

Stock Market Analysis

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About Dataset

Given historical stock price data for Apple, Microsoft, Netflix and Google over the past three months, your task is to analyze and compare the performance of these companies in the stock market using various data science techniques.

Specifically, the goal is to identify trends and patterns in stock price movements, calculate moving averages and volatility for each company, and conduct correlation analysis to examine the relationships between different stock prices.

A	B	C	D	E	F	G	H
Ticker	Date	Open	High	Low	Close	Adj Close	Volume
AAPL	07-02-2023	150.64	155.23	150.64	154.65	154.4142	83322600
AAPL	08-02-2023	153.88	154.58	151.17	151.92	151.6884	64120100
AAPL	09-02-2023	153.78	154.33	150.42	150.87	150.64	56007100
AAPL	10-02-2023	149.46	151.34	149.22	151.01	151.01	57450700
AAPL	13-02-2023	150.95	154.26	150.92	153.85	153.85	62199000
AAPL	14-02-2023	152.12	153.77	150.86	153.2	153.2	61707600
AAPL	15-02-2023	153.11	155.5	152.88	155.33	155.33	65573800
AAPL	16-02-2023	153.51	156.33	153.35	153.71	153.71	68167900
AAPL	17-02-2023	152.35	153	150.85	152.55	152.55	59144100
AAPL	21-02-2023	150.2	151.3	148.41	148.48	148.48	58867200
AAPL	22-02-2023	148.87	149.95	147.16	148.91	148.91	51011300
AAPL	23-02-2023	150.09	150.34	147.24	149.4	149.4	48394200
AAPL	24-02-2023	147.11	147.19	145.72	146.71	146.71	55469600
AAPL	27-02-2023	147.71	149.17	147.45	147.92	147.92	44998500
AAPL	28-02-2023	147.05	149.08	146.83	147.41	147.41	50547000
AAPL	01-03-2023	146.83	147.23	145.01	145.31	145.31	55479000

89	MSFT		15-03-2023	259.98	266.48	259.21	265.44	265.44	46028000
90	MSFT		16-03-2023	265.21	276.56	263.28	276.2	276.2	54768800
91	MSFT		17-03-2023	278.26	283.33	276.32	279.43	279.43	69527400
92	MSFT		20-03-2023	276.98	277.48	269.85	272.23	272.23	43466600
93	MSFT		21-03-2023	274.88	275	269.52	273.78	273.78	34558700
94	MSFT		22-03-2023	273.4	281.04	272.18	272.29	272.29	34873300
95	MSFT		23-03-2023	277.94	281.06	275.2	277.66	277.66	36610900
96	MSFT		24-03-2023	277.24	280.63	275.28	280.57	280.57	28172000
97	MSFT		27-03-2023	280.5	281.46	275.52	276.38	276.38	26840200
98	MSFT		28-03-2023	275.79	276.14	272.05	275.23	275.23	21878600
99	MSFT		29-03-2023	278.96	281.14	278.41	280.51	280.51	25087000
100	MSFT		30-03-2023	284.23	284.46	281.48	284.05	284.05	25053400
101	MSFT		31-03-2023	283.73	289.27	283	288.3	288.3	32766000
102	MSFT		03-04-2023	286.52	288.27	283.95	287.23	287.23	24883300
103	MSFT		04-04-2023	287.23	290.45	285.67	287.18	287.18	25824300
104	MSFT		05-04-2023	285.85	287.15	282.92	284.34	284.34	22064800
105	MSFT		06-04-2023	283.21	292.08	282.03	291.6	291.6	29770300
106	MSFT		10-04-2023	289.21	299.5	291.71	299.39	299.39	32100000

Data Collection & Importing

```
import streamlit as st
import pandas as pd
import numpy as np
from sklearn.ensemble import RandomForestRegressor
import matplotlib.pyplot as plt
from matplotlib.dates import DateFormatter, YearLocator, MonthLocator
```

```
# Load the dataset
df = pd.read_csv('stocks.csv')

# Check for missing values
print("Missing values in each column:")
print(df.isnull().sum())

# Drop any rows with missing values (if any)
df = df.dropna()

# Display the first few rows to confirm it loaded correctly
print("\nFirst 5 rows of the dataset:")
print(df.head())
```

