Cisco Systems: CS Project Presentation

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What is Cisco Systems?

Cisco Systems is a global technology company that specializes in networking and telecommunications solutions. Founded in 1984, Cisco Systems is headquartered in San Jose, California. They're known for their networking hardware, software, and services, including routers, switches, security products, and cloud-based networking solutions. Cisco Systems is a market leader in networking equipment and has a strong presence in enterprise and service provider markets worldwide, with products and solutions being used by businesses, governments, and individuals to connect and communicate in the digital world.

Terms to know

Mean: The mean, also known as the average, is calculated by adding up all the numeric values in a dataset and dividing by the total number of values. It represents the "central tendency" of the data and gives an idea of the average value.

Median: The median is the middle value in a dataset when the values are arranged in ascending or descending order. If the dataset has an odd number of values, the median is the middle value. If the dataset has an even number of values, the median is the average of the two middle values. The median is less sensitive to extreme values and is a good measure of the "typical" value.

Mode: The mode is the value that appears most frequently in a dataset. It represents the value that occurs with the highest frequency. A dataset can have multiple modes (bimodal, trimodal, etc.) or no mode (uniform distribution). The mode is useful for identifying the most frequently occurring value in a dataset.

These statistical measures are commonly used to summarize and describe the characteristics of a dataset, providing insights into the central tendency, variability, and distribution of the data.

Terms To Know: Continued

Column: Open

Mean: 1.29

Median: 1.152

Mode: 1.73611

Column: High

Mean: 1.271

Median: 1.233

Mode: .087674 , .088542

Column: Low

Mean: 1.155

Median: 1.097

Mode: .085069 , 1.652778

Column: Close

Mean: 1.223

Median: 1.166

Mode: .085938

Column: Volume

Mean: 390565005

Median: 346572000

Mode: Many different modes Ex: 41731200, 37324800, 49968000, etc.

Cisco Systems Stocks

Date	Open	High	Low	Close	Adj Close	Volume
4/2/90	0.078993	0.081597	0.078993	0.078993	0.055651	41731200
4/9/90	0.079861	0.079861	0.074653	0.077257	0.054428	79430400
4/16/90	0.077257	0.079861	0.075521	0.077257	0.054428	70560000
4/23/90	0.077257	0.081597	0.076389	0.078993	0.055651	37324800
4/30/90	0.080729	0.085938	0.079861	0.085938	0.060543	79171200
5/7/90	0.085938	0.08941	0.085069	0.085938	0.060543	70416000
5/14/90	0.087674	0.087674	0.084201	0.085069	0.059931	110102400
5/21/90	0.084201	0.086806	0.082465	0.083333	0.058708	78854400
5/28/90	0.083333	0.088542	0.080729	0.086806	0.061155	323107200
6/4/90	0.087674	0.09375	0.085938	0.087674	0.061766	152582400
6/11/90	0.085069	0.09809	0.085069	0.095486	0.06727	250099200
6/18/90	0.097222	0.097222	0.090278	0.094618	0.066658	73641600
6/25/90	0.094618	0.094618	0.086806	0.092014	0.064824	213984000
7/2/90	0.092014	0.09375	0.090278	0.09158	0.064518	49968000
7/9/90	0.09158	0.105035	0.090278	0.105035	0.073997	151920000
7/16/90	0.104167	0.105035	0.094618	0.097222	0.068493	231523200
7/23/90	0.097222	0.097222	0.082465	0.08941	0.062989	157478400

The dataset is about their stock prices from 1990 to 1995.

The data includes the date, open, close, high, low, adjacent close, and volume measures of the stocks.

The date is the day in which the stock had those specific values.

The open is the price at which a stock started trading when the opening bell rang.

Close refers to the price of an individual stock when the stock exchange closed shop for the day.

The high is the highest price at which a stock is traded during a period.

The low is the lowest price of the period.

Adjusted close is the closing price after adjustments for all applicable splits and dividend distributions.

Volume is simply the number of shares traded in a particular stock, index, or other investment over a specific period of time.

Data and Explanations

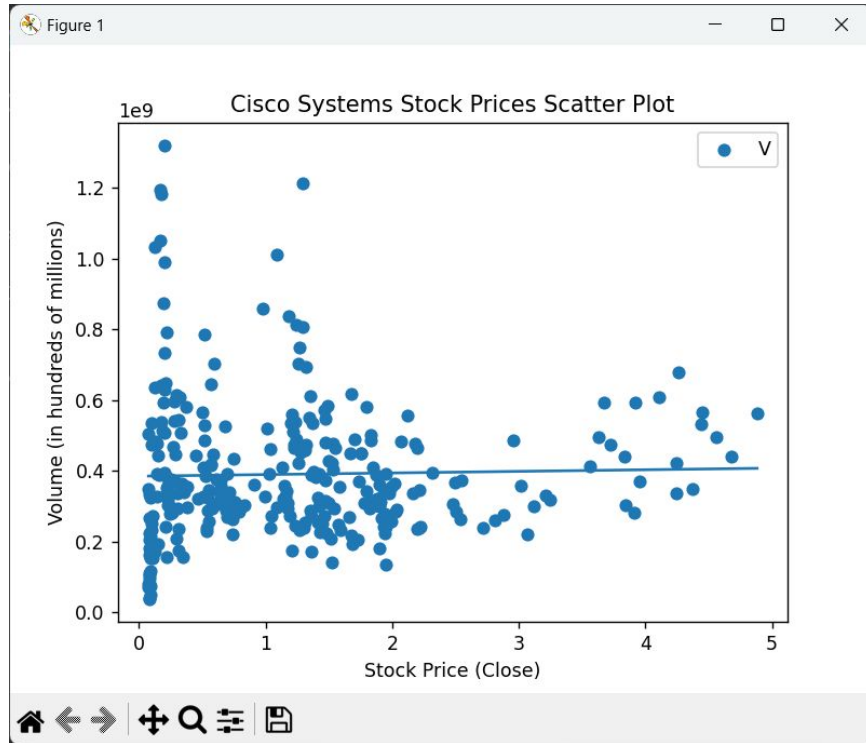# Cisco Systems Stock Prices: Bar Plot
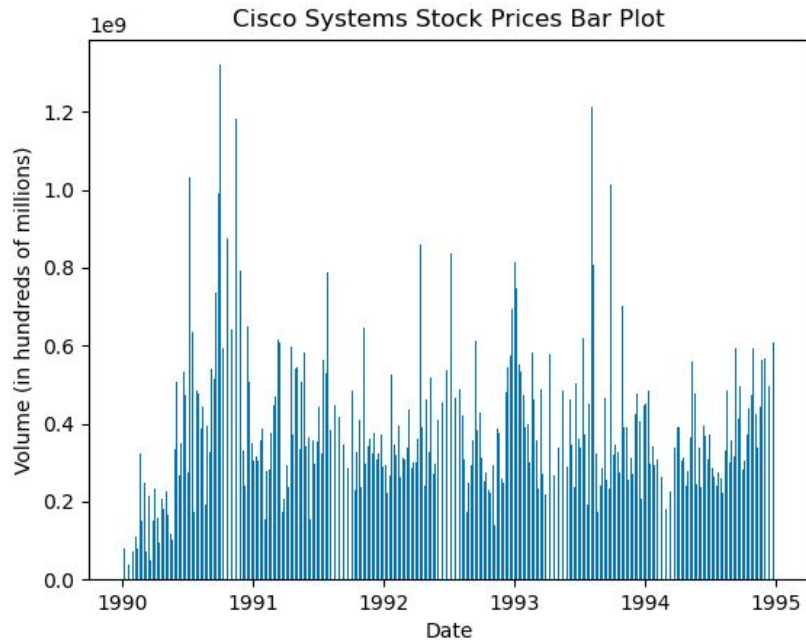
The adjacent chart labeled "Cisco Systems Stock Prices Bar Plot, illustrates the stock prices in a bar plot.

The bar plot illustrates the relationship between volume and price using vertical bars.

The relationship tells us at what prices the volume is at its strongest which indicates market strength, a measure of a market's power to perform versus other markets or versus its own historical levels of momentum and investor participation.
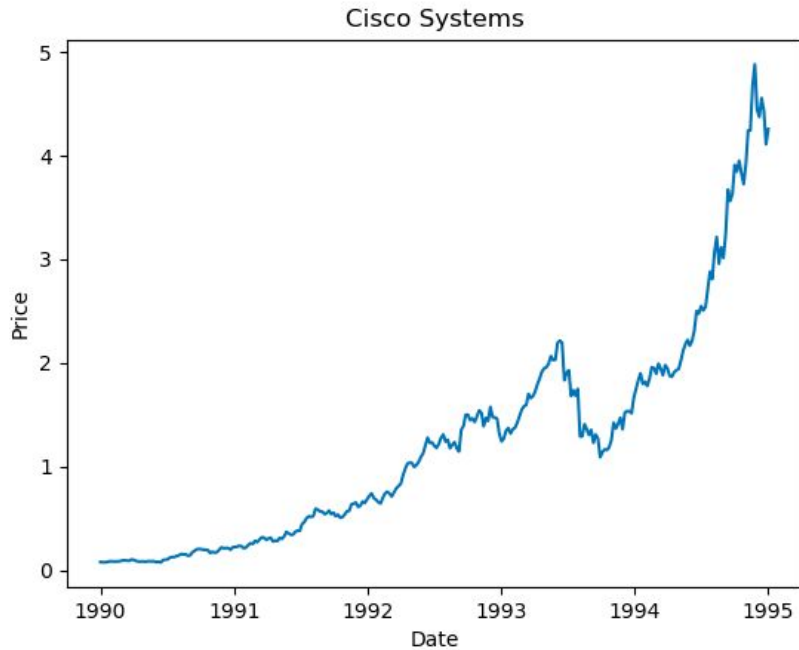
Cisco Systems Stock Prices: Scatter Plot

The adjacent chart is labeled Cisco Systems Stock Prices Scatter Plot.

The scatter plot illustrates the relationship between volume and price using dots "scattered" around.

It shows where the volume of the Cisco's stock normally funclates at.
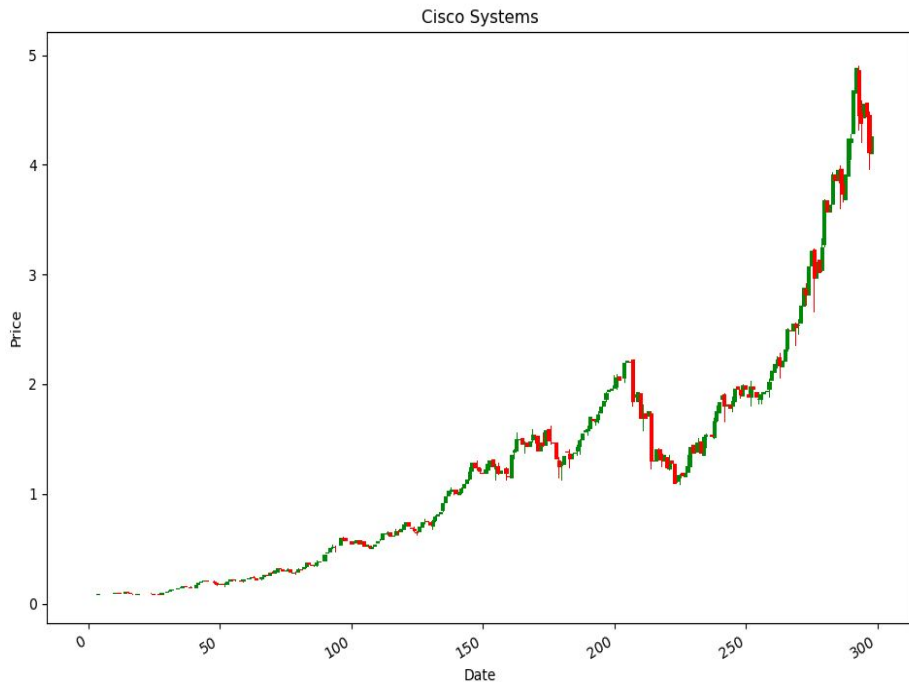
Cisco Systems Stock Prices: Line Chart

The adjacent chart is labeled Cisco Systems.

The line chart illustrates the relationship between date and price using one continuous line that fluctuates up and down.

It shows the relationship between Cisco's stock price and the date.

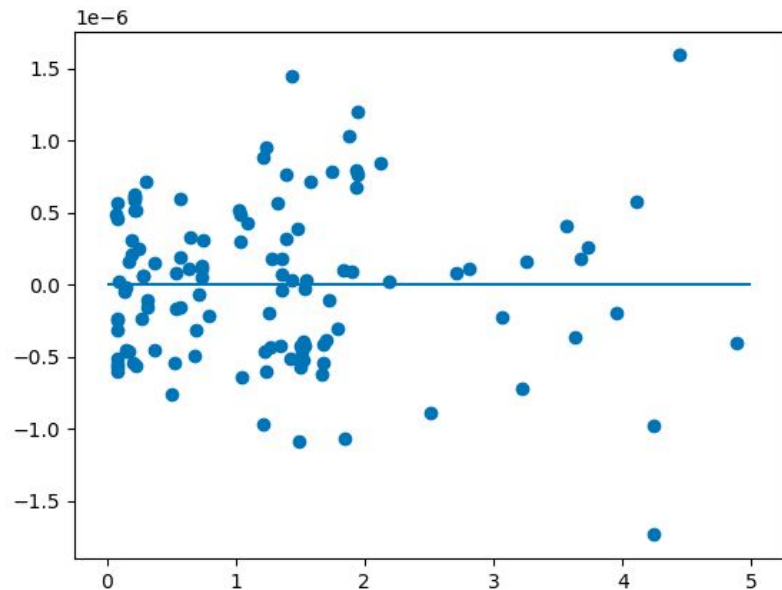# Cisco Systems Stock Prices: Candlestick Chart

Cisco Systems

The adjacent chart is labeled Cisco Systems.

The candlestick chart illustrates the relationship between the 4 data columns (open, close, high, and low).

It essentially shows the price movements of Cisco Systems stocks.

Cisco Systems Stock Prices: Training/Validation Set

This scatter plot is our training /validation set.

The validation set is a set of data, separate from the training set, that is used to validate our model performance during training. This validation process gives information that helps us tune the model's hyperparameters and configurations accordingly.

We used linear regression to show this relationship.

Linear regression is used to model relationships between variables by fitting it into a linear equation.

The MSE, the average squared difference between the estimated values and the actual value, is predicted to be 1.73986612932396123e-16

Data Chart Code

Bar Plot Code

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

stock = pd.read_csv('chop.csv')
x = np.linspace(1990,1995,299)
y = (stock.Volume)
plt.title("Cisco Systems Stock Prices Bar Plot")
plt.xlabel("Date")
plt.ylabel("Volume (in hundreds of millions)")
plt.bar(x,y,width=0.01)
plt.show()
```

Scatter Plot Code

```python
import pandas as pd
import matplotlib.pyplot as plt
import numpy as np
from numpy.polynomial.polynomial import polygit
stock = pd.read_csv('chop')
x = stock.Close
y = stock.Volume
plt.scatter(x,y)
plt.ylabel('Volume (in hundred of millions)')
plt.xlabel('Stock Price (Close)')
plt.legend('Volume')
plt.title('Cisco Systems Stock Prices Scatter Plot')
plt.plot(np.unique(x), np.ploy1d(x, y, 1))(np.unique(x))
plt.show()
```

Line Chart Code

```python
import pandas as pd
import matplotlib.pyplot as plt
import numpy as np

stock = pd.read_csv('chop.csv')
x   = np.linspace(1990, 1995, 299)
y = stock.Close
plt.plot(x,y)
plt.xlabel("Date")
plt.ylabel("Price")
plt.title("Cisco Systems")
plt.show()
```

Candlestick Chart Code

```python
import pandas as pd
import matplotlib.pyplot as plt
import numpy as np

stock_prices = pd.read_csv('chop.csv')

plt.figure()


up = stock_prices[stock_prices.Close >= stock_prices.Open]

down = stock_prices[stock_prices.Close < stock_prices.Open]

col1 = 'green'


col2 = 'red'

width = 1.5
width2 = .15

plt.bar(up.index, up.Close-up.Open, width, bottom=up.Open, color=col1)
plt.bar(up.index, up.High-up.Close, width2, bottom=up.Close, color=col1)
plt.bar(up.index, up.Low-up.Open, width2, bottom=up.Open, color=col1)

plt.bar(down.index, down.Close-down.Open, width, bottom=down.Open, color=col2)
plt.bar(down.index, down.High-down.Open, width2, bottom=down.Open, color=col2)
plt.bar(down.index, down.Low-down.Close, width2, bottom=down.Close, color=col2)


plt.xticks(rotation=30, ha='right')


plt.xlabel("Date")
plt.ylabel("Price")
plt.title("Cisco Systems")
plt.show()
```

Training/Validation Chart Code

```python
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
from sklearn import linear_model
from sklearn.model_selection import train_test_split
df = pd.read_csv('tappy.csv')
print(df)


x_df = df.drop('Close', axis='columns')
y_df = df.Close


X_train, X_test, y_train, y_test = train_test_split(x_df, y_df, test_size=0.4, random_state =10)

reg = linear_model.LinearRegression()
reg.fit(X_train, y_train)

prediction_test = reg.predict(X_test)
print(y_test, prediction_test)
print("Mean sq. error between y_test and predicted =", np.mean(prediction_test-y_test)**2)

plt.scatter(prediction_test, prediction_test-y_test)
plt.hlines(y=0, xmin=0, xmax=5)
plt.show()
```