Stock Price Analysis Report

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Subject : Introduction to AI

Introduction:

This report analyses stock price movements using Python. The dataset is loaded into a Pandas DataFrame, and various statistical and visualisation techniques are applied to understand trends and volatility. The report includes data preprocessing, visualis

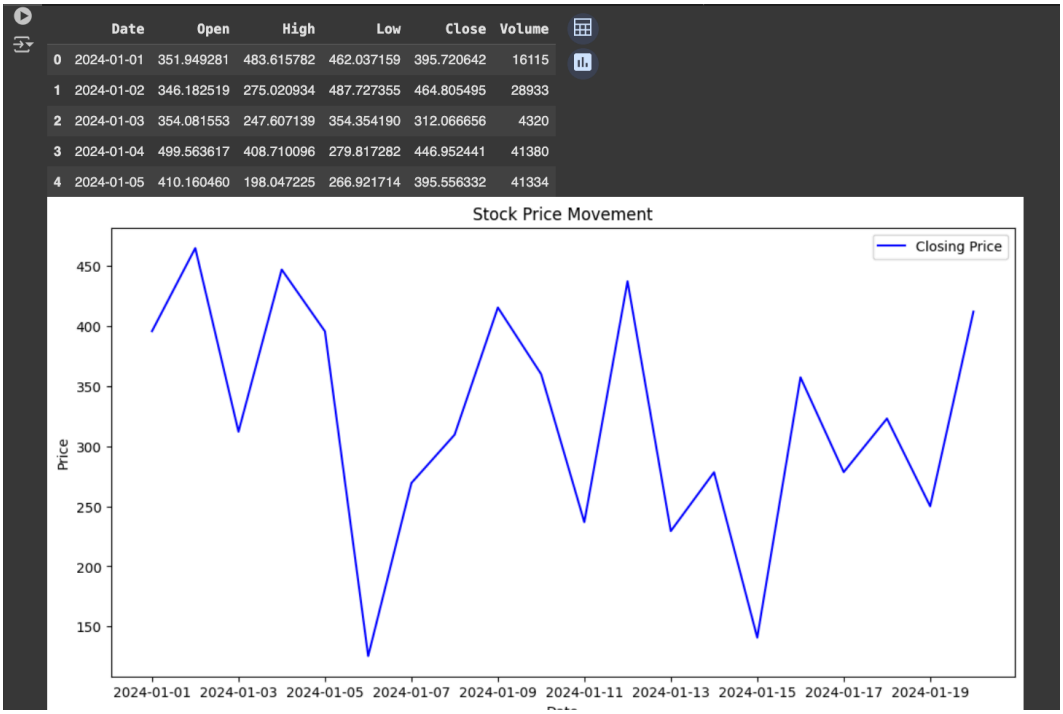
Methodology:

1. Loading the Dataset:
    - The dataset is loaded from a CSV file into a Pandas DataFrame.
2. Data Preprocessing:
    - The 'Date' column is converted to datetime format.
    - The dataset is indexed using the 'Date' column.
3. Stock Price Visualization:
    - A line chart is plotted to visualize the stock's closing price over time.
4. Moving Averages Calculation:
    - 50-day and 200-day Simple Moving Averages (SMA) are calculated.
    - These SMAs are plotted alongside the stock price to observe trends.
5. Volatility Analysis:
    - Daily returns are computed using percentage change.
    - A volatility chart is plotted to observe stock fluctuations.
6. Statistical Analysis:
    - Basic descriptive statistics of stock prices are displayed.
    -

