STOCK MARKET ANALYSIS

MINI PROJECT REPORT

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ABSTRACT

This historical stock market analysis project focuses on analyzing the performance and trends of Microsoft, Apple, Amazon, Netflix, and Google. By examining their stock price movements over a specific time period, this study aims to provide valuable insights into the historical performance, volatility, and investment potential of these technology giants. The project utilizes a range of financial and statistical tools to assess the historical stock data of Microsoft, Apple, Amazon, Netflix, and Google. It includes the calculation of key metrics such as returns, volatility, and correlation coefficients to quantify the risk and return characteristics of each stock. Moreover, the study investigates the impact of significant market events, earnings announcements, and product launches on the stock prices of these companies. Additionally, this analysis project employs various charting techniques and technical indicators to identify long-term trends, support and resistance levels, and potential entry or exit points for investors. It examines the historical price patterns, moving averages, and trading volumes to uncover potential buy or sell signals and evaluate the effectiveness of different trading strategies.

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LIST OF ABBREVIATIONS

ML	Machine Learning
AI	Artificial Intelligence
MSFT	Microsoft Corporation
AAPL	Apple Inc.
AMZN	Amazon.com Inc.
NFLX	Netflix Inc.

CHAPTER 1

INTRODUCTION

The stock market has long been a dynamic and ever-evolving landscape, influenced by a myriad of factors ranging from economic conditions to technological advancements. In this context, the performance and trends of major technology companies have played a significant role in shaping investor sentiment and driving market movements. Among these technology giants, Microsoft, Apple, Amazon, Netflix, and Google stand out as leaders, with their stocks garnering immense attention from investors and analysts alike. This historical stock market analysis project aims to delve into the performance and trends of Microsoft, Apple, Amazon, Netflix, and Google stocks over a specific time period. By examining the historical data of these companies, we seek to provide valuable insights into their stock price movements, volatility, and investment potential. The technology sector has witnessed tremendous growth and innovation in recent years, with Microsoft, Apple, Amazon, Netflix,and Google at the forefront of this transformation.

These companies have not only redefined industries but have also become household names, capturing the imaginations of consumers and investors alike. In this project, we will analyze the historical stock data of Microsoft, Apple, Amazon, Netflix, and Google, studying their performance over a specific time period. We will employ a combination of financial analysis, statistical tools, and technical indicators to evaluate the risk-return profiles of these stocks. By calculating key metrics such as returns, volatility, and correlation coefficients, we aim to provide a comprehensive understanding of the historical performance and behavior of these technology giants. The findings of this historical stock market analysis project will provide investors with a valuable perspective on the historical performance, volatility, and investment potential of Microsoft, Apple, Amazon, Netflix, and Google stocks. This analysis aims to equipinvestors with the necessary knowledge and insights to make well-informed investment decisions, considering the historical behavior of these technology giants and the broader markettrends.

1.1 PROBLEM DEFINITION

This project seeks to tackle this problem by conducting a detailed historical stock market analysis of Microsoft, Apple, Amazon, Netflix, and Google. By examining the performance of these stocks over a specific time period, we aim to provide investors with valuable insights into their risk- return profiles, trends, and investment potential. The analysis will enable investors to make more informed decisions and optimize their investment strategies based on historical data and market trends.

1.2 OBJECTIVE OF THE PROJECT

The objective of this project is to conduct a comprehensive historical stock market analysis of Microsoft, Apple, Amazon, Netflix, and Google. The analysis aims to achieve the following objectives:

Evaluate Historical Performance: Analyze the historical stock price data of Microsoft, Apple, Amazon, Netflix, and Google to assess their performance over a specific time period. Calculate key metrics such as returns, volatility, and correlation coefficients to quantify the historical risk-return profiles of these stocks.

Identify Trends and Patterns: Identify long-term trends, support and resistance levels, and potential entry or exit points for investors. Utilize charting techniques, technical indicators, and statistical tools to detect patterns and analyze historical price movements of these technology giants.

Understand Market Influences: Investigate the impact of significant market events, earnings announcements, product launches, and industry trends on the stock prices of Microsoft, Apple, Amazon, Netflix, and Google. Gain insights into the factors that have influenced the historical stock performance of these companies.

1.3 SIGNIFICANCE OF THE PROJECT

- Informed Investment Decisions
- Risk Assessment
- Market Analysis
- Portfolio Optimization
- Research and Education
- Industry and Economic Insights

1.4 OUTLINE OF THE PROJECT

The findings of this historical stock market analysis project will provide investors with a valuable perspective on the historical performance, volatility, and investment potential of Microsoft, Apple, Amazon, Netflix, and Google stocks. This analysis aims to equip investors with the necessary knowledge and insights to make well-informed investment decisions, considering the historical behavior of these upcoming technology giants and the broader marketing.

CHAPTER 2

LITERATURE REVIEW

2.1 Historical Stock Market Analysis

Previous studies have emphasized the importance of historical stock market analysis in understanding the behavior and trends of stocks over time. Various research papers have highlighted the significance of using financial ratios, technical analysis tools, and statistical models to assess historical stock performance.

2.2 Fundamental Analysis

Fundamental analysis plays a crucial role in evaluating the financial health and performance of companies. It involves analyzing financial statements, key ratios, and industry dynamics to assess the intrinsic value of stocks. Researchers have examined the relationship between financial ratios, such as price-to-earnings ratio, return on equity, and stock prices to identify investment opportunities.

2.3 Technical Analysis

Technical analysis focuses on studying historical price and volume patterns to predict future stock price movements. It involves the use of charting techniques, trend analysis, and technical indicators. Previous studies have explored the effectiveness of technical analysis indicators, such as moving averages, relative strength index, and stochastic oscillators, in predicting stock price trends.

2.4 Factors Influencing Stock Prices

Numerous factors impact stock prices, including macroeconomic indicators, industry trends, and company-specific events. Research has highlighted the importance of considering market sentiment, investor behavior, and external shocks when analyzing stock price movements.