Data Cleaning

```
import pandas as pd

# Load the dataset
df = pd.read_csv('stocks.csv')

# Check for missing values
print("Missing values in each column:")
print(df.isnull().sum())

# Drop any rows with missing values (if any)
df = df.dropna()

# Display the first few rows to confirm it loaded correctly
print("\nFirst 5 rows of the dataset:")
print(df.head())
```

Missing values in each column:

```
Ticker      0
Date        0
Open         0
High         0
Low          0
Close        0
Adj Close    0
Volume       0
dtype: int64
```

First 5 rows of the dataset:

	Ticker	Date	Open	High	Low	Close	\
0	AAPL	2023-02-07	150.639999	155.229996	150.639999	154.649994	
1	AAPL	2023-02-08	153.880005	154.580002	151.169998	151.919998	
2	AAPL	2023-02-09	153.779999	154.330002	150.419998	150.869995	
3	AAPL	2023-02-10	149.460007	151.339996	149.220001	151.009995	
4	AAPL	2023-02-13	150.949997	154.259995	150.919998	153.850006	

	Adj Close	Volume
0	154.414230	83322600
1	151.688400	64120100
2	150.639999	56007100
3	151.009995	57450700
4	153.850006	62199000

Exploratory Data Analysis

```
# Exploratory Data Analysis
# Display the first few rows to understand the dataset structure
print("\nFirst 5 rows of the dataset:")
print(df.head())

# Calculate daily returns and 10-day volatility
df['Return'] = df.groupby('Ticker')['Close'].pct_change()
companies = df['Ticker'].unique()
for company in companies:
    company_data = df[df['Ticker'] == company].copy()
    company_data['Volatility'] = company_data['Return'].rolling(window=10).std()

# Pivot the data and calculate correlation matrix
pivot_df = df.pivot(index='Date', columns='Ticker', values='Close')
correlation_matrix = pivot_df.corr()
print("Correlation Matrix:")
print(correlation_matrix)
```



Data Visualization

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

# Load the dataset
df = pd.read_csv('stocks.csv')

# Get unique company tickers
companies = df['Ticker'].unique()

# Plot closing prices for each company
plt.figure(figsize=(10, 6))
for company in companies:
    company_data = df[df['Ticker'] == company]
    plt.plot(company_data['Date'], company_data['Close'], label=company)

