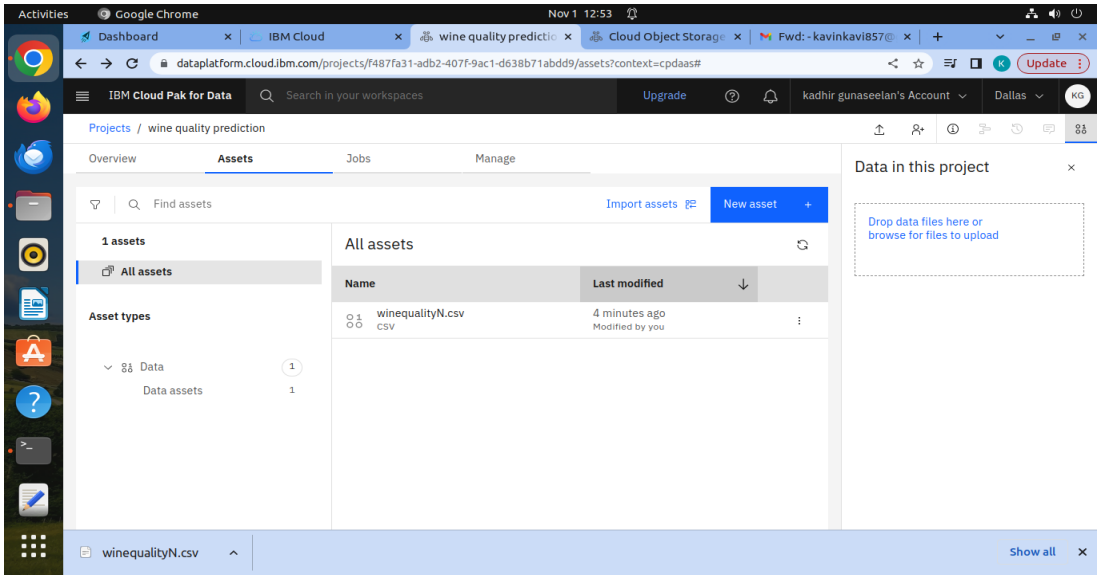
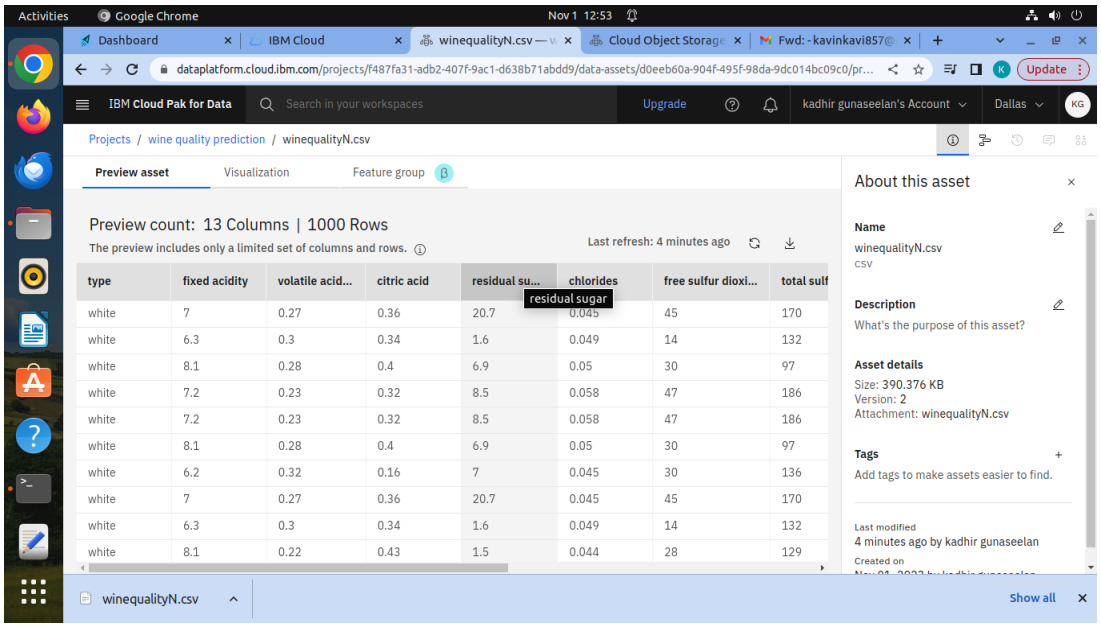
Development phase - 1

Machine learning model deployment using IBM Watson Studio

Wine quality prediction

Here we will predict the quality of wine on the basis of given features. We use the wine quality dataset available .This dataset has the fundamental features which are responsible for affecting the quality of the wine. By the use of several Machine learning models, we will predict the quality of the wine.