2.5 Technology Sector Analysis

The technology sector has been a key driver of stock market performance in recent years. Studies have examined the growth prospects, innovation, and competitive dynamics of technology companies. Researchers have explored the relationship between technological advancements, market share, and stock prices in the technology sector. The literature review highlights the significance of historical stock market analysis, fundamental analysis, technical analysis, and factorsinfluencing stock prices. It provides a foundation for understanding the existing knowledge and research related to the analysis of Microsoft, Apple, Amazon, Netflix, and Google stocks.

CHAPTER 3

SYSTEM ANALYSIS

System analysis involves examining the components, processes, and interactions within a system to understand its functioning and identify potential improvements. Identification of relevant data sources for obtaining historical stock price data, financial statements, and market events. Determination of the specific time period and frequency of data required for analysis. Implementation of data management techniques to ensure data integrity, accuracy, and accessibility.

3.1 EXISTING SYSTEM

Data Sources:

- Historical stock price data: Obtained from reliable financial data providers, stock exchanges, or specialized financial databases.
- Financial statements: Retrieved from company reports, regulatory filings, or financial data providers.
- Market events and news: Gathered from financial news platforms, press releases, and industry publications.

Data Collection and Management:

- Manual data collection: Researchers or analysts collect and compile the required data from various sources.
- Data cleaning and preprocessing: Raw data is processed to remove inconsistencies, errors, and outliers, ensuring data quality.

Analysis Tools and Techniques:

- Statistical software: Utilized for calculating returns, volatility, correlation coefficients, and conducting statistical analysis.
- Spreadsheet software: Employed for data manipulation, calculation of financial ratios, and performing basic analysis.

3.2 DRAWBACKS

- The accuracy and reliability of the data obtained from various sources may vary, leading to potential biases or errors in the analysis.
- Data from different sources may follow different accounting standards or reporting formats, making it challenging to ensure consistency in the analysis.

3.3 PROPOSED SYSTEM

To address the drawbacks and limitations of the existing system, the proposed system for the historical stock market analysis of Microsoft, Apple, Amazon, Netflix, and Google stocks incorporates several enhancements and improvements:

Enhanced Data Collection and Management:

Utilize reputable financial data providers or APIs to access high-quality, accurate, and reliable historical stock price data, financial statements, and market events. Implement automated data collection processes to ensure consistent and up-to-date data retrieval. Implement data validation and quality checks to identify and address any gaps, inconsistencies, or errors in the collected data.

Advanced Analysis Tools and Techniques:

Utilize advanced statistical software packages that offer a wide range of financial analysis tools, allowing for more sophisticated calculations and statistical modeling. Incorporate machine learning algorithms and predictive models to augment traditional analysis techniques and generate more accurate forecasts and insights. Leverage natural language processing (NLP) techniques to extract valuable information from news articles, social media, and other textual sources to incorporate sentiment analysis and event impact assessment.

Real-time Data Integration:

Incorporate real-time or near real-time data feeds to capture the latest market conditions, news, and events that may impact stock prices. Develop mechanisms to update the analysis results dynamicallyas new data becomes available, allowing for more timely and informed decision-making.

3.4 FEASIBILITY STUDY

- **Availability of data sources:** Ensure access to reliable financial data providers, APIs, and other relevant sources for obtaining historical stock price data, financial statements, and market events.
- **Adequate technical infrastructure:** Assess the availability of computational resources, software tools, and storage capacity to handle large datasets and perform complex analysis tasks.
- **Expertise and skills:** Evaluate the availability of skilled analysts or data scientists with expertise in financial analysis, statistical modeling, and data management.

3.4.1 Tests of Feasibility

Feasibility testing helps validate the assumptions made during the feasibility analysis and assess the project's practicality in real-world conditions. Here are key areas to consider for testing the feasibility of the historical stock market analysis project:

- Data Feasibility Testing
- Technical Feasibility Testing
- Economic Feasibility Testing

3.4.1.1 Data Feasibility Testing

Collect a sample dataset and assess its quality, accuracy, and relevance to the analysis requirements. Verify the availability and accessibility of the required historical stock price data, financial statements, and market events from the selected sources. Test the data collection and preprocessing mechanisms to ensure they can handle the expected data volume, frequency, and variety.

3.4.1.2 Technical Feasibility Testing

Evaluate the performance of the technical infrastructure, including computing resources, software tools, and storage capacity, under realistic workloads. Test the integration of analysis tools and algorithms, ensuring they operate smoothly and produce accurate results. Validate the scalability and responsiveness of the system to handle concurrent user access and data processing demands.

3.4.1.2 Economic Feasibility Testing

Conduct a cost analysis, comparing the actual expenses incurred during the project's initialphases with the projected costs. Assess the potential revenue generation opportunities, such as subscription models, consulting services, or partnerships with financial institutions. Evaluate thereturn on investment (ROI) based on the projected benefits and determine if it aligns with the organization's financial objectives.

CHAPTER 4

SYSTEM SPECIFICATION

4.1 HARDWARE REQUIREMENTS

- Windows 8.1 or Windows Server 2012 R2 or later
- Microsoft Edge browser (Internet Explorer is no longer supported)
- Memory (RAM): At least 2 GB available, 4 GB or more recommended
- Display: At least 1440x900 or 1600x900 (16:9) required

4.2 SOFTWARE REQUIREMENTS

PYTHON

One of the main reasons why Data Analytics using Python has become the most preferred and popular mode of data analysis is that it provides a range of libraries.

NumPy: NumPy supports n-dimensional arrays and provides numerical computing tools. It is useful for Linear algebra and Fourier transform.

POWER BI

Power BI is a cloud-based analysis service that provides rapid insight and is used to extract and visualise data. Power BI brings together data from multiple sources to give you a comprehensive view of your company's information assets.

CHAPTER 5

SOFTWARE DESCRIPTION

Financial Data Providers or APIs: Utilize data providers or APIs to retrieve historical stock price data, financial statements, and market events. Examples include Bloomberg, Yahoo Finance API, or Alpha Vantage API. Database Management System (DBMS): Employ a DBMS, such as MySQL, PostgreSQL, or MongoDB, to store and manage the collected data efficiently. Data Cleaning and Preprocessing Tools: Utilize software tools like Excel, Python (Pandas library), or R (dplyr package) to clean and preprocess the collected data, removing inconsistencies, handling missing values, and transforming the data as needed.

