

A  
Mini Project Report on  
**Stock market Trend Analysis**

Submitted in partial fulfillment of the requirements  
for the degree of  
**BACHELOR OF ENGINEERING**  
IN  
**Computer Science & Engineering**  
Artificial Intelligence & Machine Learning

by

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**2024-2025**



# A. P. SHAH INSTITUTE OF TECHNOLOGY

## CERTIFICATE

This is to certify that the project entitled “**Stock Market Trend Analysis**” is a bonafide work of Shubham Patil (22106047), Shravan Thakur (22106086), Vedant Vethekar (22106090), Yogesh Vartak (22106019) submitted to the University of Mumbai in partial fulfillment of the requirement for the award of **Bachelor of Engineering in Computer Science & Engineering (Artificial Intelligence & Machine Learning)**.

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# A. P. SHAH INSTITUTE OF TECHNOLOGY

## Project Report Approval

This Mini project report entitled “**Stock Market Trend Analyser**” by **Shubham Patil, Shravan Thakur, Vedant Vethekar and Yogesh Vartak** is approved for the degree of *Bachelor of Engineering in Computer Science & Engineering*, (AIML) **2022-23**.

External Examiner: \_\_\_\_\_

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Place: APSIT, Thane

Date:

## **Declaration**

We declare that this written submission represents my ideas in my own words and where others' ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission hasnot been taken when needed.

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## **ABSTRACT**

The stock market's complexity and rapid pace pose significant challenges for traditional analysis methods, which often struggle to keep up with real-time developments and multifaceted market influences. This abstract introduces an advanced stock market analyzer designed to address these challenges by integrating cutting-edge machine learning algorithms, real-time data processing, and sentiment analysis. By leveraging diverse data sources, including financial news and social media, and incorporating sophisticated predictive models, the analyzer aims to enhance accuracy and provide actionable insights into market conditions. This innovative approach seeks to improve investment strategies by delivering timely and comprehensive analysis, ultimately supporting more informed decision-making in a dynamic financial environment.

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# **CHAPTER 1**

## **INTRODUCTION**

# 1. INTRODUCTION

Forecasting the stock market has become very important in planning business activities. The prediction of stock price has driven many researches in a variety of disciplines, including computer science, statistics, economics, finance, and operations research. Recent studies have shown that the enormous amount of online information that is available in the public domain, such as Wikipedia, the social forums, news from media, have a significant impact on the investor's opinion towards the financial markets. The reliability of the computational models on prediction of the stock market is very important, because it is highly responsive to the economy and may result in financial losses. In this paper, we have made an extensive analysis on various stocks. First, we have performed Stock Volatility Analysis on 1000 stock dataset of NYSE. The main contributions in this paper include the development of a dictionary-based sentiment analysis model for the financial sector, and the evaluation of the model for scaling the effects of news sentiments on stocks for other markets. By using only the news sentiments, we have achieved a good accuracy of 70.59% in predicting the trends in short-term stock price movement.

Big data has become a great importance for the expansion of various industries and sectors. It is widely used by business organizations in the formalization of business ideas and intelligence. Furthermore, it has been utilized by the healthcare sector to discover important patterns and knowledge so as to improve the modern healthcare systems. Big data also holds significant importance for the technology, information and cloud computing sector. The financial and banking sectors are utilizing big data to track the financial market activity. Network analytics and big data analytics are also used to catch illegal trading in the financial markets. Similarly, financial institutions, companies, traders and big banks are utilizing big data for generating trade analytics which are utilized in high frequency trading. It also helped in the detection of illegal activities such as financial frauds and money laundering. In this paper, we hope to build a system which analyses various stocks by using various Big Data frameworks. We are going to use Hadoop MapReduce to find out the top 10 stocks with minimum and maximum volatility and PySpark to predict the closing price of those stocks using Machine Learning models and Sentiment Analysis using news sentiments.



# **CHAPTER 2**

## **LITERATURE SURVEY**

## **2. LITERATURE SURVEY**

### **Literature Survey on Stock Market Analysis**

Stock market analysis is a broad field that has evolved significantly over the decades, reflecting advances in economic theories, financial practices, and technological innovations. This literature survey provides an overview of the major developments in stock market analysis, tracing its historical roots and examining key theories and methodologies that have shaped our understanding of financial markets.

### **Early Foundations**

The study of financial markets dates back to the early 20th century, with foundational theories emerging that would shape the future of stock market analysis. One of the earliest and most influential concepts is the Efficient Market Hypothesis (EMH), introduced by Eugene Fama in the 1960s. Fama's EMH posits that stock prices fully reflect all available information, meaning that it is impossible to consistently achieve returns that exceed the market average. The hypothesis is divided into three forms: weak, semi-strong, and strong, each reflecting different levels of information efficiency. The weak form suggests that past prices and volume data are fully reflected in current prices; the semi-strong form asserts that all publicly available information is incorporated; and the strong form states that even insider information is reflected in stock prices.

