Dataset

Loading the Dataset:

```
import pandas as pd

# Read the individual CSV files
btc_df = pd.read_csv("https://raw.githubusercontent.com/Amarpreet3/CIND-820-CAPSTONE/main/Dataset/coin_Bitcoin.csv")
eth_df = pd.read_csv("https://raw.githubusercontent.com/Amarpreet3/CIND-820-CAPSTONE/main/Dataset/coin_Ethereum.csv")
xrp_df = pd.read_csv("https://raw.githubusercontent.com/Amarpreet3/CIND-820-CAPSTONE/main/Dataset/coin_XRP.csv")
ltc_df = pd.read_csv("https://raw.githubusercontent.com/Amarpreet3/CIND-820-CAPSTONE/main/Dataset/coin_Litecoin.csv")
usdc_df = pd.read_csv("https://raw.githubusercontent.com/Amarpreet3/CIND-820-CAPSTONE/main/Dataset/coin_USDCoin.csv")

# Concatenate the datasets vertically
df = pd.concat([btc_df, eth_df, xrp_df, ltc_df, usdc_df])

# Save the merged dataset to a new CSV file
df.to_csv("cryptocurrency.csv", index=False)


```

EDA

Loading packages

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
from sklearn import preprocessing
from sklearn import tree
from sklearn.metrics import confusion_matrix
from sklearn.model_selection import train_test_split
from sklearn.metrics import confusion_matrix, classification_report
from sklearn import metrics
import seaborn as sns
%matplotlib inline
```

```
import sys
!{sys.executable} -m pip install -U pandas-profiling
!jupyter nbextension enable --py widgetsnbextension
!pip install matplotlib
!pip install graphviz
```

```
Looking in indexes: https://pypi.org/simple, https://us-python.pkg.dev/colab-wheels/public/simple/
Collecting pandas-profiling
  Downloading pandas_profiling-3.6.6-py2.py3-none-any.whl (324 kB)
     ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 324.4/324.4 kB 5.8 MB/s eta 0:00:00
Collecting ydata-profiling (from pandas-profiling)
  Downloading ydata_profiling-4.2.0-py2.py3-none-any.whl (352 kB)
     ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 352.3/352.3 kB 11.2 MB/s eta 0:00:00
Requirement already satisfied: scipy<1.11,>=1.4.1 in /usr/local/lib/python3.10/dist-packages (from ydata-profiling->pandas-profiling
Requirement already satisfied: pandas!=1.4.0,<2,>1.1 in /usr/local/lib/python3.10/dist-packages (from ydata-profiling->pandas-profil
Requirement already satisfied: matplotlib<4,>=3.2 in /usr/local/lib/python3.10/dist-packages (from ydata-profiling->pandas-profiling
Requirement already satisfied: pydantic<2,>=1.8.1 in /usr/local/lib/python3.10/dist-packages (from ydata-profiling->pandas-profiling
Requirement already satisfied: PyYAML<6.1,>=5.0.0 in /usr/local/lib/python3.10/dist-packages (from ydata-profiling->pandas-profiling
Requirement already satisfied: jinja2<3.2,>=2.11.1 in /usr/local/lib/python3.10/dist-packages (from ydata-profiling->pandas-profilin
Collecting visions[type_image_path]==0.7.5 (from ydata-profiling->pandas-profiling)
  Downloading visions-0.7.5-py3-none-any.whl (102 kB)
     ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 102.7/102.7 kB 8.3 MB/s eta 0:00:00
Requirement already satisfied: numpy<1.24,>=1.16.0 in /usr/local/lib/python3.10/dist-packages (from ydata-profiling->pandas-profilin
Collecting htmlmin==0.1.12 (from ydata-profiling->pandas-profiling)
  Downloading htmlmin-0.1.12.tar.gz (19 kB)
  Preparing metadata (setup.py) ... done
Collecting phik<0.13,>=0.11.1 (from ydata-profiling->pandas-profiling)
  Downloading phik-0.12.3-cp310-cp310-manylinux_2_17_x86_64.manylinux2014_x86_64.whl (679 kB)
     ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 679.5/679.5 kB 20.3 MB/s eta 0:00:00
Requirement already satisfied: requests<3,>=2.24.0 in /usr/local/lib/python3.10/dist-packages (from ydata-profiling->pandas-profilin
Requirement already satisfied: tqdm<5,>=4.48.2 in /usr/local/lib/python3.10/dist-packages (from ydata-profiling->pandas-profiling) (4
```

```
Requirement already satisfied: seaborn<0.13,>=0.10.1 in /usr/local/lib/python3.10/dist-packages (from ydata-profiling->pandas-profil
Collecting multimethod<2,>=1.4 (from ydata-profiling->pandas-profiling)
  Downloading multimethod-1.9.1-py3-none-any.whl (10 kB)
Requirement already satisfied: statsmodels<1,>=0.13.2 in /usr/local/lib/python3.10/dist-packages (from ydata-profiling->pandas-profi
Collecting typeguard<3,>=2.13.2 (from ydata-profiling->pandas-profiling)
  Downloading typeguard-2.13.3-py3-none-any.whl (17 kB)
Collecting imagehash==4.3.1 (from ydata-profiling->pandas-profiling)
  Downloading ImageHash-4.3.1-py2.py3-none-any.whl (296 kB)
     ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 296.5/296.5 kB 23.9 MB/s eta 0:00:00
Collecting wordcloud>=1.9.1 (from ydata-profiling->pandas-profiling)
  Downloading wordcloud-1.9.2-cp310-cp310-manylinux_2_17_x86_64.manylinux2014_x86_64.whl (455 kB)
     ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 455.4/455.4 kB 28.0 MB/s eta 0:00:00
Collecting dacite>=1.8 (from ydata-profiling->pandas-profiling)
  Downloading dacite-1.8.1-py3-none-any.whl (14 kB)
Requirement already satisfied: PyWavelets in /usr/local/lib/python3.10/dist-packages (from imagehash==4.3.1->ydata-profiling->pandas
Requirement already satisfied: pillow in /usr/local/lib/python3.10/dist-packages (from imagehash==4.3.1->ydata-profiling->pandas-pro
Requirement already satisfied: attrs>=19.3.0 in /usr/local/lib/python3.10/dist-packages (from visions[type_image_path]==0.7.5->ydata
Requirement already satisfied: networkx>=2.4 in /usr/local/lib/python3.10/dist-packages (from visions[type_image_path]==0.7.5->ydata
Collecting tangled-up-in-unicode>=0.0.4 (from visions[type_image_path]==0.7.5->ydata-profiling->pandas-profiling)
  Downloading tangled_up_in_unicode-0.2.0-py3-none-any.whl (4.7 MB)
     ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 4.7/4.7 MB 39.9 MB/s eta 0:00:00
Requirement already satisfied: MarkupSafe>=2.0 in /usr/local/lib/python3.10/dist-packages (from jinja2<3.2,>=2.11.1->ydata-profiling
Requirement already satisfied: contourpy>=1.0.1 in /usr/local/lib/python3.10/dist-packages (from matplotlib<4,>=3.2->ydata-profiling
Requirement already satisfied: cycler>=0.10 in /usr/local/lib/python3.10/dist-packages (from matplotlib<4,>=3.2->ydata-profiling->pa
Requirement already satisfied: fonttools>=4.22.0 in /usr/local/lib/python3.10/dist-packages (from matplotlib<4,>=3.2->ydata-profilin
Requirement already satisfied: kiwisolver>=1.0.1 in /usr/local/lib/python3.10/dist-packages (from matplotlib<4,>=3.2->ydata-profilin
Requirement already satisfied: packaging>=20.0 in /usr/local/lib/python3.10/dist-packages (from matplotlib<4,>=3.2->ydata-profiling-
Requirement already satisfied: pyparsing>=2.3.1 in /usr/local/lib/python3.10/dist-packages (from matplotlib<4,>=3.2->ydata-profiling
Requirement already satisfied: python-dateutil>=2.7 in /usr/local/lib/python3.10/dist-packages (from matplotlib<4,>=3.2->ydata-profi
Requirement already satisfied: pytz>=2020.1 in /usr/local/lib/python3.10/dist-packages (from pandas!=1.4.0,<2,>1.1->ydata-profiling-
Requirement already satisfied: joblib>=0.14.1 in /usr/local/lib/python3.10/dist-packages (from phik<0.13,>=0.11.1->ydata-profiling->
Requirement already satisfied: typing-extensions>=4.2.0 in /usr/local/lib/python3.10/dist-packages (from pydantic<2,>=1.8.1->ydata-p
```

Data Description

```
1 print(type(df))
```

```
<class 'pandas.core.frame.DataFrame'>
```

```
1 df.head()
```

	SNo	Name	Symbol	Date	High	Low	Open	Close	Volume	Marketcap
0	1	Bitcoin	BTC	2013-04-29 23:59:59	147.488007	134.000000	134.444000	144.539993	0.0	1.603769e+09
1	2	Bitcoin	BTC	2013-04-30 23:59:59	146.929993	134.050003	144.000000	139.000000	0.0	1.542813e+09
2	3	Bitcoin	BTC	2013-05-01 23:59:59	139.889999	107.720001	139.000000	116.989998	0.0	1.298955e+09
3	4	Bitcoin	BTC	2013-05-02 23:59:59	125.599998	92.281898	116.379997	105.209999	0.0	1.168517e+09
4	5	Bitcoin	BTC	2013-05-03 23:59:59	108.127998	79.099998	106.250000	97.750000	0.0	1.085995e+09

```
1 df.tail()
```

	SNo	Name	Symbol	Date	High	Low	Open	Close	Volume	Marketcap
997	998	USD Coin	USDC	2021-07-02 23:59:59	1.000916	0.999966	1.000177	1.000035	1.787896e+09	2.539775e+10
998	999	USD Coin	USDC	2021-07-03 23:59:59	1.000670	0.999925	1.000048	0.999984	1.491017e+09	2.550437e+10
999	1000	USD Coin	USDC	2021-07-04 23:59:59	1.000187	0.998901	0.999956	0.999500	1.578667e+09	2.551172e+10
1000	1001	USD Coin	USDC	2021-07-05 23:59:59	1.000839	0.999459	0.999565	1.000528	1.887496e+09	2.554724e+10
1001	1002	USD Coin	USDC	2021-07-06 23:59:59	1.000731	0.999662	1.000501	1.000059	2.312602e+09	2.567322e+10

```
1 df.Name.unique()
```

```
array(['Bitcoin', 'Ethereum', 'XRP', 'Litecoin', 'USD Coin'], dtype=object)
```

```
1 df.Symbol.unique()
```

```
array(['BTC', 'ETH', 'XRP', 'LTC', 'USDC'], dtype=object)
```

```
df.columns
```

```
Index(['SNo', 'Name', 'Symbol', 'Date', 'High', 'Low', 'Open', 'Close',
       'Volume', 'Marketcap'],
      dtype='object')
```

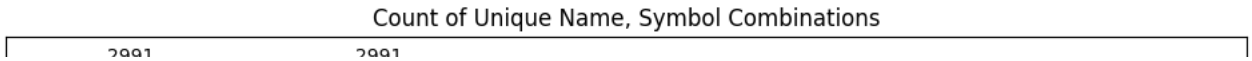
```
df[['Name', 'Symbol']].value_counts()
```

```
Name      Symbol
Bitcoin   BTC       2991
Litecoin  LTC       2991
XRP       XRP       2893
Ethereum  ETH       2160
USD Coin  USDC      1002
dtype: int64
```

```
df['Name'].value_counts()
```

```
Bitcoin     2991
Litecoin    2991
XRP         2893
Ethereum    2160
USD Coin    1002
Name: Name, dtype: int64
```

```
import matplotlib.pyplot as plt

counts = df[['Name', 'Symbol']].value_counts()

# Plotting the bar chart
plt.figure(figsize=(12, 6))
ax = counts.plot(kind='bar')
plt.xlabel('Name, Symbol')
plt.ylabel('Count')
plt.title('Count of Unique Name, Symbol Combinations')
plt.xticks(rotation=90)

# Labeling the height on top of each bar
for p in ax.patches:
    ax.annotate(str(p.get_height()), (p.get_x() + p.get_width() / 2, p.get_height()), ha='center', va='bottom')

plt.show()

```




```
1
2 print(df.dtypes)
```

```
SNo           int64
Name         object
Symbol       object
Date         object
High        float64
Low         float64
Open        float64
Close       float64
Volume      float64
Marketcap   float64
dtype: object
```

```
1
2 # Get the shape of the merged dataset
3 rows, columns = df.shape
4 print("Number of rows:", rows)
5 print("Number of columns:", columns)
```

```
Number of rows: 12037
Number of columns: 10
```

```
1 # Displaying the summary information
2 summary = df.info()
3 print(summary)
4
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 12037 entries, 0 to 1001
Data columns (total 10 columns):
 #   Column     Non-Null Count  Dtype
---  ------     --------------  -----
 0   SNo        12037 non-null  int64
 1   Name       12037 non-null  object
 2   Symbol     12037 non-null  object
 3   Date       12037 non-null  object
 4   High       12037 non-null  float64
 5   Low        12037 non-null  float64
 6   Open       12037 non-null  float64
 7   Close      12037 non-null  float64
 8   Volume     12037 non-null  float64
 9   Marketcap  12037 non-null  float64
dtypes: float64(6), int64(1), object(3)
memory usage: 1.0+ MB
None
```

```
1 # Let's see meta information about numeric data, we can also see if there any extreme values
2 df.describe()
```

	SNo	High	Low	Open	Close	Volume	Marketcap
count	12037.000000	12037.000000	12037.000000	12037.000000	12037.000000	1.203700e+04	1.203700e+04
mean	1326.877627	1797.247945	1689.071077	1745.961716	1748.923766	4.652802e+09	4.082986e+10
std	836.777590	6507.990175	6085.346811	6312.961050	6319.601286	1.141572e+10	1.194340e+11
min	1.000000	0.003082	0.002802	0.002809	0.002810	0.000000e+00	0.000000e+00
25%	602.000000	1.000692	0.990570	0.999090	0.999228	5.895540e+06	3.682208e+08
50%	1255.000000	33.345750	30.523111	32.016525	32.001958	3.204215e+08	5.655924e+09
75%	2007.000000	372.767424	350.941986	360.312012	361.045990	3.146472e+09	2.090613e+10
max	2991.000000	64863.098908	62208.964366	63523.754869	63503.457930	3.509679e+11	1.186364e+12

```
1 df.describe().transpose()
```

	count	mean	std	min	25%	50%	75%	max
SNo	12037.0	1.326878e+03	8.367776e+02	1.000000	6.020000e+02	1.255000e+03	2.007000e+03	2.991000e+03
High	12037.0	1.797248e+03	6.507990e+03	0.003082	1.000692e+00	3.334575e+01	3.727674e+02	6.486310e+04
Low	12037.0	1.689071e+03	6.085347e+03	0.002802	9.905703e-01	3.052311e+01	3.509420e+02	6.220896e+04
Open	12037.0	1.745962e+03	6.312961e+03	0.002809	9.990903e-01	3.201653e+01	3.603120e+02	6.352375e+04

```
1
2 # Convert the 'Date' column to datetime
3 df['Date'] = pd.to_datetime(df['Date'])
4
5 # Group the data by each coin
6 grouped_df = df.groupby('Symbol')
7
8 # Calculate the date duration for each coin and describtion
9 for symbol, group in grouped_df:
10     min_date = group['Date'].min()
11     max_date = group['Date'].max()
12     duration = max_date - min_date
13
14     print("Coin:", symbol)
15     print("Start Date:", min_date)
16     print("End Date:", max_date)
17     print("Date Duration:", duration)
18     print(group.describe().transpose())
19     print()
20
```

```
Coin: BTC
Start Date: 2013-04-29 23:59:59
End Date: 2021-07-06 23:59:59
Date Duration: 2990 days 00:00:00
            count          mean           std           min           25%  \
SNo        2991.0  1.496000e+03  8.635717e+02  1.000000e+00  7.485000e+02
High       2991.0  6.893326e+03  1.164283e+04  7.456110e+01  4.361790e+02
Low        2991.0  6.486010e+03  1.086903e+04  6.552600e+01  4.228795e+02
Open       2991.0  6.700146e+03  1.128804e+04  6.850500e+01  4.304455e+02
Close      2991.0  6.711290e+03  1.129814e+04  6.843100e+01  4.305695e+02
Volume     2991.0  1.090633e+10  1.888895e+10  0.000000e+00  3.036725e+07
Marketcap  2991.0  1.208761e+11  2.109438e+11  7.784112e+08  6.305579e+09

                50%           75%           max
SNo        1.496000e+03  2.243500e+03  2.991000e+03
High       2.387610e+03  8.733927e+03  6.486310e+04
Low        2.178500e+03  8.289800e+03  6.220896e+04
Open       2.269890e+03  8.569656e+03  6.352375e+04
Close      2.286410e+03  8.576239e+03  6.350346e+04
Volume     9.460360e+08  1.592015e+10  3.509679e+11
Marketcap  3.741503e+10  1.499957e+11  1.186364e+12

