

Stock Data Price Analysis

Project Overview:

The project involves analysing and visualizing stock market data for a given ticker symbol over a specified date range using the Yahoo Finance API. The analysis includes plotting the closing prices, trading volume, moving averages, daily returns, and identifying local minima and maxima. This provides insights into stock price trends and trading activity.

Features and Outputs:

1. Closing Price Plot:

- **Description:** Displays the daily closing prices of the stock.
- **Purpose:** To show the historical trend of the stock price.
- **Trading Insight:** Identifying overall trends helps in recognizing whether a stock is in an uptrend or downtrend. An uptrend may signal a buying opportunity, while a downtrend could suggest a selling or avoiding strategy.

2. Trading Volume Plot:

- **Description:** Illustrates the daily trading volumes.
- **Purpose:** To visualize the amount of stock traded each day, which can indicate market activity.
- **Trading Insight:** High trading volume can indicate strong investor interest and confirm price trends. For instance, a significant increase in volume alongside a rising price might suggest a strong uptrend, while low volume might indicate weak market participation or a potential trend reversal.

3. Moving Averages Plot:

- **Description:** Shows the closing price along with 50-day and 200-day moving averages.
- **Purpose:** To identify long-term trends and potential support and resistance levels.

- **Trading Insight**

1. **Golden Cross:** When the 50-day moving average crosses above the 200-day moving average, it is often considered a bullish signal, suggesting a buying opportunity.
2. **Death Cross:** Conversely, when the 50-day moving average crosses below the 200-day moving average, it can indicate a bearish signal, suggesting a selling opportunity.

4. **Daily Returns Plot:**

- **Description:** Visualizes the percentage change in the stock's closing price from one day to the next.
- **Purpose:** To understand daily price volatility and return behavior.
- **Trading Insight:** Large daily returns (both positive and negative) can highlight periods of high volatility. Traders may use this information to gauge market risk and decide whether to enter or exit trades based on their risk tolerance.

5. **Local Minima and Maxima Plot:**

- **Description:** Highlights local minima (valleys) and maxima (peaks) in the closing price.
- **Purpose:** To identify significant turning points in the price trend.
- **Trading Insight:**
 1. **Buying at Minima:** Local minima (valleys) can be potential buying points, especially if they coincide with support levels.
 2. **Selling at Maxima:** Local maxima (peaks) can indicate potential selling points, especially if they align with resistance levels.

6. Price Segments Between Minima:

- **Description:** Plots segments of the closing price between local minima to show price trends within these intervals.
- **Purpose:** To visualize price movements between significant lows.
- **Trading Insight:** Analyzing the price trend between minima can help in understanding the price behavior and determining potential entry or exit points. For instance, if the price consistently rises between minima, it might indicate a bullish trend, while a decline could suggest a bearish trend.

Trading Strategies:

- **Trend Following:** Use moving averages and closing price trends to follow the market direction. Buy during uptrends and sell during downtrends.
- **Volume Confirmation:** Confirm price trends with trading volume. High volume during an uptrend or downtrend strengthens the signal.
- **Volatility Management:** Monitor daily returns to gauge volatility and adjust your trading strategy based on risk tolerance.
- **Technical Analysis:** Use local minima and maxima to identify potential support and resistance levels, which can guide buy and sell decisions.

Example:

Buying Opportunity: If the price is approaching a local minima and the 50-day moving average crosses above the 200-day moving average, it might be a good time to buy, especially if trading volume is increasing.

Selling Opportunity: If the price is reaching a local maxima and shows signs of resistance, combined with a death cross or decreasing volume, it could be a signal to sell.

Methodology:

1. **Data Collection:** Utilizes the Yahoo Finance API (yfinance) to fetch historical stock data based on user input for the ticker symbol and date range.
2. **Data Processing:**
 - Computes moving averages (50-day and 200-day).
 - Calculates daily returns as percentage changes in the closing price.
 - Identifies local minima and maxima using the `scipy.signal.argrelextrema` function.
3. **Visualization:**
 - Generates line and scatter plots using matplotlib to visualize various aspects of stock data.
 - Saves each plot as a PNG file for further analysis or reporting.

Usage:

To use the script, run it in a Python environment. It will prompt for the stock ticker symbol, start date, and end date. The script will then download the relevant stock data and generate the plots.

Example Input:

- Ticker Symbol: AAPL
- Start Date: 2023-01-01
- End Date: 2024-01-01

Deliverables:

- Multiple PNG files containing visualizations of closing prices, trading volumes, moving averages, daily returns, local minima and maxima, and price segments between minima.

Conclusion:

This project provides a comprehensive analysis of stock price data through various visualizations, which can be used for trading analysis, trend identification, and investment decisions.