5.1 BACK END

Python

Python is widely used in data analysis and machine learning tasks. It offers extensive libraries suchas Pandas, NumPy, and scikit-learn, which are well-suited for handling financial data and implementing analysis algorithms.

Python BI

Power BI is a business intelligence and data visualization tool developed by Microsoft. It allows users to connect to various data sources, transform and shape data, and create interactive reports and dashboards for data analysis. Here are some key features and components of Power BI.

Data Sources: Power BI can connect to a wide range of data sources, including databases, Excel files, cloud services (such as Azure, SharePoint, and Dynamics 365), online services (such as Google Analytics and Salesforce), and many others.

Data Transformation: Power BI provides a data modeling and transformation layer called Power Query, which allows users to shape and clean their data. Power Query enables data cleansing, merging, splitting, filtering, and other transformations to prepare the data for analysis.

CHAPTER 6

PROJECT DESCRIPTION

The stock market analysis project aims to contribute to the understanding of the dynamics of the technology sector and facilitate data-driven investment decision-making for individuals and institutional investors interested in Microsoft, Apple, Amazon, Netflix, and Google stocks.

6.1 OVERVIEW OF THE PROJECT

The historical stock market analysis project holds significance in empowering stakeholders with actionable insights for investment decision-making. By leveraging historical data, trends, and patterns, the project helps identify opportunities, assess risks, and make informed investment strategies. The project also contributes to the advancement of financial analysis methodologies, data-driven decision-making, and the understanding of market dynamics. Overall, the historical stock market analysis project aims to provide a comprehensive analysis of the selected companies' historical performance, enabling stakeholders to make well-informed investment decisions and gain valuable insights into the dynamics of the stock market.

6.2 MODULE DESCRIPTION

6.2.1 Data Analysis

Data analysis is a crucial component of the historical stock market analysis project. It involves processing, exploring, and extracting insights from the collected historical stock price data, financial statements, and other relevant datasets.

Data Cleaning: Handle missing values, outliers, and inconsistencies in the data. This step ensures data quality and accuracy before proceeding with analysis.

Data Transformation: Perform data transformations, such as normalization or logarithmic scaling, to ensure the data conforms to analysis requirements and assumptions.

6.2.2 Python:

Python is an excellent programming language for the historical stock market analysis project due to its extensive libraries and frameworks specifically designed for data analysis, numerical computing, and machine learning. Here are some key Python libraries and frameworks commonly used in this project:

- Pandas
- NumPy
- Matplotlib
- Stats models

6.2.3 Visualization:

Visualization is a crucial aspect of the historical stock market analysis project as it helps present complex data in a visually appealing and understandable manner. Python provides several libraries for creating interactive and informative visualizations. It offers a range of chart types, including line plots, bar plots, scatter plots, histograms, and more. Matplotlib provides extensive customization options, allowing you to control aspects such as colors, labels, titles, and axes. It is suitable for creating static visualizations to display historical stock price movements, financial indicators, and statistical analysis results.

6.2.4 Power BI:

Power BI allows you to connect to various data sources, including databases, Excel files, and online sources, to fetch the historical stock price data, financial statements, and other relevant datasets. You can create data connections and establish data refresh schedules to ensure the visualizations and reports stay up to date.

6.2.5 Dashboards, Story and Reports:

Dashboards, stories, and reports are essential components of the historical stock market analysis project. Each of them serves a specific purpose in presenting and communicating the insights derived from the data analysis.

6.2.6 ARCHITECTURAL DIAGRAM

An architectural diagram is a diagram of a system that is used to abstract the overall outline of the software system and the relationships, constraints, and boundaries between components. It is an important tool as it provides an overall view of the physical deployment of the software system and its evolution roadmap.

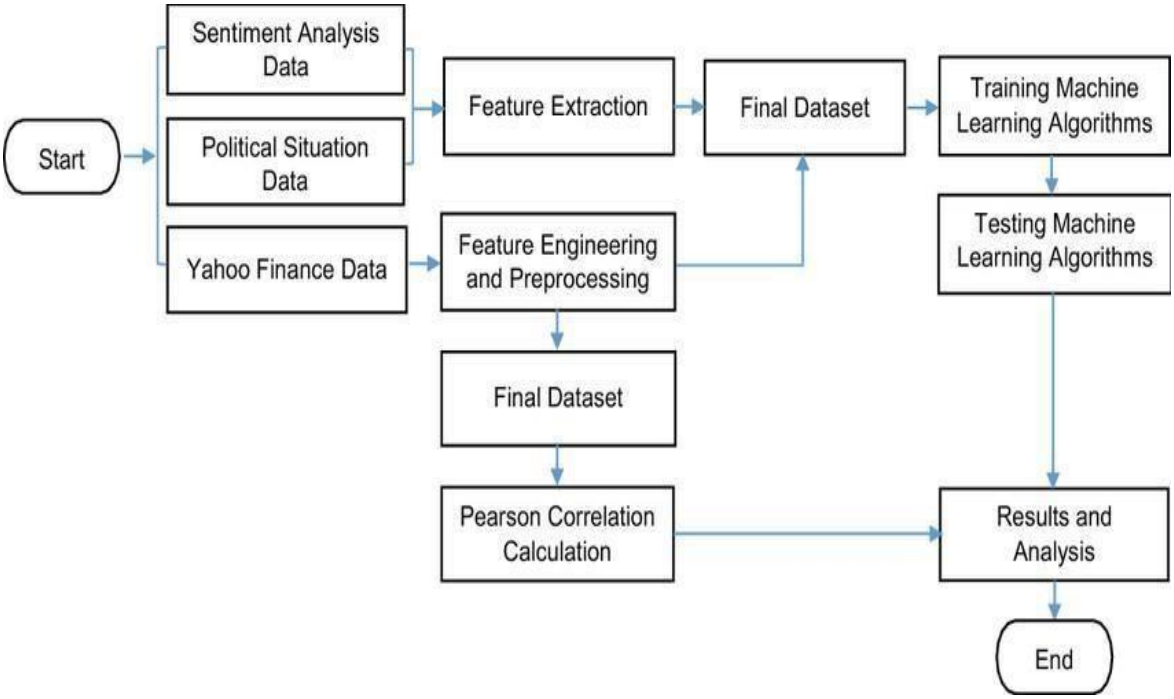

Fig.6.2.6 Architecture diagram

CHAPTER 7

SYSTEM TESTING

System Testing is a level of the software testing where complete and integrated software is tested. The purpose of this test is to evaluate the system's compliance with the specified requirements. By definition of ISTQB system testing is the process of testing an integrated system to verify that it meets specified.

