applied-datascience-phase-3

October 17, 2023

1 Date - 17/10/2023

2 Team ID - 3872

3 Project Title - Product Demand Prediction using ML

4 Importing Dependencies

[2]:
```
import pandas as pd
import numpy as np
import seaborn as sns
import plotly.express as px
import matplotlib.pyplot as plt
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler
from sklearn.metrics import r2_score, mean_absolute_error,mean_squared_error
from sklearn.linear_model import LinearRegression
from sklearn.linear_model import Lasso
from sklearn.ensemble import RandomForestRegressor
from sklearn.svm import SVR
```

5 Loading Dataset

[3]:
```
dataset = pd.read_excel("F:\\PoductDemand.xlsx")
```

6 Data Exploration

[4]:
```
dataset
```

[4]:

	ID	Store ID	Total Price	Base Price	Units Sold
0	1	8091	99.0375	111.8625	20
1	2	8091	99.0375	99.0375	28
2	3	8091	133.9500	133.9500	19
3	4	8091	133.9500	133.9500	44
4	5	8091	141.0750	141.0750	52

```
…         …       …           …           …           …
150145  212638      9984     235.8375    235.8375          38
150146  212639      9984     235.8375    235.8375          30
150147  212642      9984     357.6750    483.7875          31
150148  212643      9984     141.7875    191.6625          12
150149  212644      9984     234.4125    234.4125          15

[150150 rows x 5 columns]
```

[5]:
```
dataset.columns
```

[5]:
```
Index(['ID', 'Store ID', 'Total Price', 'Base Price', 'Units Sold'],
dtype='object')
```

[6]:
```
dataset.describe()
```

[6]:
```
                  ID       Store ID    Total Price     Base Price  \
count  150150.000000  150150.000000  150149.000000  150150.000000
mean   106271.555504    9199.422511     206.626751     219.425927
std     61386.037861     615.591445     103.308516     110.961712
min         1.000000    8023.000000      41.325000      61.275000
25%     53111.250000    8562.000000     130.387500     133.237500
50%    106226.500000    9371.000000     198.075000     205.912500
75%    159452.750000    9731.000000     233.700000     234.412500
max    212644.000000    9984.000000     562.162500     562.162500

          Units Sold
count  150150.000000
mean       51.674206
std        60.207904
min         1.000000
25%        20.000000
50%        35.000000
75%        62.000000
max      2876.000000
```

[7]:
```
dataset.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 150150 entries, 0 to 150149
Data columns (total 5 columns):
 #   Column       Non-Null Count   Dtype
---  ------       --------------   -----
 0   ID           150150 non-null  int64
 1   Store ID     150150 non-null  int64
 2   Total Price  150149 non-null  float64
 3   Base Price   150150 non-null  float64
```

```
 4   Units Sold   150150 non-null  int64
dtypes: float64(2), int64(3)
memory usage: 5.7 MB
```

7 Cleaning

[8]:
```
dataset.isnull().sum()
```

[8]:
```
ID             0
Store ID       0
Total Price    1
Base Price     0
Units Sold     0
dtype: int64
```