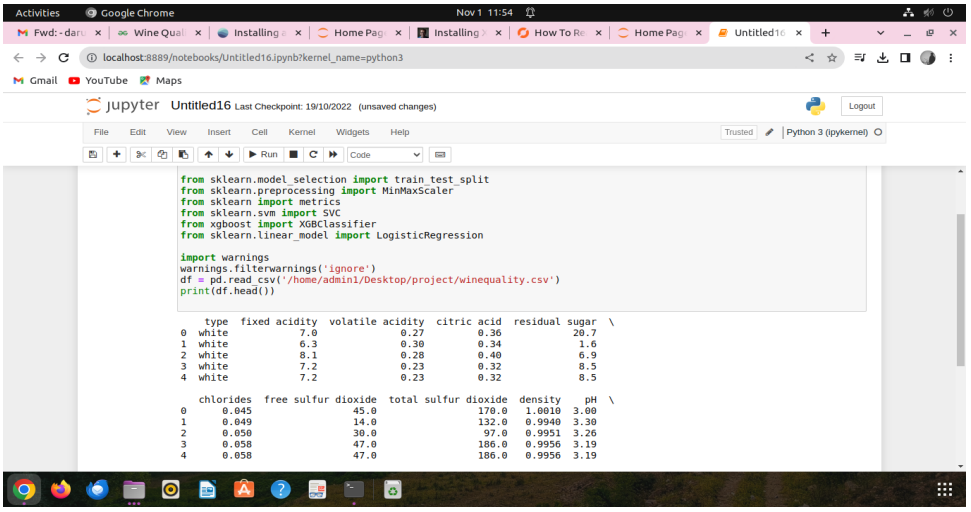
type	fixed acidity	volatile acid...	citric acid	residual su...	chlorides	free sulfur dioxi...	total sulf
white	7	0.27	0.36	20.7	0.045	45	170
white	6.3	0.3	0.34	1.6	0.049	14	132
white	8.1	0.28	0.4	6.9	0.05	30	97
white	7.2	0.23	0.32	8.5	0.058	47	186
white	7.2	0.23	0.32	8.5	0.058	47	186
white	8.1	0.28	0.4	6.9	0.05	30	97
white	6.2	0.32	0.16	7	0.045	30	136
white	7	0.27	0.36	20.7	0.045	45	170
white	6.3	0.3	0.34	1.6	0.049	14	132
white	8.1	0.22	0.43	1.5	0.044	28	129

Importing libraries and Dataset:

- **Pandas** is a useful library in data handling.
- **Numpy** library used for working with arrays.
- **Seaborn/Matplotlib** are used for data visualisation purposes.
- Sklearn – This module contains multiple libraries having pre-implemented functions to perform tasks from data preprocessing to model development and evaluation.
- **XGBoost** – This contains the eXtreme Gradient Boosting machine learning algorithm which is one of the algorithms which helps us to achieve high accuracy on prediction.

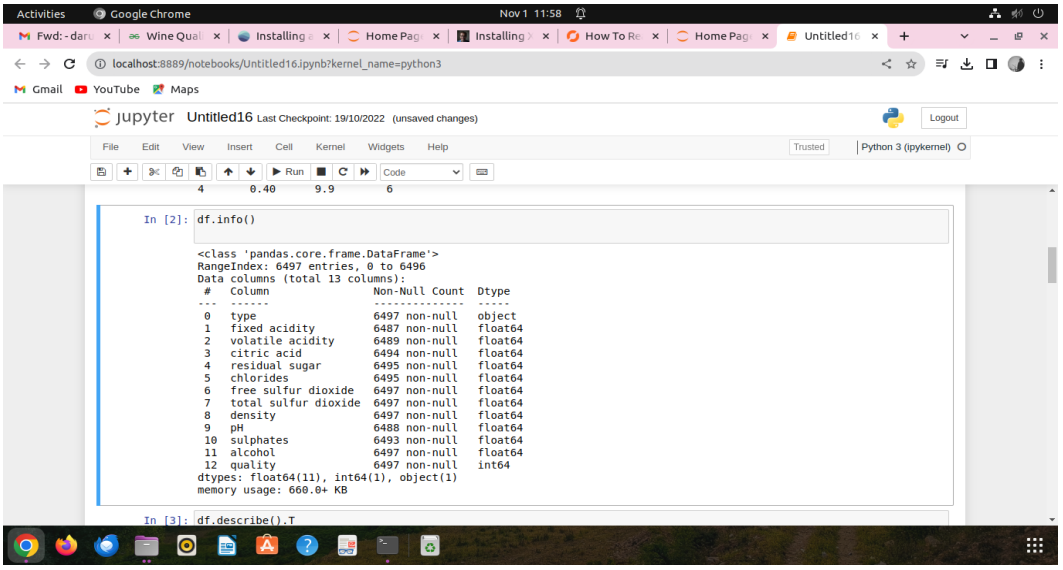
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sb