Code

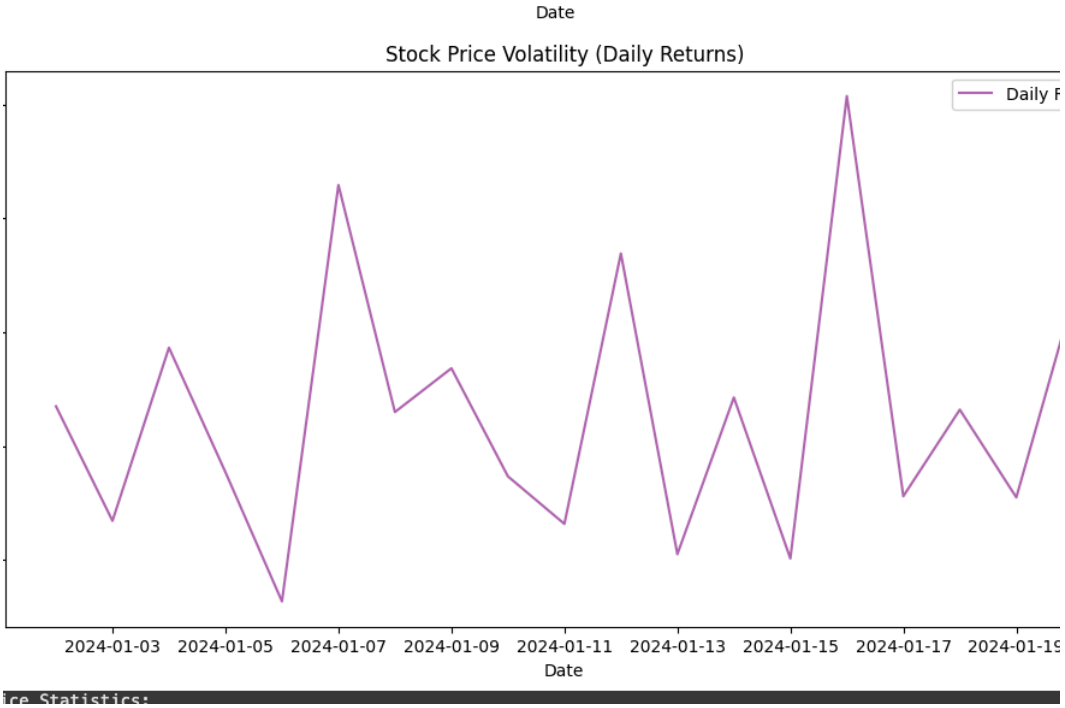
```
import pandas as pd
import matplotlib.pyplot as plt
import numpy as np

# Load the dataset (Modify the file path accordingly)
file_path = '/mnt/data/stock_data.csv'
df = pd.read_csv(file_path)

# Display first few rows
display(df.head())

# Convert 'Date' column to datetime format (Modify column name if different)
df['Date'] = pd.to_datetime(df['Date'])
df.set_index('Date', inplace=True)

# Plot stock price movement
plt.figure(figsize=(12,6))
plt.plot(df['Close'], label='Closing Price', color='blue')
plt.title('Stock Price Movement')
plt.xlabel('Date')
plt.ylabel('Price')
plt.legend()
plt.show()

# Calculate Moving Averages
df['SMA_50'] = df['Close'].rolling(window=50).mean()
df['SMA_200'] = df['Close'].rolling(window=200).mean()

# Plot Moving Averages
plt.figure(figsize=(12,6))
plt.plot(df['Close'], label='Closing Price', color='blue', alpha=0.6)
plt.plot(df['SMA_50'], label='50-day SMA', color='red')
plt.plot(df['SMA_200'], label='200-day SMA', color='green')
plt.title('Stock Price with Moving Averages')
plt.xlabel('Date')
plt.ylabel('Price')
plt.legend()
plt.show()

# Calculate Daily Returns
df['Daily Return'] = df['Close'].pct_change()

# Plot Volatility
plt.figure(figsize=(12,6))
plt.plot(df['Daily Return'], label='Daily Return', color='purple', alpha=0.6)
plt.title('Stock Price Volatility (Daily Returns)')
plt.xlabel('Date')
plt.ylabel('Daily Return')
plt.legend()
plt.show()
# Display basic statistics
print("Stock Price Statistics:”)
display(df.describe())
```

Result :-



	Date	Open	High	Low	Close	Volume
0	2024-01-01	351.949281	483.615782	462.037159	395.720642	16115
1	2024-01-02	346.182519	275.020934	487.727355	464.805495	28933
2	2024-01-03	354.081553	247.607139	354.354190	312.066656	4320
3	2024-01-04	499.563617	408.710096	279.817282	446.952441	41380
4	2024-01-05	410.160460	198.047225	266.921714	395.556332	41334

Stock Price Movement



Caption