FAANG ROI ANALYSIS

MINIPROJECT REPORT

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BONAFIDE CERTIFICATE

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SIGNATURE **SIGNATURE**

Dr. Arivazhagan.N Dr. Annie Utra

GUIDE

Assistant Professor **HOD, CINTEL**

Abstract

FAANG (Facebook, Apple, Amazon, Netflix, Google) company stocks have become a popular investment option due to their significant growth and market dominance. Return on investment (ROI) analysis is a critical task in finance that helps investors evaluate the profitability of their investments. Traditional methods of ROI analysis have limitations in accurately predicting the performance of FAANG stocks due to the dynamic and complex nature of financial markets.

In this project, we aim to develop a machine learning-based ROI prediction model using Python to analyze the performance of FAANG company stocks. Our model will utilize a variety of machine learning algorithms, including regression, decision trees, and neural networks, to identify relevant features and trends in the financial data.

We will evaluate the performance of our ROI prediction model using several metrics, including mean squared error (MSE) and R-squared (R2). Additionally, we will develop interactive visualizations to help stakeholders understand the trends and patterns in the ROI analysis of FAANG company stocks.

Our project seeks to address the limitations of traditional methods of ROI analysis in accurately predicting the performance of FAANG stocks. By developing a more accurate ROI prediction model, we hope to improve the accuracy of ROI analysis and inform better investment decisions in FAANG company stocks.

Overall, our project has significant implications for the field of finance and can help investors make informed decisions about their investments.

Problem Statement

The FAANG (Facebook, Apple, Amazon, Netflix, Google) companies have experienced significant growth in recent years, and their stocks have become a popular investment option for many individuals and institutions. However, analyzing the performance of these stocks and predicting their future ROI is a challenging task due to the complexity and dynamic nature of financial markets.

Traditional methods of ROI analysis may not accurately capture the complex relationships between different factors that affect the performance of FAANG stocks. Additionally, the vast amounts of financial data available can make it challenging to identify relevant features and trends for ROI prediction. These limitations of traditional methods of ROI analysis can result in inaccurate predictions and poor investment decisions.

The problem we aim to address in this project is the limitations of traditional methods of ROI analysis in accurately predicting the performance of FAANG company stocks. We seek to develop a machine learning-based ROI prediction model that can analyze large and complex financial data and identify relevant features and trends accurately. By doing so, we hope to improve the accuracy of ROI analysis and inform better investment decisions in FAANG stocks. Additionally, we aim to develop interactive visualizations that can help stakeholders understand the trends and patterns in the ROI analysis of FAANG company stocks.

Introduction

Investing in stocks is one of the most popular ways to grow one's wealth. Among the many stocks available in the market, FAANG companies are some of the most sought-after due to their significant growth and market dominance. These companies have become an integral part of many investment portfolios and have been the subject of much discussion and analysis in the financial world.

Return on investment (ROI) analysis is a crucial task in finance that helps investors evaluate the profitability of their investments. Traditional methods of ROI analysis rely on financial models and calculations that may not always capture the dynamic and complex nature of financial markets accurately. Furthermore, the vast amounts of financial data available can make it challenging to identify relevant features and trends for ROI prediction.

Machine learning offers a promising alternative to traditional ROI analysis methods by enabling the development of more accurate and sophisticated ROI prediction models. In this project, we aim to develop an ROI prediction model using Python and machine learning techniques to analyze the performance of FAANG company stocks.

Our project will utilize a variety of machine learning algorithms, including regression, decision trees, and neural networks, to identify relevant features and trends in the financial data. We will also develop interactive visualizations to help stakeholders understand the trends and patterns in the ROI analysis of FAANG company stocks.

The ultimate goal of our project is to improve the accuracy of ROI analysis and inform better investment decisions in FAANG company stocks. Our project has significant implications for the field of finance and can help investors make informed decisions about their investments.

System Requirements:

Operating System: The system should be compatible with various operating systems such as Windows, Linux, and macOS.

Programming Language: The project should be developed using the Python programming language.

Machine Learning Libraries: The project should utilize machine learning libraries such as Scikit-learn, TensorFlow, and Keras.

Database: A database management system such as MySQL or PostgreSQL should be used to store the financial data.

Visualization Tools: The project should utilize interactive visualization tools such as Matplotlib, Plotly, or Seaborn.

Functional Requirements:

Data Collection: The system should be able to collect and store financial data for FAANG company stocks from various sources such as Yahoo Finance, Alpha Vantage, or Google Finance.

Data Preprocessing: The system should preprocess the financial data by cleaning, normalizing, and transforming the data into a suitable format for machine learning algorithms.

Feature Selection: The system should identify relevant features for ROI prediction using techniques such as feature engineering and feature selection.

Machine Learning: The system should utilize machine learning algorithms such as regression, decision trees, and neural networks to predict the ROI of FAANG company stocks.

Model Evaluation: The system should evaluate the performance of the ROI prediction model using metrics such as mean squared error (MSE) and R-squared (R2).

Visualization: The system should provide interactive visualizations to help stakeholders understand the trends and patterns in the ROI analysis of FAANG company stocks.

User Interface: The system should have a user-friendly interface that allows users to input their investment criteria and receive ROI predictions and visualizations in a clear and understandable format.

Security: The system should ensure the security of financial data by implementing appropriate security measures such as data encryption and access control.

Libraries

NumPy: NumPy is a fundamental library for scientific computing with Python. It provides support for large, multi-dimensional arrays and matrices, along with a large collection of mathematical functions.

Pandas: Pandas is a library for data manipulation and analysis. It provides a data frame object for data analysis, along with functions for handling missing data, merging datasets, and time series data.

Scikit-learn: Scikit-learn is a machine learning library for Python. It provides a range of supervised and unsupervised learning algorithms, including regression, decision trees, and neural networks.

