A Comprehensive Framework for Stock Prediction: Leveraging NLP Models, Technical Analysis, and Fundamental Data

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***Abstract*—This study delineates a thorough methodology for forecasting stock trends by amalgamating news sentiment analysis through various Natural Language Processing (NLP) models with both technical and fundamental analysis. Conventional stock prediction techniques frequently depend on discrete methodologies, concentrating either on historical pricing data or market fundamentals. However, given the burgeoning accessibility of real-time news alongside advancements in NLP, the integration of qualitative data into predictive models has become not only viable but increasingly crucial.**

In this scholarly inquiry, we establish a hybrid framework that fuses multiple NLP models to scrutinise and quantify the sentiment and pertinence of financial news. The insights garnered are subsequently integrated with technical indicators and fundamental metrics to augment the precision of stock trend forecasts. The NLP models employed in this investigation encompass sentiment analysis, named entity recognition, and topic modelling, which collectively furnish a robust comprehension of news that influences market movements. Technical analysis is executed utilizing algorithms that assess price trajectories, trading volume, and additional market indicators, whereas fundamental analysis capitalizes on financial ratios and macroeconomic data.

The proposed model undergoes evaluation on a varied dataset that includes historical stock prices, financial disclosures, and news articles. We apply an array of machine learning and deep learning algorithms to scrutinise the data and anticipate prospective stock movements. The findings indicate that our integrated framework surpasses traditional models, yielding considerable enhancements in predictive accuracy. This research accentuates the significance of a multifaceted strategy to stock prediction, amalgamating the strengths of NLP, technical, and fundamental analysis to furnish a more comprehensive insight into market dynamics.

Keywords—NLP, Analysis, Dataset, Data, Deep Learning, Sentiment analysis

I. INTRODUCTION

In the sphere of finance and data science prediction of stock market trends is an area of great interest from long time. Accuracy is in this field is of utmost importance irrespective of individual investors or financial institutes and for the stability and efficiency of the market itself. Conventional approaches to predicting stocks movement typically rely on either technical analysis, which examines historical price patterns and trading volumes statistics, or fundamental analysis, which evaluates a company's financial health and market position among their domain.Though to some extent successful, these techniques frequently ignore the impact of qualitative factors that can have a significant impact on stock prices and the performance of the company, like news and market sentiment.

In recent years, the advent of data science specially in advanced Natural Language Processing (NLP) techniques, has opened new approach for integrating qualitative data into quantitative models. News articles of various sources, social media posts on significant platforms, and financial reports from the market itself contain a wealth of information that, if scrutinized correctly, can offer preliminary signs of changes in the market. However, the challenge lies in accurately and reliably processing and interpreting or deciphering this vast amount of unstructured text data to extract feasible insights. This is where the mutual understanding between NLP models and traditional financial analysis becomes crucial.

This study puts forward a hybrid approach that combines multiple NLP models with technical and fundamental analysis to predict stock market trends. By leveraging NLP, we intentd to capture and quantify the sentiment, tone, and relevance of financial news, which are then merged with technical indicators derived from historical price data and fundamental metrics from company reports of their stocks. This combined effort is expected to enhance and tune prediction accuracy by addressing the limitations and shortcomings of traditional methods and providing a more feasible and realistic factors which drive the market.

Our research methodology involves the deployment of various NLP techniques, such as sentiment analysis, topic modeling, and named entity recognition, to analyze news articles and financial reports altogether. These insights are then fabricated with technical analysis, using algorithms that assess trends, momentum, and other market indicators, and fundamental analysis, which evaluates key financial ratios and economic indicators in the market. The potency of this integrated model is tested using an extensive collection of data beholds financial data, historical stock prices and enriched accumulation of news articles.The remainder of this paper is structured as follows: Section 2 provides a literature review, discussing previous research on stock prediction using NLP and traditional methods. Section 3 outlines the methodology, detailing the data collection, NLP models, and analytical techniques used. Section 4 presents the results and

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