Coin: ETH
Start Date: 2015-08-08 23:59:59
End Date: 2021-07-06 23:59:59
Date Duration: 2159 days 00:00:00
            count          mean           std           min           25%  \
SNo        2160.0  1.080500e+03  6.236826e+02  1.000000e+00  5.407500e+02
High       2160.0  3.982586e+02  6.280823e+02  4.829880e-01  1.426522e+01
Low        2160.0  3.655926e+02  5.666115e+02  4.208970e-01  1.319095e+01
Open       2160.0  3.828799e+02  5.997199e+02  4.315890e-01  1.375760e+01
Close      2160.0  3.839107e+02  6.010788e+02  4.348290e-01  1.381920e+01
Volume     2160.0  7.057058e+09  1.064526e+10  1.021280e+05  3.825102e+07
Marketcap  2160.0  4.172084e+10  6.909184e+10  3.221363e+07  1.135576e+09

                50%           75%           max
SNo        1.080500e+03  1.620250e+03  2.160000e+03
High       2.051246e+02  3.964946e+02  4.362351e+03
Low        1.933027e+02  3.751468e+02  3.785849e+03
Open       1.984251e+02  3.862649e+02  4.174636e+03
Close      1.986437e+02  3.864353e+02  4.168701e+03
Volume     2.148880e+09  9.629136e+09  8.448291e+10
Marketcap  2.070063e+10  4.231010e+10  4.828819e+11

Coin: LTC
Start Date: 2013-04-29 23:59:59
End Date: 2021-07-06 23:59:59
Date Duration: 2990 days 00:00:00
            count          mean           std           min           25%  \
SNo        2991.0  1.496000e+03  8.635717e+02  1.000000e+00  7.485000e+02
High       2991.0  5.134440e+01  6.657230e+01  1.344810e+00  3.841130e+00
```

```
Low        2991.0  4.693123e+01  5.947442e+01  1.113740e+00  3.730025e+00
Open       2991.0  4.924736e+01  6.325627e+01  1.153240e+00  3.792325e+00
Close      2991.0  4.927901e+01  6.324046e+01  1.157010e+00  3.794135e+00
Volume     2991.0  1.284851e+09  2.247871e+09  0.000000e+00  2.242845e+06
Marketcap  2991.0  2.934139e+09  3.964279e+09  3.789242e+07  1.614311e+08

                  50%           75%           max
```

Analysing Null/NAN values

```
1 df.isnull().sum()
```

```
SNo          0
Name         0
Symbol       0
Date         0
High         0
Low          0
Open         0
Close        0
Volume       0
Marketcap    0
dtype: int64
```

```
1 df.isnull().count()
```

```
SNo          12037
Name         12037
Symbol       12037
Date         12037
High         12037
Low          12037
Open         12037
Close        12037
Volume       12037
Marketcap    12037
dtype: int64
```

Statistics Summary

```
1 # Display summary statistics of numeric columns
2 numeric_columns = df.select_dtypes(include=[int, float])
3 summary_statistics = numeric_columns.describe()
4 print("Summary Statistics:")
5 print(summary_statistics)
```

```
Summary Statistics:
                SNo          High           Low          Open         Close  \
count  12037.000000  12037.000000  12037.000000  12037.000000  12037.000000
mean    1326.877627   1797.247945   1689.071077   1745.961716   1748.923766
std      836.777590   6507.990175   6085.346811   6312.961050   6319.601286
min        1.000000      0.003082      0.002802      0.002809      0.002810
25%      602.000000      1.000692      0.990570      0.999090      0.999228
50%     1255.000000     33.345750     30.523111     32.016525     32.001958
75%     2007.000000    372.767424    350.941986    360.312012    361.045990
max     2991.000000  64863.098908  62208.964366  63523.754869  63503.457930

             Volume     Marketcap
count  1.203700e+04  1.203700e+04
mean   4.652802e+09  4.082986e+10
std    1.141572e+10  1.194340e+11
min    0.000000e+00  0.000000e+00
25%    5.895540e+06  3.682208e+08
50%    3.204215e+08  5.655924e+09
75%    3.146472e+09  2.090613e+10
max    3.509679e+11  1.186364e+12
```

Categorical to One-Hot (numeric) Encoding

```
1 #Let's create a list for our categorical columns
2 #cat_cols=["Name", "Symbol", "Date"]
```

```
# Create a copy of the data frame in memory with a different name
#df_onehot=df.copy()
#convert only categorical variables/features to dummy/one-hot features
#df_onehot = pd.get_dummies(df, columns=cat_cols, prefix = cat_cols)
#print the dataset
#df_onehot
```

Pandas Profiling

```
from pandas_profiling import ProfileReport
profile = ProfileReport(df)
```

```
<ipython-input-24-ce1e41813c97>:1: DeprecationWarning: `import pandas_profiling` is going to be deprecated by April 1st. Please use `im
  from pandas_profiling import ProfileReport
```

```
profile.to_notebook_iframe()
```

Summarize dataset: 100% 68/68 [00:26<00:00, 1.80it/s, Completed]

Generate report structure: 100% 1/1 [00:13<00:00, 13.66s/it]

Render HTML: 100% 1/1 [00:03<00:00, 3.41s/it]

Overview

Dataset statistics

Number of variables	10
Number of observations	12037
Missing cells	0
Missing cells (%)	0.0%
Duplicate rows	0
Duplicate rows (%)	0.0%
Total size in memory	1.3 MiB
Average record size in memory	110.0 B

Variable types

Numeric	7
Categorical	2
DateTime	1

Alerts

`Volume` has 628 (5.2%) zeros **Zeros**

Reproduction

Analysis started	2023-06-07 12:53:12.684952
Analysis finished	2023-06-07 12:53:39.580828

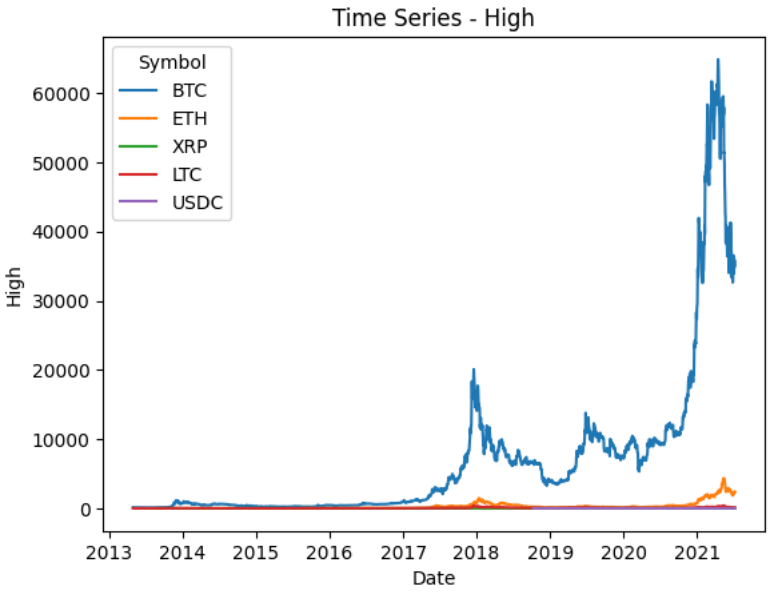
Visualizing the Data

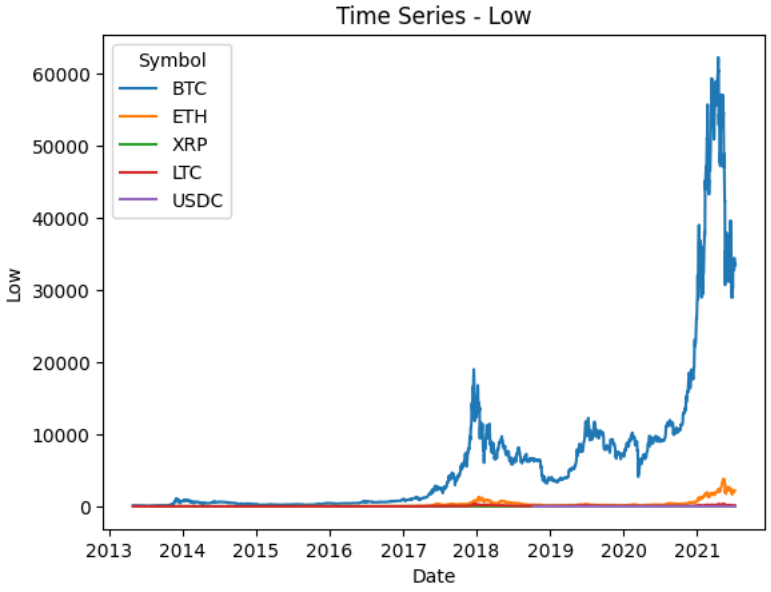
```
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

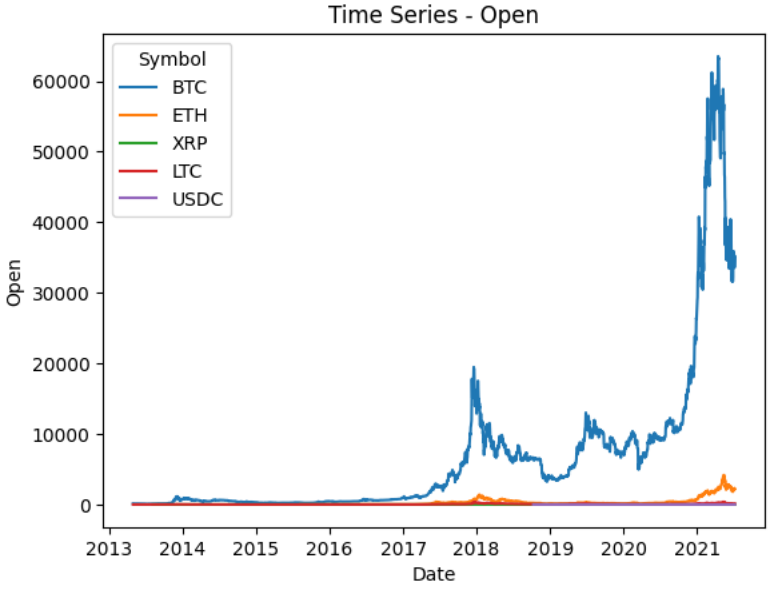
```
#DataFrame copied to keep the original unaltered
df_visual = df.copy()
```

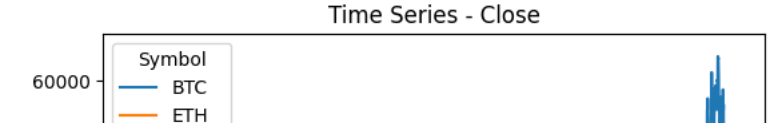
Visulizing each attribute for selected coins - Line graph

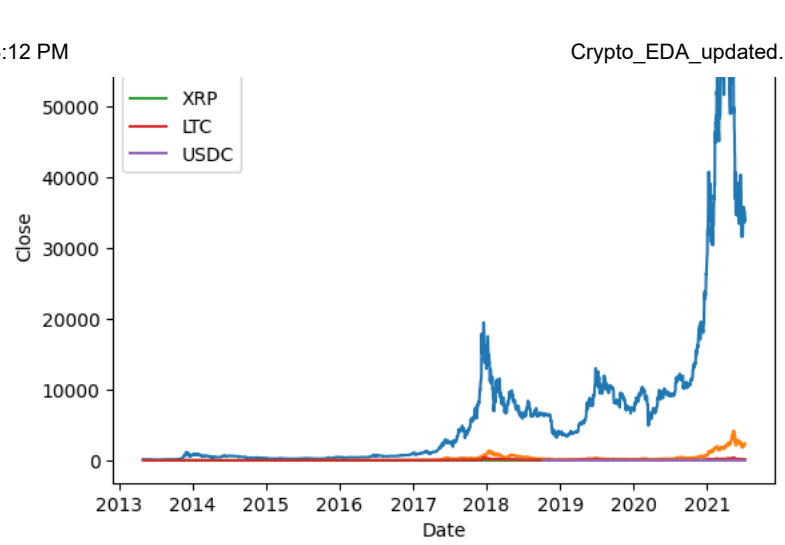
```

# List of columns to visualize
columns_to_visualize = ['High', 'Low', 'Open', 'Close', 'Volume', 'Marketcap']

# Loop through each column
for column in columns_to_visualize:
    # Set up the plot for the current column
    sns.lineplot(data=df_visual, x='Date', y=column, hue='Symbol')

    # Add title and labels
    plt.title(f'Time Series - {column}')
    plt.xlabel('Date')
    plt.ylabel(column)

    # Display the plot
    plt.show()

```


Time Series - High
Symbol
BTC
ETH
XRP
LTC
USDC
High
Date
0
10000
20000
30000
40000
50000
60000
2013
2014
2015
2016
2017
2018
2019
2020
2021


Time Series - Low
Symbol
BTC
ETH
XRP
LTC
USDC
Low
Date
0
10000
20000
30000
40000
50000
60000
2013
2014
2015
2016
2017
2018
2019
2020
2021

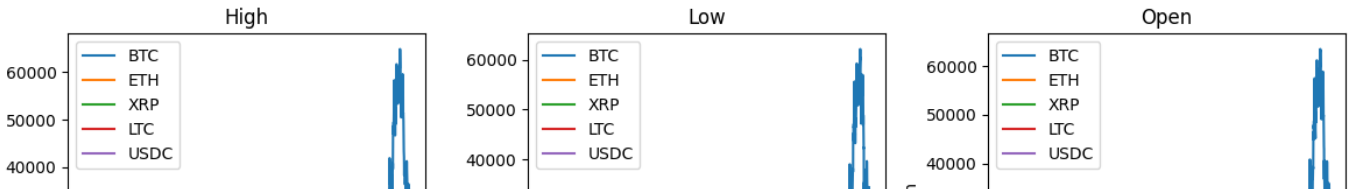

Time Series - Open
Symbol
BTC
ETH
XRP
LTC
USDC
Open
Date
0
10000
20000
30000
40000
50000
60000
2013
2014
2015
2016
2017
2018
2019
2020
2021


Time Series - Close
Symbol
BTC
ETH
60000



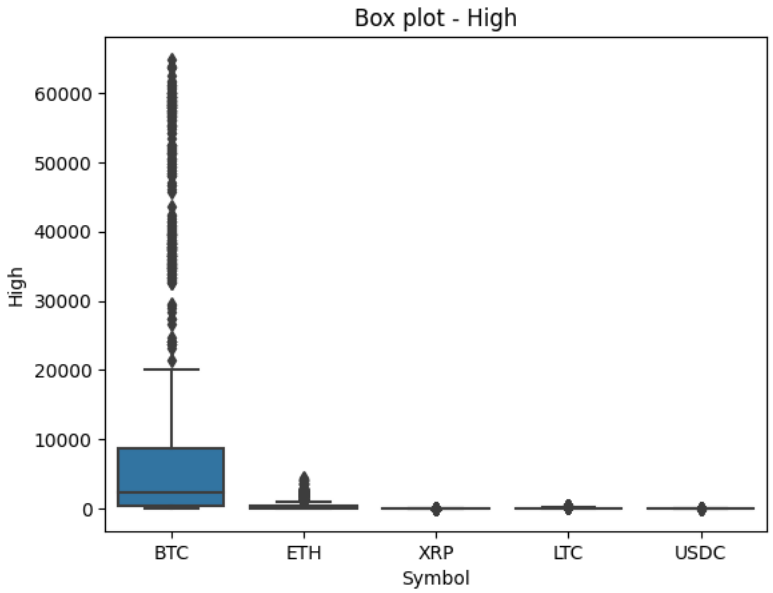
Time Series - Volume

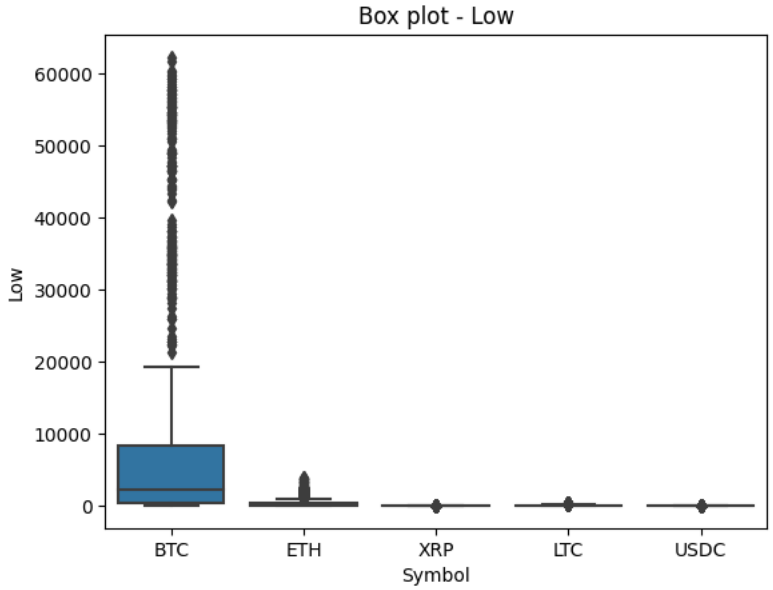
```
# Create a list of unique symbols
symbols = df_visual['Symbol'].unique()

# Plot the data for each column in a 2x3 grid
fig, axs = plt.subplots(2, 3, figsize=(12, 8))
for i, column in enumerate(columns_to_visualize):
    row, col = i // 3, i % 3

    for symbol in symbols:
        data = df_visual[df_visual['Symbol'] == symbol]
        axs[row, col].plot(data['Date'], data[column], label=symbol)

    axs[row, col].set_title(column)
    axs[row, col].set_xlabel('Date')
    axs[row, col].set_ylabel(column)
    axs[row, col].legend()
    axs[row, col].tick_params(axis='x', rotation=45)

plt.tight_layout()
plt.show()