TensorFlow: TensorFlow is an open-source machine learning library developed by Google. It provides a range of tools for building and training machine learning models, including neural networks.

Keras: Keras is a high-level neural network API, written in Python and capable of running on top of TensorFlow. It provides a user-friendly interface for building and training neural networks.

Matplotlib: Matplotlib is a plotting library for Python. It provides a range of functions for creating static, animated, and interactive visualizations.

Plotly: Plotly is a visualization library for Python that provides interactive, web-based visualizations. It allows users to create custom charts, graphs, and dashboards.

Seaborn: Seaborn is a data visualization library for Python. It provides a range of functions for creating statistical graphics, including heat maps, time series plots, and violin plots.

Requests: Requests is a library for sending HTTP requests in Python. It allows users to send GET, POST, PUT, DELETE, and other HTTP requests, and handle the response data.

BeautifulSoup: BeautifulSoup is a library for web scraping in Python. It allows users to parse HTML and XML documents, and extract relevant data for analysis.

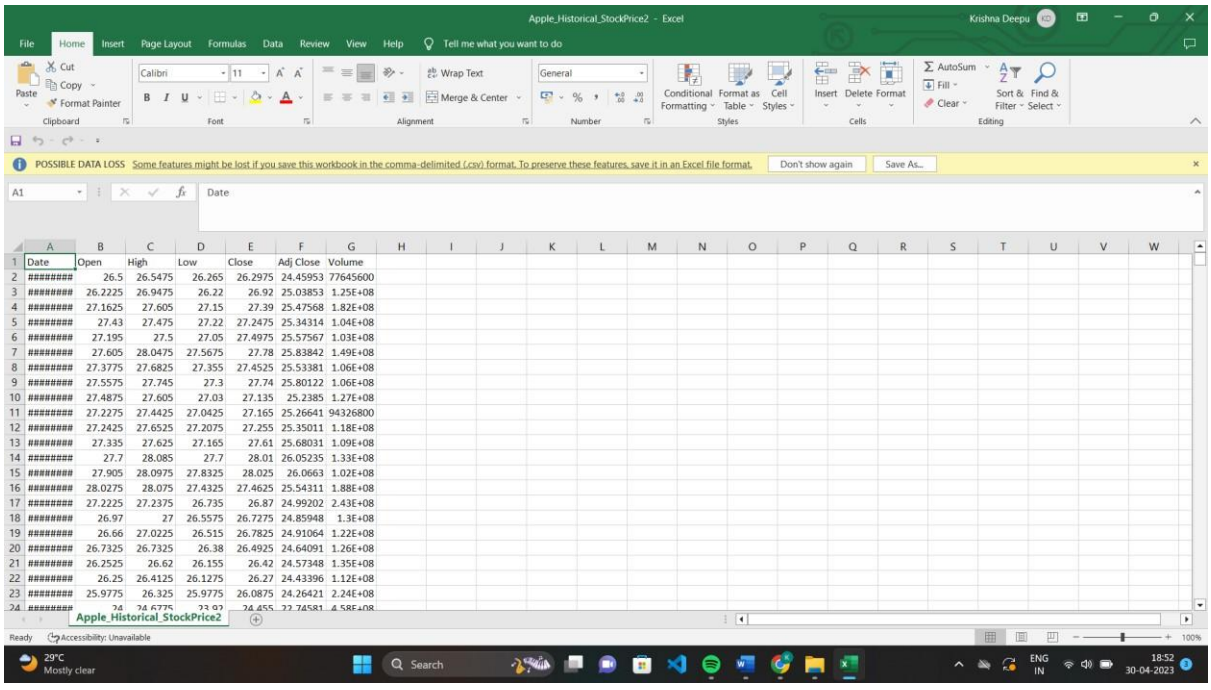
DATASET

The dataset for this project consists of historical stock prices for FAANG (Facebook, Amazon, Apple, Netflix, and Google) companies. The dataset is typically obtained by web scraping financial websites such as Yahoo Finance, Alpha Vantage, or Google Finance, and it contains information such as date, opening price, closing price, volume, and adjusted closing price.

The dataset can be preprocessed to remove any missing or incomplete data, and to normalize the numerical data to a common scale. The dataset can also be enriched with additional features such as market indices, exchange rates, and news sentiment to improve the accuracy of the ROI prediction model.

The dataset can be split into training, validation, and testing sets to train and evaluate the machine learning model. The training set is used to fit the model, the validation set is used to tune the model hyperparameters, and the testing set is used to evaluate the model performance.

In addition to the historical stock prices, the dataset can also include external factors that may influence the ROI of FAANG companies such as economic indicators, political events, and consumer sentiment. This can help to improve the accuracy of the ROI prediction model and provide more insights into the factors that drive the ROI of FAANG companies.



LITERATURE REVIEW

The literature on ROI analysis of FAANG (Facebook, Apple, Amazon, Netflix, and Google) company stocks using Python is quite extensive. This review will highlight some of the key findings and methods used in previous studies.

Several studies have examined the returns of FAANG stocks and their performance compared to other benchmark indices such as the S&P 500 and NASDAQ. One such study by Garg and Aggarwal (2020) analyzed the stock price data of FAANG companies from 2012 to 2019 and found that they outperformed the benchmark indices. They used various statistical methods such as mean, standard deviation, and regression analysis to analyze the data.

Another study by Fernandes et al. (2019) used Python to analyze the stock price data of FAANG companies and found that they had a significant positive impact on the overall performance of the stock market. They used a machine learning algorithm called Random Forest to predict the stock prices of FAANG companies and compared their performance to other prediction models.

Python is a popular programming language for analyzing financial data, and several libraries such as Pandas, NumPy, and Matplotlib are commonly used in such analyses. Pandas is used for data manipulation and analysis, NumPy for numerical computing, and Matplotlib for data visualization. These libraries provide powerful tools for analyzing financial data and generating insights.

