In [1]:

```python
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
%matplotlib inline
```

Load the Nifty50 data - Past 10 years- Daily data

In [2]:

```python
df_Nifty = pd.read_csv('NIFTY 50_Data.csv')
```

In [3]:

```python
df_Nifty.head()
```

Out[3]:

	Date	Open	High	Low	Close
0	30 Oct 2020	11678.45	11748.95	11535.45	11642.40
1	29 Oct 2020	11633.30	11744.15	11606.45	11670.80
2	28 Oct 2020	11922.60	11929.40	11684.85	11729.60
3	27 Oct 2020	11807.10	11899.05	11723.00	11889.40
4	26 Oct 2020	11937.40	11942.85	11711.70	11767.75

In [4]:

```python
df_Nifty.tail()
```

Out[4]:

	Date	Open	High	Low	Close
2682	08 Jan 2010	5264.25	5276.75	5234.70	5244.75
2683	07 Jan 2010	5281.80	5302.55	5244.75	5263.10
2684	06 Jan 2010	5278.15	5310.85	5260.05	5281.80
2685	05 Jan 2010	5277.15	5288.35	5242.40	5277.90
2686	04 Jan 2010	5200.90	5238.45	5167.10	5232.20

In [5]:

```
df_Nifty.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 2687 entries, 0 to 2686
Data columns (total 5 columns):
Date     2687 non-null object
Open     2687 non-null float64
High     2687 non-null float64
Low      2687 non-null float64
Close    2687 non-null float64
dtypes: float64(4), object(1)
memory usage: 105.0+ KB
```

In [6]:

```
df_Nifty.shape
```

Out[6]:

```
(2687, 5)
```

In [7]:

```
# Count of missing values from all columns
df_Nifty.isna().sum()
```

Out[7]:

```
Date     0
Open     0
High     0
Low      0
Close    0
dtype: int64
```

In [8]:

```
df_Nifty.describe()
```

Out[8]:

	Open	High	Low	Close
count	2687.000000	2687.000000	2687.000000	2687.000000
mean	7985.370153	8026.814700	7930.718143	7978.685709
std	2300.108222	2304.515287	2288.039456	2295.774054
min	4623.150000	4623.150000	4531.150000	4544.200000
25%	5744.250000	5781.875000	5691.800000	5741.375000
50%	7978.450000	8031.200000	7936.700000	7971.300000
75%	10176.125000	10225.925000	10120.175000	10160.975000
max	12430.500000	12430.500000	12321.400000	12362.300000

In [9]:

```
df_Nifty.describe(include = 'all')
```

Out[9]:

	Date	Open	High	Low	Close
count	2687	2687.000000	2687.000000	2687.000000	2687.000000
unique	2687	NaN	NaN	NaN	NaN
top	08 Apr 2016	NaN	NaN	NaN	NaN
freq	1	NaN	NaN	NaN	NaN
mean	NaN	7985.370153	8026.814700	7930.718143	7978.685709
std	NaN	2300.108222	2304.515287	2288.039456	2295.774054
min	NaN	4623.150000	4623.150000	4531.150000	4544.200000
25%	NaN	5744.250000	5781.875000	5691.800000	5741.375000
50%	NaN	7978.450000	8031.200000	7936.700000	7971.300000
75%	NaN	10176.125000	10225.925000	10120.175000	10160.975000
max	NaN	12430.500000	12430.500000	12321.400000	12362.300000

In [10]:

```
df_Nifty.columns
```

Out[10]:

```
Index(['Date', 'Open', 'High', 'Low', 'Close'], dtype='object')
```