```

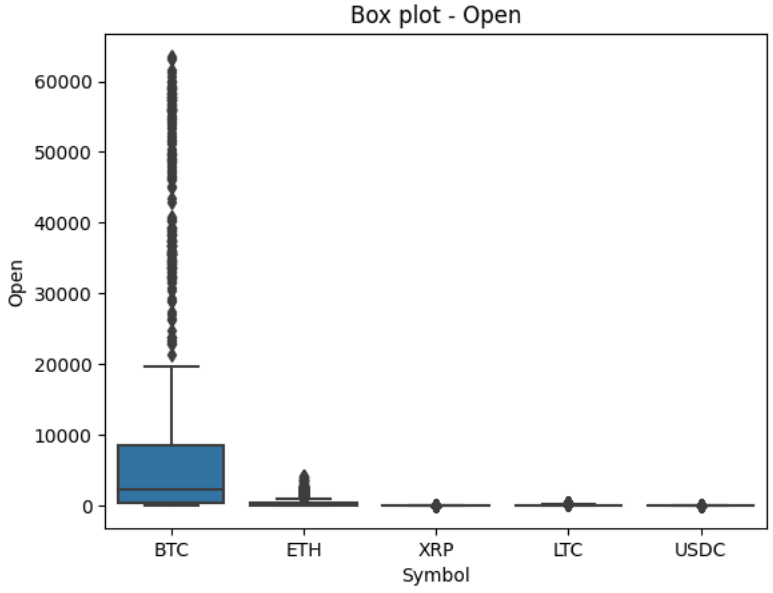


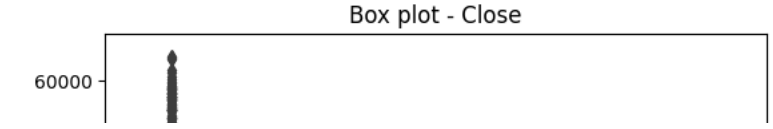
Visulizing each attribute for selected coins - Box Plot

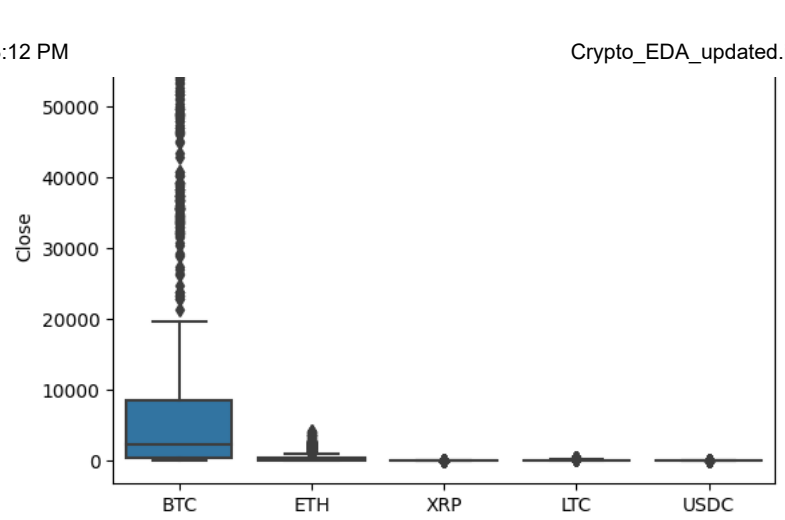
```
1
2 # Loop through each column
3 for column in columns_to_visualize:
4     # Set up the boxplot for the current column
5     sns.boxplot(x='Symbol', y=column, data=df_visual)
6
7     # Add title and labels
8     plt.title(f'Box plot - {column}')
9     plt.xlabel('Symbol')
10    plt.ylabel(column)
11
12    # Display the plot
13    plt.show()
14
```


Box plot - High
High
60000
50000
40000
30000
20000
10000
0
BTC
ETH
XRP
LTC
USDC
Symbol

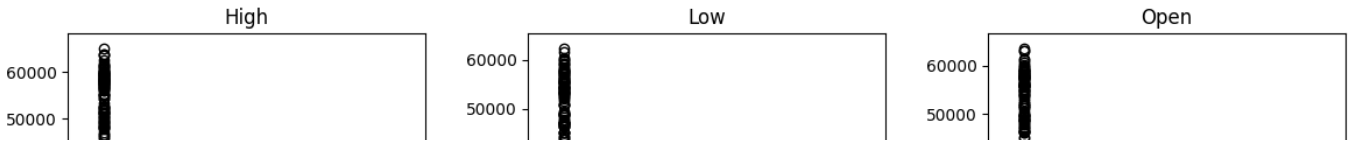

Box plot - Low
Low
60000
50000
40000
30000
20000
10000
0
BTC
ETH
XRP
LTC
USDC
Symbol


Box plot - Open
Open
60000
50000
40000
30000
20000
10000
0
BTC
ETH
XRP
LTC
USDC
Symbol


Box plot - Close
60000




```
# Create a list of unique symbols
symbols = df_visual['Symbol'].unique()

# Plot the data for each column in a 2x3 grid
fig, axs = plt.subplots(2, 3, figsize=(12, 8))
for i, column in enumerate(columns_to_visualize):
    row, col = i // 3, i % 3

    data_to_plot = []
    for symbol in symbols:
        data = df_visual[df_visual['Symbol'] == symbol][column]
        data_to_plot.append(data)

    axs[row, col].boxplot(data_to_plot, labels=symbols)
    axs[row, col].set_title(column)
    axs[row, col].set_xlabel('Symbol')
    axs[row, col].set_ylabel(column)
    axs[row, col].tick_params(axis='x', rotation=45)

plt.tight_layout()
plt.show()

```

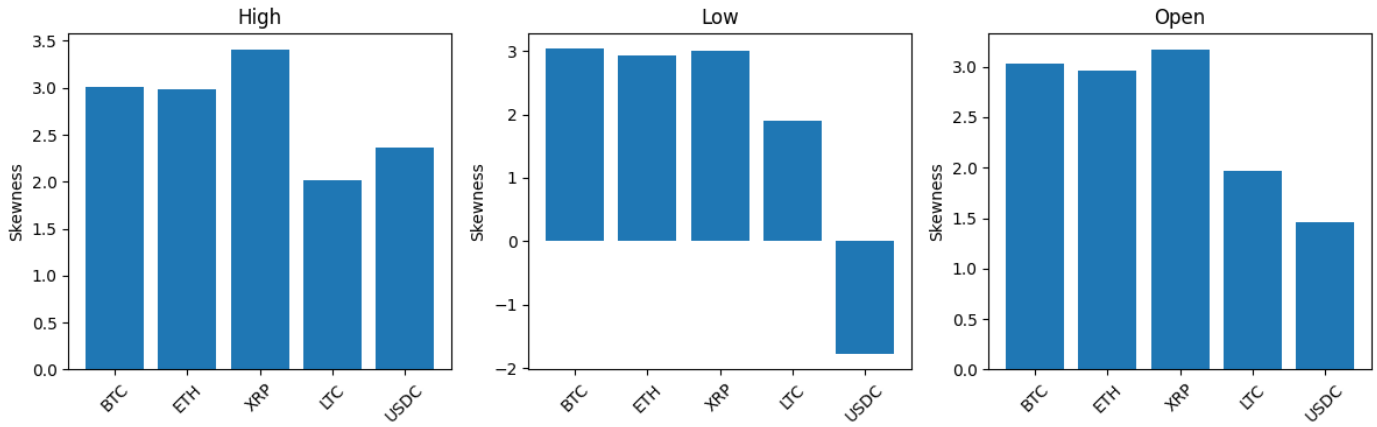


Skewness Analysis

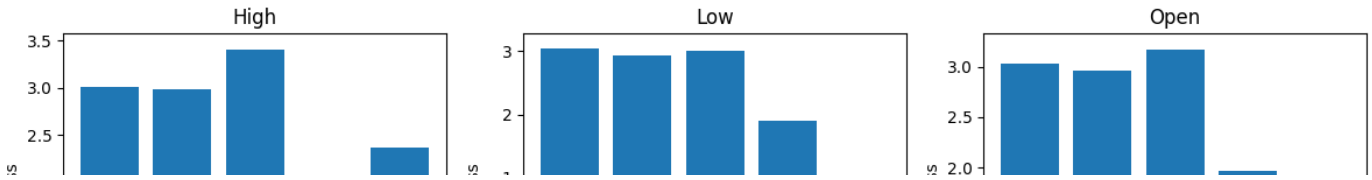
```
import pandas as pd

# Calculate skewness for each coin and column
skewness = df_visual.groupby('Symbol')[columns_to_visualize].skew()

# Display the skewness
print("Skewness:")
print(skewness)

```

```
Skewness:
              High       Low      Open     Close    Volume  Marketcap
Symbol
BTC       3.012925  3.033504  3.025191  3.018634  3.742112   3.071752
ETH       2.982709  2.931693  2.959628  2.948667  2.442103   3.099590
LTC       2.020982  1.907707  1.971091  1.966783  2.610141   2.021090
USDC      2.360479 -1.784938  1.459959  1.498858  2.496024   2.667453
XRP       3.405164  3.012947  3.168133  3.158788  5.141658   2.928928
```


```
# Create a list of unique symbols
symbols = df_visual['Symbol'].unique()

# Plot the skewness for each column in a 2x3 grid
fig, axs = plt.subplots(2, 3, figsize=(12, 8))
for i, column in enumerate(columns_to_visualize):
    row, col = i // 3, i % 3

    # Get the skewness for each coin
    skewness_values = []
    for symbol in symbols:
        data = df_visual[df_visual['Symbol'] == symbol][column]
        skewness_value = data.skew()
        skewness_values.append(skewness_value)

    axs[row, col].bar(symbols, skewness_values)
    axs[row, col].set_title(column)
    axs[row, col].set_xlabel('Symbol')
    axs[row, col].set_ylabel('Skewness')
    axs[row, col].tick_params(axis='x', rotation=45)

plt.tight_layout()
plt.show()

```




```
df_visual = df.copy()  # Create a copy of the DataFrame
# Create a list of unique symbols
symbols = df_visual['Symbol'].unique()

# Plot the skewness for each column in a 2x3 grid
fig, axs = plt.subplots(2, 3, figsize=(12, 8))
for i, column in enumerate(columns_to_visualize):
    row, col = i // 3, i % 3

    # Get the skewness for each coin
    skewness_values = []
    for symbol in symbols:
        data = df_visual[df_visual['Symbol'] == symbol][column]
        skewness_value = data.skew()
        skewness_values.append(skewness_value)

    axs[row, col].bar(symbols, skewness_values)
    axs[row, col].set_title(column)
    axs[row, col].set_xlabel('Symbol')
    axs[row, col].set_ylabel('Skewness')
    axs[row, col].tick_params(axis='x', rotation=45)

plt.tight_layout()
plt.show()


```

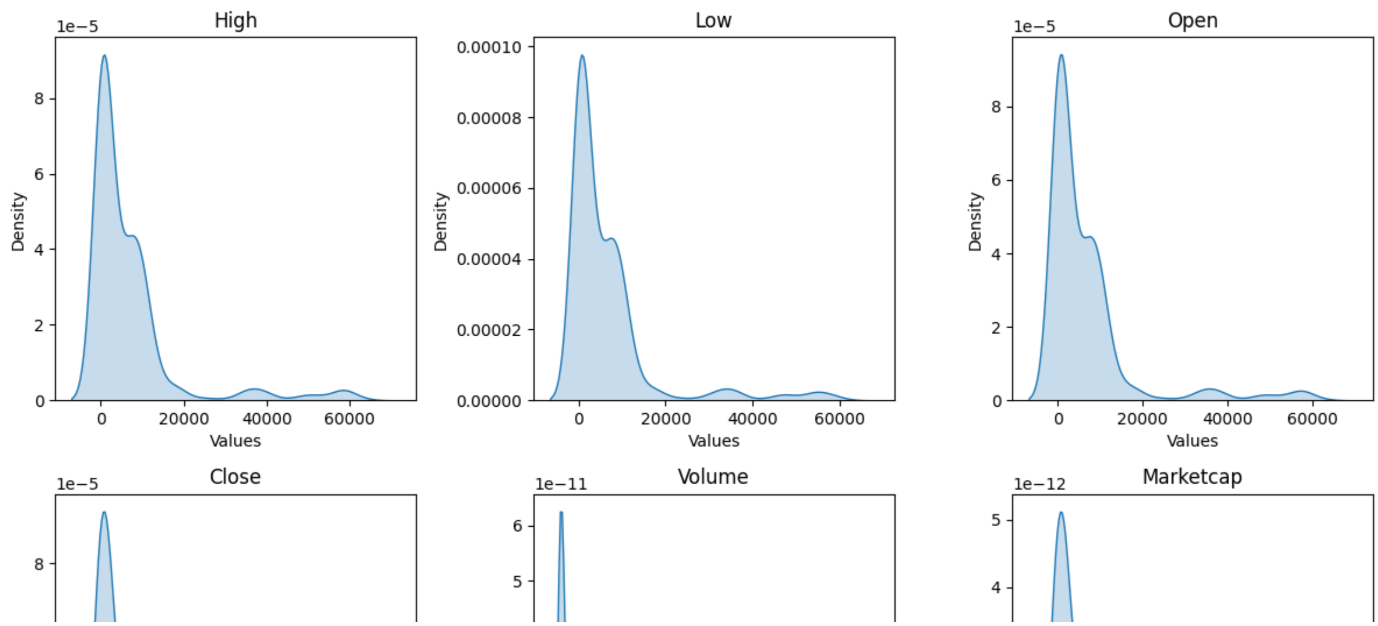



```
import seaborn as sns
import matplotlib.pyplot as plt

# Create a list of unique symbols
symbols = df_visual['Symbol'].unique()

# Set up the plot grid
fig, axs = plt.subplots(2, len(columns_to_visualize), figsize=(16, 8))

# Loop through each column
for i, column in enumerate(columns_to_visualize):
    # Plot density for the current column
    for j, symbol in enumerate(symbols):
        data = df_visual[df_visual['Symbol'] == symbol][column]
        sns.kdeplot(data, shade=True, ax=axs[j // len(columns_to_visualize), i], color='darkblue')

    # Add title and labels for density plot
    axs[0, i].set_title(f'Density Plot - {column}')
    axs[0, i].set_xlabel(column)
    axs[0, i].set_ylabel('Density')
    axs[0, i].legend(symbols)

    # Calculate and plot skewness
    skewness_values = []
    for symbol in symbols:
        data = df_visual[df_visual['Symbol'] == symbol][column]
        skewness_value = data.skew()
        skewness_values.append(skewness_value)

    # Plot skewness
    axs[1, i].bar(symbols, skewness_values)
    axs[1, i].set_title(f'Skewness - {column}')
    axs[1, i].set_xlabel('Symbol')
    axs[1, i].set_ylabel('Skewness')
    axs[1, i].tick_params(axis='x', rotation=45)

# Adjust the layout and spacing
plt.tight_layout()

# Show the plots
plt.show()

```

```
<ipython-input-35-0d6c1c6765d4>:15: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(data, shade=True, ax=axs[j // len(columns_to_visualize), i], color='darkblue')
<ipython-input-35-0d6c1c6765d4>:15: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(data, shade=True, ax=axs[j // len(columns_to_visualize), i], color='darkblue')
<ipython-input-35-0d6c1c6765d4>:15: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(data, shade=True, ax=axs[j // len(columns_to_visualize), i], color='darkblue')
<ipython-input-35-0d6c1c6765d4>:15: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(data, shade=True, ax=axs[j // len(columns_to_visualize), i], color='darkblue')
<ipython-input-35-0d6c1c6765d4>:15: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.
```

```python
import seaborn as sns
import matplotlib.pyplot as plt

# Choose the coin for analysis
selected_coin = 'BTC'

# Filter the data for the selected coin
selected_coin_data = df_visual[df_visual['Symbol'] == selected_coin]

# Set up the plot grid
fig, axs = plt.subplots(2, 3, figsize=(12, 8))

# Loop through each column
for i, column in enumerate(columns_to_visualize):
    row, col = i // 3, i % 3

    # Plot density for the current column
    sns.kdeplot(selected_coin_data[column], shade=True, ax=axs[row, col])

    # Add title and labels
    axs[row, col].set_title(column)
    axs[row, col].set_xlabel('Values')
    axs[row, col].set_ylabel('Density')

# Adjust the layout
plt.tight_layout()

# Show the plot
plt.show()
```

```
<ipython-input-36-43bc8c5ac3a4>:18: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(selected_coin_data[column], shade=True, ax=axs[row, col])
<ipython-input-36-43bc8c5ac3a4>:18: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(selected_coin_data[column], shade=True, ax=axs[row, col])
<ipython-input-36-43bc8c5ac3a4>:18: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(selected_coin_data[column], shade=True, ax=axs[row, col])
<ipython-input-36-43bc8c5ac3a4>:18: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(selected_coin_data[column], shade=True, ax=axs[row, col])
<ipython-input-36-43bc8c5ac3a4>:18: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(selected_coin_data[column], shade=True, ax=axs[row, col])
<ipython-input-36-43bc8c5ac3a4>:18: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(selected_coin_data[column], shade=True, ax=axs[row, col])
```



Skewness of each coin for each attribute

```
import seaborn as sns
import matplotlib.pyplot as plt

# List of coins to analyze
coins = df_visual['Symbol'].unique()

# Set up the plot grid
fig, axs = plt.subplots(len(coins), len(columns_to_visualize), figsize=(12, 8))

# Define a list of colors for the density plots
colors = ['blue', 'green', 'red', 'orange', 'purple', 'brown']

# Loop through each coin
for i, coin in enumerate(coins):
    coin_data = df_visual[df_visual['Symbol'] == coin]
```

```
    # Loop through each column
    for j, column in enumerate(columns_to_visualize):
        # Plot density for the current column and coin with the corresponding color
        sns.kdeplot(coin_data[column], shade=True, ax=axs[i, j], color=colors[j % len(colors)])

        # Add title and labels
        axs[i, j].set_title(f'{coin} - {column}')
        axs[i, j].set_xlabel('Values')
        axs[i, j].set_ylabel('Density')

# Adjust the layout
plt.tight_layout()

# Show the plot
plt.show()

```

```
import pandas as pd

# Calculate skewness for each column
skewness = df_visual[columns_to_visualize].skew()

# Find the column with the highest skewness
```

```
highest_skewness_column = skewness.idxmax()

# Get the highest skewness value
highest_skewness_value = skewness[highest_skewness_column]

# Print the result
print(f"The column with the highest skewness is '{highest_skewness_column}' with a skewness value of {highest_skewness_value:.2f}.")