[9]:
```
a=dataset['Total Price'].agg([np.mean])
a
```

[9]:
```
mean    206.626751
Name: Total Price, dtype: float64
```

[10]:
```
dataset.replace(np.NaN,206.626751,inplace=True)
```

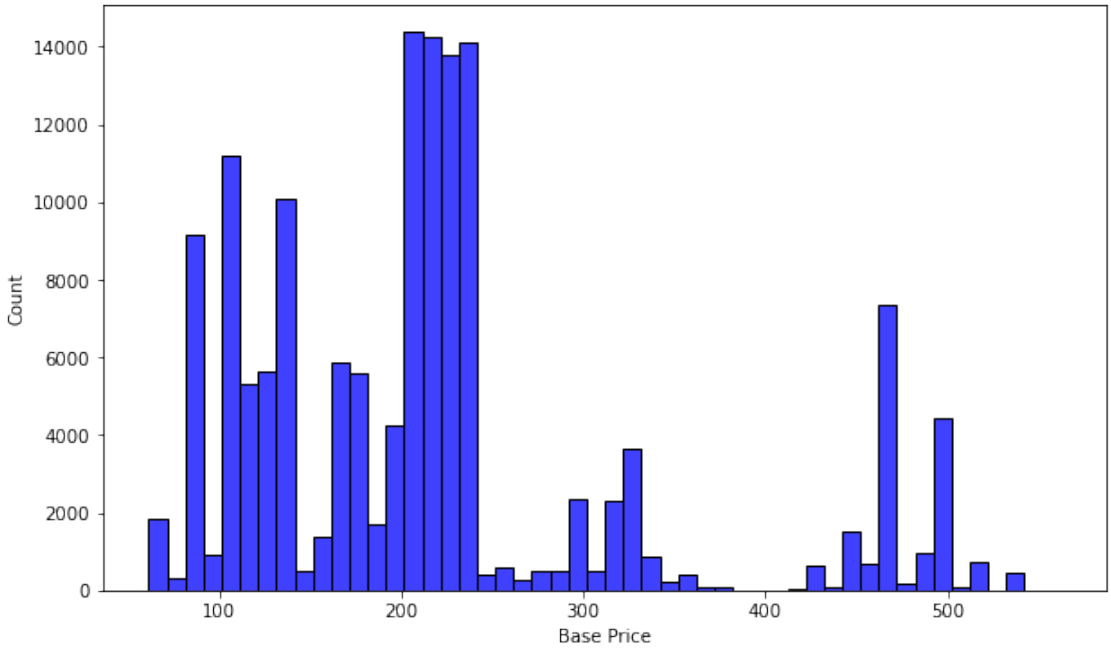
[11]:
```
dataset.isnull().sum()
```

[11]:
```
ID             0
Store ID       0
Total Price    0
Base Price     0
Units Sold     0
dtype: int64
```

8 Pre-Processing and Visualisation of Data

[12]:
```
plt.figure(figsize=(10,6))
sns.histplot(dataset, x='Base Price', bins=50, color='blue')
```