### **Technical Analysis**

Technical analysis, which predates the formalization of EMH, is centered on the idea that historical price movements and trading volumes can be used to forecast future stock prices. This approach gained traction in the early 20th century, with Charles Dow, one of the founders of Dow Jones & Company, making significant contributions through his Dow Theory. Dow's theory emphasized the importance of market trends and cycles, laying the groundwork for modern technical analysis techniques. Key tools in technical analysis include various chart patterns, such as head and shoulders, and technical indicators like moving averages, Relative Strength Index (RSI), and Bollinger Bands. Technical analysts believe that market psychology and historical price behavior often repeat, providing clues for future price movements.

## Fundamental Analysis

In parallel with technical analysis, fundamental analysis emerged as a key method for evaluating stock investments. The seminal work in this field was *Security Analysis* (1934) by Benjamin Graham and David Dodd. Fundamental analysis involves assessing a company's intrinsic value based on financial statements, earnings reports, and economic conditions. Graham and Dodd's approach includes valuation models such as the discounted cash flow (DCF) analysis, which estimates the value of an investment based on its expected future cash flows. Fundamental analysis focuses on understanding a company's financial health, competitive position, and overall economic environment to determine whether a stock is overvalued or undervalued.

## Behavioral Finance

The latter part of the 20th century saw the rise of behavioral finance, which challenged the assumptions of EMH by incorporating insights from psychology into financial decision-making. Daniel Kahneman and Amos Tversky, pioneers in this field, introduced concepts such as cognitive biases and prospect theory. Behavioral finance examines how psychological factors, such as overconfidence, loss aversion, and herd behavior, influence investor decisions and market outcomes. For example, the concept of "loss aversion" explains why investors may hold onto losing stocks for too long, hoping to avoid realizing a loss. Behavioral finance has identified numerous market anomalies, such as bubbles and crashes, which cannot be explained by traditional efficient market theories alone.

## Quantitative Models and Machine Learning

The advent of computers and advanced statistical methods has transformed stock market analysis. Quantitative models, which use mathematical and statistical techniques to predict stock prices and returns, have become increasingly sophisticated. Early quantitative approaches relied on linear regression and time series analysis to identify patterns and make forecasts. However, the integration of machine learning and artificial intelligence (AI) has marked a significant shift in this field. Modern machine learning algorithms, such as neural networks, support vector machines, and ensemble methods, are now employed to analyze vast amounts of data and detect complex patterns that traditional methods might overlook. These techniques leverage large datasets, including historical prices, trading volumes, and economic indicators, to enhance predictive accuracy and identify trading opportunities.

## Sentiment Analysis

In recent years, sentiment analysis has gained prominence as a method for understanding market behavior. This approach involves analyzing textual data from sources such as news articles, social media, and financial reports to gauge investor sentiment and its impact on stock prices. Advances in natural language processing (NLP) have enabled more accurate sentiment analysis by parsing and interpreting large volumes of unstructured data. Research in this area explores how shifts in sentiment can influence market trends and individual stock performance. For example, positive sentiment around a company's product launch might drive up its stock price, while negative news could have the opposite effect.

## High-Frequency Trading (HFT)

High-frequency trading (HFT) represents another significant development in stock market analysis. HFT involves executing a large number of trades at extremely high speeds, often using sophisticated algorithms to make split-second trading decisions. The growth of HFT has raised concerns about its impact on market liquidity, volatility, and fairness. Research in this area examines how HFT affects market dynamics, including issues related to price manipulation, liquidity provision, and systemic risk. Critics argue that HFT can exacerbate market volatility and disadvantage slower, traditional investors, while proponents claim it enhances market efficiency and liquidity.

## Recent Trends and Future Directions

The field of stock market analysis continues to evolve, driven by technological advancements and ongoing research. The integration of big data analytics, AI, and machine learning is likely to further enhance our ability to analyze and predict market behavior. Additionally, the growing emphasis on environmental, social, and governance (ESG) factors is reshaping investment strategies and influencing market trends. As financial markets become increasingly complex, interdisciplinary approaches that combine insights from finance, economics, psychology, and data science will be crucial in developing more effective analytical tools and strategies.

# **CHAPTER 3**

## **Problem Statement**

### **3. Problem Statement**

Current stock market analysis tools struggle to effectively predict market movements and support informed investment decisions due to several limitations. Traditional methods, such as technical and fundamental analysis, often fail to capture the dynamic and complex nature of modern financial markets, which are influenced by real-time data, high-frequency trading, and evolving investor sentiment. Additionally, existing models may not fully integrate unstructured data from news and social media, leading to delayed or inaccurate insights. The rapid pace of market changes and the impact of high-frequency trading further complicate accurate analysis and decision-making.

# **CHAPTER 4**

## **Experimental Setup**

# **CHAPTER 5**

## **Proposed System & Implementation**



# **CHAPTER 6**

## **Conclusion**

## 6. Conclusion

The development of an advanced stock market analyzer is crucial for addressing the limitations of traditional analysis methods and improving investment decision-making. By integrating cutting-edge machine learning algorithms, real-time data processing, and sentiment analysis, the proposed analyzer promises to enhance the accuracy of market predictions and provide actionable insights. This comprehensive approach will enable investors to better navigate the complexities of modern financial markets, which are increasingly influenced by high-frequency trading and evolving market sentiment.

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