```

```
The column with the highest skewness is 'Low' with a skewness value of 6.27.
```

```
  sns.kdeplot(coin_data[column], shade=True, ax=axs[i, j], color=colors[i % len(colors)])
```

```
import pandas as pd

# List of coins to analyze
coins = df_visual['Symbol'].unique()

# Loop through each coin
for coin in coins:
    print(f"Coin: {coin}")

    # Filter data for the current coin
    coin_data = df_visual[df_visual['Symbol'] == coin]

    # Calculate skewness for each column
    skewness = coin_data[columns_to_visualize].skew()

    # Sort the skewness values in descending order
    sorted_skewness = skewness.sort_values(ascending=False)

    # Retrieve the column names in descending order of skewness
    columns_sorted_by_skewness = sorted_skewness.index.tolist()

    # Print the columns in descending order of skewness
    print("Columns in descending order of skewness:")
    for column in columns_sorted_by_skewness:
        print(column)

    print()  # Add a blank line between coins

```

```
Coin: BTC
Columns in descending order of skewness:
Volume
Marketcap
Low
Open
Close
High

Coin: ETH
Columns in descending order of skewness:
Marketcap
High
Open
Close
Low
Volume

Coin: XRP
Columns in descending order of skewness:
Volume
High
Open
Close
Low
Marketcap

Coin: LTC
Columns in descending order of skewness:
Volume
Marketcap
High
Open
Close
Low

Coin: USDC
Columns in descending order of skewness:
Marketcap
Volume
```

```
High
Close
Open
Low
```

```
<ipython-input-37-b2c4b60f042b>:20: FutureWarning:
```

Apply the skewness transformations

Logarithmic Transformation

```
#Taking the logarithm of the data can help reduce right-skewness (positive skewness). It can be done using functions like np.log or np.log
```

```
import seaborn as sns
import matplotlib.pyplot as plt
import numpy as np

# List of coins to analyze
coins = df_visual['Symbol'].unique()

# Set up the plot grid
fig, axs = plt.subplots(len(coins), len(columns_to_visualize), figsize=(12, 8))

# Define a list of colors for the density plots
colors = ['blue', 'green', 'red', 'orange', 'purple', 'brown']

# Loop through each coin
for i, coin in enumerate(coins):
    coin_data = df_visual[df_visual['Symbol'] == coin]

    # Loop through each column
    for j, column in enumerate(columns_to_visualize):
        # Apply the logarithmic transformation to the data
        transformed_data = np.log1p(coin_data[column])

        # Plot density for the transformed data
        sns.kdeplot(transformed_data, shade=True, ax=axs[i, j], color=colors[j % len(colors)])

        # Add title and labels
        axs[i, j].set_title(f'{coin} - {column} (T)')
        axs[i, j].set_xlabel('Values')
        axs[i, j].set_ylabel('Density')

# Adjust the layout
plt.tight_layout()

# Show the plot
plt.show()

```

```
<ipython-input-41-4a4198343e9e>:24: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j], color=colors[j % len(colors)])
<ipython-input-41-4a4198343e9e>:24: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j], color=colors[j % len(colors)])
<ipython-input-41-4a4198343e9e>:24: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j], color=colors[j % len(colors)])
<ipython-input-41-4a4198343e9e>:24: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j], color=colors[j % len(colors)])
<ipython-input-41-4a4198343e9e>:24: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j], color=colors[j % len(colors)])
```

```
#Now sidewise the original to compare
```

```
import seaborn as sns
import matplotlib.pyplot as plt
import numpy as np

# List of coins to analyze
coins = df_visual['Symbol'].unique()

# Set up the plot grid
fig, axs = plt.subplots(len(coins), len(columns_to_visualize) * 2, figsize=(16, 8))

# Define a list of colors for the density plots
colors = ['blue', 'green', 'red', 'orange', 'purple', 'brown']

# Loop through each coin
for i, coin in enumerate(coins):
    coin_data = df_visual[df_visual['Symbol'] == coin]

    # Loop through each column
    for j, column in enumerate(columns_to_visualize):
        # Original data
        original_data = coin_data[column]

        # Apply the logarithmic transformation to the data
        transformed_data = np.log1p(original_data)

        # Plot density for the original data
        sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
        axs[i, j*2].set_title(f'{coin} - {column} (O)')
        axs[i, j*2].set_xlabel('Values')
        axs[i, j*2].set_ylabel('Density')

        # Plot density for the transformed data
        sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
        axs[i, j*2+1].set_title(f'{coin} - {column} (T)')
        axs[i, j*2+1].set_xlabel('Values')
        axs[i, j*2+1].set_ylabel('Density')

# Adjust the layout
plt.tight_layout()

# Show the plot
plt.show()

```

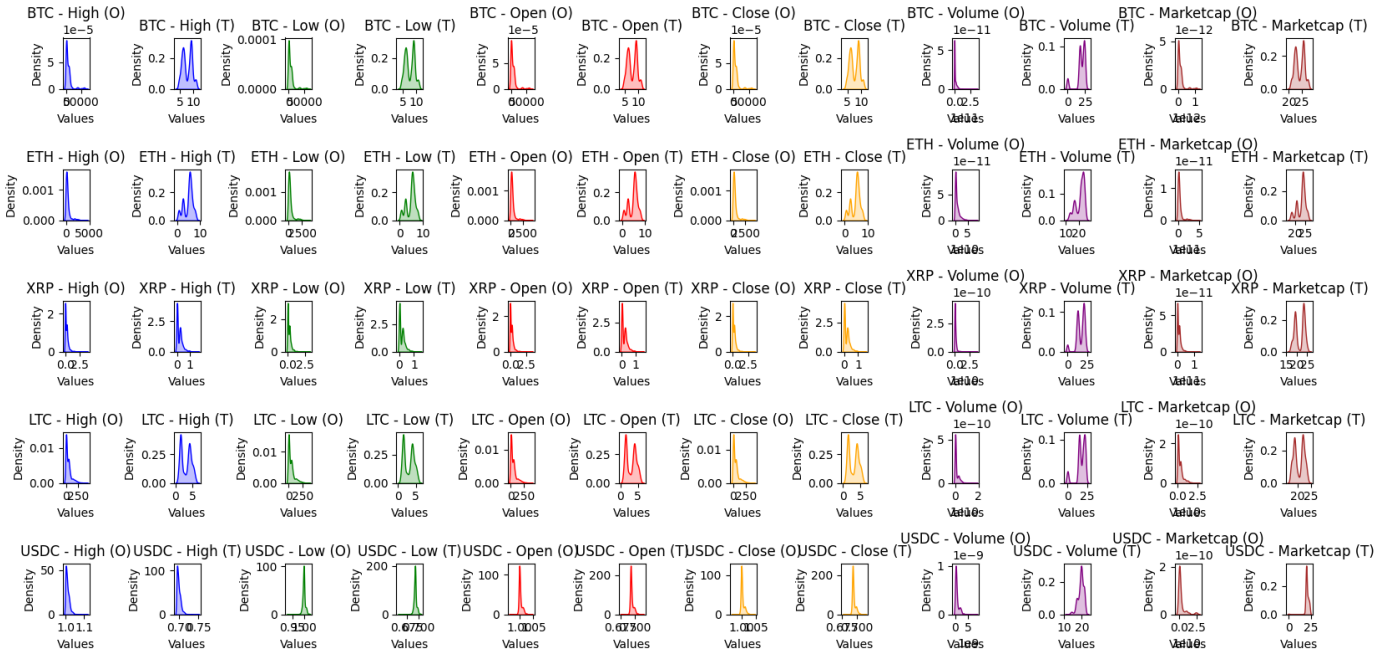
```
<ipython-input-43-8238f6494fb7>:27: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-43-8238f6494fb7>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-43-8238f6494fb7>:27: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-43-8238f6494fb7>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-43-8238f6494fb7>:27: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-43-8238f6494fb7>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-43-8238f6494fb7>:27: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-43-8238f6494fb7>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-43-8238f6494fb7>:27: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-43-8238f6494fb7>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-43-8238f6494fb7>:27: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-43-8238f6494fb7>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-43-8238f6494fb7>:27: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-43-8238f6494fb7>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
```

```
<ipython-input-43-8238f6494fb7>:27: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-43-8238f6494fb7>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-43-8238f6494fb7>:27: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-43-8238f6494fb7>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-43-8238f6494fb7>:27: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-43-8238f6494fb7>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-43-8238f6494fb7>:27: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-43-8238f6494fb7>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-43-8238f6494fb7>:27: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-43-8238f6494fb7>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-43-8238f6494fb7>:27: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-43-8238f6494fb7>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-43-8238f6494fb7>:27: FutureWarning:
```

```
`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-43-8238f6494fb7>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-43-8238f6494fb7>:27: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-43-8238f6494fb7>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-43-8238f6494fb7>:27: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-43-8238f6494fb7>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-43-8238f6494fb7>:27: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-43-8238f6494fb7>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-43-8238f6494fb7>:27: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-43-8238f6494fb7>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-43-8238f6494fb7>:27: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-43-8238f6494fb7>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-43-8238f6494fb7>:27: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-43-8238f6494fb7>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-43-8238f6494fb7>:27: FutureWarning:
```

```
`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-43-8238f6494fb7>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-43-8238f6494fb7>:27: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-43-8238f6494fb7>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-43-8238f6494fb7>:27: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-43-8238f6494fb7>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-43-8238f6494fb7>:27: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-43-8238f6494fb7>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-43-8238f6494fb7>:27: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-43-8238f6494fb7>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-43-8238f6494fb7>:27: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-43-8238f6494fb7>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-43-8238f6494fb7>:27: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-43-8238f6494fb7>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-43-8238f6494fb7>:27: FutureWarning:
```

```
 shade  is now deprecated in favor of  fill ; setting  fill=True .
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-43-8238f6494fb7>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-43-8238f6494fb7>:27: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-43-8238f6494fb7>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
```



Square Root Transformation

```
1 #Taking the square root of the data can help reduce right-skewness. It can be done using the np.sqrt function.
```

```
1 import seaborn as sns
2 import matplotlib.pyplot as plt
3 import numpy as np
```

```

# List of coins to analyze
coins = df_visual['Symbol'].unique()

# Set up the plot grid
fig, axs = plt.subplots(len(coins), len(columns_to_visualize) * 2, figsize=(16, 8))

# Define a list of colors for the density plots
colors = ['blue', 'green', 'red', 'orange', 'purple', 'brown']

# Loop through each coin
for i, coin in enumerate(coins):
    coin_data = df_visual[df_visual['Symbol'] == coin]

    # Loop through each column
    for j, column in enumerate(columns_to_visualize):
        # Original data
        original_data = coin_data[column]

        # Apply the square root transformation to the data
        transformed_data = np.sqrt(original_data)

        # Plot density for the original data
        sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
        axs[i, j*2].set_title(f'{coin} - {column} (O)')
        axs[i, j*2].set_xlabel('Values')
        axs[i, j*2].set_ylabel('Density')

        # Plot density for the transformed data
        sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
        axs[i, j*2+1].set_title(f'{coin} - {column} (T)')
        axs[i, j*2+1].set_xlabel('Values')
        axs[i, j*2+1].set_ylabel('Density')

# Adjust the layout
plt.tight_layout()

# Show the plot
plt.show()

```

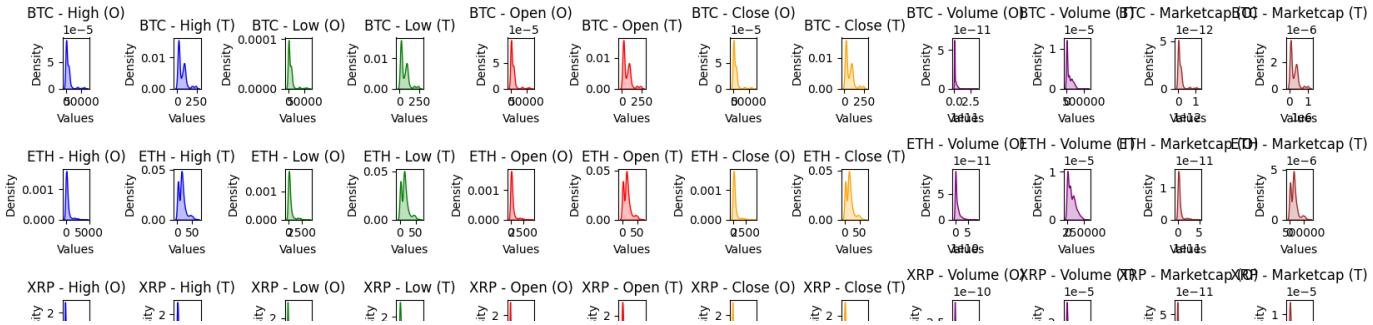
```
<ipython-input-45-586d99960ae0>:27: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-45-586d99960ae0>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-45-586d99960ae0>:27: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-45-586d99960ae0>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-45-586d99960ae0>:27: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-45-586d99960ae0>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-45-586d99960ae0>:27: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-45-586d99960ae0>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-45-586d99960ae0>:27: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-45-586d99960ae0>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-45-586d99960ae0>:27: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-45-586d99960ae0>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-45-586d99960ae0>:27: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-45-586d99960ae0>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
```

```
<ipython-input-45-586d99960ae0>:27: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-45-586d99960ae0>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-45-586d99960ae0>:27: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-45-586d99960ae0>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-45-586d99960ae0>:27: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-45-586d99960ae0>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-45-586d99960ae0>:27: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-45-586d99960ae0>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-45-586d99960ae0>:27: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-45-586d99960ae0>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-45-586d99960ae0>:27: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-45-586d99960ae0>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-45-586d99960ae0>:27: FutureWarning:
```

```
`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-45-586d99960ae0>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-45-586d99960ae0>:27: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-45-586d99960ae0>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-45-586d99960ae0>:27: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-45-586d99960ae0>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-45-586d99960ae0>:27: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-45-586d99960ae0>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-45-586d99960ae0>:27: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-45-586d99960ae0>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-45-586d99960ae0>:27: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-45-586d99960ae0>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-45-586d99960ae0>:27: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-45-586d99960ae0>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-45-586d99960ae0>:27: FutureWarning:
```

```
`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-45-586d99960ae0>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-45-586d99960ae0>:27: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-45-586d99960ae0>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-45-586d99960ae0>:27: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-45-586d99960ae0>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-45-586d99960ae0>:27: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-45-586d99960ae0>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-45-586d99960ae0>:27: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-45-586d99960ae0>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-45-586d99960ae0>:27: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-45-586d99960ae0>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-45-586d99960ae0>:27: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-45-586d99960ae0>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-45-586d99960ae0>:27: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
```

```
 shade  is now deprecated in favor of  fill ; setting  fill=True .
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-45-586d99960ae0>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-45-586d99960ae0>:27: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-45-586d99960ae0>:33: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
```