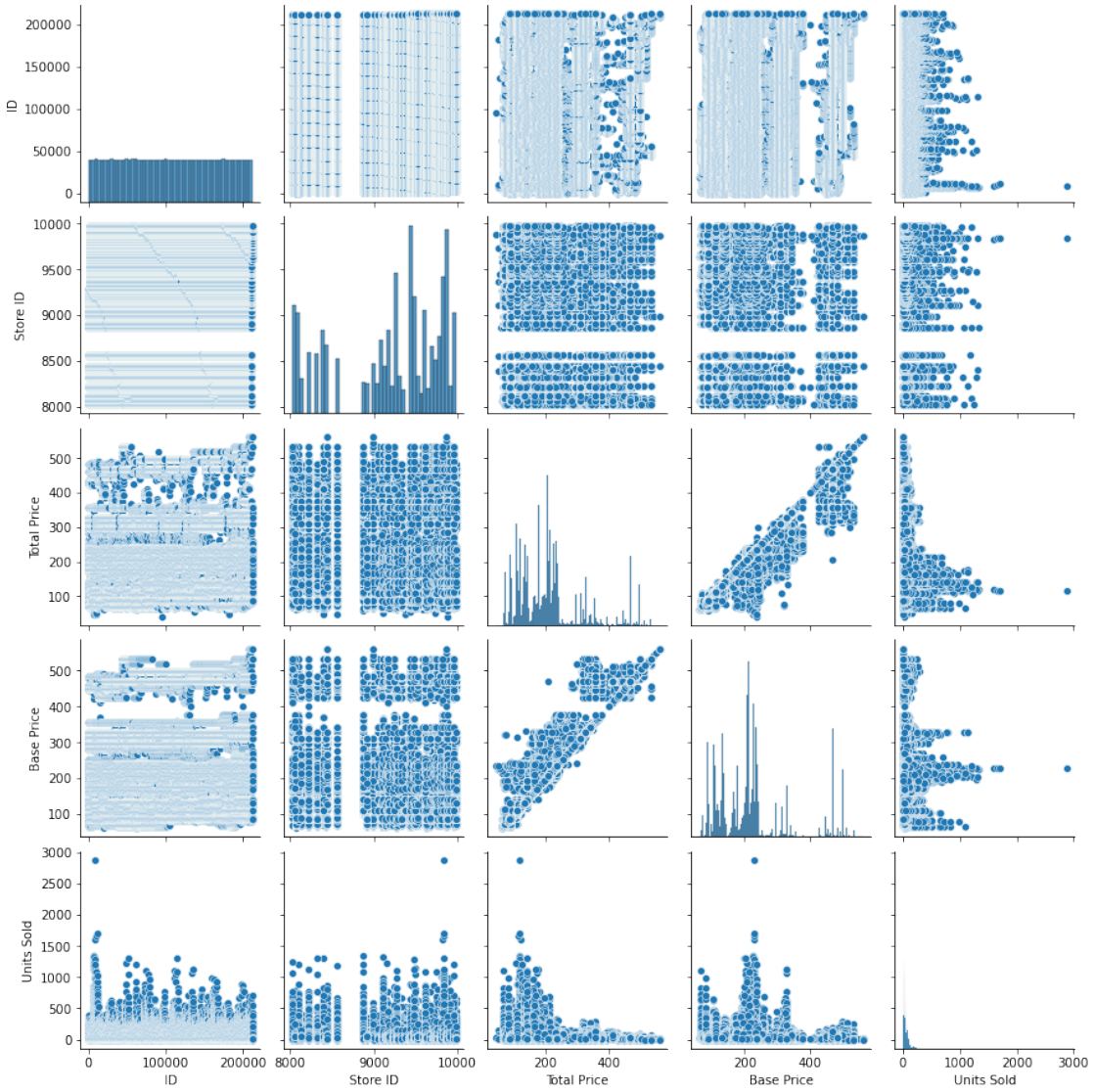
[12]:
```
<AxesSubplot:xlabel='Base Price', ylabel='Count'>
```