7.1 TESTING METHODS

Software Testing Type is a classification of different testing activities into categories, each having, a defined test objective, test strategy, and test deliverables. The goal of having a testing type is to validate the Application under Test for the defined Test Objective.

For instance, the goal of Accessibility testing is to validate the AUT to be accessible by disabled people. So, if your Software solution must be disabled friendly, you check it against Accessibility Test Cases.

7.2 TYPES OF TESTING

7.2.1 Unit Testing

In computer programming, unit testing is a software testing method by which individual units of source code, sets of one or more computer program modules together with associated control data, usage procedures, and operating procedures, are tested to determine whether they are fit for use.

Test functions responsible for retrieving historical stock price data, financial statements, or other relevant data from external sources. Verify that the functions correctly handle different inputs, handle errors gracefully, and return the expected data format.

Test functions that clean and preprocess the raw data, such as handling missing values, outliers, or formatting inconsistencies. Ensure that the data cleaning functions produce the desired results and maintain data integrity.

7.2.2 Integration Testing

Integration testing (sometimes called integration and testing, abbreviated I&T) is the phase in software testing in which individual software modules are combined and tested as a group. It occurs after unit testing and before validation testing. Integration testing takes as its input modules that have been unit tested, groups them in larger aggregates, applies tests defined in an integration test plan to those aggregates, and delivers as its output the integrated system ready for system testing. Identify the key integration points where different components interact or exchange data. This includescomponents such as data retrieval, data preprocessing, analysis algorithms, visualization modules, and reporting functionalities. Define specific test scenarios that cover different combinations of components and their interactions. For example, test scenarios could involve retrieving data from external sources, preprocessing the data, applying analysis algorithms, generating visualizations and generating reports.

7.2.3 Functional Testing

Functional tests provide systematic demonstrations that functions tested are available as specified by the business and technical requirements, system documentation, and user manuals.

Organization and preparation of functional tests is focused on requirements, key functions, or special test cases. In addition, systematic coverage pertaining to identify Business process flows; data fields, predefined processes, and successive processes must be considered for testing. Before functional testing is complete, additional tests are identified and the effective value of current tests is determined.

7.3 TESTING STRATEGY

Test Strategy is also known as test approach defines how testing would be carried out. Test approach has two techniques:

- **Proactive -** An approach in which the test design process is initiated as early as possible in order to find and fix the defects before the build is created.
- **Reactive -** An approach in which the testing is not started until after design and coding are completed.

Test strategy calls for implementing two entirely different methodologies for testing this project.

Start by thoroughly understanding and analyzing the project requirements, including functional, non-functional, and performance-related aspects. This will serve as the foundation for developing the testing strategy. Develop a comprehensive test plan that outlines the testing objectives, scope, test scenarios, and test coverage. Define the testing approach, techniques, and tools to be used. Identify the resources, timelines, and dependencies for testing activities.

7.4 TEST CASE DESIGN

7.4.1 TEST CASE 1

Test Title: Accuracy

Test ID: T1

Test Priority: High

Test Objective: To make sure that the analyzed data is correct

Description:

Furthermore, the project employs various charting techniques, trend analysis, and statistical tools to identify patterns and trends in the stock price movements of Microsoft, Apple, Amazon, Netflix, and Google. This includes the assessment of historical price data, moving averages, relative strength indicators, and volume analysis to detect potential buying or selling opportunities.

7.4.2 TEST CASE 2

Test Title: Response Data

Test ID: T2

Test Priority: High

Test Objective: To assure that visualized dashboard is understandable.

Description:

Visualization is a crucial aspect of the historical stock market analysis project as it helps present complex data in a visually appealing and understandable manner. Python provides several libraries for creating interactive and informative visualizations.

CHAPTER 8

SYSTEM IMPLEMENTATION

The system is been implemented as follows:

8.1 PYTHON BACKEND:

Python is an excellent programming language for the historical stock market analysis project due to its extensive libraries and frameworks specifically designed for data analysis, numerical computing, and machine learning. Here are some key Python libraries and frameworks commonly used in this project:

Pandas is a powerful library for data manipulation and analysis. It provides data structures (e.g., Data Frame) to handle structured data efficiently, making it ideal for processing and exploring historical stock price data, financial statements, and other datasets. NumPy is commonly used in mathematical calculations, statistical analysis, and working with numerical data. Matplotlib is a widely used data visualization library in Python. It provides a flexible and customizable framework for creating various types of charts, graphs, and plots to visualize historical stock price movements, financial indicators, and analysis outcomes.

Python external Package Requirements:

pandas – A powerful library for data manipulation and analysis, particularly suited for working with structured data such as historical stock price data and financial statements. numpy – A fundamental package for numerical computing in Python, providing support for efficient array operations and mathematical functions.

Matplotlib – A widely-used library for creating static, animated, and interactive visualizations, including line plots, bar charts, scatter plots, and histograms.

seaborn – A statistical data visualization library that builds on top of matplotlib, offering additional functionality and improved aesthetics for creating informative and visually appealing plots.