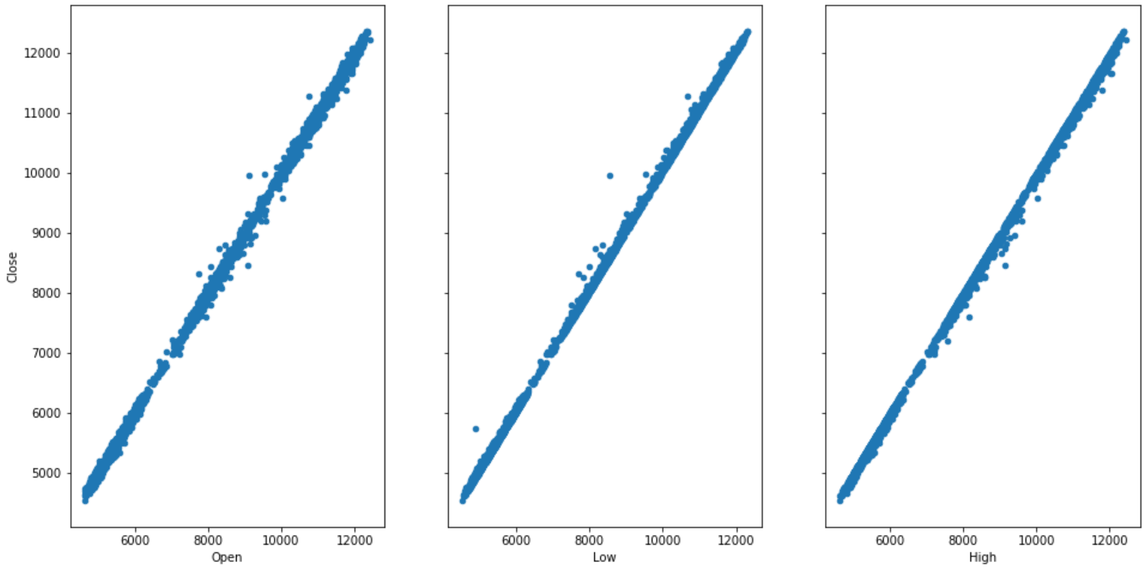
Exploratory Data Analysis

In [11]:

```
# visualize the relationship between the features and the response usin
fig, axs = plt.subplots(1, 3, sharey=True)
df_Nifty.plot(kind='scatter', x='Open', y='Close', ax=axs[0], figsize=(
df_Nifty.plot(kind='scatter', x='Low', y='Close', ax=axs[1])
df_Nifty.plot(kind='scatter', x='High', y='Close', ax=axs[2])
```