Box-Cox Transformation

```
#The Box-Cox transformation is a more generalized method that can handle both positive and negative skewness. It uses a power transformati
```

```
import seaborn as sns
import matplotlib.pyplot as plt
from sklearn.preprocessing import PowerTransformer

# List of coins to analyze
coins = df_visual['Symbol'].unique()

# Set up the plot grid
fig, axs = plt.subplots(len(coins), len(columns_to_visualize) * 2, figsize=(16, 8))

# Define a list of colors for the density plots
colors = ['blue', 'green', 'red', 'orange', 'purple', 'brown']

# Loop through each coin
for i, coin in enumerate(coins):
    coin_data = df_visual[df_visual['Symbol'] == coin]

    # Loop through each column
    for j, column in enumerate(columns_to_visualize):
        # Original data
        original_data = coin_data[column]

        # Exclude columns with negative values
        if original_data.min() >= 0:
            # Apply the Yeo-Johnson transformation to the data
            transformer = PowerTransformer(method='yeo-johnson')
            transformed_data = transformer.fit_transform(original_data.values.reshape(-1, 1))
            transformed_data = transformed_data.flatten()

            # Plot density for the original data
            sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
            axs[i, j*2].set_title(f'{coin} - {column} (O)')
            axs[i, j*2].set_xlabel('Values')
            axs[i, j*2].set_ylabel('Density')

            # Plot density for the transformed data
            sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
            axs[i, j*2+1].set_title(f'{coin} - {column} (T)')
```

```
            axs[i, j*2+1].set_xlabel('Values')
            axs[i, j*2+1].set_ylabel('Density')

# Adjust the layout
plt.tight_layout()

# Show the plot
plt.show()

```

```
<ipython-input-47-50e9e65183cd>:31: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-47-50e9e65183cd>:37: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-47-50e9e65183cd>:31: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-47-50e9e65183cd>:37: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-47-50e9e65183cd>:31: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-47-50e9e65183cd>:37: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-47-50e9e65183cd>:31: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-47-50e9e65183cd>:37: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-47-50e9e65183cd>:31: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-47-50e9e65183cd>:37: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-47-50e9e65183cd>:31: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-47-50e9e65183cd>:37: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-47-50e9e65183cd>:31: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-47-50e9e65183cd>:37: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
```

```
<ipython-input-47-50e9e65183cd>:31: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-47-50e9e65183cd>:37: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-47-50e9e65183cd>:31: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-47-50e9e65183cd>:37: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-47-50e9e65183cd>:31: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-47-50e9e65183cd>:37: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-47-50e9e65183cd>:31: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-47-50e9e65183cd>:37: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-47-50e9e65183cd>:31: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-47-50e9e65183cd>:37: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-47-50e9e65183cd>:31: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-47-50e9e65183cd>:37: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-47-50e9e65183cd>:31: FutureWarning:
```

```
`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-47-50e9e65183cd>:37: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-47-50e9e65183cd>:31: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-47-50e9e65183cd>:37: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-47-50e9e65183cd>:31: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-47-50e9e65183cd>:37: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-47-50e9e65183cd>:31: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-47-50e9e65183cd>:37: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-47-50e9e65183cd>:31: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-47-50e9e65183cd>:37: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-47-50e9e65183cd>:31: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-47-50e9e65183cd>:37: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-47-50e9e65183cd>:31: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-47-50e9e65183cd>:37: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-47-50e9e65183cd>:31: FutureWarning:
```

```
`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-47-50e9e65183cd>:37: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-47-50e9e65183cd>:31: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-47-50e9e65183cd>:37: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-47-50e9e65183cd>:31: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-47-50e9e65183cd>:37: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-47-50e9e65183cd>:31: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-47-50e9e65183cd>:37: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-47-50e9e65183cd>:31: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-47-50e9e65183cd>:37: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-47-50e9e65183cd>:31: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-47-50e9e65183cd>:37: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-47-50e9e65183cd>:31: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-47-50e9e65183cd>:37: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-47-50e9e65183cd>:31: FutureWarning:
```

```
shade  is now deprecated in favor of  fill ; setting  fill=True .
This will become an error in seaborn v0.14.0; please update your code.
```

Reciprocal Transformation

```
#Taking the reciprocal (1/x) of the data can help reduce left-skewness (negative skewness).
```

```
import seaborn as sns
import matplotlib.pyplot as plt

# List of coins to analyze
coins = df_visual['Symbol'].unique()

# Set up the plot grid
fig, axs = plt.subplots(len(coins), len(columns_to_visualize) * 2, figsize=(16, 8))

# Define a list of colors for the density plots
colors = ['blue', 'green', 'red', 'orange', 'purple', 'brown']

# Loop through each coin
for i, coin in enumerate(coins):
    coin_data = df_visual[df_visual['Symbol'] == coin]

    # Loop through each column
    for j, column in enumerate(columns_to_visualize):
        # Original data
        original_data = coin_data[column]

        # Apply the reciprocal transformation to the data
        transformed_data = 1 / original_data

        # Plot density for the original data
        sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
        axs[i, j*2].set_title(f'{coin} - {column} (O)')
        axs[i, j*2].set_xlabel('Values')
        axs[i, j*2].set_ylabel('Density')

        # Plot density for the transformed data
        sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
        axs[i, j*2+1].set_title(f'{coin} - {column} (T)')
        axs[i, j*2+1].set_xlabel('Values')
        axs[i, j*2+1].set_ylabel('Density')

# Adjust the layout
plt.tight_layout()

# Show the plot
plt.show()

```

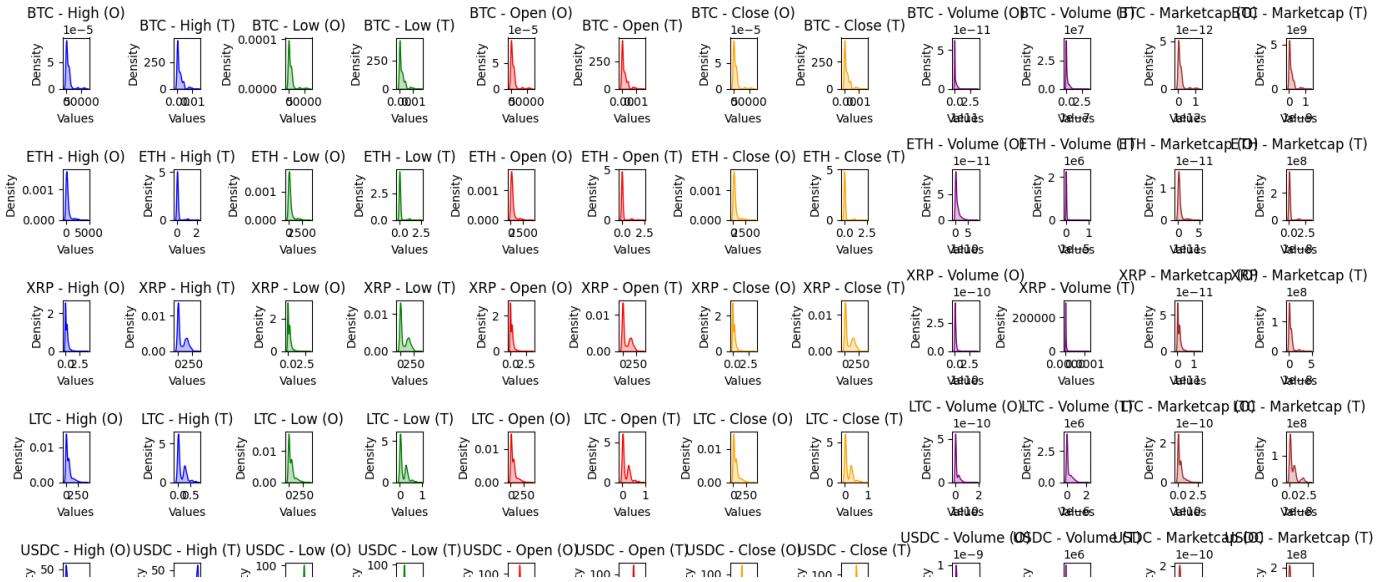
```
<ipython-input-49-fc23af5fbc54>:26: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:32: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:26: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:32: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:26: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:32: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:26: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:32: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:26: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:32: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:26: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:32: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:26: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:32: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
```

```
<ipython-input-49-fc23af5fbc54>:26: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:32: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:26: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:32: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:26: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:32: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:26: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:32: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:26: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:32: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:26: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:32: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:26: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:32: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:26: FutureWarning:
```

```
`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:32: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:26: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:32: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:26: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:32: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:26: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:32: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:26: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:32: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:26: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:32: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:26: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:32: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:26: FutureWarning:
```

```
`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:32: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:26: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:32: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:26: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:32: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:26: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:32: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:26: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:32: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:26: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:32: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:26: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:32: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:26: FutureWarning:
```

```
 shade  is now deprecated in favor of  fill ; setting  fill=True .
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:32: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:26: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-49-fc23af5fbc54>:32: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
```



Yeo-Johnson Transformation

```
#Similar to the Box-Cox transformation, the Yeo-Johnson transformation is a power transformation that can handle both positive and negativ
```

```
import seaborn as sns
import matplotlib.pyplot as plt
from sklearn.preprocessing import PowerTransformer

# List of coins to analyze
coins = df_visual['Symbol'].unique()

# Set up the plot grid
fig, axs = plt.subplots(len(coins), len(columns_to_visualize) * 2, figsize=(16, 8))

# Define a list of colors for the density plots
colors = ['blue', 'green', 'red', 'orange', 'purple', 'brown']

# Loop through each coin
for i, coin in enumerate(coins):
    coin_data = df_visual[df_visual['Symbol'] == coin]

    # Loop through each column
    for j, column in enumerate(columns_to_visualize):
        # Original data
        original_data = coin_data[column]

        # Apply the Yeo-Johnson transformation to the data
        transformer = PowerTransformer(method='yeo-johnson')
        transformed_data = transformer.fit_transform(original_data.values.reshape(-1, 1))
        transformed_data = transformed_data.flatten()

        # Plot density for the original data
```

```
        sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
        axs[i, j*2].set_title(f'{coin} - {column} (O)')
        axs[i, j*2].set_xlabel('Values')
        axs[i, j*2].set_ylabel('Density')

        # Plot density for the transformed data
        sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
        axs[i, j*2+1].set_title(f'{coin} - {column} (T)')
        axs[i, j*2+1].set_xlabel('Values')
        axs[i, j*2+1].set_ylabel('Density')

# Adjust the layout
plt.tight_layout()

# Show the plot
plt.show()

```

```
<ipython-input-51-1fe78f55a88a>:29: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-51-1fe78f55a88a>:35: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-51-1fe78f55a88a>:29: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-51-1fe78f55a88a>:35: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-51-1fe78f55a88a>:29: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-51-1fe78f55a88a>:35: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-51-1fe78f55a88a>:29: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-51-1fe78f55a88a>:35: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-51-1fe78f55a88a>:29: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-51-1fe78f55a88a>:35: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-51-1fe78f55a88a>:29: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-51-1fe78f55a88a>:35: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-51-1fe78f55a88a>:29: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-51-1fe78f55a88a>:35: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
```

```
<ipython-input-51-1fe78f55a88a>:29: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-51-1fe78f55a88a>:35: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-51-1fe78f55a88a>:29: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-51-1fe78f55a88a>:35: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-51-1fe78f55a88a>:29: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-51-1fe78f55a88a>:35: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-51-1fe78f55a88a>:29: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-51-1fe78f55a88a>:35: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-51-1fe78f55a88a>:29: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-51-1fe78f55a88a>:35: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-51-1fe78f55a88a>:29: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-51-1fe78f55a88a>:35: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-51-1fe78f55a88a>:29: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-51-1fe78f55a88a>:35: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-51-1fe78f55a88a>:29: FutureWarning:
```

```
`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-51-1fe78f55a88a>:35: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-51-1fe78f55a88a>:29: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-51-1fe78f55a88a>:35: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-51-1fe78f55a88a>:29: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-51-1fe78f55a88a>:35: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-51-1fe78f55a88a>:29: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-51-1fe78f55a88a>:35: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-51-1fe78f55a88a>:29: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-51-1fe78f55a88a>:35: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-51-1fe78f55a88a>:29: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-51-1fe78f55a88a>:35: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-51-1fe78f55a88a>:29: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-51-1fe78f55a88a>:35: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-51-1fe78f55a88a>:29: FutureWarning:
```

```
`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-51-1fe78f55a88a>:35: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-51-1fe78f55a88a>:29: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-51-1fe78f55a88a>:35: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-51-1fe78f55a88a>:29: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-51-1fe78f55a88a>:35: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-51-1fe78f55a88a>:29: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-51-1fe78f55a88a>:35: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-51-1fe78f55a88a>:29: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-51-1fe78f55a88a>:35: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-51-1fe78f55a88a>:29: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-51-1fe78f55a88a>:35: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-51-1fe78f55a88a>:29: FutureWarning:
```

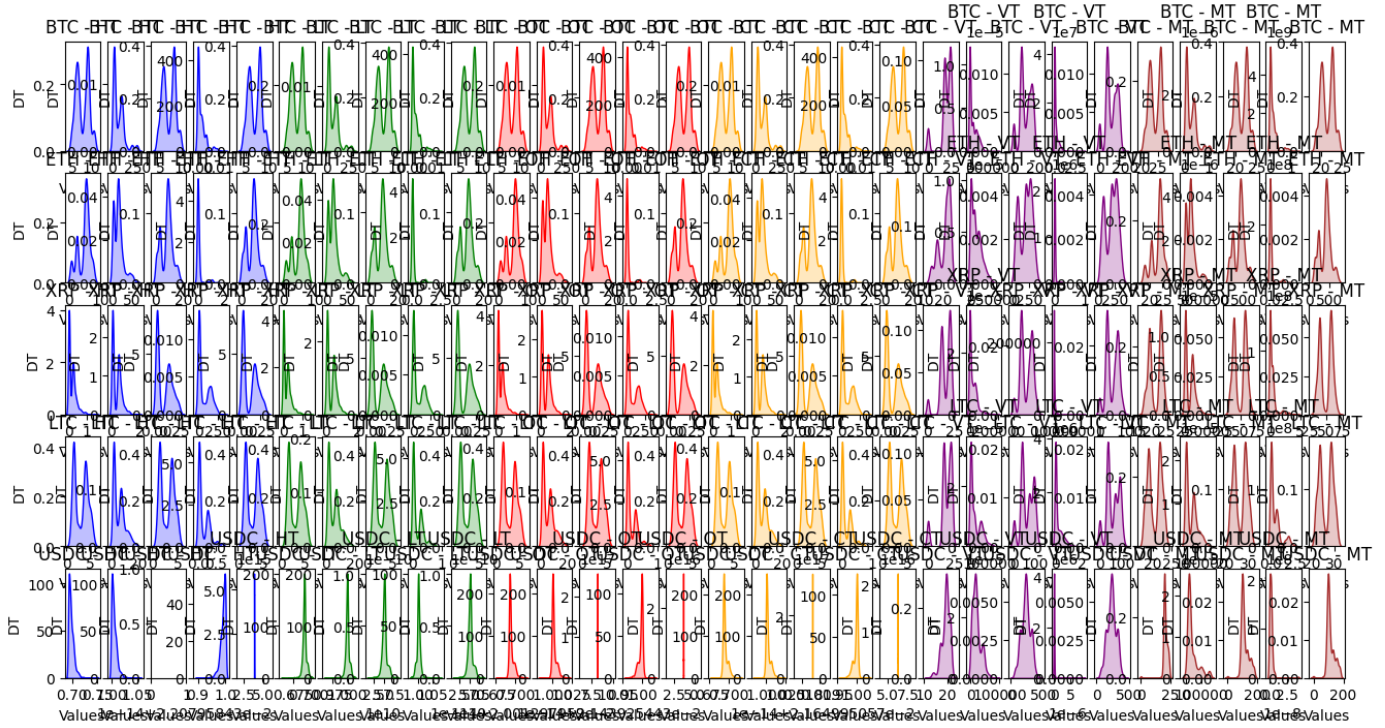
```
`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(original_data, shade=True, ax=axs[i, j*2], color=colors[j % len(colors)])
<ipython-input-51-1fe78f55a88a>:35: FutureWarning:

`shade` is now deprecated in favor of `fill`; setting `fill=True`.
This will become an error in seaborn v0.14.0; please update your code.

  sns.kdeplot(transformed_data, shade=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
<ipython-input-51-1fe78f55a88a>:29: FutureWarning:
```

