STOCK MARKET ANALYSIS USING PANDAS

Abstract

The stock market is a dynamic financial system where prices fluctuate based on demand, supply, economic conditions, and investor sentiment. Analyzing stock market data helps investors and analysts understand price behavior and market trends. This project focuses on performing stock market analysis using Python and the Pandas library. Historical daily stock data is collected from Yahoo Finance using the yfinance library. The data is analyzed to calculate daily price changes, percentage returns, and volume trends. Additionally, date-wise stock analysis with graphical visualization is implemented to provide clear insights into stock performance on a specific trading day.

Introduction

Stock market analysis is the process of evaluating stock price movements to make informed investment decisions. With the availability of large amounts of financial data, manual analysis has become difficult and time-consuming. Python has emerged as a powerful tool for financial data analysis due to its simplicity and rich ecosystem of libraries. Pandas provides efficient data structures for handling time-series data, while Matplotlib enables effective visualization of trends. This project demonstrates how Python can be used to analyze stock market data in a simple and structured manner.

Objectives

- To collect historical stock market data using Python
- To perform daily stock price analysis
- To calculate price change and percentage change
- To identify bullish and bearish market behavior
- To perform date-wise stock analysis based on user input
- To visualize stock prices and volume using graphs

Tools & Technologies

- Python – Programming language used for analysis
- Pandas – Used for data manipulation and analysis
- Matplotlib – Used for graphical visualization
- yfinance – Used to fetch stock market data from Yahoo Finance
- Jupyter Notebook / Google Colab – Development environment

Data Description

The project uses historical daily stock market data obtained from Yahoo Finance. Each row in the dataset represents one trading day. The data includes the following fields: Open price, High price, Low price, Close price, and Trading Volume. The sample stock analyzed in this project is Tata Consultancy Services (TCS), listed on the National Stock Exchange (NSE) of India with the symbol TCS.NS. The dataset excludes weekends and stock market holidays.

Methodology

The methodology of this project begins with fetching historical stock data using the yfinance library. The downloaded data is cleaned by removing missing values and flattening multi-level columns. Daily price change is

calculated by subtracting the opening price from the closing price. Percentage change is calculated to understand the relative price movement. For date-wise analysis, the user provides a specific date, and the system retrieves stock data for that day. If the selected date is a non-trading day, the nearest previous trading day is used. Graphical visualizations such as OHLC bar charts and volume charts are generated to represent stock behavior clearly.

Results & Observations

The project successfully performs daily and date-wise stock analysis. Price changes and percentage returns provide insights into market movement. The OHLC graph clearly represents the opening, closing, highest, and lowest prices for a selected day. Volume analysis highlights the level of market participation. The results show that Python and Pandas are effective tools for analyzing stock market data.

Conclusion

This project demonstrates the application of Python and Pandas in stock market analysis. By analyzing historical stock data and visualizing it through graphs, users can better understand stock price behavior and market trends. The project provides a strong foundation for further enhancements such as technical indicators, price prediction models, and real-time dashboards.