The entire code for this a uploading the dataset is written in Python using libraries supported by Python.

```
import numpy as np
import pandas as pd
from matplotlib import pyplot as plt
import seaborn as sns
```

```
df1=pd.read_csv("/content/drive/MyDrive/Apple.csv")
df2=pd.read_csv("/content/drive/MyDrive/Google.csv")
df3=pd.read_csv("/content/drive/MyDrive/Microsoft.csv")
df4=pd.read_csv("/content/drive/MyDrive/Netflix.csv")
df5=pd.read_csv("/content/drive/MyDrive/Amazon.csv")
```

8.2 FUNCTION

Write a function to compare stock prices of MAANG Companies.

```
#Comparing Stock Prices of MAANG Companies

def compare(price_type):
    plt.figure(figsize=(20,15))
    plt.plot(df1['Date'],df1[price_type], label = "Apple")
    plt.plot(df2_n['Date'], df2_n[price_type], label = "Google")
    plt.plot(df3['Date'],df3[price_type], label = "Microsoft")
    plt.plot(df4_n['Date'], df4_n[price_type], label = "Netflix")
    plt.plot(df5['Date'],df5[price_type], label = "Amazon")
    plt.legend()
    plt.xlabel("Years")
    plt.ylabel(price_type+" Price")
    plt.title(price_type +" Price Comparison of MAANG")
    plt.show()
```

```
price=['Open','High','Low','Close','Adj Close']
for p in price:
    compare(p)
```

Next, write a function to respond to your analysis. Now add all your dataset to compare the stock prices of MAANG Companies. Once all the Data are uploaded, code a python program and execute it. You will be able to analyze the stock prices of the five companies, and visualize the data using Power BI tool for clear Understanding.

CHAPTER 9

CONCLUSION & FUTURE ENHANCEMENTS

9.1 CONCLUSION

In conclusion, the historical stock market analysis project aimed to analyze the stock market performance of Microsoft, Apple, Amazon, Netflix, and Google. The project involved the collection of historical stock price data, financial statements, and other relevant datasets for these companies. Through the application of various data analysis techniques, the project sought to derive meaningful insights, identify trends, and make informed investment recommendations. Throughout the project, a comprehensive analysis was conducted using Python and a range of external packages such as pandas, numpy, matplotlib, seaborn, scikit-learn, and others. These packages facilitated data manipulation, visualization, statistical modeling, and machine learning tasks. Additionally, the project leveraged tools like Power BI to create interactive dashboards, stories, and reports, enhancing the presentation and communication of the analysis outcomes.

9.2 FUTURE ENHANCEMENTS

Real-time Data Integration: Incorporate real-time data feeds to provide up-to-date information on stock prices, financial indicators, and news related to the selected companies. This would enable users to make more timely and informed investment decisions. Advanced Machine Learning Models: Explore and implement advanced machine learning algorithms, such as recurrent neural networks (RNNs) or long short-term memory (LSTM) networks, to improve the accuracy of stock price predictions and trend analysis.These future enhancements would further enhance the capabilities of the historical stock market analysis project, providing users with more sophisticated tools, insights, and decision-making support. By leveraging advanced techniques, real-time data, and additional data sources, the project can continue to evolve and offer more comprehensive and accurate analysis in the dynamic and complex stock market environment.

CHAPTER 10

APPENDIX

10.1. SOURCE CODE

```
import numpy as np
import pandas as pd
from matplotlib import pyplot as plt
import seaborn as sns

df1=pd.read_csv("/content/drive/MyDrive/Apple.csv")
df2=pd.read_csv("/content/drive/MyDrive/Google.csv")
df3=pd.read_csv("/content/drive/MyDrive/Microsoft.csv")
df4=pd.read_csv("/content/drive/MyDrive/Netflix.csv")
df5=pd.read_csv("/content/drive/MyDrive/Amazon.csv")

#Creating two additional dataframes for companies which went public later
df2_n=pd.read_csv("/content/drive/MyDrive/Google.csv")
df4_n=pd.read_csv("/content/drive/MyDrive/Netflix.csv")
df_date=pd.read_csv("/content/drive/MyDrive/Apple.csv")

df_date[df_date.columns[:-1]]=0

df_date['Date'][0]

np.where(df_date["Date"]=="2004-08-18")

def add_empty_rows(df,end):
    for i in range(end,-1,-1):
        df=pd.concat([pd.DataFrame([[0,0,0,0,0,0,df_date['Date'][i]]],
columns=df.columns), df], ignore_index=True)
    return df

df2_n=add_empty_rows(df2_n,1161)

np.where(df_date["Date"]=="2002-05-22")

df4_n=add_empty_rows(df4_n,597)

#Setting Date as Index and also changing its Datatype
def set_ind(df,cmp_name):
    df['Date'] = df['Date'].apply(pd.to_datetime)
    df['Company']=cmp_name
    df.set_index('Company',inplace=True)
```

```
set_ind(df1,'Apple')
set_ind(df2,'Google')
set_ind(df3,'Microsoft')
set_ind(df4,'Netflix')
set_ind(df5,'Amazon')
set_ind(df2_n,'Google')
set_ind(df4_n,'Netflix')

#Let's have a look at the datasets now.
df1.head()

df2.head()

df3.head()

df4.head()

df5.head()

#Exploratory Data Analysis
#Analysing Volume of Stock Traded
def volume_analysis(df,cmp_name):
    df['Volume'].plot(figsize=(10,7),title='Volume Of '+cmp_name+' Stock
Prices',c='orange')
    plt.ylabel('Volume')
    plt.show()

volume_analysis(df1,'Apple')
volume_analysis(df2,'Google')
volume_analysis(df3,'Microsoft')
volume_analysis(df4,'Netflix')
volume_analysis(df5,'Amazon')

#Analysing the Prices of stocks of MAANG companies over the years
def price(df,cmp_name,price_type):
    plt.figure(figsize=(16,8))
    if(price_type=='Open'):
        clr='black'
    elif(price_type=='Close'):
        clr='green'
    elif(price_type=='High'):
        clr='blue'
    else:
        clr='purple'
    df[price_type].plot(c=clr)
    plt.ylabel(price_type)
    plt.xlabel('Year')
    plt.title(price_type+" Price of "+cmp_name)
    plt.show()
```

```
#Opening price
price(df1,"Apple","Open")
price(df2,"Google","Open")
price(df3,"Microsoft","Open")
price(df4,"Netflix","Open")
price(df5,"Amazon","Open")

#Closing Price
price(df1,"Apple","Close")
price(df2,"Google","Close")
price(df3,"Microsoft","Close")
price(df4,"Netflix","Close")
price(df5,"Amazon","Close")

#Daily Peak prices
price(df1,"Apple","High")
price(df2,"Google","High")
price(df3,"Microsoft","High")
price(df4,"Netflix","High")
price(df5,"Amazon","High")

#Daily Minimum prices
price(df1,"Apple","Low")
price(df2,"Google","Low")
price(df3,"Microsoft","Low")
price(df4,"Netflix","Low")
price(df5,"Amazon","Low")

#A comparitive analysis of the high and low prices of stock over the years showing
change in the daily range of trading.
df1.info()

def high_low(df,cmp_name):
    plt.figure(figsize=(20,8))
    df['Daily Range']= df['High']-df['Low']
    plt.plot(df['Date'],df['Daily Range'],c='blue')
    plt.xlabel("Years")
    plt.ylabel("Stock Price Trading Range")
    plt.title("Daily Stock Price Range for "+cmp_name)
    plt.show()

high_low(df1,'Apple')
high_low(df2,'Google')
high_low(df3,'Microsoft')
high_low(df4,'Netflix')
high_low(df5,'Amazon')
```

```
#Analysing the Daily Returns on Stock
def daily_returns(df,cmp_name):
    df['Daily Return'] = df['Adj Close'].pct_change()
    #We chose Adj Close here because it is inidicated as the fair price of the
stock on that day. However you may also take CLose price for the analysis.
    plt.figure(figsize=(20, 10))
    df['Daily Return'].hist(bins=40)
    plt.xlabel('Daily Return')
    plt.title('Dialy Returns On '+cmp_name)
    plt.show()

daily_returns(df1,'Apple')
daily_returns(df2,'Google')
daily_returns(df3,'Microsoft')
daily_returns(df4,'Netflix')
daily_returns(df5,'Amazon')

#Comparing Stock Prices of MAANG Companies
def compare(price_type):
    plt.figure(figsize=(20,15))
    plt.plot(df1['Date'],df1[price_type], label = "Apple")
    plt.plot(df2_n['Date'], df2_n[price_type], label = "Google")
    plt.plot(df3['Date'],df3[price_type], label = "Microsoft")
    plt.plot(df4_n['Date'], df4_n[price_type], label = "Netflix")
    plt.plot(df5['Date'],df5[price_type], label = "Amazon")
    plt.legend()
    plt.xlabel("Years")
    plt.ylabel(price_type+" Price")
    plt.title(price_type +" Price Comparison of MAANG")
    plt.show()

price=['Open','High','Low','Close','Adj Close']
for p in price:
    compare(p)
```