All Transformations sidewise

```
import seaborn as sns
import matplotlib.pyplot as plt
import numpy as np
from scipy import stats

# List of coins to analyze
coins = df_visual['Symbol'].unique()

# Set up the plot grid
fig, axs = plt.subplots(len(coins), len(columns_to_visualize) * 5, figsize=(16, 8))

# Define a list of colors for the density plots
colors = ['blue', 'green', 'red', 'orange', 'purple', 'brown']

# Loop through each coin
for i, coin in enumerate(coins):
    coin_data = df_visual[df_visual['Symbol'] == coin]

    # Loop through each column
    for j, column in enumerate(columns_to_visualize):
        # Original data
        original_data = coin_data[column]

        # Logarithmic transformation
        log_transformed_data = np.log1p(original_data)

        # Square root transformation
        sqrt_transformed_data = np.sqrt(original_data)

        # Box-Cox transformation
        boxcox_transformed_data, _ = stats.boxcox(original_data + 1)  # Adding 1 to handle zero or negative values

        # Reciprocal transformation
        reciprocal_transformed_data = 1 / original_data

        # Yeo-Johnson transformation
        yeojohnson_transformed_data, _ = stats.yeojohnson(original_data)

        # Plot density for the logarithmic transformed data
        sns.kdeplot(log_transformed_data, fill=True, ax=axs[i, j*5], color=colors[j % len(colors)])
        axs[i, j*5].set_title(f'{coin} - {column[0]}T')
        axs[i, j*5].set_xlabel('Values')
        axs[i, j*5].set_ylabel('DT')

        # Plot density for the square root transformed data
        sns.kdeplot(sqrt_transformed_data, fill=True, ax=axs[i, j*5+1], color=colors[j % len(colors)])
        axs[i, j*5+1].set_title(f'{coin} - {column[0]}T')
        axs[i, j*5+1].set_xlabel('Values')
        axs[i, j*5+1].set_ylabel('DT')

        # Plot density for the Box-Cox transformed data
        sns.kdeplot(boxcox_transformed_data, fill=True, ax=axs[i, j*5+2], color=colors[j % len(colors)])
        axs[i, j*5+2].set_title(f'{coin} - {column[0]}T')
        axs[i, j*5+2].set_xlabel('Values')
        axs[i, j*5+2].set_ylabel('DT')

        # Plot density for the reciprocal transformed data
        sns.kdeplot(reciprocal_transformed_data, fill=True, ax=axs[i, j*5+3], color=colors[j % len(colors)])
        axs[i, j*5+3].set_title(f'{coin} - {column[0]}T')
        axs[i, j*5+3].set_xlabel('Values')
        axs[i, j*5+3].set_ylabel('DT')

        # Plot density for the Yeo-Johnson transformed data
```

```
        sns.kdeplot(yeojohnson_transformed_data, fill=True, ax=axs[i, j*5+4], color=colors[j % len(colors)])
        axs[i, j*5+4].set_title(f'{coin} - {column[0]}T')
        axs[i, j*5+4].set_xlabel('Values')
        axs[i, j*5+4].set_ylabel('DT')

# Adjust the layout
plt.tight_layout()

# Show the plot
plt.show()

```

```
<ipython-input-52-c41bf16b2614>:52: UserWarning: Dataset has 0 variance; skipping density estimate. Pass `warn_singular=False` to disab
  sns.kdeplot(boxcox_transformed_data, fill=True, ax=axs[i, j*5+2], color=colors[j % len(colors)])
<ipython-input-52-c41bf16b2614>:70: UserWarning: Tight layout not applied. tight_layout cannot make axes width small enough to accommod
  plt.tight_layout()
```

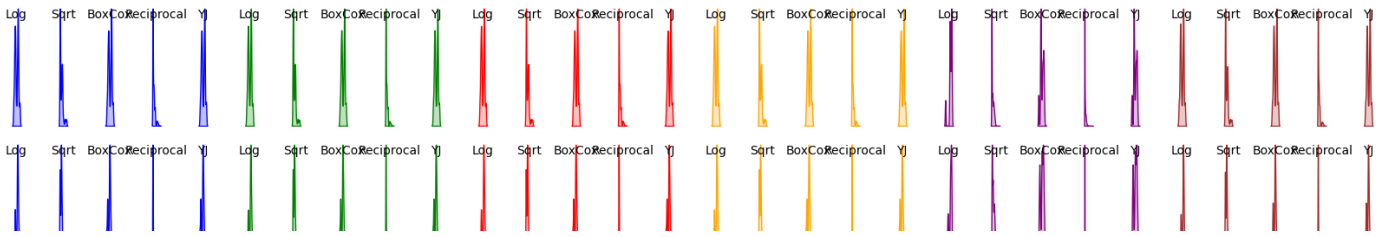


Removing the labels to visualize

```
import seaborn as sns
import matplotlib.pyplot as plt
import numpy as np
from scipy import stats

# List of coins to analyze
coins = df_visual['Symbol'].unique()

# Set up the plot grid
fig, axs = plt.subplots(len(coins), len(columns_to_visualize) * 5, figsize=(16, 8))

# Define a list of colors for the density plots
colors = ['blue', 'green', 'red', 'orange', 'purple', 'brown']

# Loop through each coin
for i, coin in enumerate(coins):
    coin_data = df_visual[df_visual['Symbol'] == coin]

    # Loop through each column
    for j, column in enumerate(columns_to_visualize):
```

```
        # Original data
        original_data = coin_data[column]

        # Logarithmic transformation
        log_transformed_data = np.log1p(original_data)

        # Square root transformation
        sqrt_transformed_data = np.sqrt(original_data)

        # Box-Cox transformation
        boxcox_transformed_data, _ = stats.boxcox(original_data + 1)  # Adding 1 to handle zero or negative values

        # Reciprocal transformation
        reciprocal_transformed_data = 1 / original_data

        # Yeo-Johnson transformation
        yeojohnson_transformed_data, _ = stats.yeojohnson(original_data)

        # Plot density for the logarithmic transformed data
        sns.kdeplot(log_transformed_data, fill=True, ax=axs[i, j*5], color=colors[j % len(colors)])
        axs[i, j*5].text(0.5, 0.9, 'Log', horizontalalignment='center', verticalalignment='center',
                         transform=axs[i, j*5].transAxes)
        axs[i, j*5].axis('off')

        # Plot density for the square root transformed data
        sns.kdeplot(sqrt_transformed_data, fill=True, ax=axs[i, j*5+1], color=colors[j % len(colors)])
        axs[i, j*5+1].text(0.5, 0.9, 'Sqrt', horizontalalignment='center', verticalalignment='center',
                           transform=axs[i, j*5+1].transAxes)
        axs[i, j*5+1].axis('off')

        # Plot density for the Box-Cox transformed data
        sns.kdeplot(boxcox_transformed_data, fill=True, ax=axs[i, j*5+2], color=colors[j % len(colors)])
        axs[i, j*5+2].text(0.5, 0.9, 'BoxCox', horizontalalignment='center', verticalalignment='center',
                           transform=axs[i, j*5+2].transAxes)
        axs[i, j*5+2].axis('off')

        # Plot density for the reciprocal transformed data
        sns.kdeplot(reciprocal_transformed_data, fill=True, ax=axs[i, j*5+3], color=colors[j % len(colors)])
        axs[i, j*5+3].text(0.5, 0.9, 'Reciprocal', horizontalalignment='center', verticalalignment='center',
                           transform=axs[i, j*5+3].transAxes)
        axs[i, j*5+3].axis('off')

        # Plot density for the Yeo-Johnson transformed data
        sns.kdeplot(yeojohnson_transformed_data, fill=True, ax=axs[i, j*5+4], color=colors[j % len(colors)])
        axs[i, j*5+4].text(0.5, 0.9, 'YJ', horizontalalignment='center', verticalalignment='center',
                           transform=axs[i, j*5+4].transAxes)
        axs[i, j*5+4].axis('off')

# Adjust the layout
plt.tight_layout()

# Show the plot
plt.show()


```

```
<ipython-input-53-4e1d44754c8d>:52: UserWarning: Dataset has 0 variance; skipping density estimate. Pass `warn_singular=False` to disab
  sns.kdeplot(boxcox_transformed_data, fill=True, ax=axs[i, j*5+2], color=colors[j % len(colors)])
```

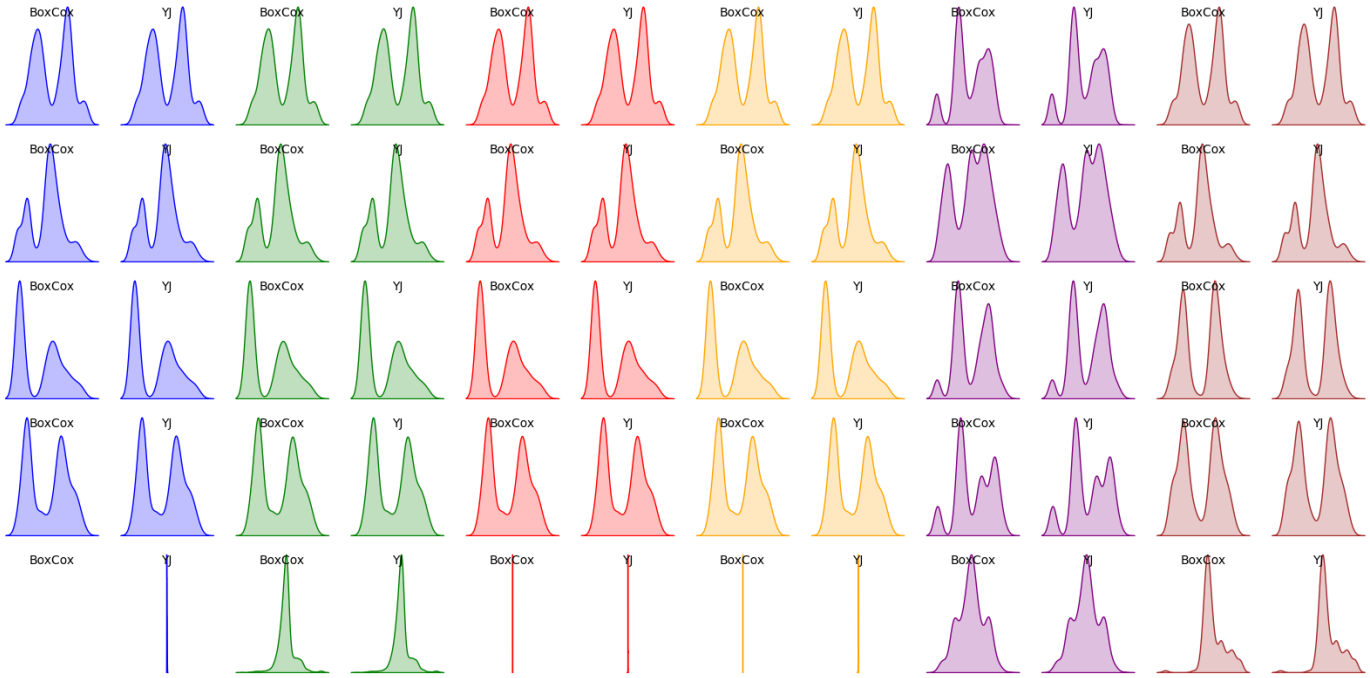



```
#Based on the density plots generated for each transformation, it appears that the Box-Cox Transformation (BoxCox) and the Yeo-Johnson Tra

#Both methods are capable of handling both positive and negative skewness and provide more flexibility in transforming the data distributi

#You can compare the density plots of the transformed data for both the BoxCox and YJ methods and choose the one that appears to have the
```

Chose the two transformations which effectively reduced the skewness

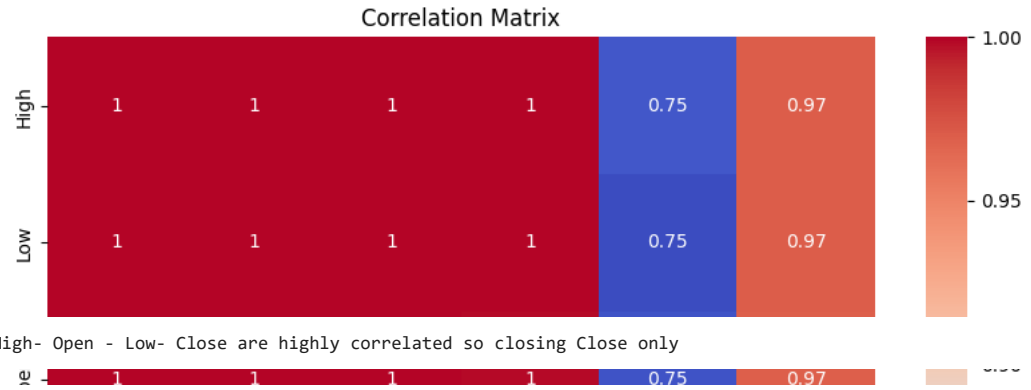
```
import seaborn as sns
import matplotlib.pyplot as plt
import numpy as np
from scipy import stats

# List of coins to analyze
coins = df_visual['Symbol'].unique()

# Set up the plot grid
fig, axs = plt.subplots(len(coins), len(columns_to_visualize) * 2, figsize=(16, 8))

# Define a list of colors for the density plots
colors = ['blue', 'green', 'red', 'orange', 'purple', 'brown']

# Loop through each coin
for i, coin in enumerate(coins):
    coin_data = df_visual[df_visual['Symbol'] == coin]

    # Loop through each column
    for j, column in enumerate(columns_to_visualize):
        # Original data
        original_data = coin_data[column]

        # Box-Cox transformation
        boxcox_transformed_data, _ = stats.boxcox(original_data + 1)  # Adding 1 to handle zero or negative values

        # Yeo-Johnson transformation
        yeojohnson_transformed_data, _ = stats.yeojohnson(original_data)

        # Plot density for the Box-Cox transformed data
        sns.kdeplot(boxcox_transformed_data, fill=True, ax=axs[i, j*2], color=colors[j % len(colors)])
        axs[i, j*2].text(0.5, 0.9, 'BoxCox', horizontalalignment='center', verticalalignment='center',
                         transform=axs[i, j*2].transAxes)
        axs[i, j*2].axis('off')

        # Plot density for the Yeo-Johnson transformed data
        sns.kdeplot(yeojohnson_transformed_data, fill=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
        axs[i, j*2+1].text(0.5, 0.9, 'YJ', horizontalalignment='center', verticalalignment='center',
                           transform=axs[i, j*2+1].transAxes)
        axs[i, j*2+1].axis('off')

# Adjust the layout
plt.tight_layout()

# Show the plot
plt.show()
```

```
<ipython-input-55-91373e4aaac9>:31: UserWarning: Dataset has 0 variance; skipping density estimate. Pass `warn_singular=False` to disab
  sns.kdeplot(boxcox_transformed_data, fill=True, ax=axs[i, j*2], color=colors[j % len(colors)])
```



Correlation of columns_to_visualize

```
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt

# Assuming you have a DataFrame called 'df' with your data
# and a list called 'columns_to_visualize' with the columns to analyze

# Subset the DataFrame with the columns to visualize
subset_df = df[columns_to_visualize]

# Compute the correlation matrix
correlation_matrix = subset_df.corr()

# Plot the correlation matrix as a heatmap
plt.figure(figsize=(10, 8))
sns.heatmap(correlation_matrix, annot=True, cmap='coolwarm')
plt.title('Correlation Matrix')
plt.show()

```

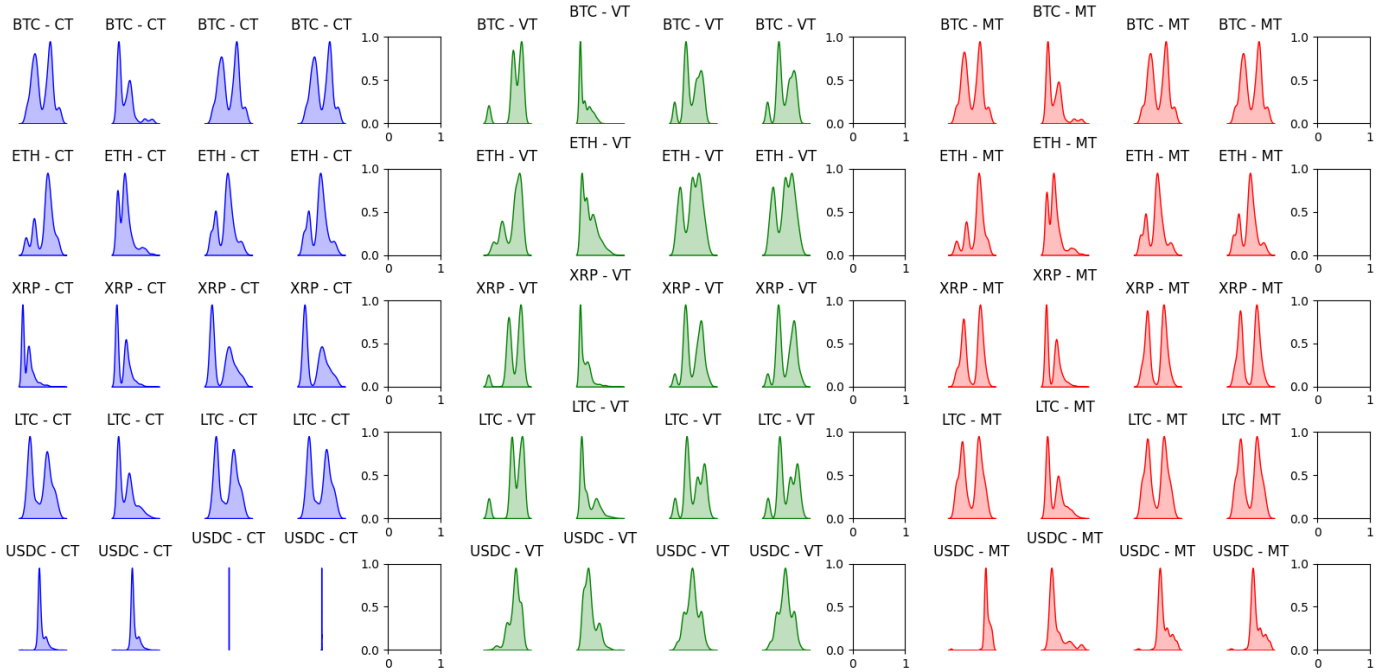



```
#High- Open - Low- Close are highly correlated so closing Close only
```