plt.xlabel('Date')
plt.ylabel('Closing Price ($)')
plt.title('Stock Prices Over Time')
plt.legend()
plt.xticks(rotation=90)
plt.tight_layout()
plt.savefig('stock_prices.png')
```

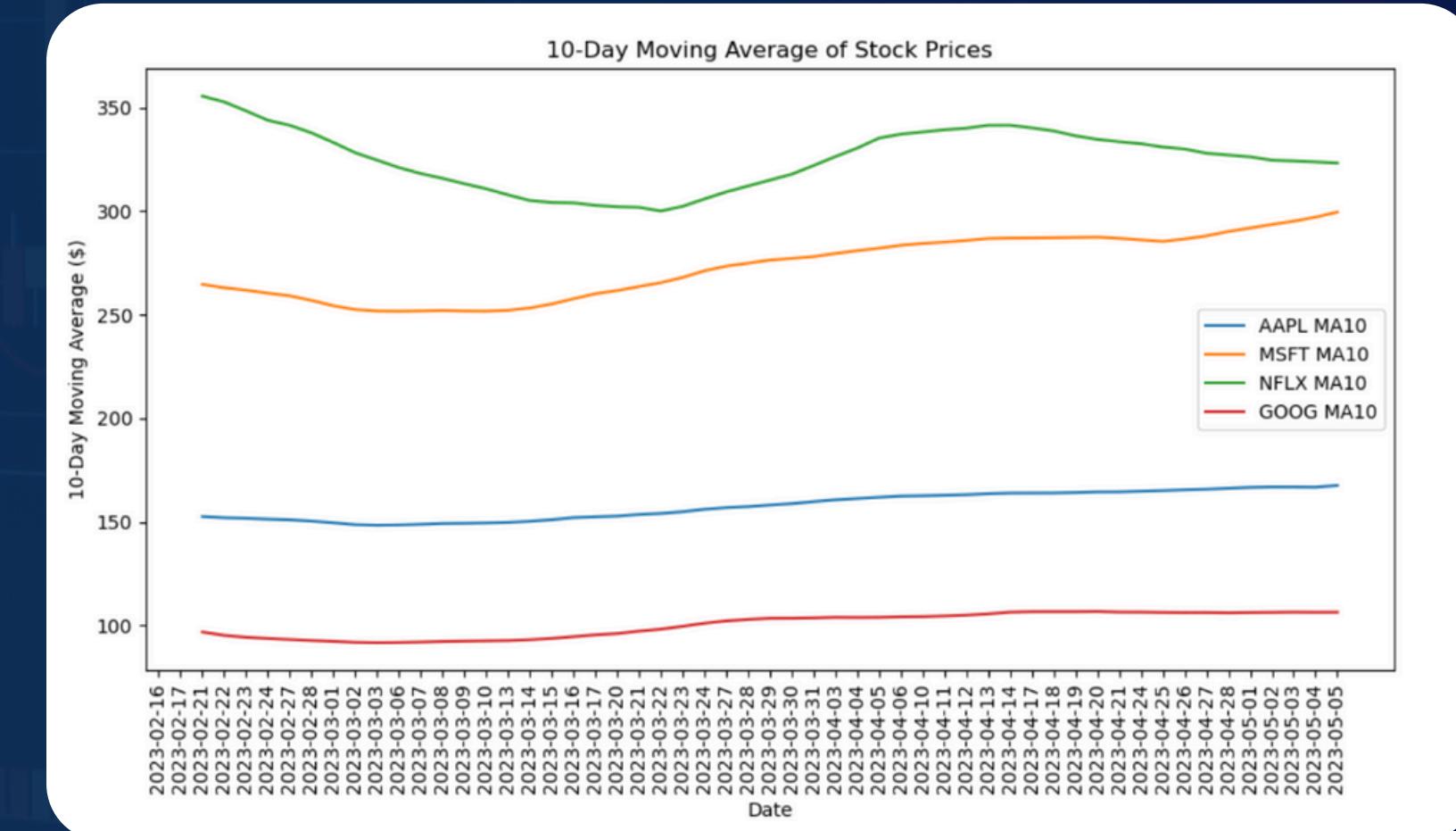
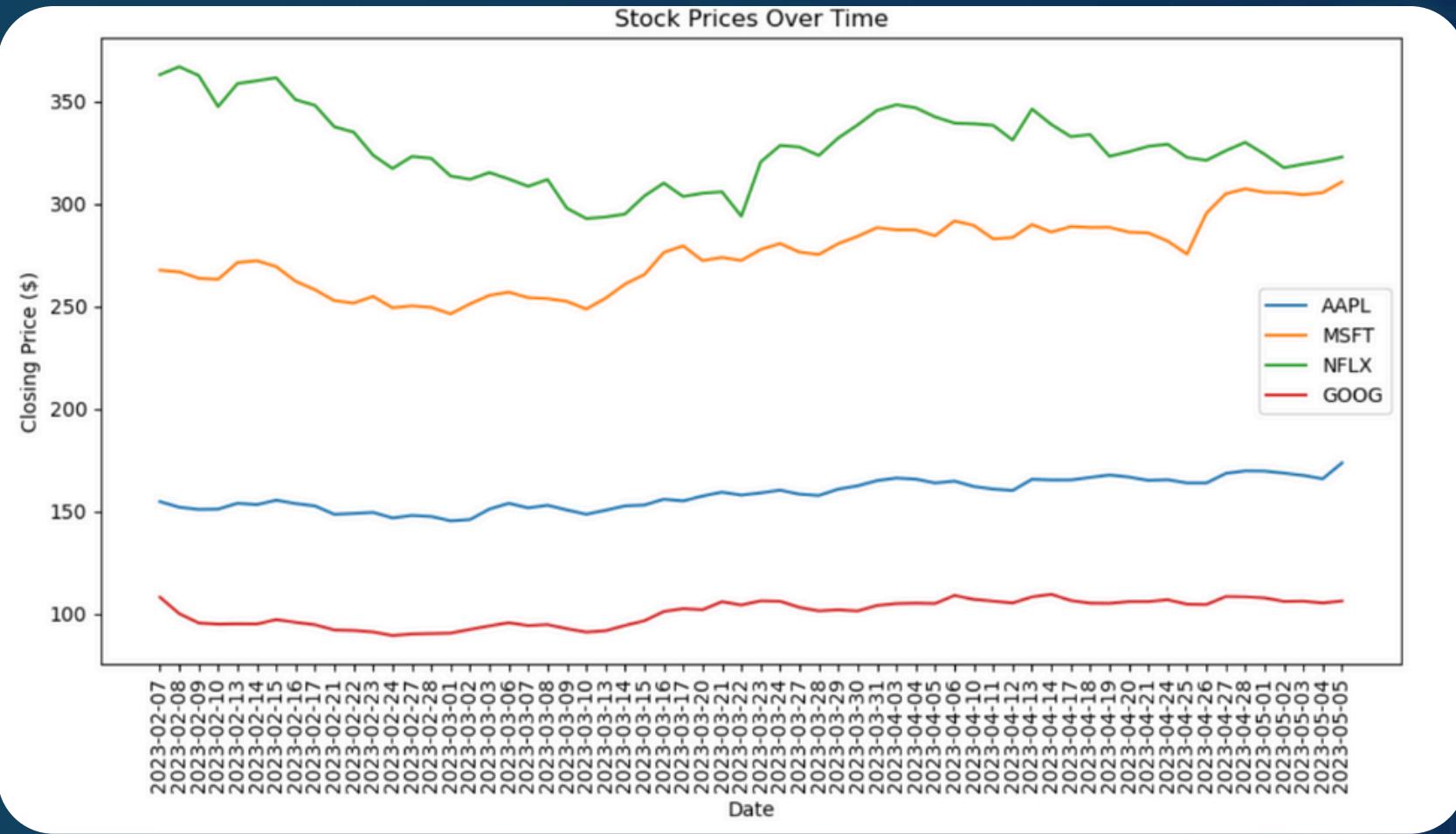
```
import pandas as pd
import matplotlib.pyplot as plt

