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Solutions:

Time Series and Temporal Data

Introduction

In this critical thinking, our mission is to create Python graphics for time series and temporal data. Explain the distinctions between time series and temporal data, and create a concise overview of what these representations signify to the end-user. The dataset used for this critical thinking was retrieved from the **Yahoo finance** (finance.yahoo.com) for the historical prices of Bitcoin-USD data.

Bitcoin-USD dataset

It's a stock data that mostly popular among people. **Date** is the month, day, and year on which an order is executed in the market is referred to as the trade date. **Open** is the price at which a stock began trading is referred to as the open. **High** is the highest price at which a stock was traded within a certain time period is known as the high. **Low** is the lowest price of the time period is low. **Close** is the price of an individual stock when the stock exchange closed for the day is referred to as close. **Adj. Close** is dividend payments, stock splits, and fresh share issuance are all examples of company acts that affect adjusted values. **Volume** is the total number of shares traded in securities over a certain time period is known as volume.

Temporal and Types of Temporal Data

Temporal data is data that is dependent on time and where time is explicitly documented. Time is an intrinsic feature of this type of data and is always associated with it.

Types of temporal data: sequential, cyclical and hierarchical. **Sequential:** Here, we treat time as a set of continuous linear numbers. **Cyclical:** Time can be considered as a recurring occurrence in which set intervals, such as weeks or months, are known. **Hierarchical:** An hierarchical pattern is another approach to comprehending temporal information.

Time-Series and Temporal Data

Time-series data is a refined version of temporal data in which observations are made at evenly spaced moments in time in a sequential manner. On the other hand, with temporal data, observations are simply tied to time, and gaps may not be evenly spaced.
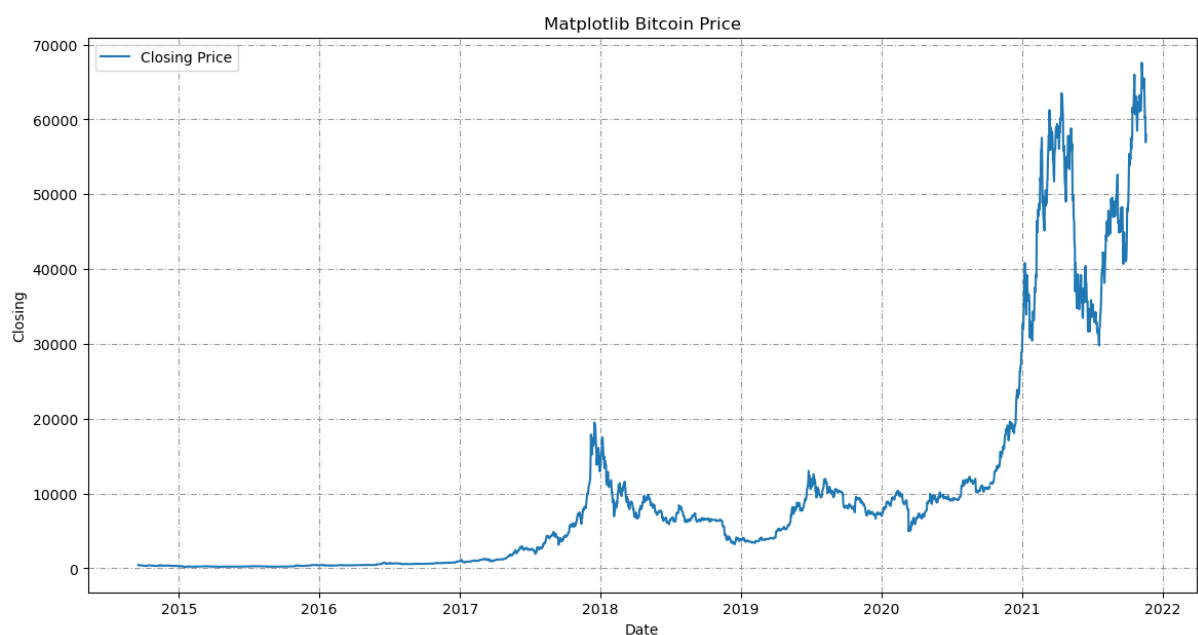
Time-series data is a subset of temporal data, hence time-series data is temporal data, but temporal data is not always time-series data. The water level in the Puzhal reservoir in Chennai, for example, is shown in the following figure over a period of time that is not always evenly spaced out; hence, the picture is displayed using temporal data rather than time-series data.

Python Visualizations

Now we will view examples of data visualization using python packages and see the difference between them. The packages we will see are Matplotlib, Seaborn and Plotly. In all examples, we will view the date variable with the close variable to see the differences between packages. In figure 1 below we can see the output of matplotlib package.
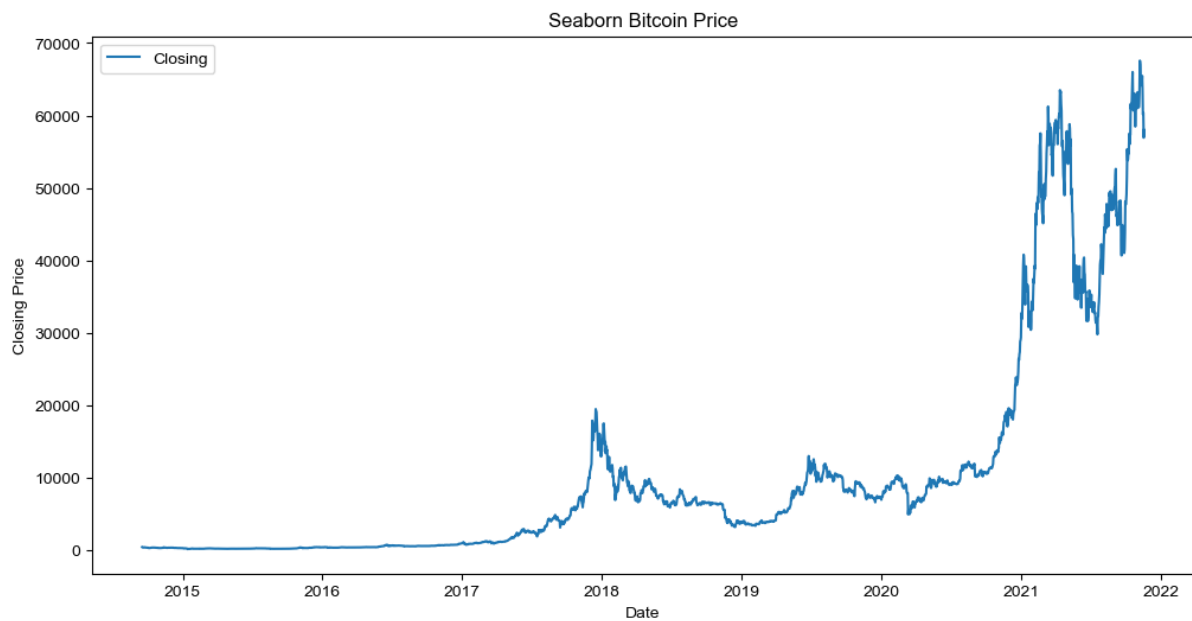
Figure 1

Matplotlib line chart

The second visual is seaborn. The output of Seaborn in figure 2 seems to be like matplotlib.

Figure 2

Seaborn line chart

Finally with the last visual Plotly package. In figure 3, It seems that it does not have that difference from the other packages.

Figure 3

Plotly line chart

In fact, the big and important difference between the packages is the visual interactivity. Plotly is the only one that allows this feature among other packages. Interactive visualization is a type of data visualization that focuses on graphical representations of data to improve how people interact with data.

References

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