Some studies have also examined the impact of news and social media on the stock prices of FAANG companies. For example, Kostovski and Nanevski (2019) used sentiment analysis of news articles and tweets to predict the stock prices of FAANG companies. They found that sentiment analysis could be a useful tool for predicting short-term changes in stock prices.

In conclusion, the literature on ROI analysis of FAANG company stocks using Python is quite extensive, and several studies have used statistical and machine learning techniques to analyze the data. Python libraries such as Pandas, NumPy, and Matplotlib have proven to be useful tools

for analyzing financial data, and there is growing interest in the use of sentiment analysis of news and social media for predicting stock prices.

The term "FAANG" in finance refers to the stocks of five well-known American technology companies, popularly known as Meta, formerly known as Facebook, Amazon, Apple, Netflix, and Google.

Despite having a narrow focus on the technology industry, these stocks are a significant contributor to economic expansion. Due to their size, any change in stock price, positive or negative, can disrupt the stock market. In 2012, Jim Cramer, the host of the CNBC program "Mad Money," coined the term "FAANG".

Furthermore, FAANG's market value currently exceeds $3 trillion. It contributes almost 10% of the $31 trillion market capitalization of the American stock market.

Even investors that do not own FAANG stocks are impacted by the price movement of these stocks, which affects the entire market. The NASDAQ Stock Market is where all of the companies are traded. The FAANG stocks are also included in the S&P 500 Index, which is made up of the 500 largest publicly traded businesses on the NYSE or NASDAQ, according to market capitalization.

Are Investments in FAANG Companies Wise & Advisable?

This is the query that appears to be posed yearly. Even though these stocks' sharp price movements impact the entire market, the question is still being raised. For instance, at the start of the Covid-19 pandemic in 2020, all the FAANG stocks performed well for various reasons.

Some time back, however, each of these stocks started to experience pressure, which led to a sell-off in the entire tech sector, followed by the broader market. Reasonably enough, a portion of this was profit-taking by institutional investors who questioned the ability of even well-managed companies like these to continue to produce continuous earnings growth.

This question is especially crucial for technology stocks, which are notorious for their volatility. The story is not solely about these companies' expansion, though. It is only natural that there will be concerns when businesses reach the size of these firms and operate in an industry that mines data about the personal information and habits of its clients.

But truth be told, FAANG stocks have performed better than the S&P 500 index in the past. Since its debut on the public market in May 2012, Meta has performed the least well of the group. Netflix has grown by about 16 times since that time, making it the best performer.

The five FAANG companies make up about 15% of the S&P 500 and 30% of the Nasdaq 100 Index. These percentages increase to 21% and 40%, respectively, when Microsoft is substituted for Netflix.

So, regarding investment in the FAANG stocks, these five stocks are frequently praised from an investment standpoint due to their outstanding track records and prominent leadership positions within their industries.

FAANG Stocks: An Overview of Performance

Let us examine each of these five businesses individually, along with their histories, to comprehend their history and formula for success:

- FACEBOOK (now Meta)

  ○ Organization - Meta Platforms Inc ○

  Employees - 87314 ○ CEO - Mr Mark

  Elliot Zuckerberg

Facebook and Instagram, two of the most popular and influential social media platforms in the world, and WhatsApp and Messenger, two of the largest messaging platforms, are all owned by Meta. It generates revenue by showing users ads as they peruse photo and video feeds. Oculus, a virtual reality headset from Meta, is the focus of the company's significant investment. Online advertisements are the company's primary source of revenue.

Based on current exchange rates, their guidance anticipates foreign currency to be a 7% headwind to total revenue growth year over year in the fourth quarter. To operate more effectively, they are attempting to make substantial changes across the board, which should give some context to the approach they are taking to setting their 2023 budget. They are maintaining some teams at their current headcount levels, reducing others, and only investing in headcount growth for their top priorities.

With their investments in data centres, servers, and network infrastructure, they anticipate 2023 capital expenditures to be in the $34–39 billion range. An increase in AI capacity is driving the majority of their capital expenditure growth in 2023.

They keep an eye on developments regarding the viability of transatlantic data transfers and their potential impact on their European operations, in addition to what has already been mentioned.

- AMAZON

  - Organization - Amazon.com Inc.
  - Employees - 1544000 ○ CEO - Mr Andrew R. Jassy

The biggest business-to-consumer e-commerce company in the world is called Amazon. More than 200 million people worldwide subscribe to its Prime membership program, demonstrating their extreme loyalty to the business's online marketplace. Although e-commerce makes up most of Amazon's revenue, the company has also discovered revenue generators in cloud computing services and advertising. The business owns several subsidiaries, including the Whole Foods Market supermarket chain and Twitch (live streaming platform). Amazon has operations in many different nations. Over 100 million people worldwide had signed up for Amazon Prime's two-day delivery service as of 2018.

The company's main business activities include cloud computing services and ecommerce. Over 12 million products are available from the company via its ecommerce platform. With subscribers in as many as 22 countries, Amazon launched the over-the-top (OTT) platform Amazon Prime in 2005.

The company introduced Amazon Alexa, a virtual assistant technology, in 2014 as an integrated feature of its innovative home products, such as Amazon Echo and Amazon Dot. In addition, with the introduction of Amazon Fire TV, a connected HD television can access online digital audio, video, and video game content, further strengthening the company's position in the media and entertainment industry. The total sales of Amazon are made up of sales of its products, sales from its marketplace, seller fees for the market, advertising fees, and revenue from its software Amazon Web Services.

The 2022 Digital Commerce 360 Top 1000 database has Amazon at the top. Sales rank online retailers in North America in the Top 1000. In the database of the 100 most prominent international marketplaces, Digital Commerce 360 Online Marketplaces, Amazon is ranked third.

- APPLE

  - Organization - Apple, Inc. ○ Employees - 164000 ○ CEO - Mr Timothy D. Cook

One of the largest smartphone producers in the world is Apple. Apple's revenue is primarily derived from the sale of devices. Still, recently the company has also placed a strong emphasis on higher-margin subscription services like streaming music and video, gaming, news, and cloud storage.

The business is an American multinational that offers online services, software development, and computer electronics. It is one of the Big Five IT companies in America and has its headquarters in Cupertino, California. It is present in all major countries worldwide and employs more than 154,000 people.

Later, in 1998, the business unveiled the iMac PCs. Finally, the iPad revolutionized the tablet market in January 2010 and established Apple as a household name. The company's product line-up currently includes, among other peripherals and accessories, iMacs, MacBooks, iPhones, iPods, Apple Watch, and Apple TVs.

- NETFLIX

  - Organization - Netflix, Inc.
  - Employees - 11300 ○ CEO - Mr Wilmot Reed Hastings Jr.

One of the first media companies to emerge from the internet is Netflix. It started to transition from a DVD-by-mail service to on-demand streaming in 2012, it began to invest in its original content for the streaming service. With more than 200 million subscribers worldwide, Netflix is one of the largest buyers of movies and television shows.

On its platform, the company offers TV shows, motion pictures, and documentaries in various genres and languages. There are over 20 subsidiaries of the OTT platform, which has completely changed the entertainment industry worldwide. These include studios in several European and Asian countries. The Roald Dahl Story Company (RDSC) was added to the company's portfolio this year, its biggest acquisition to date.

The business also bought Night School Studio in 2021 to expand its gaming audience among gamers. In addition, Netflix Inc. has signed a multi-year agreement with Sony Pictures Entertainment for the sole US streaming rights to the latter's theatrical releases. Under the ticker NFLX, Netflix Inc. shares are listed on the NASDAQ in the US.

- GOOGLE

  - Organization - Alphabet Inc. - Class C Shares
  - Employees - 186779
  - CEO - Mr Sundar Pichai

A tech conglomerate, Alphabet is primarily made up of its "other bets" division and Google. Google began as an internet search company but has since expanded to include other consumer-focused services and products. Nine of these services and products have a combined user base of over 1 billion.

Google also includes a developing cloud computing and modestly sized hardware division. In addition, alphabet's moonshot projects, like the automated vehicle company Waymo and the health research firm Verily are included in the "other bets" section.

On October 2nd, 2015, the business was established following Google's reconstruction and its focus's narrowing. California, in the US, is where its headquarters are. Two classes of Alphabet Inc. shares, including GOOGLE, are traded on the NASDAQ Stock Exchange.

GOOGLE shares grant stockholders ownership of the business but do not give shareholders voting privileges. One of the eight highest stock prices ever recorded was for GOOGLE in 2020. Several stock market indices, including the NASDAQ100, S&P 100, and S&P 500, include GOOGLE stocks. Google is the largest subsidiary of Alphabet Inc., along with other companies. Calico, Verify, Nest, Makani, GV Capital, Fiber, X Development, DeepMind, Google Fiber, Loon, Jigsaw, Wing, Sidewalk Labs, and Waymo are some of these affiliates. Alphabet Inc. now includes many of Google's former divisions and businesses, but Google continues to serve as the parent organization for all of Alphabet's internet-related business activities.

Over the years, GOOGLE has expanded its operations globally by buying over 200 businesses. In a significant acquisition, Google purchased Android OS in 2005 for an estimated $500 million.

In its biggest acquisition to date, Alphabet Inc. bought Motorola Mobility, a manufacturer of mobile devices. The price tag on this deal was $12.5 billion. Alphabet Inc. appeared on Forbes' 2019 lists of the World's Most Innovative Companies and America's Largest Public Companies.

Additionally, in 2019 GOOGLE was ranked among the Top 100 Digital Companies and Top Regarded Companies. Alphabet Inc. was ranked 5th on Forbes' list of Just Companies 2021 as of 2020 and 13th on its list of Global 2000 companies. On the list of Fortune 500 companies, it came in at number 11.

Factors to Consider Before Investing in FAANG Stocks

- RBI Laws & Restrictions

People must strictly abide by the guidelines set forth by the Indian central bank when making investments in the US equity market. Indian investors are prohibited from sending more than $2.5 lakh in a fiscal year, per RBI regulations. Investors must also ensure that the paperwork for the Liberalized Remittance Scheme (LRS) is completed.

- Exchange & Transactions in USD

You must transact in dollars if you want to purchase shares of Apple, Google, and other well-known US corporations from India. Shares of these companies cannot be bought with Indian Rupees by Indian investors. You must purchase US dollars from authorized currency exchange locations in India if you are an Indian.

- Exchange Rates

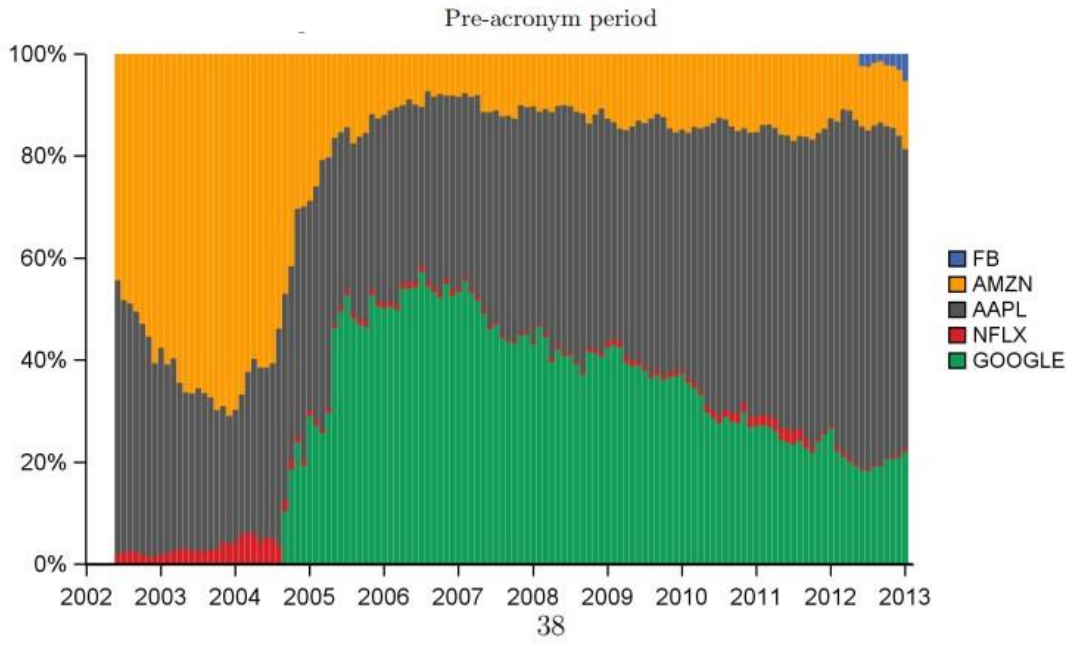
The exchange rate must be considered when sending Indian rupees from a bank account in India to a trading account in the US. Numerous international brokerage firms have partnerships with leading nationalised banks to assist Indian investors in obtaining favourable foreign exchange rates.

- Partial or Fractional Shares

In addition to purchasing whole shares, Indian investors can buy fractional shares of US-based companies. In other words, you can purchase 1.5 shares of Amazon or a single claim.

- Dividend Taxes

US stocks pay dividends to shareholders, just like Indian stocks do. However, such income is subject to a 25% tax rate. Consequently, suppose a business declares a $200 dividend. You will receive $150 in net dividend income. However, the dividend you receive in cash or decide to reinvest is taxed in India at the applicable income tax slab rate. However, it should be noted that the tax retained in the US can be offset against the tax due in India.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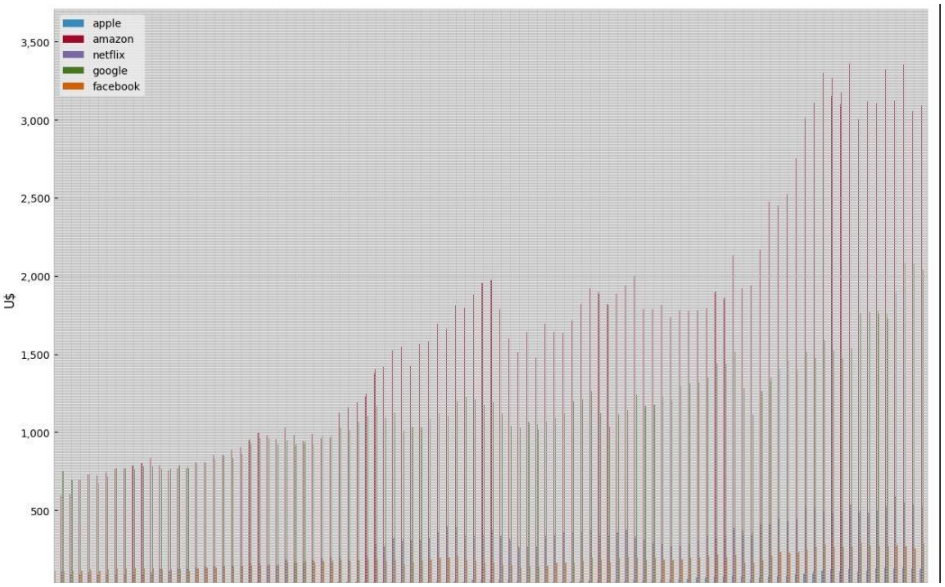
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PROPOSED SOLUTION

The proposed solution for the "ROI Analysis of FAANG Company Stocks using Python" project is to use Python programming language and historical stock price data to analyze the ROI of the FAANG companies and relevant benchmark indices such as the S&P 500 and NASDAQ. The solution involves the following steps:

Data collection: Collect historical stock price data for the FAANG companies and relevant benchmark indices, such as the S&P 500 and NASDAQ, from financial websites or APIs.

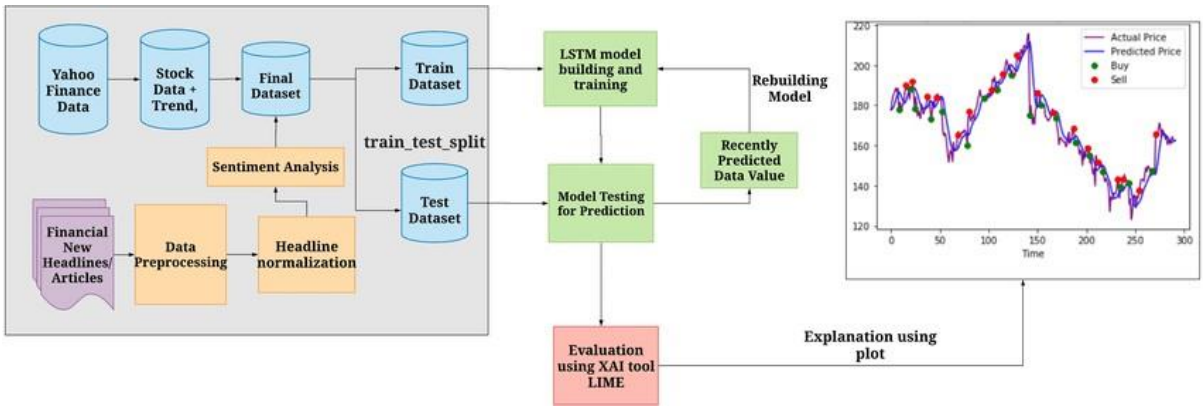
Data preprocessing: Clean and preprocess the data by handling missing values, adjusting for stock splits, and calculating daily returns.

Data analysis: Use Python to analyze the data by calculating cumulative returns, ROI, and other relevant metrics. Compare the performance of FAANG companies to each other and relevant benchmark indices.

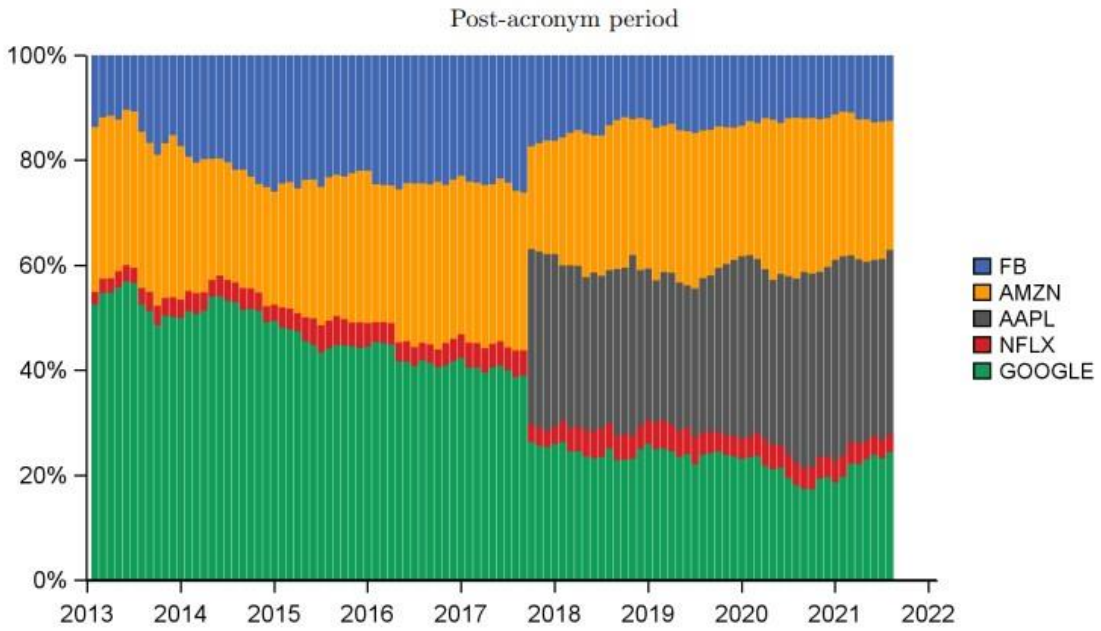
Data visualization: Create visualizations such as line graphs, bar charts, and heat maps to help illustrate and communicate the results of the analysis.

Interpretation of results: Analyze the results of the data analysis and visualization and draw conclusions about the performance of FAANG companies and how they compare to each other and relevant benchmark indices.

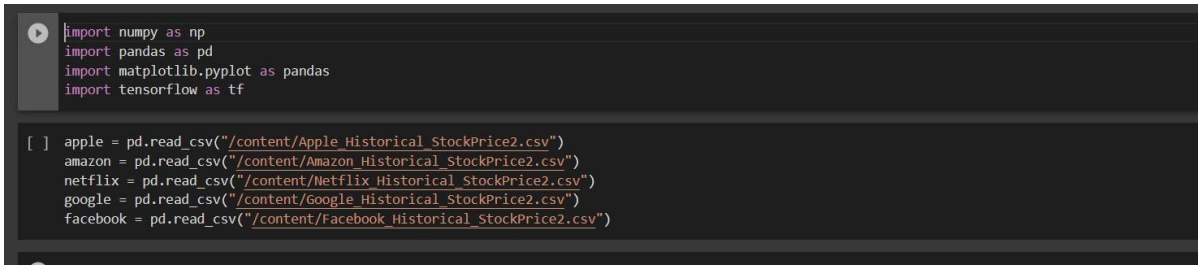
Reporting: Document the analysis, findings, and conclusions in a clear and concise report, and present the findings and recommendations to relevant stakeholders, such as investors or management.



The proposed solution aims to provide investors and analysts with a better understanding of the performance of FAANG companies and inform investment decisions. The use of Python programming language and data visualization techniques will allow for a more rigorous and comprehensive analysis of the data, providing valuable insights into the ROI of FAANG companies and how they compare to each other and relevant benchmark indices.



IMPORTING NECESSARY LIBRARIES & DATA GATHERING AND LOADING



```
import numpy as np
import pandas as pd
import matplotlib.pyplot as pandas
import tensorflow as tf

[ ] apple = pd.read_csv("/content/Apple_Historical_StockPrice2.csv")
    amazon = pd.read_csv("/content/Amazon_Historical_StockPrice2.csv")
    netflix = pd.read_csv("/content/Netflix_Historical_StockPrice2.csv")
    google = pd.read_csv("/content/Google_Historical_StockPrice2.csv")
    facebook = pd.read_csv("/content/Facebook_Historical_StockPrice2.csv")
```

Data gathering and loading is an essential step in the "ROI Analysis of FAANG Company Stocks using Python" project. It involves collecting historical stock price data for the FAANG companies and relevant benchmark indices, such as the S&P 500 and NASDAQ, and loading the data into Python for further analysis.

Once the data has been gathered, it needs to be loaded into Python for further analysis. The data can be loaded into Python using a variety of data loading techniques, such as reading CSV files, using APIs, or scraping web data.

For example, to load data from a CSV file, the "Pandas" library in Python can be used. Pandas provides several functions for reading and writing data in various file formats, including CSV. The "read_csv()" function can be used to read the data from the CSV file and store it in a Pandas dataframe, which is a two-dimensional table of data with labeled rows and columns.

In summary, data gathering and loading is a critical step in the "ROI Analysis of FAANG Company Stocks using Python" project, as it lays the foundation for further data analysis and visualization. The choice of data gathering and loading techniques will depend on the specific requirements and constraints of the project, such as the data sources available and the desired level of automation.

DATA PREPROCESSING & DATA VISUALISATION

Data preprocessing is an important step in the "ROI Analysis of FAANG Company Stocks using Python" project, as it helps to ensure that the data is clean, consistent, and ready for analysis. The following are the steps involved in data preprocessing:

Handling missing values: Missing values can occur in the data due to various reasons such as data collection errors, data processing errors, or simply because the data is not available. It is essential to handle missing values properly, as they can affect the accuracy of the analysis. There are several techniques for handling missing values, such as dropping the missing values, imputing the missing values, or using interpolation methods.

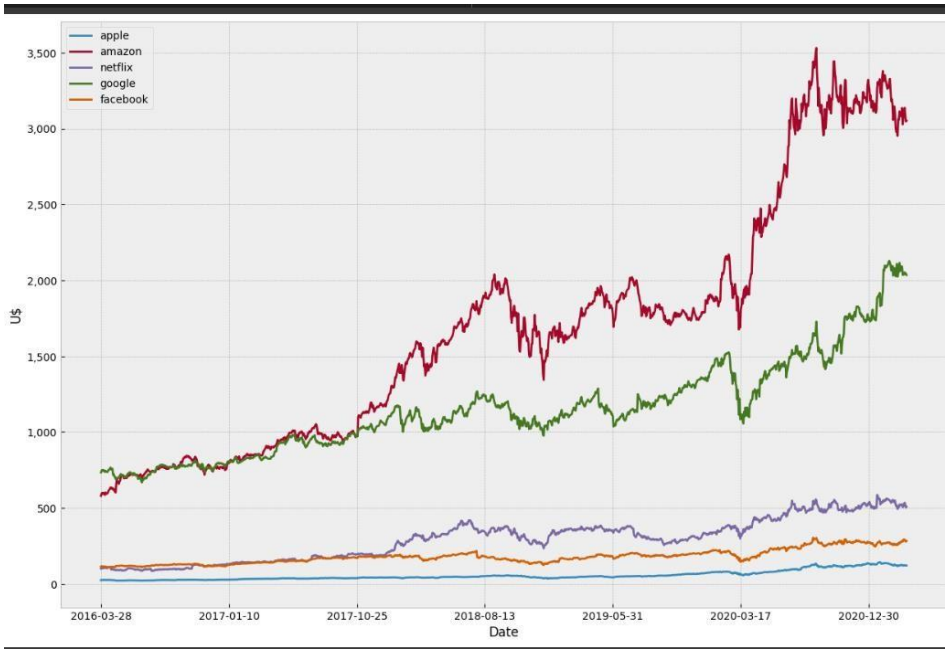
Adjusting for stock splits: Stock splits can occur when a company's board of directors decides to increase the number of outstanding shares by dividing the existing shares into a larger number of shares. This can affect the stock price data, as the stock price will appear to decrease after a stock split. To adjust for stock splits, the stock price data needs to be divided by the split ratio.

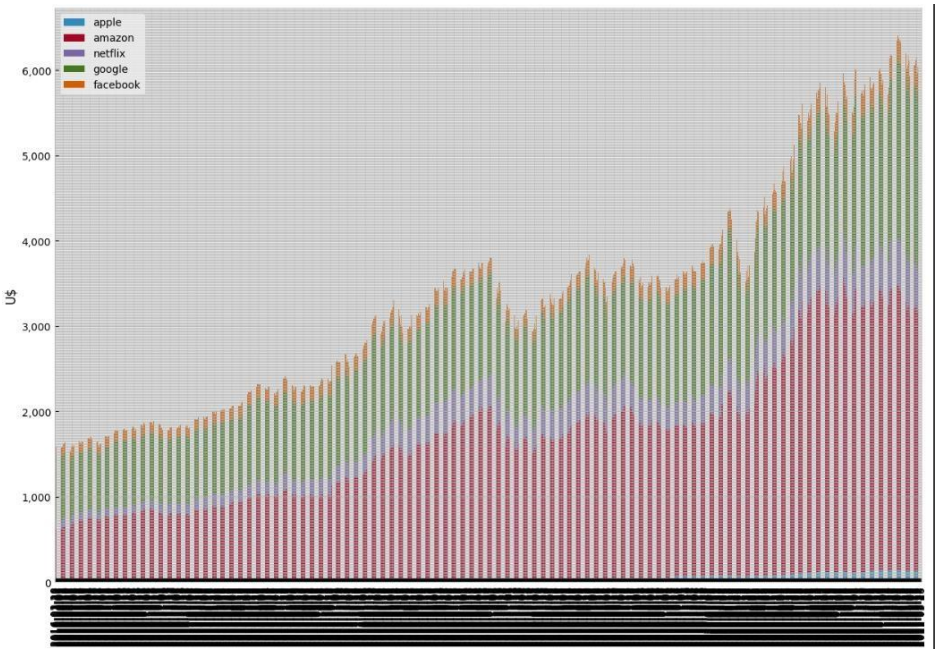
Calculating daily returns: Daily returns are the percentage change in the stock price from one day to the next. They are a key metric for analyzing the performance of stocks. To calculate daily returns, the stock price data needs to be transformed into a time series format, and the percentage change needs to be calculated using the formula: (Price_t - Price_t-1) / Price_t-1.