# Load the dataset
df = pd.read_csv('stocks.csv')

# Get unique company tickers
companies = df['Ticker'].unique()

# Plot 10-day moving averages
plt.figure(figsize=(10, 6))
for company in companies:
    company_data = df[df['Ticker'] == company].copy()
    company_data['MA10'] = company_data['Close'].rolling(window=10).mean()
    plt.plot(company_data['Date'], company_data['MA10'], label=f'{company} MA10')

plt.xlabel('Date')
plt.ylabel('10-Day Moving Average ($)')
plt.title('10-Day Moving Average of Stock Prices')
plt.legend()
plt.xticks(rotation=90)
plt.tight_layout()
plt.savefig('moving_averages.png')
```



```

import pandas as pd
import matplotlib.pyplot as plt

# Load the dataset
df = pd.read_csv('stocks.csv')

# Calculate daily returns

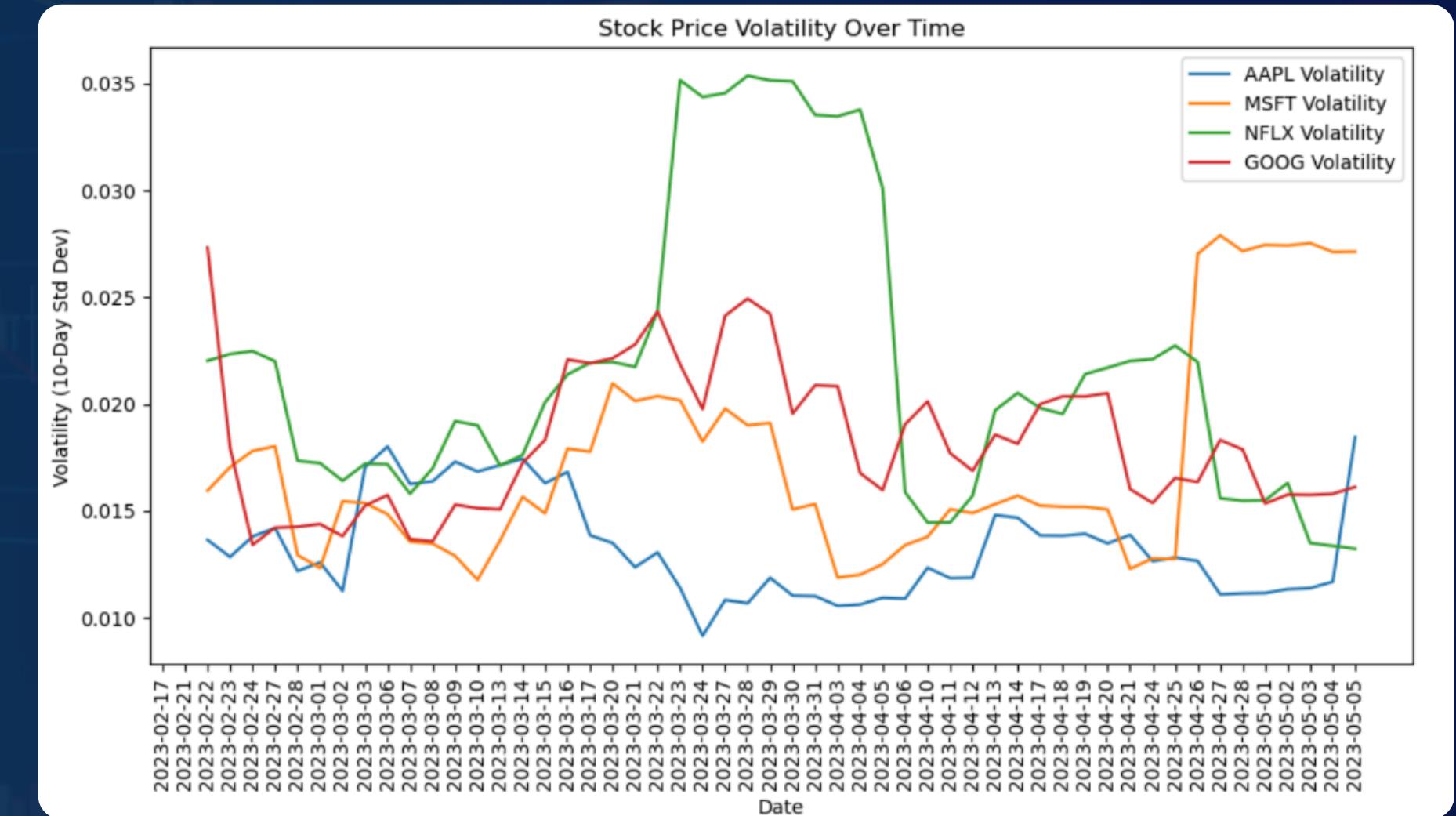
df['Return'] = df.groupby('Ticker')['Close'].pct_change()