[13]:
```
plt.figure(figsize=(11,7))
sns.pairplot(dataset)
```

[13]: <seaborn.axisgrid.PairGrid at 0x151a9ef3a00>

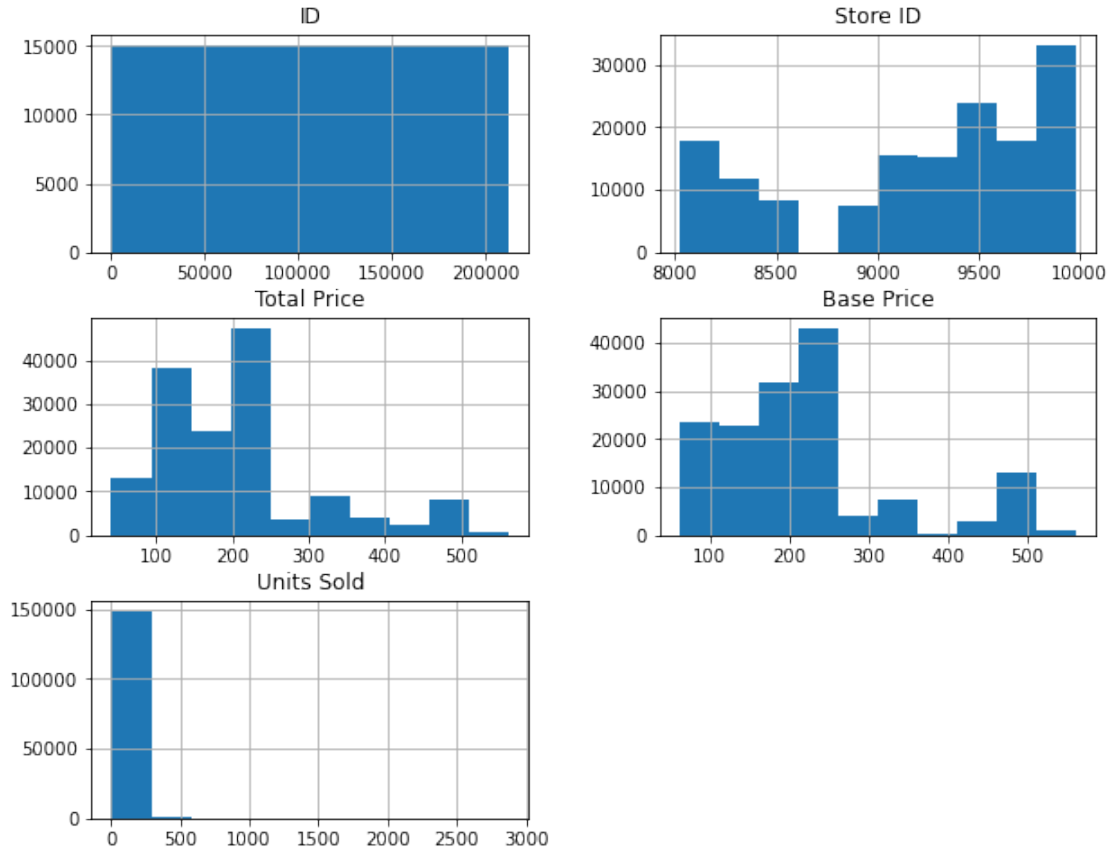
<Figure size 792x504 with 0 Axes>



[14]:
```
fig=px.scatter(dataset,x="Units Sold",y="Total Price",size="Units Sold")
fig.show()
```

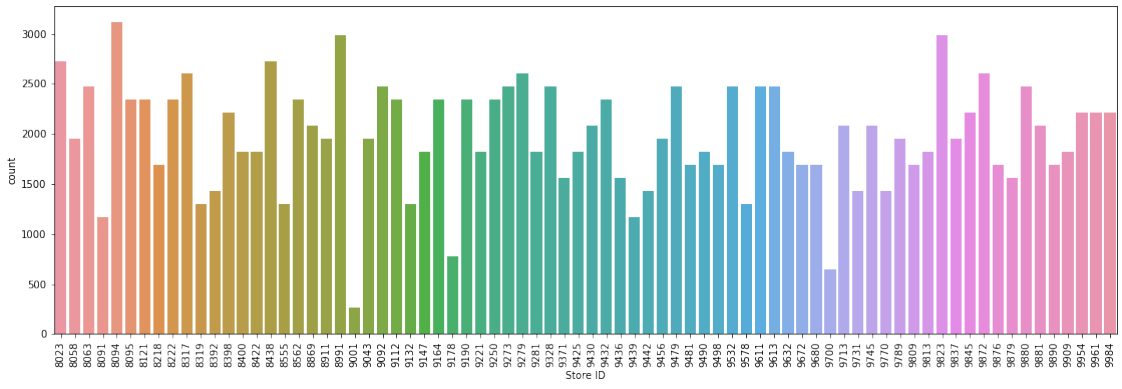
[15]:
```
dataset.hist(figsize=(10,8))
```

[15]:
```
array([[<AxesSubplot:title={'center':'ID'}>,
        <AxesSubplot:title={'center':'Store ID'}>],
       [<AxesSubplot:title={'center':'Total Price'}>,
        <AxesSubplot:title={'center':'Base Price'}>],
       [<AxesSubplot:title={'center':'Units Sold'}>, <AxesSubplot:>]],
      dtype=object)
```

