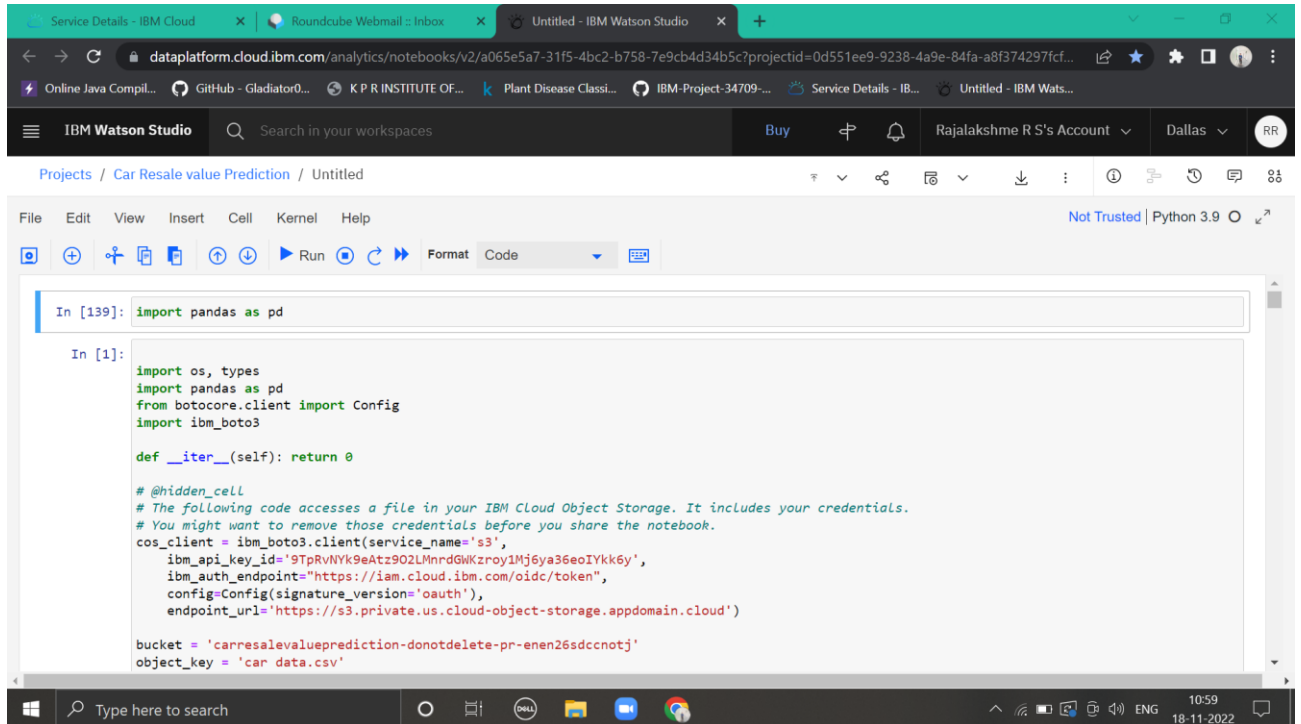


TRAINING THE MODEL IN IBM WATSON STUDIO



The screenshot shows the IBM Watson Studio interface. The browser tabs include 'Service Details - IBM Cloud', 'Roundcube Webmail : Inbox', and 'Untitled - IBM Watson Studio'. The URL is dataplatform.cloud.ibm.com/analytics/notebooks/v2/a065e5a7-31f5-4bc2-b758-7e9cb4d34b5c?projectId=0d551ee9-9238-4a9e-84fa-a8f374297fcf.... The notebook is titled 'Untitled' and is part of a project named 'Car Resale value Prediction'. The code in the notebook is as follows:

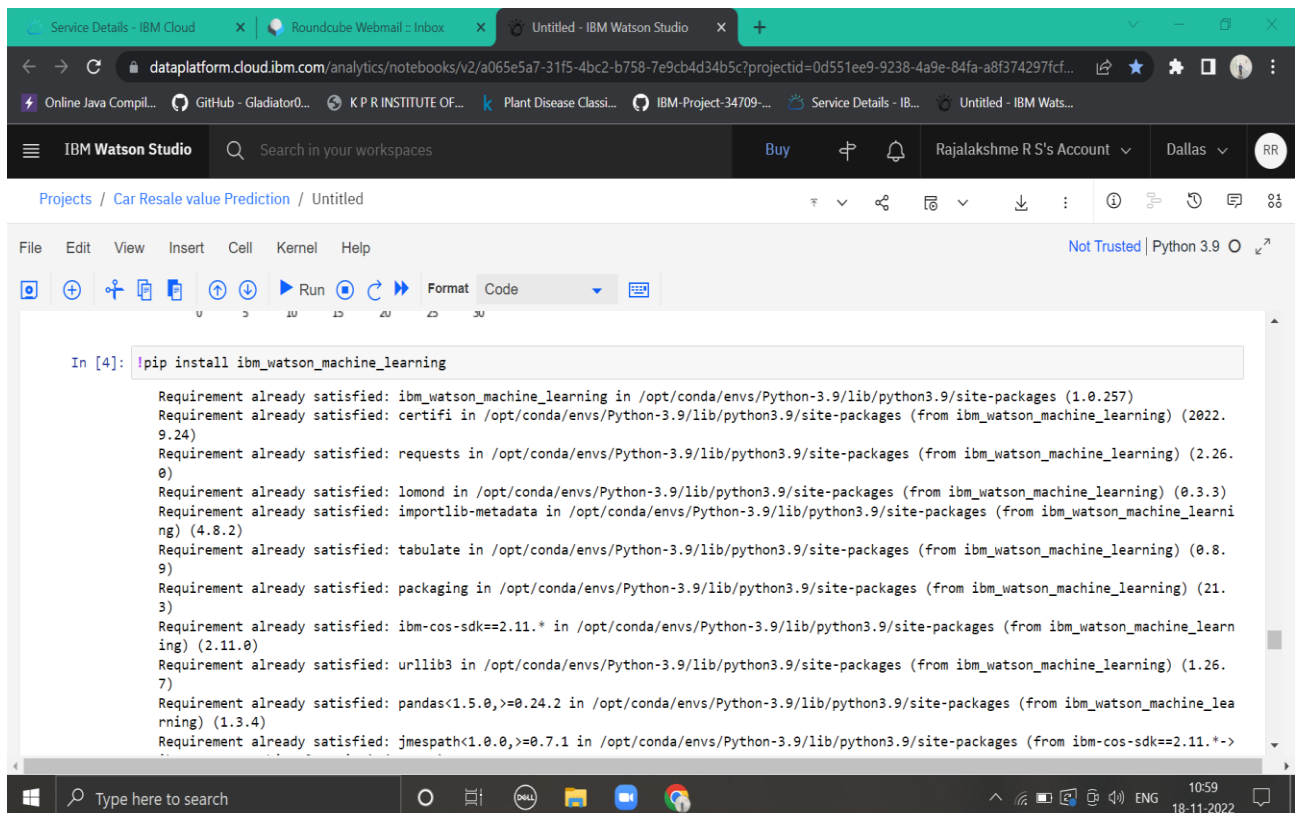
```
In [139]: import pandas as pd

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='9TpRvNYk9eAtz902LMnrdGWKzroy1Mj6ya36eoIYkk6y',
                              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 = 'carresalevalueprediction-donotdelete-pr-enen26sdccnotj'
object_key = 'car data.csv'
```



The screenshot shows the same IBM Watson Studio interface, but the code cell has been executed. The output of the `!pip install ibm_watson_machine_learning` command is displayed:

```
In [4]: !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: certifi in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from ibm_watson_machine_learning) (2022.9.24)
Requirement already satisfied: requests in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from ibm_watson_machine_learning) (2.26.0)
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: 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: 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: pandas<1.5.0,>=0.24.2 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from ibm_watson_machine_learning) (1.3.4)
Requirement already satisfied: jmespath<1.0.0,>=0.7.1 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from ibm-cos-sdk==2.11.*->ibm_watson_machine_learning) (0.10.0)
```

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In [9]:

```
from ibm_watson_machine_learning import APIClient
wml_credentials={
    "url":"https://us-south.ml.cloud.ibm.com",
    "apikey":"XiY4a0GpSjB43IKTNxMmMQzb9FA9q1_8NpWRX0NT6mYZ"
}
client = APIClient(wml_credentials)
```

In [10]:

```
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 [12]:

```
space_uid=guid_from_space_name(client, 'Models')
print("Space UID=" +space_uid)
```

Space UID=b8565015-31f5-4238-92ab-86c71541f92c

In [13]:

```
client.set.default_space(space_uid)
```

Out[13]: 'SUCCESS'

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In [14]:

```
client.software_specifications.list()
```

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

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In [133]: `from sklearn import metrics`

In [135]: `print('MAE:', metrics.mean_absolute_error(y_test, predictions))
print('MSE:', metrics.mean_squared_error(y_test, predictions))
print('RMSE:', np.sqrt(metrics.mean_squared_error(y_test, predictions)))`

MAE: 0.8849978021977988
MSE: 3.9544237722813156
RMSE: 1.9885733007061408

In [25]: `software_spec_uid=client.software_specifications.get_uid_by_name("runtime-22.1-py3.9")
software_spec_uid`

Out[25]: '12b83a17-24d8-5082-900f-0ab31fbfd3cb'

In [30]: `model_details=client.repository.store_model(model=regressor,meta_props={
 client.repository.ModelMetaNames.NAME:"car_data",
 client.repository.ModelMetaNames.TYPE:"scikit-learn_0.23",
 client.repository.ModelMetaNames.SOFTWARE_SPEC_UID:software_spec_uid
})
model_id=client.repository.get_model_uid(model_details)`

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