# Get unique company tickers
companies = df['Ticker'].unique()

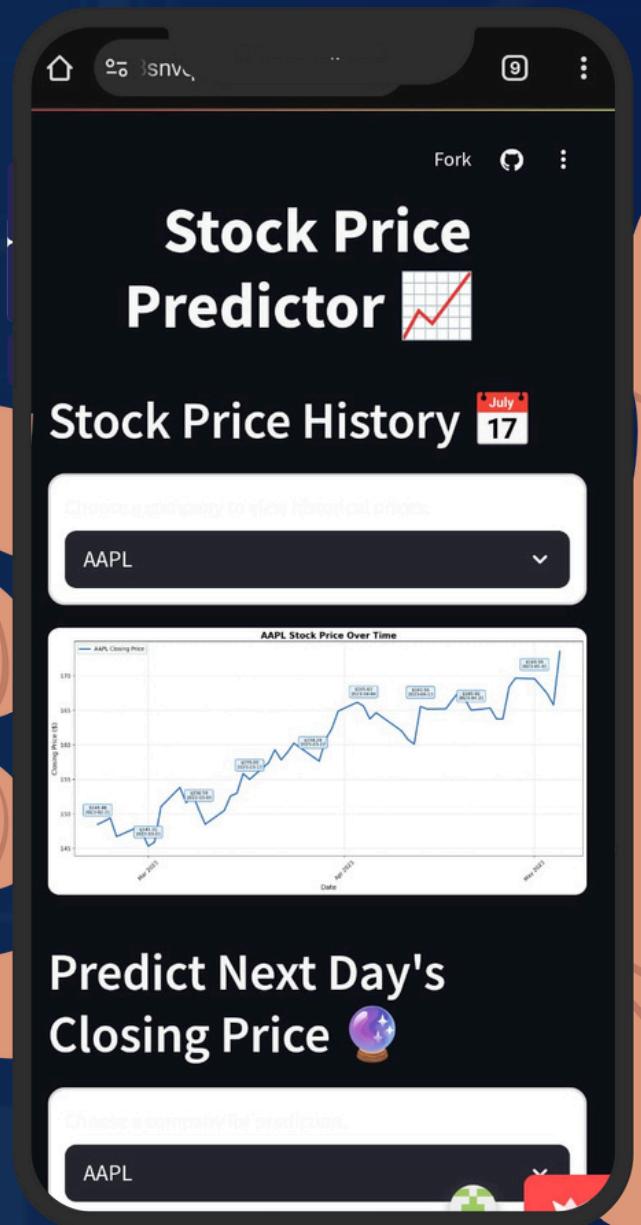
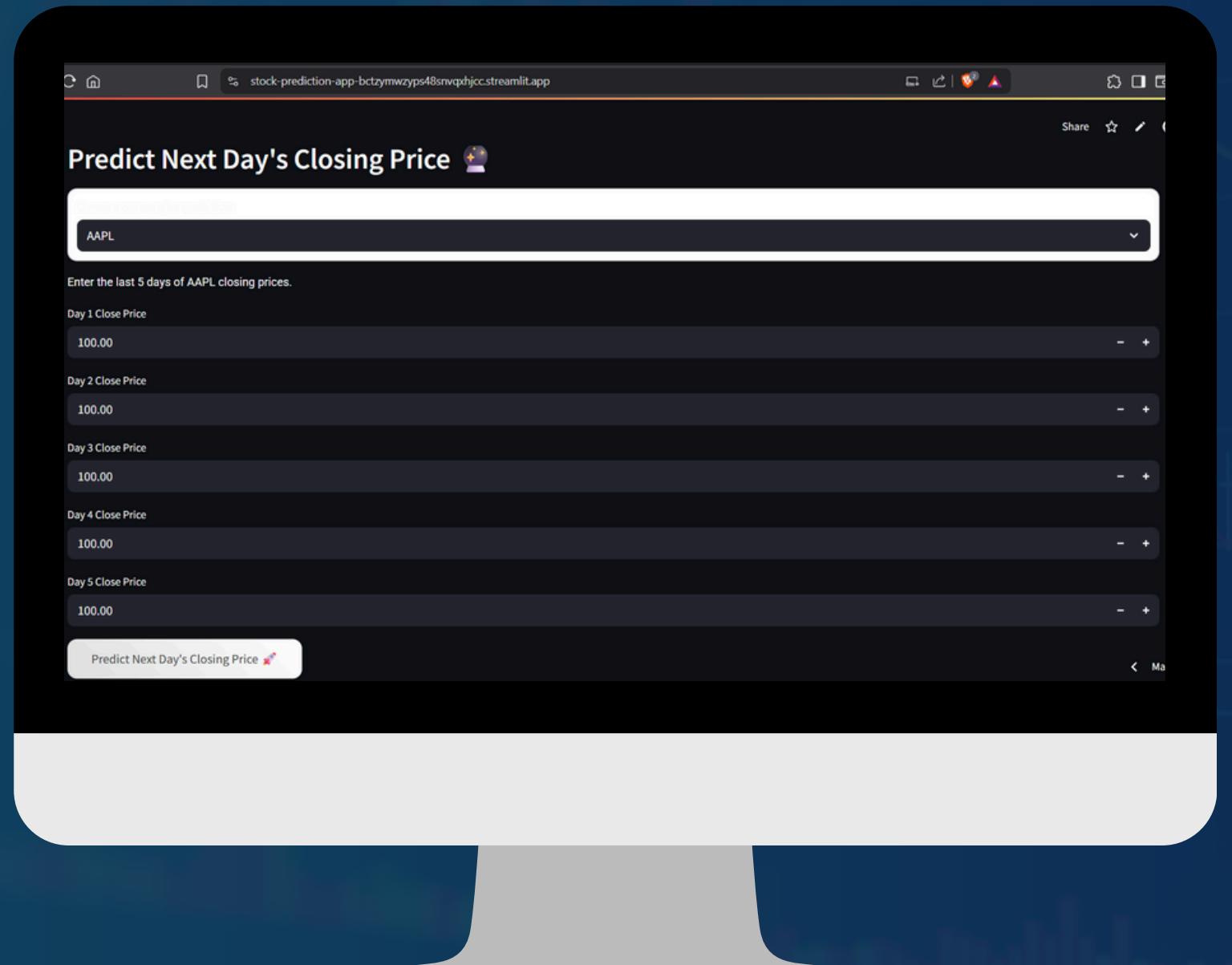
# Plot 10-day volatility
plt.figure(figsize=(10, 6))
for company in companies:
    company_data = df[df['Ticker'] == company].copy()
    company_data['Volatility'] = company_data['Return'].rolling(window=10).std()
    plt.plot(company_data['Date'], company_data['Volatility'], label=f'{company} Volatility')