SCREENSHOTS

10.2 SCREENSHOTS

Apple Head Data

Company	Open	High	Low	Close	Adj Close	Volume	Date	Daily Range	Daily Return
Apple	0.936384	1.004464	0.907924	0.999442	0.850643	535796800	2000-01-03	0.096540	NaN
Apple	0.966518	0.987723	0.903460	0.915179	0.778926	512377600	2000-01-04	0.084263	-0.084310
Apple	0.926339	0.987165	0.919643	0.928571	0.790324	778321600	2000-01-05	0.067522	0.014633
Apple	0.947545	0.955357	0.848214	0.848214	0.721931	767972800	2000-01-06	0.107143	-0.086538
Apple	0.861607	0.901786	0.852679	0.888393	0.756127	460734400	2000-01-07	0.049107	0.047369

Figure 10.2.1

Description

- The total analysed data of Apple can be given by the variable name with the head tag.
- The dataset for open, high, low, close, Adj close, volume, date, daily range & daily return can be given by df1.head().

Google Head Data

Company	Open	High	Low	Close	Adj Close	Volume	Date
Google	2.490664	2.591785	2.390042	2.499133	2.499133	897427216	2004-08-19
Google	2.515820	2.716817	2.503118	2.697639	2.697639	458857488	2004-08-20
Google	2.758411	2.826406	2.716070	2.724787	2.724787	366857939	2004-08-23
Google	2.770615	2.779581	2.579581	2.611960	2.611960	306396159	2004-08-24
Google	2.614201	2.689918	2.587302	2.640104	2.640104	184645512	2004-08-25

Figure 10.2.2

Description

- The total analysed data of Google can be given by the variable name with the head tag.
- The dataset for open, high, low, close, Adj close, volume, date, daily range & daily return can be given by df2.head().

Volume of Apple Stock Prices

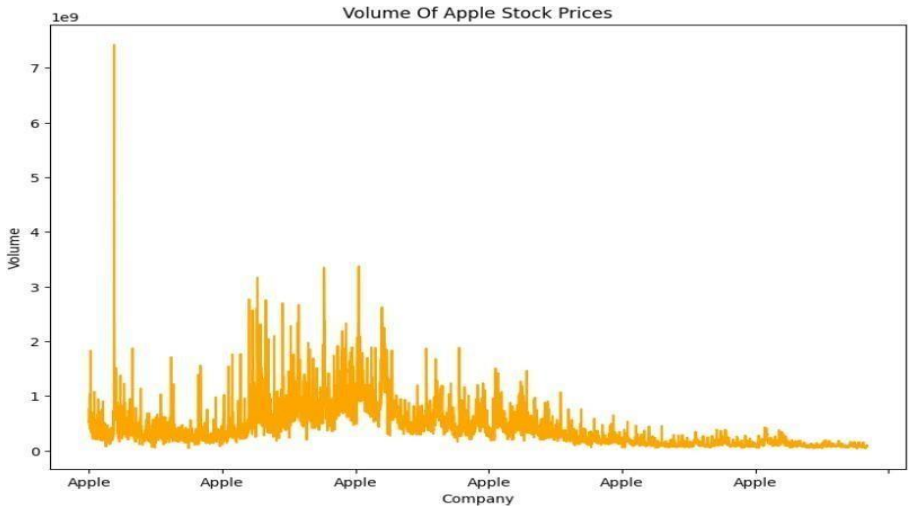

Figure 10.2.3

- The volume of Apple stock prices is plotted according to the volume level.
- The decreased and increased volume can be given by the volumetric analysis