from sklearn.model_selection import train_test_split
from sklearn.preprocessing import MinMaxScaler
from sklearn import metrics
from sklearn.svm import SVC
from xgboost import XGBClassifier
from sklearn.linear_model import LogisticRegression

import warnings
warnings.filterwarnings('ignore')
```

Now let's look at the first five rows of the dataset.



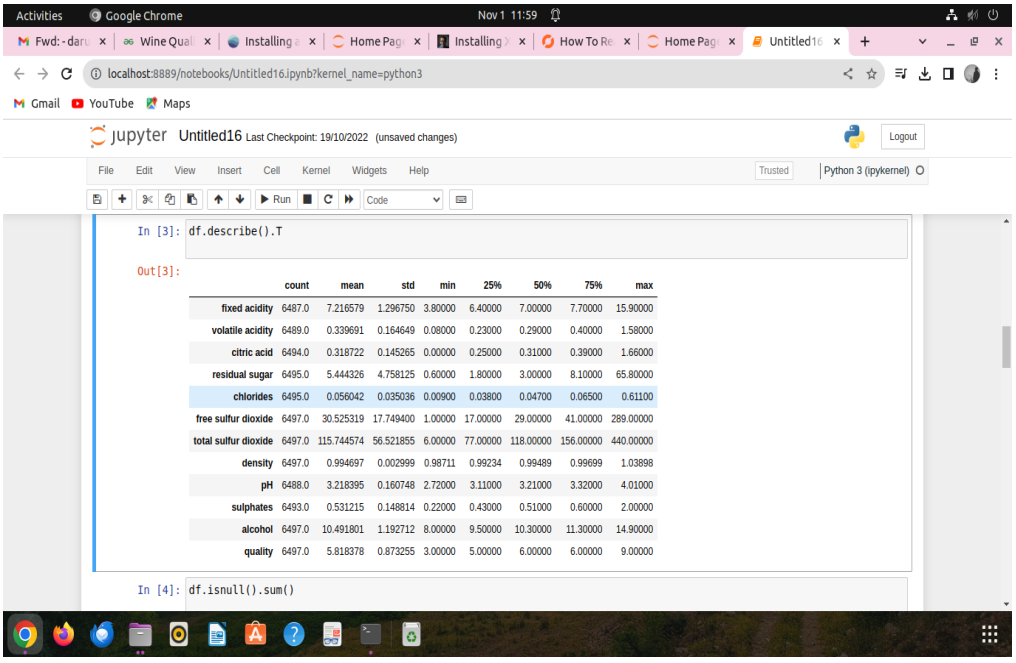
Let’s explore the type of data present in each of the columns present in the dataset.

```
df = pd.read_csv('winequality.csv')
print(df.head())
```



Now we’ll explore the descriptive statistical measures of the dataset.

df.describe().T



	count	mean	std	min	25%	50%	75%	max
fixed acidity	6487.0	7.216579	1.296750	3.80000	6.40000	7.00000	7.70000	15.90000
volatile acidity	6489.0	0.339691	0.164649	0.08000	0.23000	0.29000	0.40000	1.58000
citric acid	6494.0	0.318722	0.145265	0.00000	0.25000	0.31000	0.39000	1.66000
residual sugar	6495.0	5.444326	4.758125	0.60000	1.80000	3.00000	8.10000	65.80000
chlorides	6495.0	0.056042	0.035036	0.00900	0.03800	0.04700	0.06500	0.61100
free sulfur dioxide	6497.0	30.525319	17.749400	1.00000	17.00000	29.00000	41.00000	289.00000
total sulfur dioxide	6497.0	115.744574	56.521855	6.00000	77.00000	118.00000	156.00000	440.00000
density	6497.0	0.994697	0.002999	0.98711	0.99234	0.99489	0.99699	1.03898
pH	6488.0	3.218395	0.160748	2.72000	3.11000	3.21000	3.32000	4.01000
sulphates	6493.0	0.531215	0.148814	0.22000	0.43000	0.51000	0.60000	2.00000
alcohol	6497.0	10.491801	1.192712	8.00000	9.50000	10.30000	11.30000	14.90000
quality	6497.0	5.818378	0.873255	3.00000	5.00000	6.00000	6.00000	9.00000