Apply the transformations on reduced attributes

```
import seaborn as sns
import matplotlib.pyplot as plt
import numpy as np
from scipy import stats

# List of coins to analyze
coins = df_visual['Symbol'].unique()

# Set up the plot grid
fig, axs = plt.subplots(len(coins), 15, figsize=(16, 8))

# Define a list of colors for the density plots
colors = ['blue', 'green', 'red']

# Loop through each coin
for i, coin in enumerate(coins):
    coin_data = df_visual[df_visual['Symbol'] == coin]

    # Loop through each column
    for j, column in enumerate(['Close', 'Volume', 'Marketcap']):
        # Original data
        original_data = coin_data[column]

        # Logarithmic transformation
        log_transformed_data = np.log1p(original_data)

        # Square root transformation
        sqrt_transformed_data = np.sqrt(original_data)

        # Box-Cox transformation
        boxcox_transformed_data, _ = stats.boxcox(original_data + 1)  # Adding 1 to handle zero or negative values

        # Yeo-Johnson transformation
        yeojohnson_transformed_data, _ = stats.yeojohnson(original_data)

        # Plot density for the logarithmic transformed data
        sns.kdeplot(log_transformed_data, fill=True, ax=axs[i, j*5], color=colors[j % len(colors)])
        axs[i, j*5].set_title(f'{coin} - {column[0]}T')
        axs[i, j*5].set_xlabel('')
        axs[i, j*5].set_ylabel('DT')
        axs[i, j*5].axis('off')

        # Plot density for the square root transformed data
        sns.kdeplot(sqrt_transformed_data, fill=True, ax=axs[i, j*5+1], color=colors[j % len(colors)])
        axs[i, j*5+1].set_title(f'{coin} - {column[0]}T')
        axs[i, j*5+1].set_xlabel('')
        axs[i, j*5+1].set_ylabel('DT')
        axs[i, j*5+1].axis('off')

        # Plot density for the Box-Cox transformed data
        sns.kdeplot(boxcox_transformed_data, fill=True, ax=axs[i, j*5+2], color=colors[j % len(colors)])
        axs[i, j*5+2].set_title(f'{coin} - {column[0]}T')
        axs[i, j*5+2].set_xlabel('')
        axs[i, j*5+2].set_ylabel('DT')
        axs[i, j*5+2].axis('off')

        # Plot density for the Yeo-Johnson transformed data
```

```
        sns.kdeplot(yeojohnson_transformed_data, fill=True, ax=axs[i, j*5+3], color=colors[j % len(colors)])
        axs[i, j*5+3].set_title(f'{coin} - {column[0]}T')
        axs[i, j*5+3].set_xlabel('')
        axs[i, j*5+3].set_ylabel('DT')
        axs[i, j*5+3].axis('off')

# Adjust the layout
plt.tight_layout()

# Show the plot
plt.show()

```



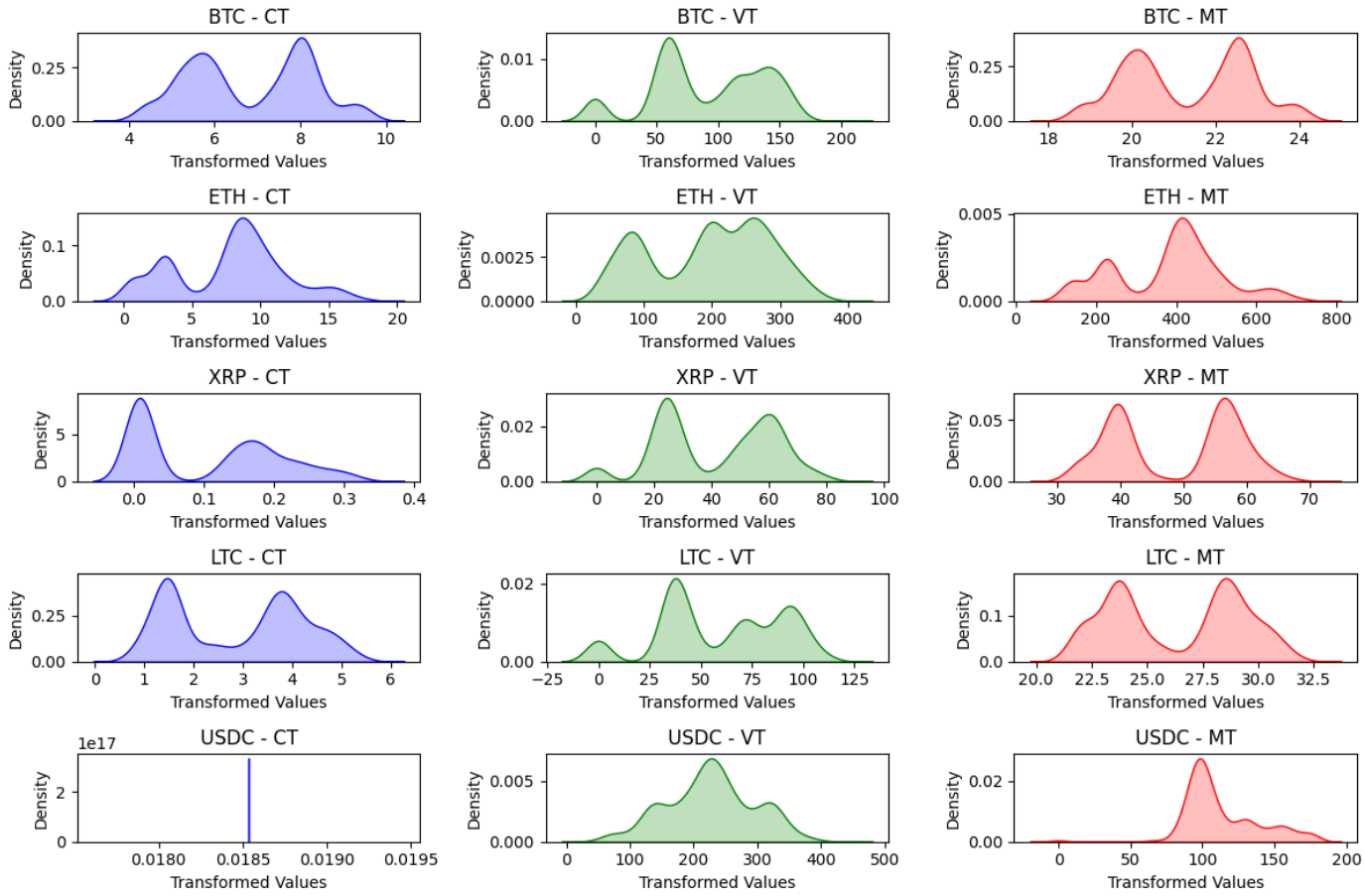
Results based on above transformations

```
#Based on the provided density plots, we can make some observations about the effectiveness of each transformation method in reducing skew

#For the 'Close' attribute:
#- The Box-Cox transformation (CT) appears to be the most effective in reducing skewness for most coins, as it results in distributions th
#- The Yeo-Johnson transformation (YT) also shows some improvement in reducing skewness, but it is not as consistent as the Box-Cox transf

#For the 'Volume' attribute:
#- The Box-Cox transformation (CT) and the Yeo-Johnson transformation (YT) both show similar effectiveness in reducing skewness, with slig

#For the 'Marketcap' attribute:
#- The Box-Cox transformation (CT) and the Yeo-Johnson transformation (YT) again show similar effectiveness in reducing skewness, with som

#Based on these observations, it seems that the Box-Cox transformation (CT) generally performs well in reducing skewness for the given att
```

Box-Cox transformation (CT) for the 'Close', 'Volume', and 'Marketcap' attributes.

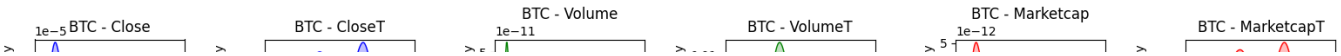
```
import seaborn as sns
import matplotlib.pyplot as plt
import numpy as np
from scipy import stats

# List of coins to analyze
coins = df_visual['Symbol'].unique()

```

```
# Set up the plot grid
fig, axs = plt.subplots(len(coins), 3, figsize=(12, 8))

# Define a list of colors for the density plots
colors = ['blue', 'green', 'red']

# Loop through each coin
for i, coin in enumerate(coins):
    coin_data = df_visual[df_visual['Symbol'] == coin]

    # Loop through each column
    for j, column in enumerate(['Close', 'Volume', 'Marketcap']):
        # Original data
        original_data = coin_data[column]

        # Box-Cox transformation
        boxcox_transformed_data, _ = stats.boxcox(original_data + 1)  # Adding 1 to handle zero or negative values

        # Plot density for the Box-Cox transformed data
        sns.kdeplot(boxcox_transformed_data, fill=True, ax=axs[i, j], color=colors[j % len(colors)])
        axs[i, j].set_title(f'{coin} - {column[0]}T')
        axs[i, j].set_xlabel('Transformed Values')
        axs[i, j].set_ylabel('Density')

# Adjust the layout
plt.tight_layout()

# Show the plot
plt.show()

```



▾ Box-Cox transformation (CT) for the 'Close', 'Volume', and 'Marketcap' attributes- Original Vs Transformed

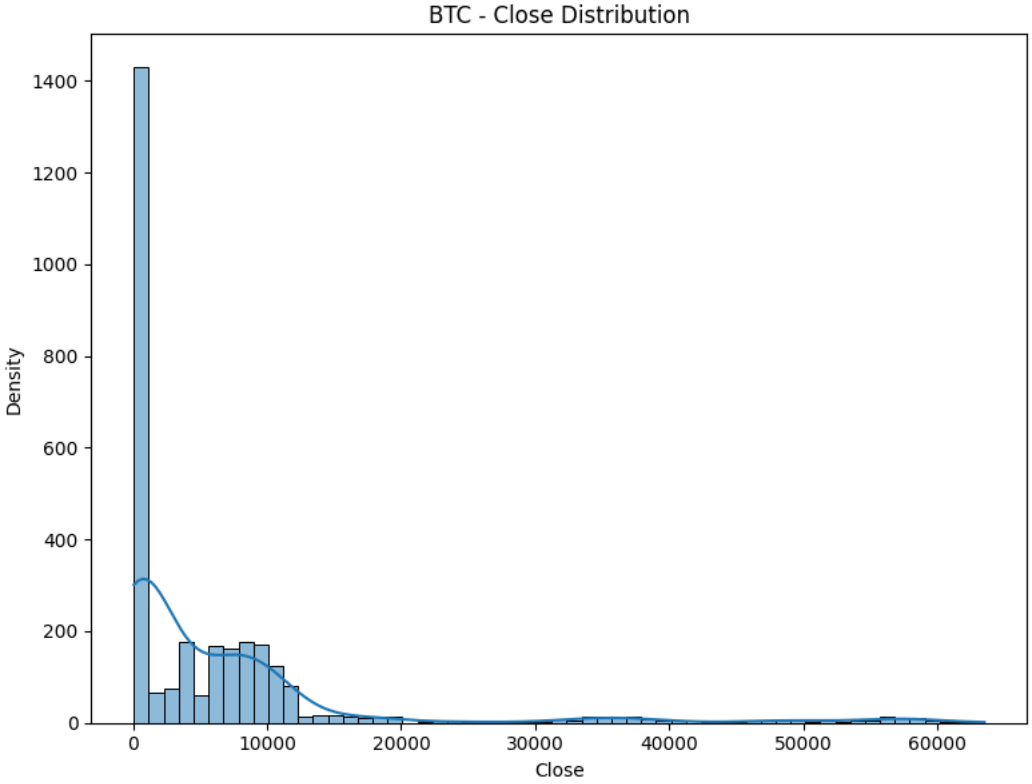
```
import seaborn as sns
import matplotlib.pyplot as plt
import numpy as np
from scipy import stats

# List of coins to analyze
coins = df_visual['Symbol'].unique()

# Set up the plot grid
fig, axs = plt.subplots(len(coins), 6, figsize=(16, 8))

# Define a list of colors for the density plots
colors = ['blue', 'green', 'red']

# Loop through each coin
for i, coin in enumerate(coins):
    coin_data = df_visual[df_visual['Symbol'] == coin]

    # Loop through each column
    for j, column in enumerate(['Close', 'Volume', 'Marketcap']):
        # Original data
        original_data = coin_data[column]

        # Box-Cox transformation
        boxcox_transformed_data, _ = stats.boxcox(original_data + 1)  # Adding 1 to handle zero or negative values

        # Plot density for the original data
        sns.kdeplot(original_data, fill=True, ax=axs[i, j*2], color=colors[j % len(colors)])
        axs[i, j*2].set_title(f'{coin} - {column}')
        axs[i, j*2].set_xlabel('Values')
        axs[i, j*2].set_ylabel('Density')

        # Plot density for the Box-Cox transformed data
        sns.kdeplot(boxcox_transformed_data, fill=True, ax=axs[i, j*2+1], color=colors[j % len(colors)])
        axs[i, j*2+1].set_title(f'{coin} - {column}T')
        axs[i, j*2+1].set_xlabel('Transformed Values')
        axs[i, j*2+1].set_ylabel('Density')

# Adjust the layout
plt.tight_layout()

# Show the plot
plt.show()

```

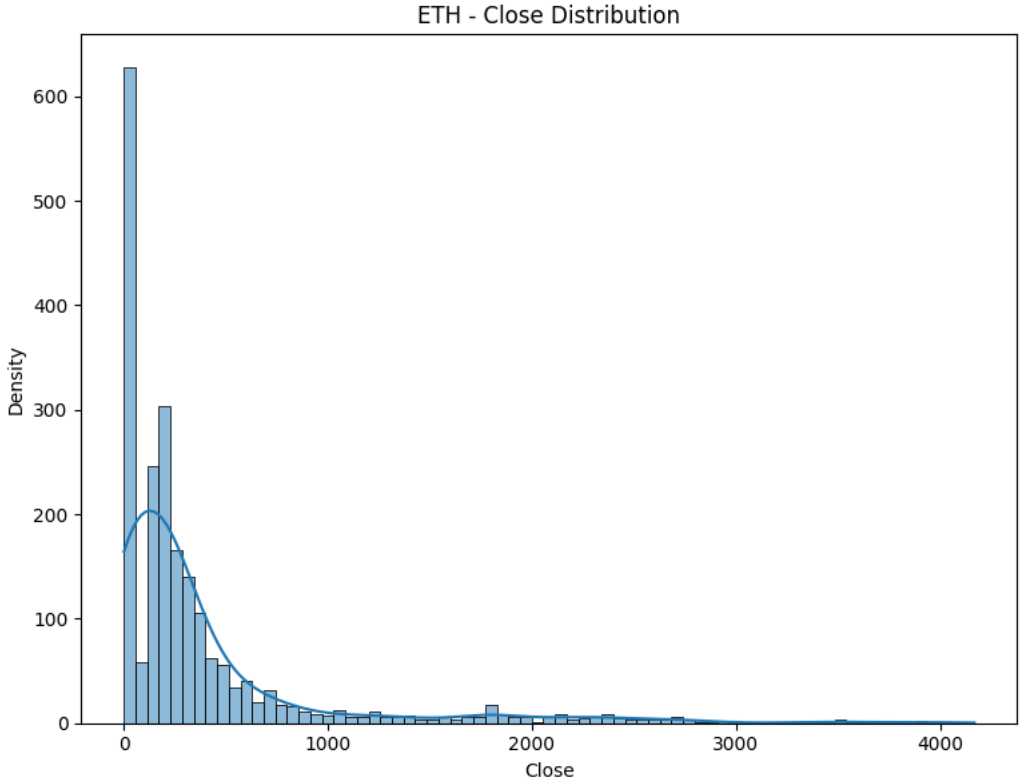


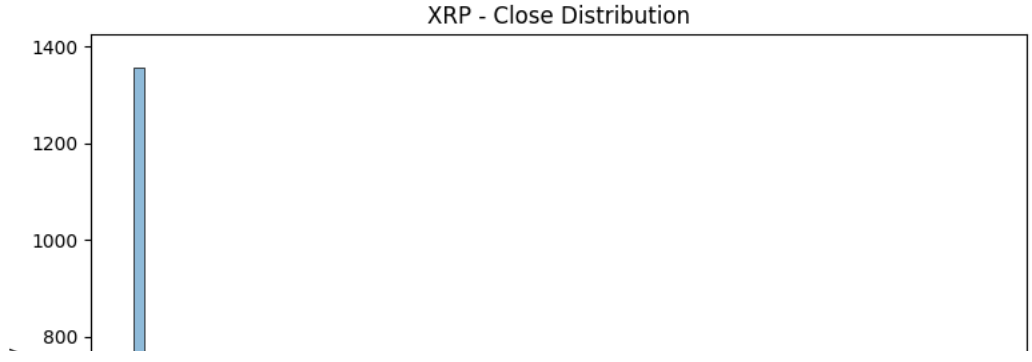
Univariate Analysis

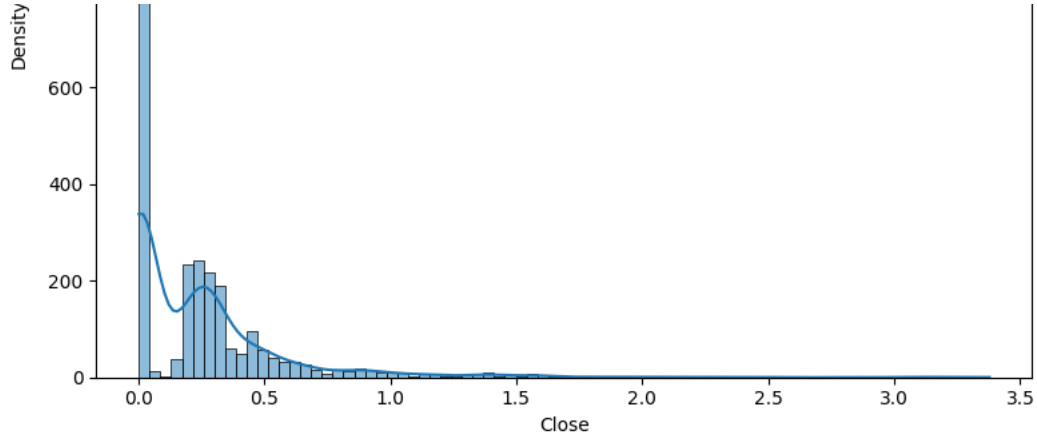
To perform univariate analysis for each coin using the attribute "Close"