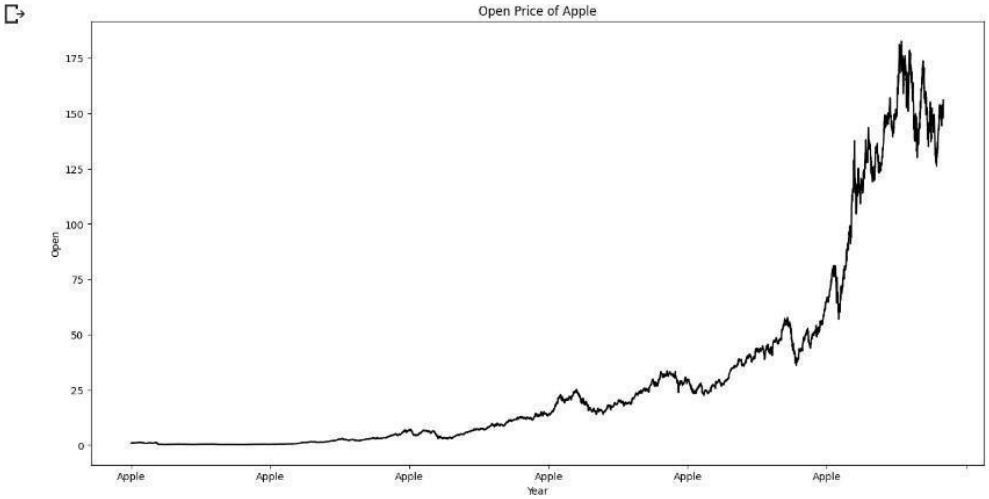

Figure 10.2.4

- The open price of Apple stock prices is plotted according to the price level.
- The decreased and increased prices can be given by the problematic analysis

Close Price of Microsoft

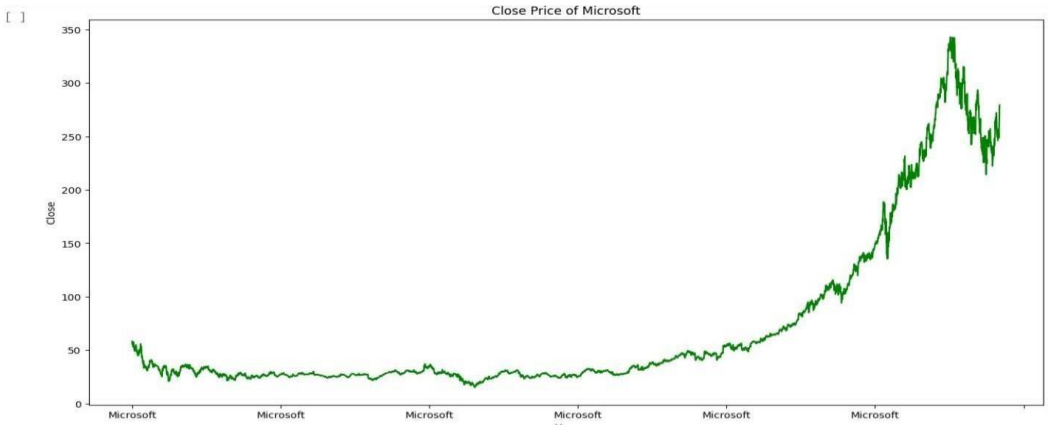

Figure 10.2.5

- The close price of Microsoft stock prices is plotted according to the price level.
- The decreased and increased close price can be given by the problematic analysis.

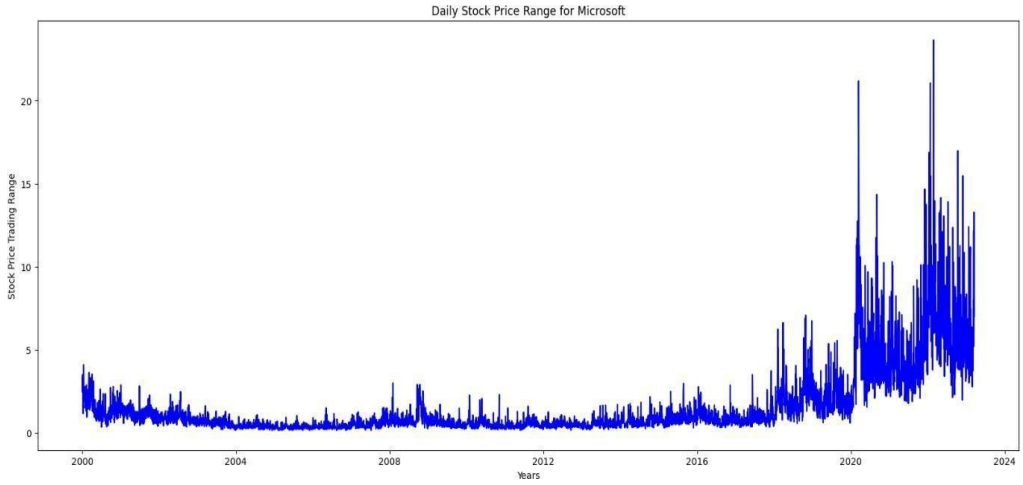

Figure 10.2.6

- The close price of Microsoft stock prices is plotted according to the price level.
- The decreased and increased close price can be given by the problematic analysis.

Daily returns on Apple

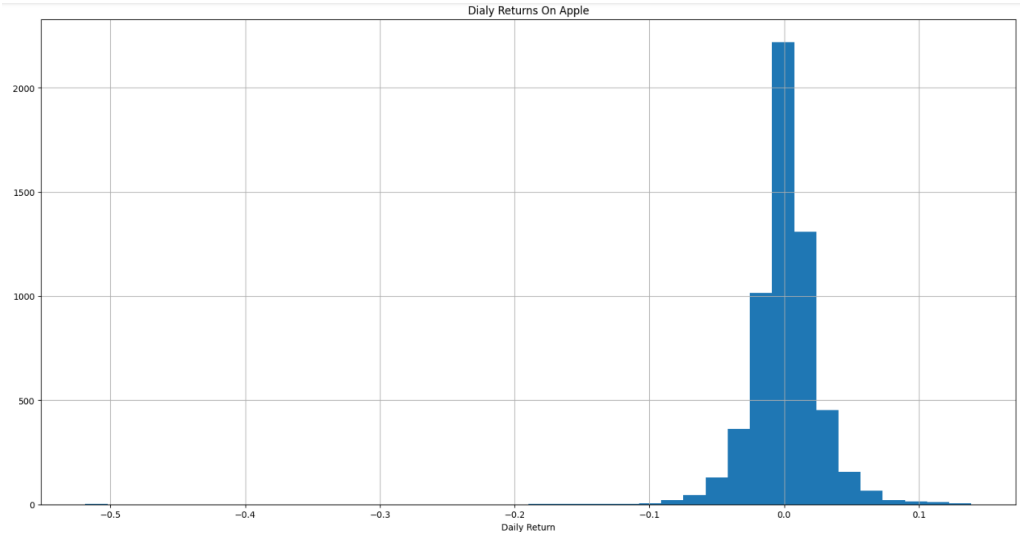

Figure 10.2.7

- The daily returns on Apple stock prices is plotted according to the price level.
- The decreased and increased daily returns price can be given by the problematic analysis.

