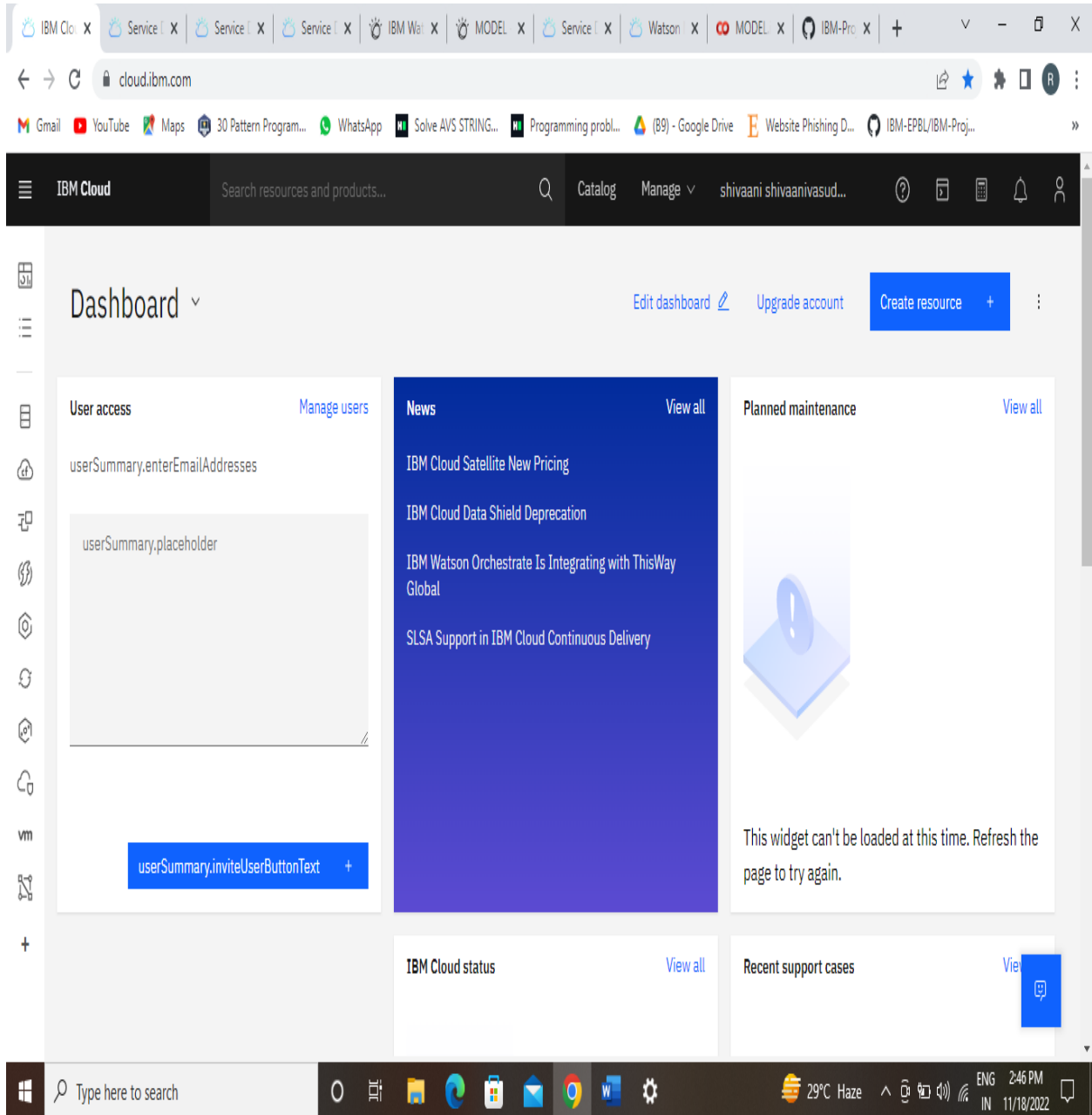


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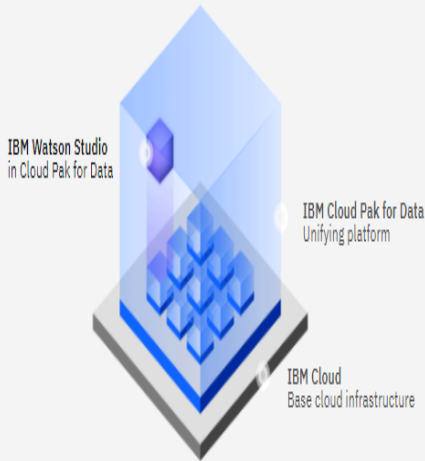
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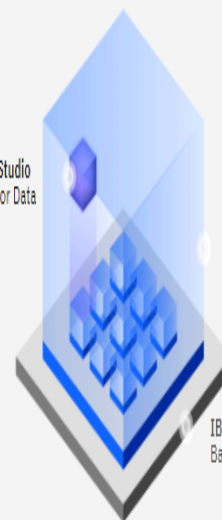
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Name

jokie

Description

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Space GUID

59c7fe0a-f909-4f87-9e57-22d9daaf...

Data created

Cloud Object Sto...

Storage used

0 Bytes used

Name

Cloud Object Storage-w4

Bucket

80282fa2-ebd9-4610-a7c5-57a0fcac32a0

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Code

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	12b83a17-2408-5082-900f-0ab31fbfd3cb	base
scikit-learn_0.22-py3.6	154010fa-5b3b-4ac1-82af-4d5ee5abbcb85	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

In [13]:

```
MODEL_NAME="RandomForestClassifier"
DEPLOYMENT_NAME="flight delay"
DEMO_MODEL='model'
```

In [14]:

```
soft_spec_id=wml_clients.software_specifications.get_id_by_name("runtime-22.1-py3.9")
```

In [15]:

```
model_props={
wml_clients.repository.ModelMetadataNames.NAME:MODEL_NAME,
wml_clients.repository.ModelMetadataNames.TYPE:"scikit-learn_1.0",
wml_clients.repository.ModelMetadataNames.SOFTWARE_SPEC_UID: soft_spec_id