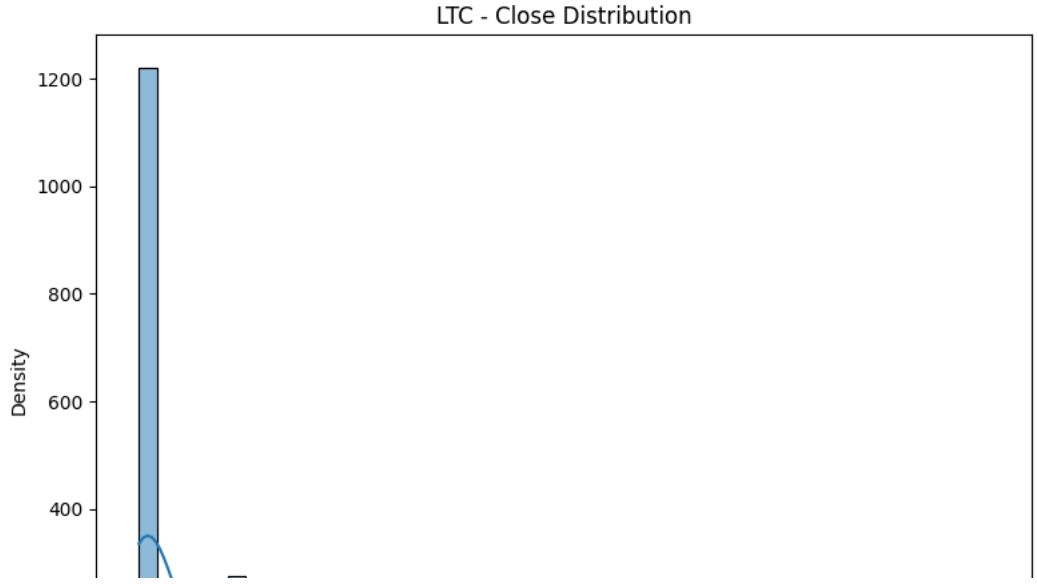
```
import seaborn as sns
import matplotlib.pyplot as plt

# List of coins to analyze
coins = df_visual['Symbol'].unique()

# Set up the plot grid
fig, axs = plt.subplots(len(coins), 1, figsize=(8, 6 * len(coins)))

# Loop through each coin
for i, coin in enumerate(coins):
    coin_data = df_visual[df_visual['Symbol'] == coin]

    # Plot the distribution of 'Close' attribute for the current coin
    sns.histplot(data=coin_data, x='Close', kde=True, ax=axs[i])
    axs[i].set_title(f'{coin} - Close Distribution')
    axs[i].set_xlabel('Close')
    axs[i].set_ylabel('Density')

# Adjust the layout
plt.tight_layout()

# Show the plot
plt.show()

```


BTC - Close Distribution
Density
Close
0
200
400
600
800
1000
1200
1400
0
10000
20000
30000
40000
50000
60000


ETH - Close Distribution
Density
Close
0
100
200
300
400
500
600
0
1000
2000
3000
4000


XRP - Close Distribution
800
1000
1200
1400

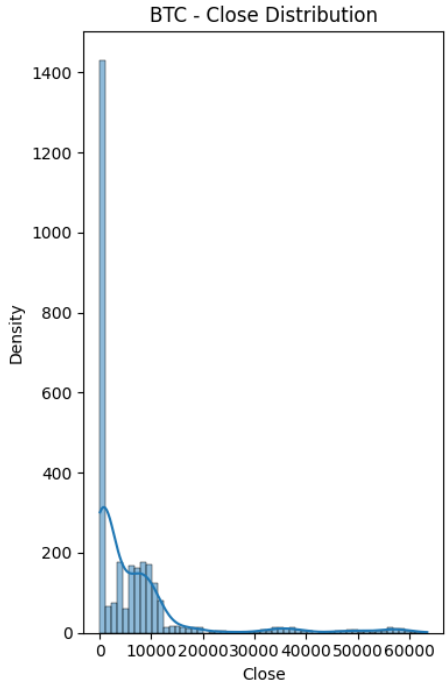


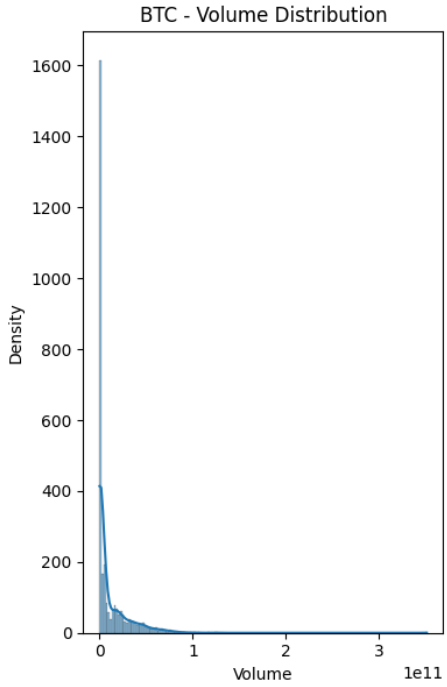


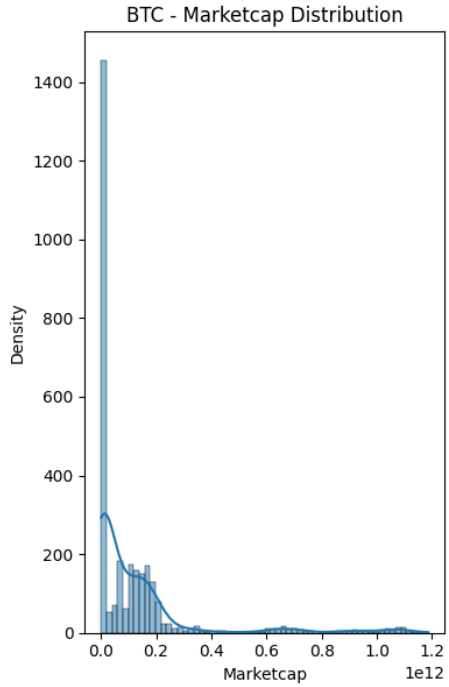
- To generate univariate analysis for the attributes 'Close', 'Volume', and 'Marketcap' for each coin

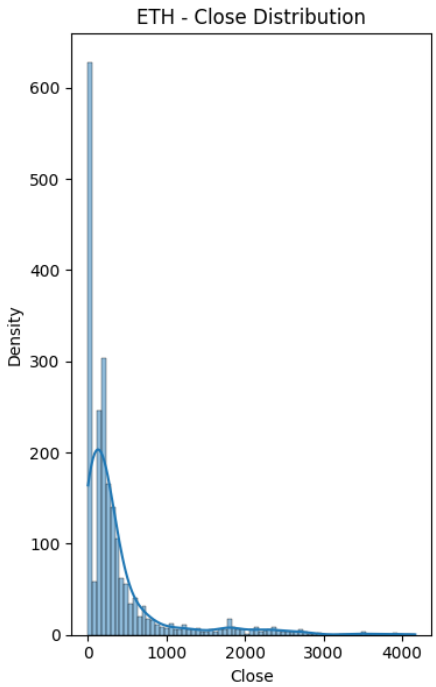
```
import seaborn as sns
import matplotlib.pyplot as plt

# List of coins to analyze
coins = df_visual['Symbol'].unique()

# Set up the plot grid
fig, axs = plt.subplots(len(coins), 3, figsize=(12, 6 * len(coins)))

# Loop through each coin
for i, coin in enumerate(coins):
    coin_data = df_visual[df_visual['Symbol'] == coin]

    # Plot the distribution of 'Close' attribute for the current coin
    sns.histplot(data=coin_data, x='Close', kde=True, ax=axs[i, 0])
    axs[i, 0].set_title(f'{coin} - Close Distribution')
    axs[i, 0].set_xlabel('Close')
    axs[i, 0].set_ylabel('Density')

    # Plot the distribution of 'Volume' attribute for the current coin
    sns.histplot(data=coin_data, x='Volume', kde=True, ax=axs[i, 1])
    axs[i, 1].set_title(f'{coin} - Volume Distribution')
    axs[i, 1].set_xlabel('Volume')
    axs[i, 1].set_ylabel('Density')

    # Plot the distribution of 'Marketcap' attribute for the current coin
    sns.histplot(data=coin_data, x='Marketcap', kde=True, ax=axs[i, 2])
    axs[i, 2].set_title(f'{coin} - Marketcap Distribution')
    axs[i, 2].set_xlabel('Marketcap')
    axs[i, 2].set_ylabel('Density')

# Adjust the layout
```

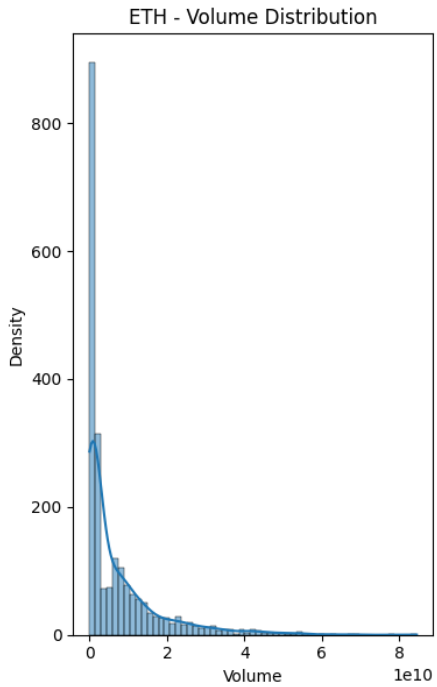
```
plt.tight_layout()

# Show the plot
plt.show()

```

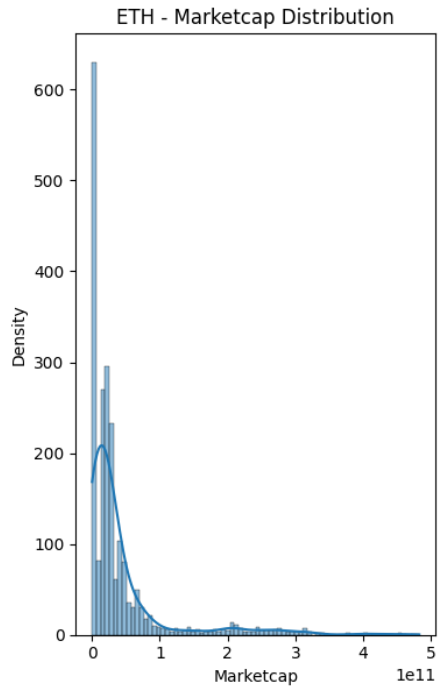

BTC - Close Distribution
Density
Close

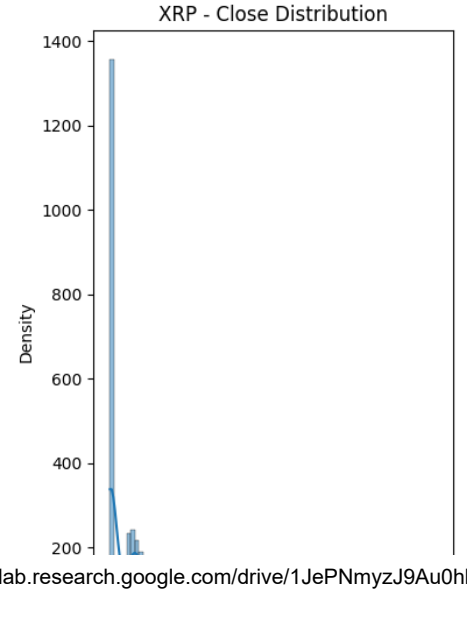

BTC - Volume Distribution
Density
Volume
1e11

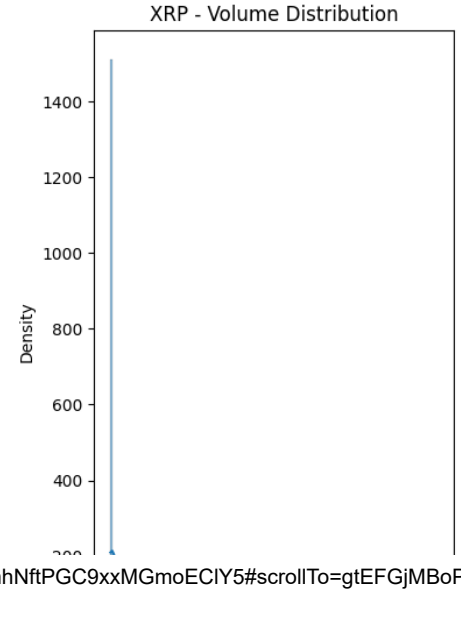

BTC - Marketcap Distribution
Density
Marketcap
1e12

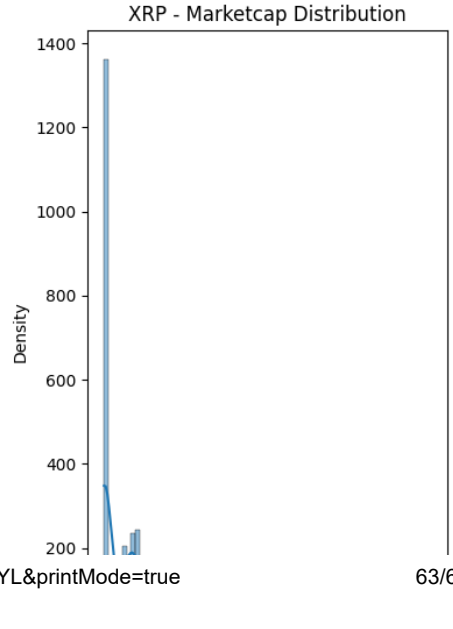

ETH - Close Distribution
Density
Close

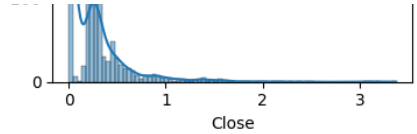

ETH - Volume Distribution
Density
Volume
1e10

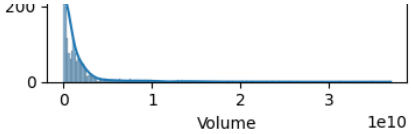

ETH - Marketcap Distribution
Density
Marketcap
1e11

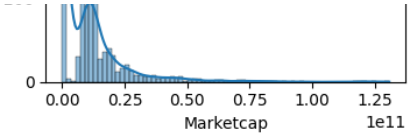

XRP - Close Distribution
Density

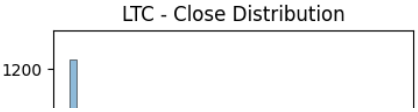

XRP - Volume Distribution
Density

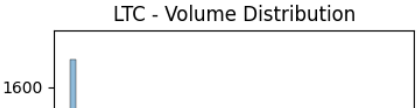

XRP - Marketcap Distribution
Density











Bivariate Analysis

To perform bivariate analysis for the attributes 'Close', 'Volume', and 'Marketcap' for each coin


```
import seaborn as sns
import matplotlib.pyplot as plt

# List of coins to analyze
coins = df_visual['Symbol'].unique()

# Set up the plot grid
fig, axs = plt.subplots(len(coins), 3, figsize=(12, 8))

# Loop through each coin
for i, coin in enumerate(coins):
    coin_data = df_visual[df_visual['Symbol'] == coin]

    # Bivariate analysis for 'Close' and 'Volume'
    sns.scatterplot(x='Close', y='Volume', data=coin_data, ax=axs[i, 0], color='blue')
    axs[i, 0].set_title(f'{coin} - Close vs. Volume')

    # Bivariate analysis for 'Close' and 'Marketcap'
    sns.scatterplot(x='Close', y='Marketcap', data=coin_data, ax=axs[i, 1], color='green')
    axs[i, 1].set_title(f'{coin} - Close vs. Marketcap')

    # Bivariate analysis for 'Volume' and 'Marketcap'
    sns.scatterplot(x='Volume', y='Marketcap', data=coin_data, ax=axs[i, 2], color='red')
    axs[i, 2].set_title(f'{coin} - Volume vs. Marketcap')

# Adjust the layout
plt.tight_layout()

# Show the plot
plt.show()

```