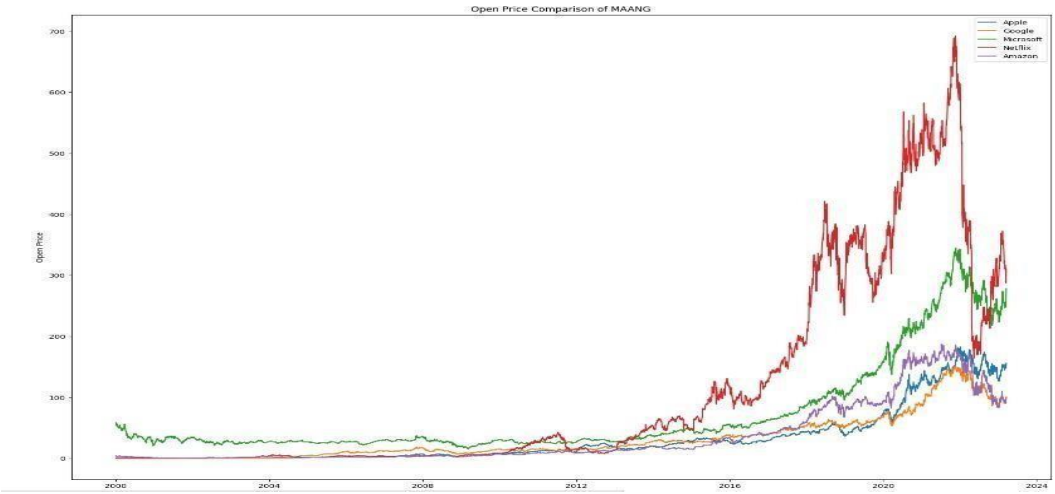

Figure 10.2.8

- The comparison stock prices is plotted according to the price level.
- The decreased and increased comparison price can be given by the problematic analysis.

Tree Map

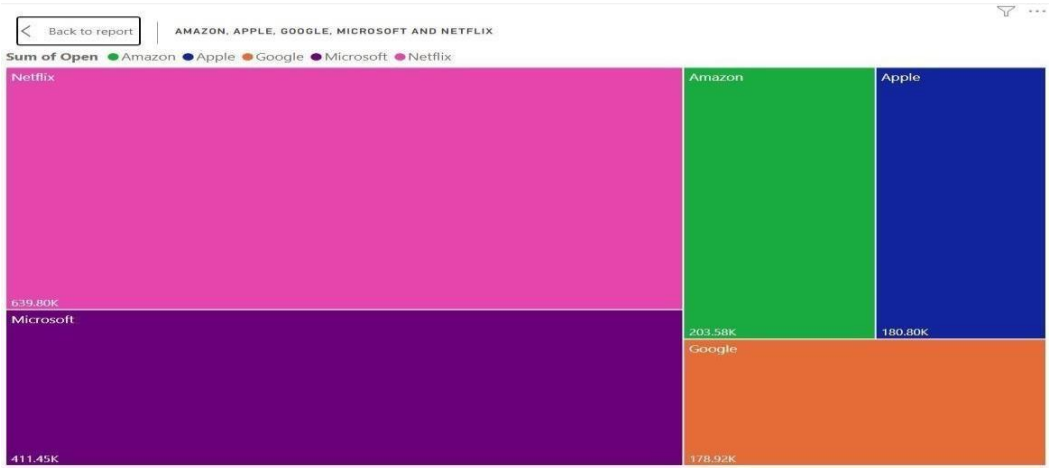

Figure 10.2.9

- The comparison visualization stock prices is plotted as a tree map according to the price level.
- The decreased and increased comparison price can be given by the problematic analysis.

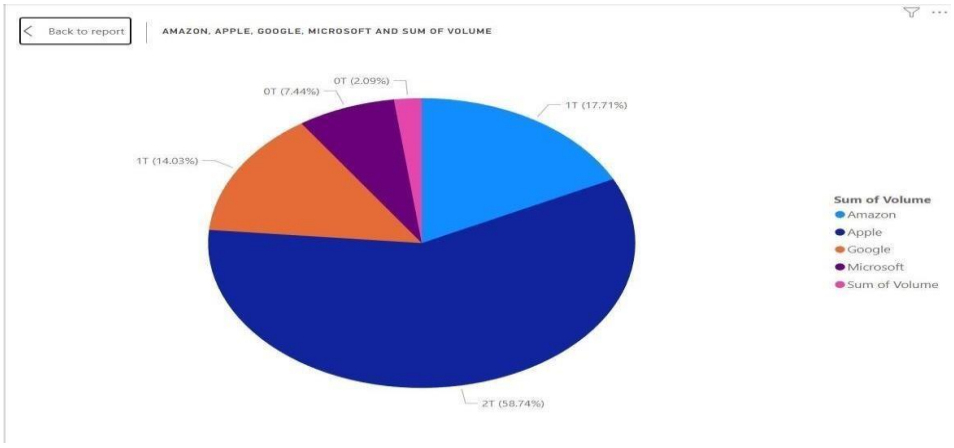

Figure 10.2.10

- The comparison visualization stock prices is plotted as a tree map according to the price level.
- The decreased and increased comparison price can be given by the problematic analysis.

CHAPTER 11
REFERENCES

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