Out[11]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x46635727b8>
```

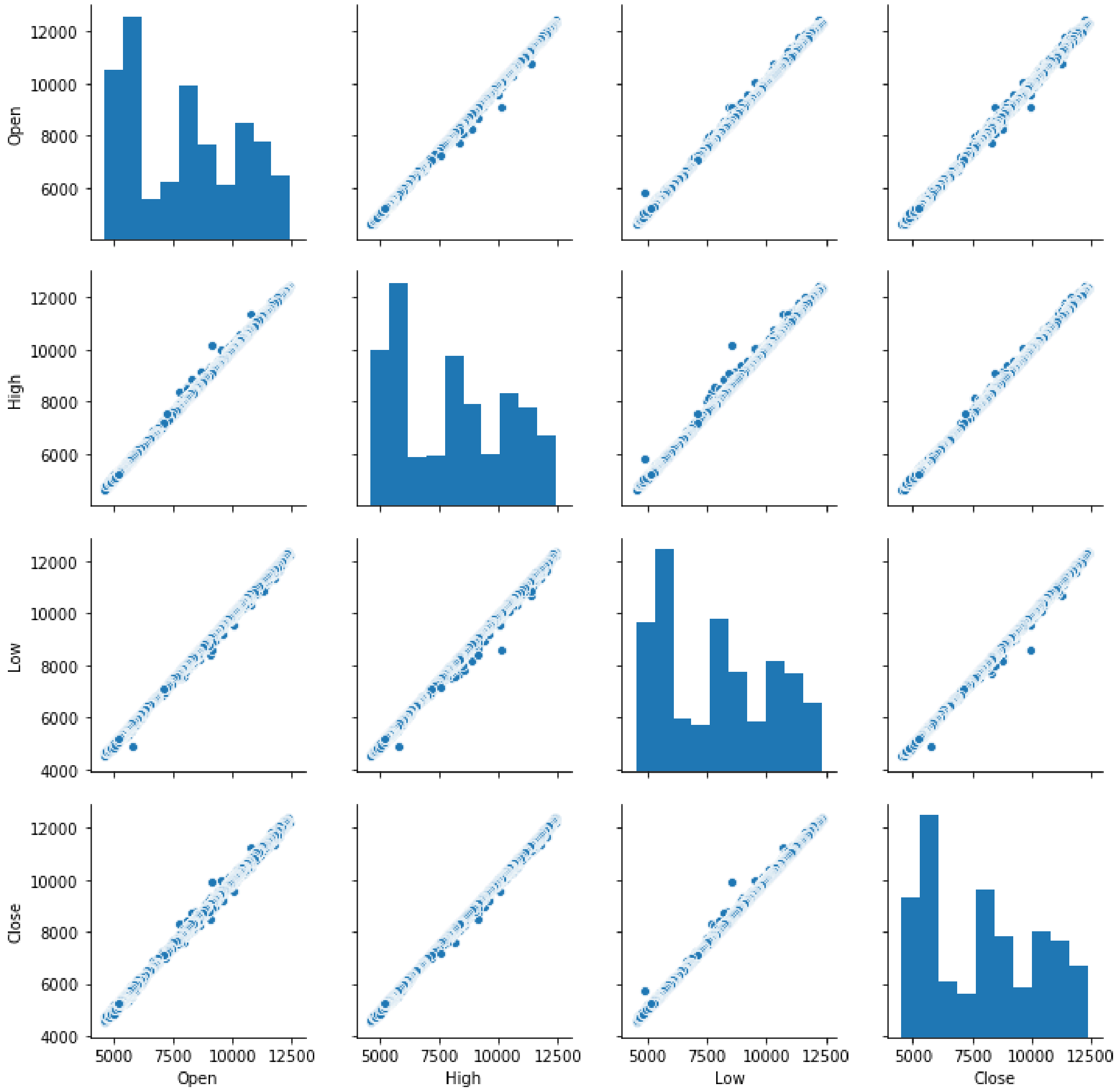


In [12]:

```
sns.pairplot(df_Nifty)
```

Out[12]:

```
<seaborn.axisgrid.PairGrid at 0x4663680f98>
```

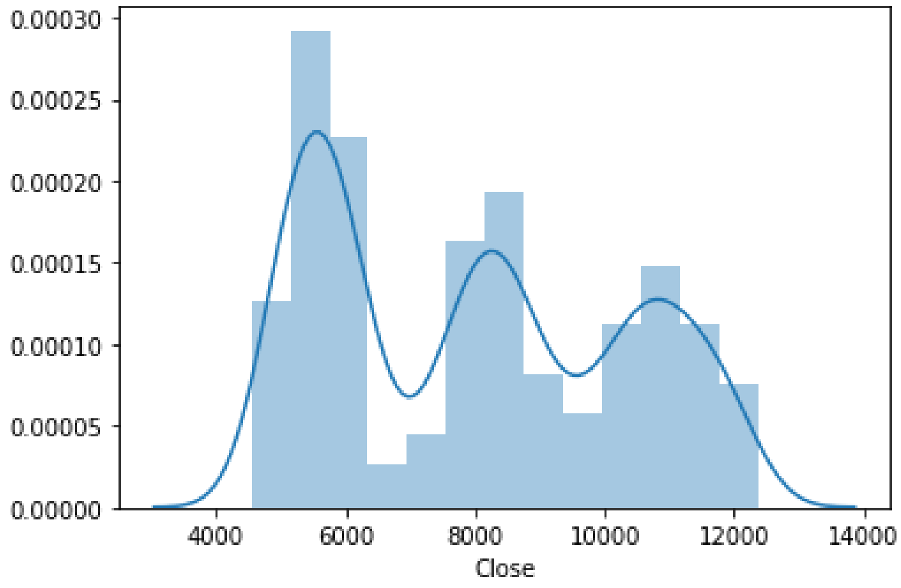


In [13]:

```
sns.distplot(df_Nifty['Close'])
```

Out[13]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x46640bd8d0>
```

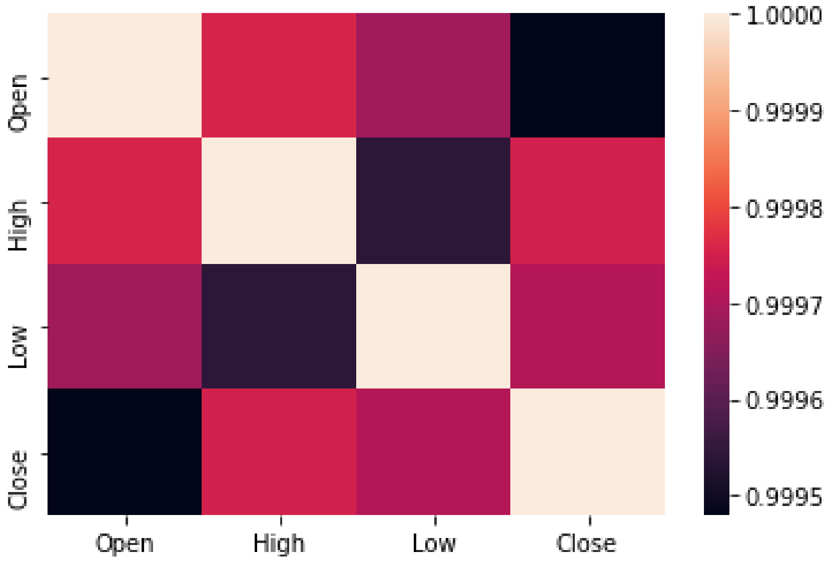


In [14]:

```
sns.heatmap(df_Nifty.corr())
```

Out[14]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x46649f1a58>
```



Training using Linear Regression Model

Inputs: Open, Low and High of Nifty50 daily data

Inputs: Open, Low and High of Nifty50 daily data
Output: Predict the Close price (End of the day)

In [15]:

```
X = df_Nifty[['Open', 'High', 'Low']]
y = df_Nifty['Close']
```

Train Test Split

In [16]:

```
from sklearn.model_selection import train_test_split
```

In [17]:

```
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.3
```

Creating and Training the Model

In [18]:

```
from sklearn.linear_model import LinearRegression
```

In [19]:

```
nifty50_lr_model = LinearRegression()
```

In [20]:

```
nifty50_lr_model.fit(X_train,y_train)
```

Out[20]:

```
LinearRegression(copy_X=True, fit_intercept=True, n_jobs=None, normalize=False)
```

Model Evaluation

Evaluating our Nifty50 Linear Regression Model

In [21]:

```
# print the intercept (c)
print(nifty50_lr_model.intercept_)
```

```
-2.89305668014822
```

In [22]:

```
# Print the Coefficients (m)
coeff_df = pd.DataFrame(nifty50_lr_model.coef_,X.columns,columns=['Coef
coeff_df
```

Out[22]:

	Coefficient
Open	-0.630189
High	0.871684
Low	0.758666

Predictions from our Nifty50_Linear_Regression _model

In [23]:

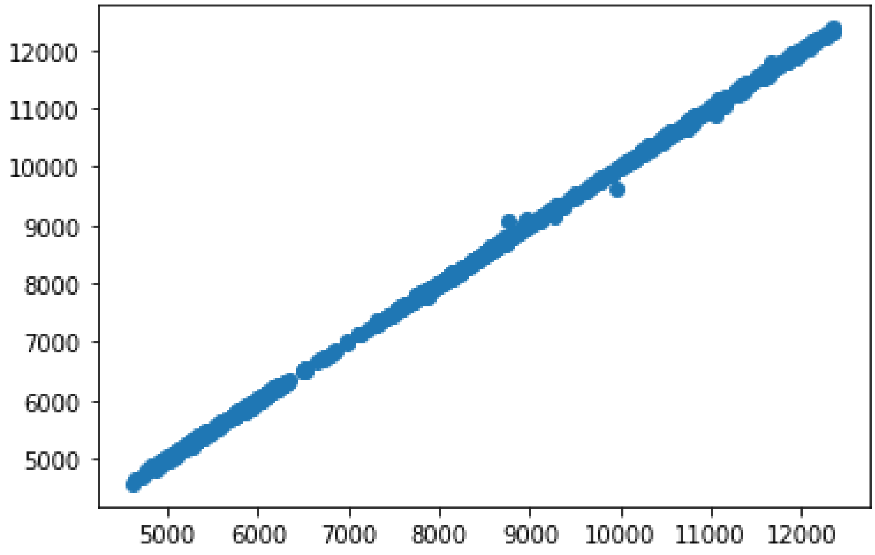
```
predictions = nifty50_lr_model.predict(X_test)
```

In [24]:

```
plt.scatter(y_test,predictions)
```

Out[24]:

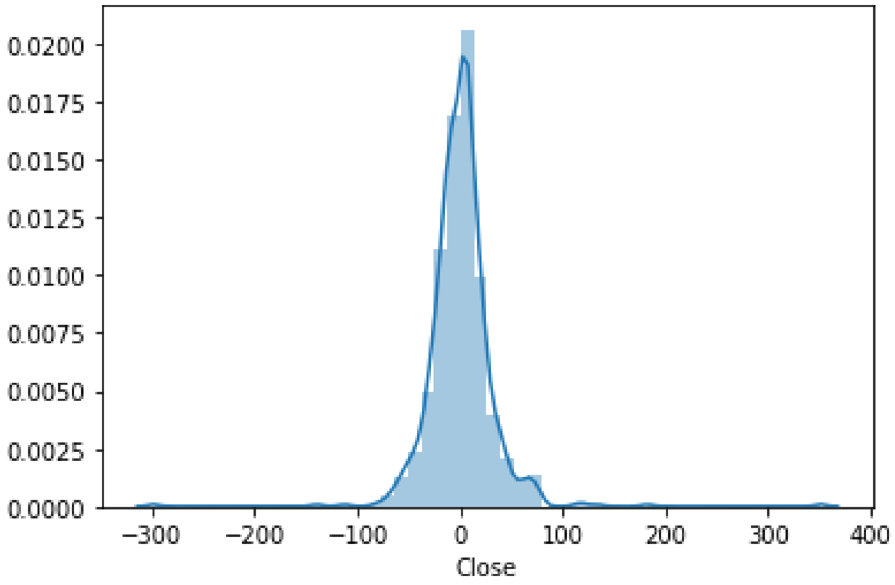
```
<matplotlib.collections.PathCollection at 0x46660854a8>
```



Residual Histogram

In [25]:

```
sns.distplot((y_test-predictions),bins=50);
```



Metrics and Accuracy

In [26]:

```
from sklearn import metrics
```

In [27]:

```
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: 19.89725567309226
MSE: 990.6229052969499
RMSE: 31.474162503503567
```

In [28]:

```
# Let's create a DataFrame since the model expects it
# Consider we predict for next day Close value of Nifty50 using below i
X_new = pd.DataFrame({'Open': [11642.4], 'Low': [11450], 'High': [11657
X_new.head()
```

Out[28]:

	Open	Low	High
0	11642.4	11450	11657

In [29]:

```
# Using the Nifty50 Linear Regression Model
# To make predictions for the above inputs
print('Nifty50 Close : ', nifty50_lr_model.predict(X_new))
```

```
Nifty50 Close :  [11484.75287719]
```

In [30]:

```
# print the score of the model
nifty50_lr_model.score(X_test, y_test)
```

Out[30]:

```
0.9998151322971077
```

In [31]:

```
print('Score of Nifty50 Model: ' ,nifty50_lr_model.score(X_test, y_test
```

```
Score of Nifty50 Model:  99.98151322971077 %
```