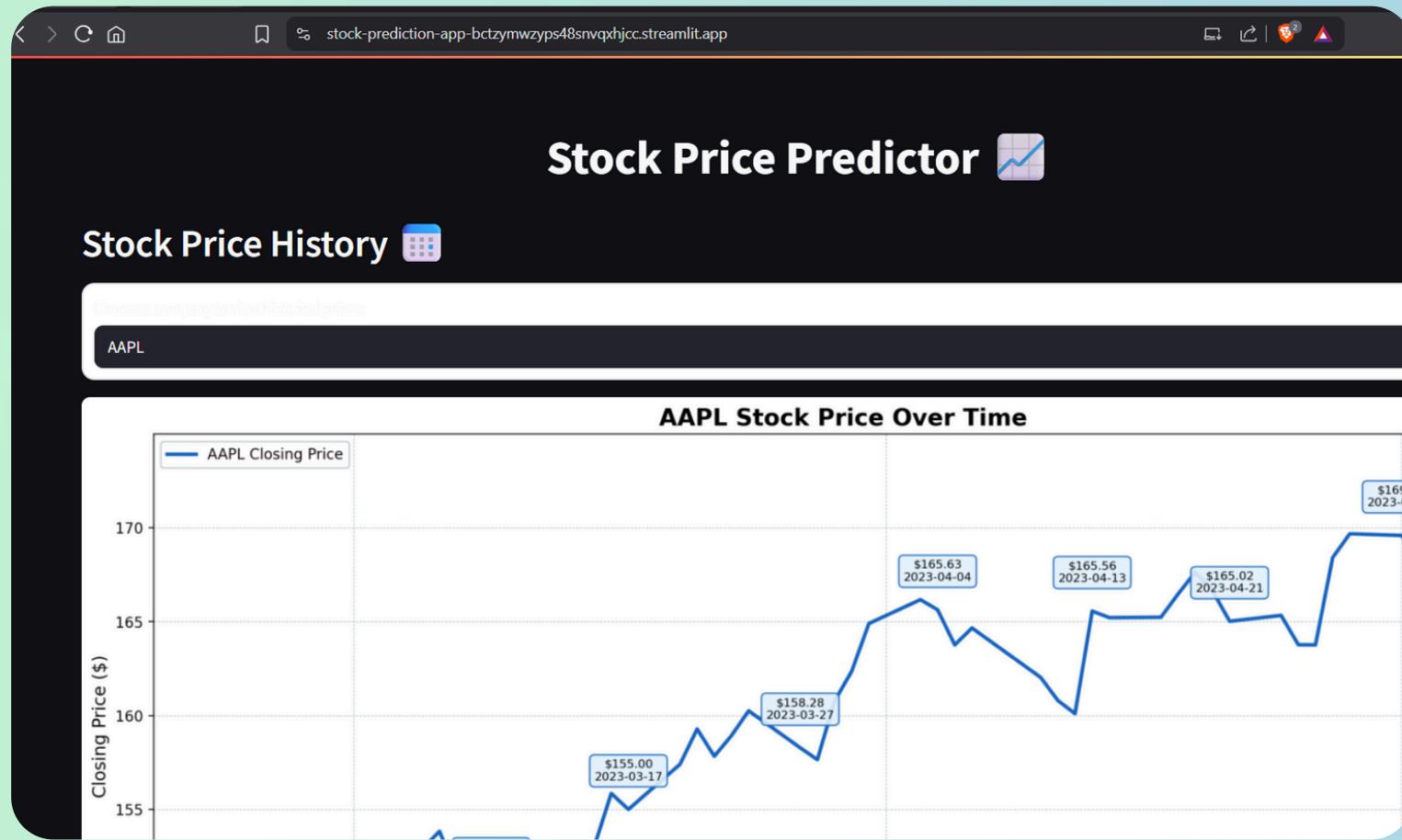
plt.xlabel('Date')
plt.ylabel('Volatility (10-Day Std Dev)')
plt.title('Stock Price Volatility Over Time')
plt.legend()
plt.xticks(rotation=90)
plt.tight_layout()
plt.savefig('volatility.png')

```



Dashboard





Predict Next Day's Closing Price 🌟

Select a company for prediction:

AAPL

Enter the last 5 days of AAPL closing prices.

Day 1 Close Price: 100.00

Day 2 Close Price: 100.00

Day 3 Close Price: 100.00

Day 4 Close Price: 100.00

Day 5 Close Price: 100.00

Predict Next Day's Closing Price 🚀

Stock Market Basics 📊

Day 3 Close Price: 100.00

Day 4 Close Price: 100.00

Day 5 Close Price: 100.00

Predict Next Day's Closing Price 🚀

Predicted AAPL Closing Price for the next day: \$155.82 🎉

- What is a stock?**
A stock represents ownership in a company, giving you a share of its profits and growth.
- What is the stock market?**
A marketplace (e.g., NYSE, Nasdaq) where stocks are bought and sold based on supply and demand.
- What determines stock prices?**
Prices are driven by company performance, market demand, and economic factors.

- ## Stock Market Basics 📊
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 - What determines stock prices?**
Prices are driven by company performance, market demand, and economic factors.
 - What is a bull market?**
A period when stock prices rise, reflecting investor optimism 🐄.
 - What is a bear market?**
A period when stock prices fall, indicating investor pessimism 🐾.
 - What are dividends?**
Payments from a company's profits to shareholders, often quarterly.
 - What is trading?**
Buying and selling stocks to profit from price changes, including day trading for short-term gains.
 - What are risk and return?**
Stocks offer high potential returns but carry risks; diversification helps manage risk.
 - What are market indices?**
Metrics like the S&P 500 or Dow Jones track a group of stocks to show market trends 📈.

Thank You!