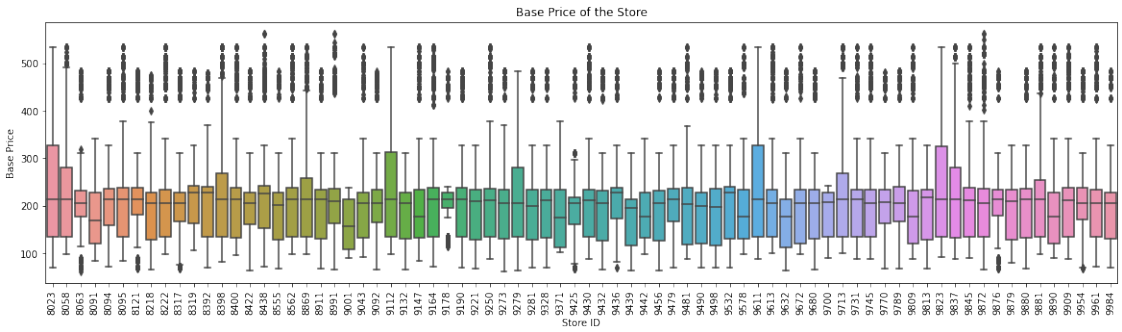


[16]:
```
plt.figure(figsize=(19,6))
plt.xticks(rotation=90)
sns.countplot(x = 'Store ID', data = dataset)
```

[16]: <AxesSubplot:xlabel='Store ID', ylabel='count'>



[17]:
```
fig, ax = plt.subplots(figsize=(20, 5))
plt.xticks(rotation=90)
sns.boxplot(data=dataset, x='Store ID', y='Base Price')
ax.set_title('Base Price of the Store')
plt.show()
```

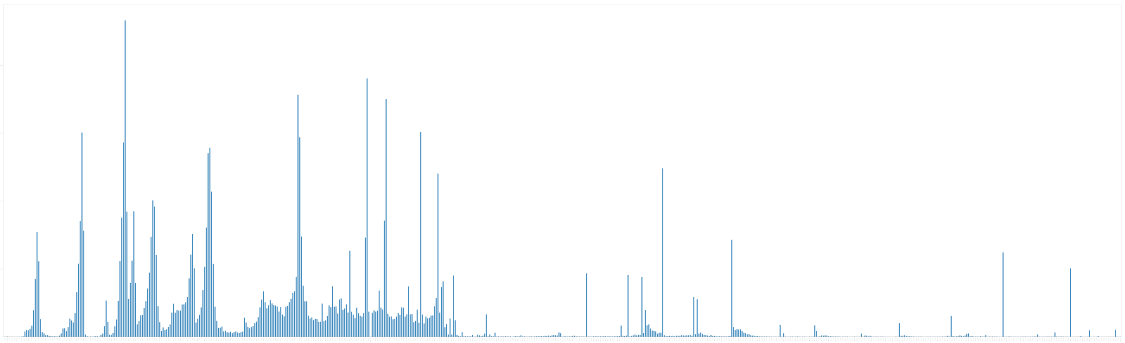


[18]:
```
a1 = dataset.groupby('Total Price')['Units Sold'].sum()
a1
```

[18]:
```
Total Price
41.3250       24
48.4500       95
49.1625      236
52.7250       18
57.0000       91
             ...
528.6750      31
533.6625    5213
542.9250       4
550.0500      10
562.1625      43
Name: Units Sold, Length: 647, dtype: int64
```

[19]:
```
plt.figure(figsize=(250,76))
plt.xticks(rotation=90)
a1.plot(kind = 'bar', ylabel = 'Sum of the demand' )
```

[19]:
```
<AxesSubplot:xlabel='Total Price', ylabel='Sum of the demand'>
```



9 Visualising Correlation

[20]:
```
plt.figure(figsize=(10,5))
sns.heatmap(dataset.corr(), annot=True)
```

[20]: <AxesSubplot:>

[ ]: