A Stock Price Web Application using Python and Streamlit

INTRODUCTION:

In the finance field, stock market and its trends are extremely volatile in nature. It attracts researchers to capture the volatility and predicting its next moves. Investors and market analysts study the market behaviour and plan their buy or sell strategies accordingly. As stock market produces large amount of data every day, it is very difficult for an individual to consider all the current and past information for predicting future trend of a stock. Mainly there are two methods for forecasting market trends. One is Technical analysis and other is Fundamental analysis. Technical analysis considers past price and volume to predict the future trend where as Fundamental analysis On the other hand, Fundamental analysis of a business involves analyzing its financial data to get some insights. The efficacy of both technical and fundamental analysis is disputed by the efficient-market hypothesis which states that stock market prices are essentially unpredictable.

This research follows the Fundamental analysis technique to discover future trend of a stock by considering news articles about a company as prime information and tries to classify news as good (positive) and bad (negative). If the news sentiment is positive, there are more chances that the stock price will go up and if the news sentiment is negative, then stock price may go down.

This research is an attempt to build a model that predicts news polarity which may affect changes in stock trends. In other words, check the impact of news articles on stock prices. We are using supervised machine learning as classification and other text mining techniques to check news polarity. And also be able to classify unknown news, which is not used to build a classifier. Three different classification algorithms are implemented to check and improve classification accuracy. We have taken past three years data from Apple Company as stock price and news articles.

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The stock market is known for being volatile, dynamic, and nonlinear. Accurate stock price prediction is extremely challenging because of multiple (macro and micro) factors, such as politics, global economic conditions, unexpected events, a company's financial performance, and so on.

But all of this also means that there's a lot of data to find patterns in. So, financial analysts, researchers, and data scientists keep exploring analytics techniques to detect stock market trends. This gave rise to the concept of algorithmic trading, which uses automated, pre-programmed trading strategies to execute orders.

In this article, we'll be using both traditional quantitative finance methodology and machine learning algorithms to predict stock movements. We'll go through the following topics:

- Stock analysis: fundamental vs. technical analysis
- Stock prices as time-series data and related concepts
- Predicting stock prices with Moving Average techniques
- Introduction to LSTMs
- Predicting stock prices with an LSTM model
- Final thoughts on new methodologies, such as ESN

Stock analysis: fundamental analysis vs. technical analysis

When it comes to stocks, fundamental and technical analyses are at opposite ends of the market analysis spectrum.

Fundamental analysis (you can read more about it here):

Evaluates a company's stock by examining its intrinsic value, including but not limited to tangible assets, financial statements, management effectiveness,

strategic initiatives, and consumer behaviors; essentially all the basics of a company.

Being a relevant indicator for long-term investment, the fundamental analysis relies on both historical and present data to measure revenues, assets, costs, liabilities, and so on.

Generally speaking, the results from fundamental analysis don't change with short-term news.

Technical analysis (you can read more about it here):

Analyzes measurable data from stock market activities, such as stock prices, historical returns, and volume of historical trades; i.e. quantitative information that could identify trading signals and capture the movement patterns of the stock market.

Technical analysis focuses on historical data and current data just like fundamental analysis, but it's mainly used for short-term trading purposes.

Due to its short-term nature, technical analysis results are easily influenced by news.

Popular technical analysis methodologies include moving average (MA), support and resistance levels, as well as trend lines and channels.

For our exercise, we'll be looking at technical analysis solely and focusing on the Simple MA and Exponential MA techniques to predict stock prices. Additionally, we'll utilize LSTM (Long Short-Term Memory), a deep learning framework for time-series, to build a predictive model and compare its performance against our technical analysis.

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As stated in the disclaimer, stock trading strategy is not in the scope of this article. I'll be using trading/investment terms only to help you better understand the analysis, but this is not financial advice. We'll be using terms like:

- trend indicators: statistics that represent the trend of stock prices,
- medium-term movements: the 50-day movement trend of stock prices.

Career options available in the Stock Market:

- Market maker
- Stockbroker
- Sub broker
- Research analyst
- Trader for hedge funds
- Personal finance expert for clients of broking house
- Risk mitigation

REQUIREMENT ANALYSIS

For this demonstration exercise, we'll use the closing prices of Apple's stock (ticker symbol AAPL) from the past 21 years (1999-11-01 to 2021-07-09). Analysis data will be loaded from Alpha Vantage, which offers a free API for historical and real-time stock market data.

To get data from Alpha Vantage, you need a free API key; a walk-through tutorial can be found here. Don't want to create an API? No worries, the analysis data is available here as well. If you feel like exploring other stocks, code to download the data is accessible in this Github repo as well. Once you have the API, all you need is the ticker symbol for the particular stock.

For model training, we'll use the oldest 80% of the data, and save the most recent 20% as the hold-out testing set.

Software:

Visual Studio Code

Visual Studio is an integrated development environment (IDE) developed by Microsoft. It is used to develop computer programs including websites, web apps, web services and mobile apps. Visual Studio uses Microsoft software development platforms including Windows API, Windows Forms, Windows Presentation Foundation (WPF), Windows Store and Microsoft Silverlight. It can produce both native code and managed code.

Visual Studio includes a code editor supporting IntelliSense (the code completion component) as well as code refactoring. The integrated debugger works as both a source-level debugger and as a machine-level debugger. Other built-in tools include a code profiler, designer for building GUI applications, web designer, class designer, and database schema designer. It accepts plug-ins that expand the functionality at almost every level—including adding support for source control systems (like Subversion and Git) and adding new toolsets like editors and visual designers for domain-specific languages or toolsets for other aspects of the software development lifecycle (like the Azure DevOps client: Team Explorer).

Python

Python is a high-level, general-purpose programming language. Its design philosophy emphasizes code readability with the use of significant indentation.

Python is dynamically typed and garbage-collected. It supports multiple programming paradigms, including structured (particularly procedural), object-

oriented and functional programming. It is often described as a "batteries included" language due to its comprehensive standard library.

Guido van Rossum began working on Python in the late 1980s as a successor to the ABC programming language and first released it in 1991 as Python 0.9.0. Python 2.0 was released in 2000. Python 3.0, released in 2008, was a major revision not completely backward-compatible with earlier versions. Python 2.7.18, released in 2020, was the last release of Python 2.

Python consistently ranks as one of the most popular programming languages, and has gained widespread use in the machine learning community.

To create an amazing Web Application that deals with Data Science, we have a perfect platform to carry out this task. Streamlit and Python package builds and shares the data application in the fastest way possible.

Streamlit is open source anyone can contribute to it but first install Streamlit locally.

pip install streamlit

Streamlit ensures the fastest way to build and share data apps. Stock is always going to be the trending matter for years to speak. Everyone with a good income likes to invest in the Stock market. A Stock Market is a place where shares of public listed companies are traded. Since we are dealing with Stock Price details, we might require Web Scrap the details. But to our recuse, there is one such Python library that deals with the stock price. Yahoo Finance in short finance works with online advertising companies to provide you with advertising that is as relevant and useful as possible.

pip install yfinance

The actual part of the code begins now. Since we will be analyzing the Google and Microsoft stock prices, initialize the ticker attribute, and get the history of GOOGLE and MSFT for the past one month.

yfinance allows you to check the updates over a certain period of time. yfinance returns pandas.DataFrame with multi-level column names, with a level for the ticker and a level for the stock price data. You can check the below code that displays the heading, data, summary information about the company, and plot an amazing graph.

yfinace.download displays tabular data that includes Open, High, Low, Closing, and Volume data at different time intervals. Once you have initialized the ticker you check the detailed information about the ticker that includes the long summary, the total number of employees, the state and country name, the revenue growth, and much more information.

IMPLEMENTATION

```
import streamlit as st

import yfinance as finance



def get_ticker(name):

    company = finance.Ticker(name) # google

    return company

# Project Details
```

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```
st.title("Build and Deploy Stock Market App Using Streamlit")

st.header("A Basic Data Science Web Application")

st.sidebar.header("Geeksforgeeks \n TrueGeeks")


company1 = get_ticker("GOOGL")

company2 = get_ticker("MSFT")


# fetches the data: Open, Close, High, Low and Volume

google = finance.download("GOOGL", start="2021-10-01", end="2021-10-01")

microsoft = finance.download("MSFT", start="2021-10-01", end="2021-10-01")