}
```

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Code

In [4]: #Analyze the data

In [8]: df.info()

<class 'pandas.core.frame.DataFrame'>
RangeIndex: 11231 entries, 0 to 11230
Data columns (total 26 columns):
Column Non-Null Count Dtype

0 YEAR 11231 non-null int64
1 QUARTER 11231 non-null int64
2 MONTH 11231 non-null int64
3 DAY_OF_MONTH 11231 non-null int64
4 DAY_OF_WEEK 11231 non-null int64
5 UNIQUE_CARRIER 11231 non-null object
6 TAIL_NUM 11231 non-null object
7 FL_NUM 11231 non-null int64
8 ORIGIN_AIRPORT_ID 11231 non-null int64
9 ORIGIN 11231 non-null object
10 DEST_AIRPORT_ID 11231 non-null int64
11 DEST 11231 non-null object
12 CRS_DEP_TIME 11231 non-null int64
13 DEP_TIME 11124 non-null float64
14 DEP_DELAY 11124 non-null float64

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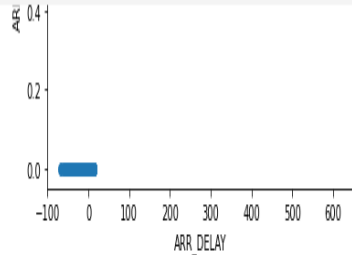
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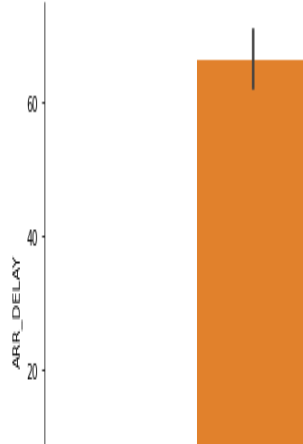
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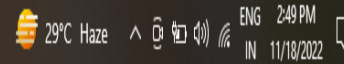
In [16]: sns.catplot(x="ARR_DEL15",y="ARR_DELAY",kind='bar',data=df)

Out[16]: <seaborn.axisgrid.FacetGrid at 0x7f8447df1710>



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In [41]:

#random forest

In [42]:

```
from sklearn.ensemble import RandomForestClassifier
model=RandomForestClassifier()
model=RandomForestClassifier(n_estimators=50,random_state=42)
model.fit(x_train,y_train)
model.score(x_test,y_test)
```

Out[42]:

0.8945268347129506

In [43]:

```
pd.DataFrame(model.predict(x_test)).value_counts()
```

Out[43]:

```
0    1985
1     262
dtype: int64
```

In [45]:

#Logestic regression

In [47]:

```
from sklearn.linear_model import LogisticRegression
lr=LogesticRegression(solver='sag')
```

IBM Watson Studio interface showing the URL: dataplatform.cloud.ibm.com/analytics/notebooks/v2/4b813f5c-b13b-4f15-89ad-32422e242df0?projectid=44f1bdba-1d6c-4ca1-abe6-8b1c71dbc8af&context=cpd...

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In []:

EVALUATION OF RANDOM FOREST

```
In [64]: from sklearn.metrics import confusion_matrix, accuracy_score, classification_report
pred=model.predict(x_test)
cm=confusion_matrix(y_test, pred)
plt.figure(figsize=(10,6))
sns.heatmap(cm, annot=True, cmap='winter', linewidths=0.3, linecolor='black', annot_kws={"size": 20})
TP=cm[0][0]
TN=cm[1][1]
FN=cm[1][0]
FP=cm[0][1]
#print(round(accuracy_score(prediction3,y_test)*100,2))
#print('Testing Accuracy for knn',(TP+TN)/(TP+TN+FN+FP))
print('Testing Sensitivity for Random Forest',(TP/(TP+FN)))
print('Testing Specificity for Random Forest',(TN/(TN+FP)))
print('Testing Precision for Random Forest',(TP/(TP+FP)))
print('Testing accuracy for Random Forest',accuracy_score(y_test, pred))
```

Testing Sensitivity for Random Forest 0.8942065491183879
Testing Specificity for Random Forest 0.8969465648854962
Testing Precision for Random Forest 0.9858166481687015

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```
Requirement already satisfied: importlib-metadata in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from ibm-watson-machine-learning) (4.0.2)
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: tabulate in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from ibm-watson-machine-learning) (0.8.9)
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: 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: urllib3 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from ibm-watson-machine-learning) (1.26.7)
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: 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: 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)
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==2.11.*->ibm-watson-machine-learning) (2.11.0)
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==2.11.*->ibm-watson-machine-learning) (2.11.0)
Requirement already satisfied: python-dateutil<3.0.0,>=2.1 in /opt/conda/envs/Python-3.9/lib/python3.9/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>=2017.3 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from pandas<1.5.0,>=0.24.2->ibm-watson-machine-learning) (2021.3)
Requirement already satisfied: numpy>=1.17.3 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from pandas<1.5.0,>=0.24.2->ibm-watson-machine-learning) (1.20.3)
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->ibm-cos-sdk-core==2.11.0->ibm-cos-sdk==2.11.*->ibm-watson-machine-learning) (1.15.0)
Requirement already satisfied: idna<4,>=2.5 in /opt/conda/envs/Python-3.9/lib/python3.9/site-packages (from requests->ibm-watson-machine-learning) (3.2)
```

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In [4]: import json

In [5]: import numpy as np

In [6]: wml_cred={
"apikey": "4f3bepuok7oC01UkeKU831Sq5rz5-JP0R_hlJeB2oaEL",
"url": "https://us-south.ml.cloud.ibm.com"
}

In [7]: wml_clients=APIClient(wml_cred)

In [8]: wml_clients.spaces.list()

Note: 'limit' is not provided. Only first 50 records will be displayed if the number of records exceed 50

ID	NAME	CREATED
deaaa6e0-4843-467d-94d8-71d0272de83b	flight delay	2022-11-10T16:39:49.137Z
875c75d7-ca1d-4cd4-9b2b-7cb88af3e2f8	flight delay analysis	2022-11-10T16:38:09.154Z

In [9]: space_id="deaaa6e0-4843-467d-94d8-71d0272de83b"

In [10]: wml_clients.get_default_space(space_id)

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IAM-enabled
Service Endpoint
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Plan	Features	Pricing
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Watson Machine Learning Free

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Plan: Lite

Service name: Watson Machine Learning-hh

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