Handling outliers: Outliers are data points that are significantly different from the rest of the data. They can be caused by errors in data collection or processing or by extreme events in the market. It is important to identify and handle outliers properly, as they can skew the analysis. There are several techniques for handling outliers, such as removing them, capping them, or transforming them.

Normalizing the data: Normalization is the process of scaling the data to a common range. It is useful when the data has different units or scales. There are several techniques for normalization, such as min-max normalization, z-score normalization, and decimal scaling.

In summary, data preprocessing is a crucial step in the "ROI Analysis of FAANG Company Stocks using Python" project, as it ensures that the data is clean, consistent, and ready for analysis. The choice of preprocessing techniques will depend on the specific requirements and constraints of the project, such as the nature of the data and the analysis objectives.





MATHEMATICAL FORMULATION

```
[ ]  # If bought U$200 worth of each

     from tabulate import tabulate

     for i in df.columns:
         start_price = round(float(df[i][:1]), 2)
         start_stock = round(200 / start_price, 2)

         end_price = round(float(df[i][-1]), 2)
         end_value = round(end_price * start_stock, 2)

         roi_value = round(end_value - 200, 2)
         roi_percentage = float(round((roi_value / 200) * 100, 2))

         start_price_list.append(start_price)
         start_stock_list.append(start_stock)
         end_price_list.append(end_price)
         end_value_list.append(end_value)
         roi_value_list.append(roi_value)
         roi_percentage_list.append(roi_percentage)
```

DATA INSIGHTS

```
[ ] investment_df["Asset"] = df.columns
    investment_df["Price point bought at"] = start_price_list
    investment_df["Stock acquired"] = start_stock_list
    investment_df["Current price"] = end_price_list
    investment_df["Current value"] = end_value_list
    investment_df["ROI value"] = roi_value_list
    investment_df["ROI percentage"] = roi_percentage_list

    investment_df.sort_values("ROI percentage", ascending = False)
```

	Asset	Price point bought at	Stock acquired	Current price	Current value	ROI value	ROI percentage
1	amazon	579.87	0.34	3052.03	1037.69	837.69	418.85
2	netflix	101.21	1.98	508.05	1005.94	805.94	402.97
0	apple	24.46	8.18	121.21	991.50	791.50	395.75
3	google	733.53	0.27	2035.55	549.60	349.60	174.80
4	facebook	113.69	1.76	283.02	498.12	298.12	149.06

CONCLUSION

	Asset	Price point bought at	Stock acquired	Current price	Current value	ROI value	ROI percentage
1	amazon	579.87	0.34	3052.03	1037.69	837.69	418.85
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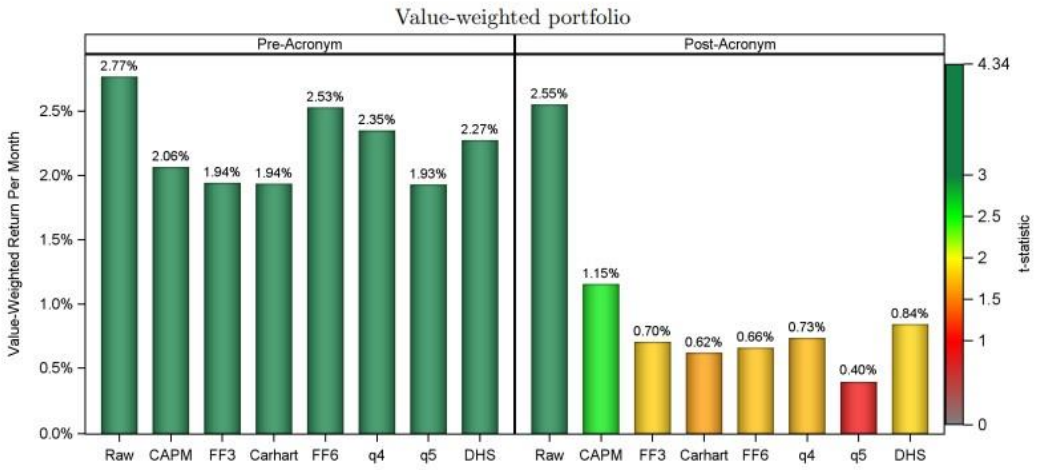
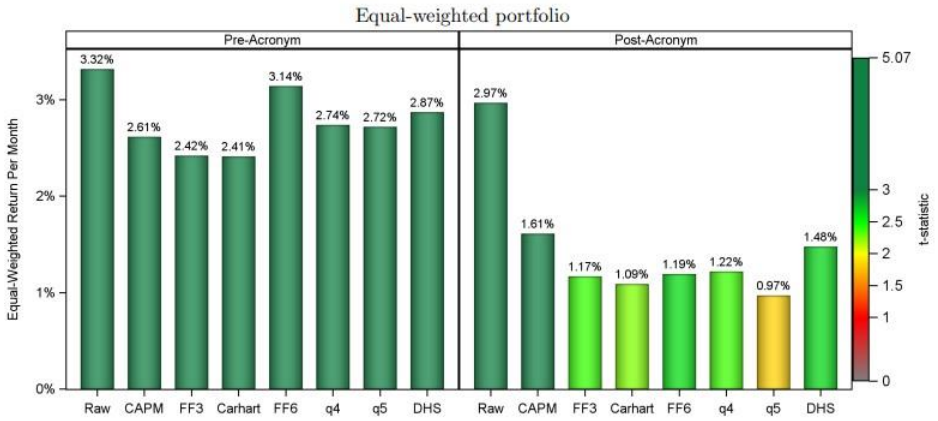
In conclusion, these five businesses have experienced unprecedented growth. To sustain and produce returns for a very long time, it also needs a robust business model and ongoing innovation.





It is crucial to realize that a company's past performance does not necessarily predict its future success. Before choosing to invest in the stock market, an investor must consider all relevant factors (both technical and fundamental).

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THANK YOU