# Valid periods: 1d,5d,1mo,3mo,6mo,1y,2y,5y,10y,ytd,max

data1 = company1.history(period="3mo")

data2 = company2.history(period="3mo")


# markdown syntax

st.write("""

### Google
```

""")

detailed summary on Google

st.write(company1.info['longBusinessSummary'])

st.write(google)

plots the graph

st.line_chart(data1.values)

st.write("""### Microsoft""")

st.write(company2.info['longBusinessSummary'], "\n", microsoft)

st.line_chart(data2.values)

RESULTS:

A Basic Data Science Web Application

Google

Alphabet Inc. offers various products and platforms in the United States, Europe, the Middle East, Africa, the Asia-Pacific, Canada, and Latin America. It operates through Google Services, Google Cloud, and Other Bets segments. The Google Services segment provides products and services, including ads, Android, Chrome, devices, Gmail, Google Drive, Google Maps, Google Photos, Google Play, Search, and YouTube. It is also involved in the sale of apps and in-app purchases and digital content in the Google Play and YouTube; and devices, as well as in the provision of YouTube consumer subscription services. The Google

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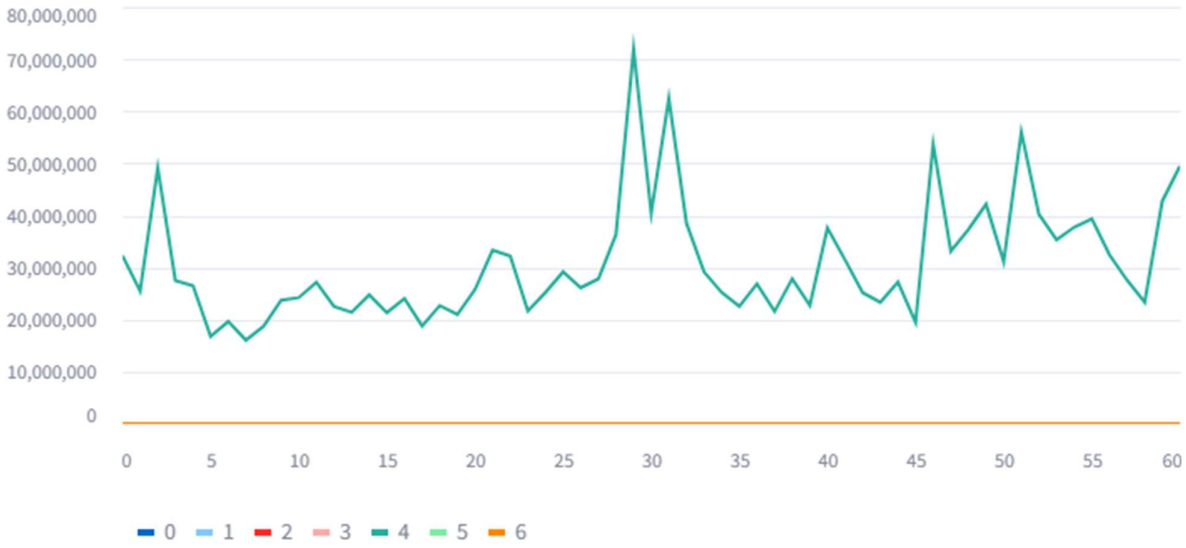
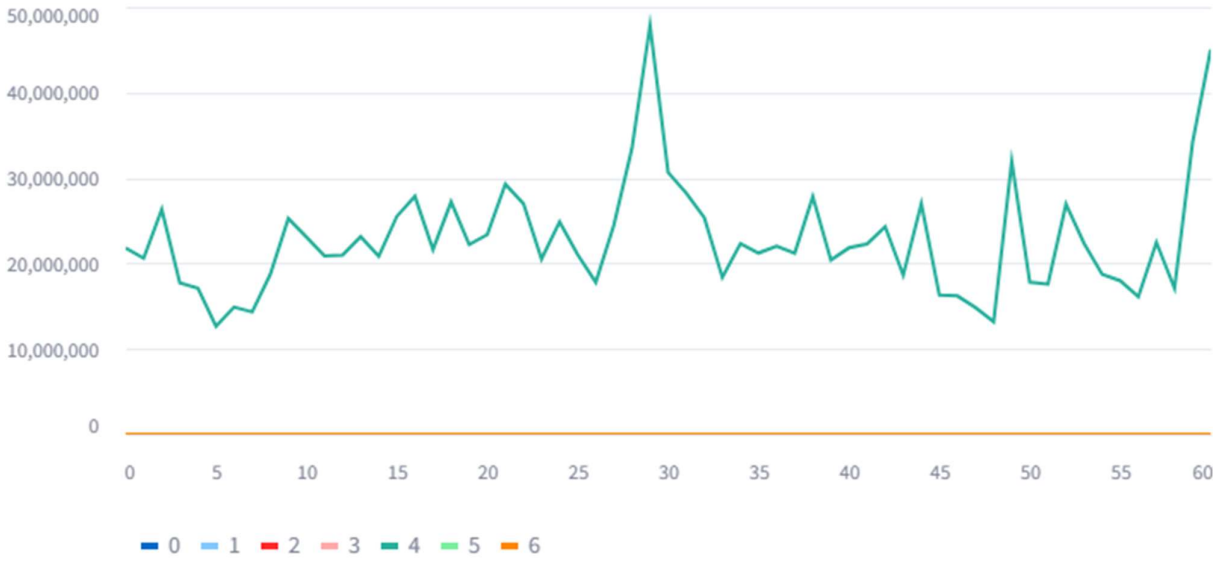
Cloud segment offers infrastructure, cybersecurity, databases, analytics, AI, and other services; Google Workspace that include cloud-based communication and collaboration tools for enterprises, such as Gmail, Docs, Drive, Calendar, and Meet; and other services for enterprise customers. The Other Bets segment sells healthcare-related and internet services. The company was incorporated in 1998 and is headquartered in Mountain View, California.



Microsoft

Microsoft Corporation develops and supports software, services, devices and solutions worldwide. The Productivity and Business Processes segment offers office, exchange, SharePoint, Microsoft Teams, office 365 Security and Compliance, Microsoft viva, and Microsoft 365 copilot; and office consumer services, such as Microsoft 365 consumer subscriptions, Office licensed on-premises, and other office services. This segment also provides LinkedIn; and dynamics business solutions, including Dynamics 365, a set of intelligent, cloud-based applications across ERP, CRM, power apps, and power automate; and on-premises ERP and CRM applications. The Intelligent Cloud segment offers server

products and cloud services, such as azure and other cloud services; SQL and windows server, visual studio, system center, and related client access licenses, as well as nuance and GitHub; and enterprise services including enterprise support services, industry solutions, and nuance professional services. The More Personal Computing segment offers Windows, including windows OEM licensing and other non-volume licensing of the Windows operating system; Windows commercial comprising volume licensing of the Windows operating system, windows cloud services, and other Windows commercial offerings; patent licensing; and windows Internet of Things; and devices, such as surface, HoloLens, and PC accessories. Additionally, this segment provides gaming, which includes Xbox hardware and content, and first- and third-party content; Xbox game pass and other subscriptions, cloud gaming, advertising, third-party disc royalties, and other cloud services; and search and news advertising, which includes Bing, Microsoft News and Edge, and third-party affiliates. The company sells its products through OEMs, distributors, and resellers; and directly through digital marketplaces, online, and retail stores. The company was founded in 1975 and is headquartered in Redmond, Washington.



ADVANTAGES:

Investment Opportunities:

The stock market offers a wide range of investment opportunities for investors to choose from. Investors can invest in different sectors of the economy, such as technology, healthcare, energy, and finance, and invest in stocks of companies that they believe will grow in the future. This diversification allows investors to manage risk and maximize returns.

Capital Formation

The stock market plays a crucial role in the capital formation of a country. By allowing companies to issue shares and raise capital, the stock market provides businesses with the funds they need to expand their operations and create jobs. This capital formation is essential for economic growth and development.

Liquidity:

The stock market is a highly liquid market, allowing investors to buy and sell securities at any time during market hours. This liquidity provides investors with the flexibility to exit their investments when needed and manage their portfolio efficiently.

Transparency

The stock market is a highly regulated market, ensuring that investors have access to accurate information about the companies they are investing in. This transparency provides investors with the information they need to make informed investment decisions.

Ownership

By investing in stocks, investors become owners of the company they are investing in. This ownership provides investors with the opportunity to participate in the growth of the company and benefit from its success.

DISADVANTAGES:

Volatility

The stock market is a highly volatile market, with prices fluctuating frequently based on a variety of factors such as global events, economic indicators, and company news. These fluctuations can result in significant losses for investors who have invested in the wrong stocks.

Risk

The stock market is a risky investment option as the value of the securities can be affected by a variety of factors, including market trends, company performance, and global events. There is always the risk of losing money, and investors should only invest what they can afford to lose.

Fraud

While the stock market is highly regulated, there are still instances of fraud and insider trading, which can result in significant losses for investors. Investors should be aware of the risks involved and only invest in regulated markets and companies.

Time-Consuming

Investing in the stock market requires a significant amount of time and effort to research and analyze the companies you are investing in. Investors must stay informed about the market trends and company news to make informed investment decisions.

Emotional Investing

The Stock market capital can be emotional, with investors often making investment decisions based on emotions rather than logic. This emotional investing can lead to poor investment decisions and significant losses.

APPLICATIONS

A stock market is a marketplace where stocks and other securities are bought and sold between investors. It is a vital part of a country's financial system and plays a significant role in the economy by allowing businesses to raise capital and investors to participate in the growth of the economy. In this Blog We Will Learn About Stock Market Merits and Demerits.

Stocks represent ownership in a company, and when a company wants to raise funds, they can issue shares of stock to the public. These shares are then traded on the stock market, where investors can buy and sell them. The stock market provides a platform for companies to raise capital by issuing shares and allows investors to buy and sell those shares to benefit from the growth of the company.

FUTURE SCOPE

The first step towards making a career in the stock market is always checking on how much aptitude you have for the workings of the market. If you have a passion for the numbers and understand the background of the market you are halfway there. There is nothing as hard and fast rule to have a degree in Finance to make a Career in Stock Market. Even if you are a B.Sc/B.Tech or 12th pass out, you have equal chances to become a successful career in this domain.

The Stock market is an emerging place to start your career with. Day by day it is getting bigger, and many startups are setting up every day in the country. The opportunity to become an entrepreneur is also straightforward in the stock market.

In India, young people are often reluctant to make the Stock market their Career choice as they get scared by any kind of financial investment required in the process.

But the growth of this industry in the last few decades is phenomenal and one who is passionate can seriously turn their dreams into reality by choosing the right path.

Making money is everyone's dream but people often get scared by the risks. Stock Market is one such field where a person having its knowledge is prepared to take a calculated risk which in return gives him a profit multiplied by manifolds.

Investing in many different stocks can help build your wealth by leveraging growth in different sectors of the economy, resulting in a profit even if some of your individual stocks lose value.

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What is required to make a successful Career in Stock Market

Be passionate: As the market requires continuous learning and improving, being passionate about it is something that is of utmost priority. You need motivation from within to grow by making you aware of all the new nuances and facts of the industry

Finalize your interest Area: Since there are a plethora of options under the Stock market, you should demarcate your interest area. Within the Stock market, you can choose to work in Broking and distribution, asset management, be a trainer, financial advisor, etc depending upon your interest. Having a clear idea of which field interests you the most will help make smarter career sections.

Decision making: Once you have finalized your field of interest, now its the turn to have the complete knowledge about that particular field. Decide by making smart choices which courses you can opt for, which training you should take to become well versed in this domain.

Read Tirelessly: Reading is something that can not be taken for granted. All the successful people in the world had good reading habits. Particularly in this field, one needs to be more proactive towards reading in order to understand the market in a better way.

Choose a Right mentor: It's a career where the business is often cyclical in nature and the same will affect your performance as well. So it's always good to have a mentor who can predict the situation and work on your skills with time.

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CONCLUSION:

The stock market has its share of merits and demerits, and investors should carefully evaluate these factors before making any investment decisions. While the stock market offers investors with investment opportunities, capital formation, liquidity, transparency, and ownership, it also carries risks such as volatility, fraud, and emotional investing.

Investors should consult with financial advisors and experts, stay informed about market trends and news, and only invest what they can afford to lose. Further, get in touch with our experts in Vakilsearch to know more about stock market. With the right approach and risk management, the stock market can be a profitable investment option for investors looking to grow their wealth in the long term.