International Research Journal on Advanced Engineering and Management
https://goldncloudpublications.com
https://doi.org/10.47392/IRJAEM.2025.0438
e ISSN: 2584-2854
Volume: 03
Issue: 09 September 2025
Page No: 2786 - 2788

Financial Sentiment Mining with FINBERT in Market Prediction and Sentiment Analysis

Mariam Ghani[1]
[1]*MS Mariam Ghani, Ghani Nahar vista Indira Nagar Chennai, 600020, India.*
Emails: *m9ghani@gmail.com*[1]

Abstract
Financial sentiment analysis (FSA) is an integral technique and is growing at a steadfast rate in order to help in market evaluations by determining the stock prices and allow investors to make informed financial decisions. Large language models (LLM)were developed, such as FinBERT, to ameliorate the performance in sentiment analysis. This study analyses the performance of LLMs and transformer models such as FinBERT, and their performance being used in order to predict stock prices by the scraped financial headlines. This system is built to help dynamic financial headlines help understand the relevance of investing in stocks and allows the model to adapt to diff linguistic patterns and financial contexts. Numerous factors contribute to the nature of the market, including economic factors, performance of organizations and legal factors, sentimental factors such as emotions in financial news and social media contribute largely to the stock prices as well as the overall performance as observed. To deeply comprehend and harness these, the study involves interrogating the influence of sentiment signals extracted from financial headlines using transformer-based models, evaluating their impact on stock price prediction and comparing them to traditional methods
Keywords: *Financial sentiment analysis; Stock price prediction; FinBERT; Transformer models; Market prediction;*

1. Introduction
As new technologies emerge at a steadfast rate, it has become a challenging task to predict the forecast of the market. Various factors play a key role in the stability of the ever-changing market, ranging from price sensitivity to financial headlines about a stock which can influence user engagement. To understand and harness these feelings and the impact it creates, financial sentiment analysis using the headlines can be done in order to give the right analysis for the stocks and help the end user make a better decision. This study delves into FinBERT's usage and leveraging this technology to predict the right stock prices. While there have been multiple NLP models which can be used for financial analysis, FinBERT being the most efficient gives a higher level of accuracy and better prediction for the movement of the market. Traditional models such as ARIMA have been utilized for modelling the financial market

1.1 Traditional Methods
Traditional methods for prediction of the financial market along with sentiment analysis have done by statistical methods such as ARIMA. Even though, it yields a good accuracy, it fails to capture and assess the non-linearity in the data. Other methods such as use of LSTM, a well-renowned deep learning technique, can be used as the NLP technique to model the data. However, it has been observed that LSTM has rather slow processing speed when compared to FinBERT [1]

1.2 NLP Techniques
LSTM, coupled with a number of different NLP techniques are used in order to model the market, however, they're limitations include slow processing time, unable to recognize the non-linearity. Moreover, common practices include hybrid models such as combining GRU (gates recurrent unit) and CNN (Convolutional neural network) which can yield a rather competitive accuracy. Although the hybrid models can be effective for mediocre predictions, better modelling and results have been observed with the usage of FinBERT. and sentiment analysis was carried out using FinBERT.

International Research Journal on Advanced Engineering and Management
https://goldncloudpublications.com
https://doi.org/10.47392/IRJAEM.2025.0438
e ISSN: 2584-2854
Volume: 03
Issue: 09 September 2025
Page No: 2786 - 2788

2. Method

The methodology used in this study comprises of the usage of an online python-based web scraper pipeline by which the headlines were extracted and then further stored with metadata.Furthermore,this was followed by the preprocessing of the data, wherein company names were extracted using Named Entity Recognition(NER) and sentiment analysis was carried out using FinBERT to compute the different sentiments possible(positive, negative or neutral).These scores obtained were further used with the current stock price to make better decisions. All the experiments conducted were in relation with the hugging face transformer library with other imports as well for clear analysis as shown in the table below. Table 1 shows Experimental Input Parameters

Table 1 Experimental Input Parameters

Company	Headline	Sentiment Score	Sentiment Label
Twillo	Twilio (TWLO) PT Lifted to $144 on Strong Q2	0.433	Positive
Barclays	Barclays Bullish on Arista Networks (ANET)	0.82	Positive
Baird	Baird Sees Strong AI Potential in monday.com	0.21	Positive

2.1 Tables

The table above provides the sample financial news headline alongside with the sentiment score of each of the headline and the label given to each headline based on the score retrieved. These were generated using the transformer model and ranging from-1(negative) to +1(positive), rounded up to 3 decimal places for better readability. The table was designed to complement the main task and represents the summarized sentiment analysis of the headlines and the scores which are valued. This allows the text to be concise, succinct and reader-friendly. [2]

2.2. Figures

The figure below displays the long-term trajectory of one of the sample companies, Microsoft Corporation, their key growth phases, correction phases and their overall stock journey throughout the years. It allows integral context for comprehending the stock's performance in comparison to the external events which serves as a base for tracking progress. Consequently, other visualizations similar to the image below help the user interpret the stock price and the company's journey throughout the years and perceive before making a decision to invest in the particular stock. Figure 1 shows EDA Visualizations of the Stock Prices [3]

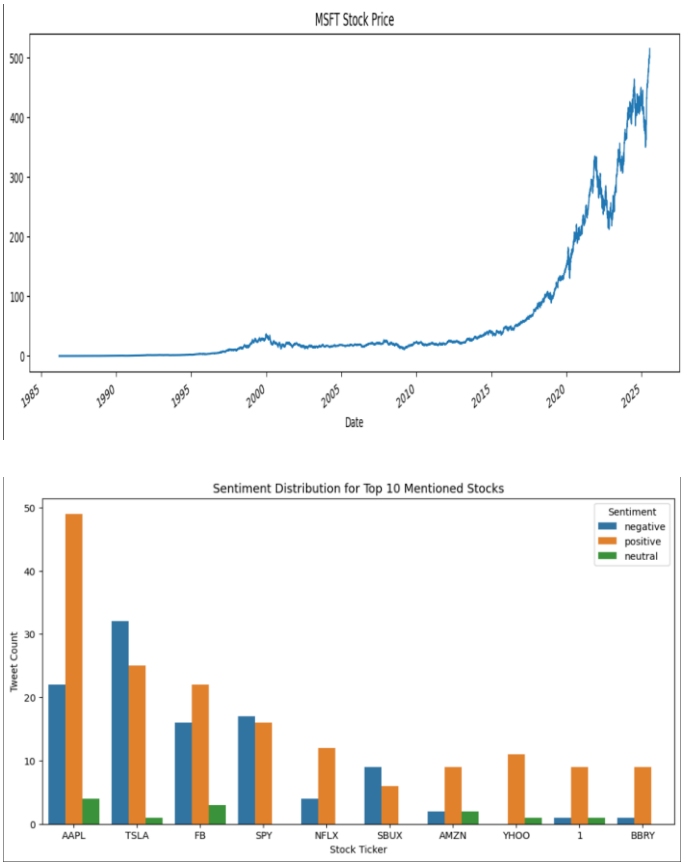

Figure 1 EDA Visualizations of the Stock Prices

3. Results And Discussion

3.1 Results

The experiments carried out were designed to evaluate the relationship between the headlines sentiment analysis and the stock price prediction, which in turn resulted in a positive relation. Positive, higher sentiment scores resulted in higher stock prices as shown by the results, supporting the hypothesis that sentiment can serve as an indicator in the financial market modelling. Therefore, the target variable being-the market index(up/down) following news events displayed the different directional shifts

International Research Journal on Advanced Engineering and Management
https://goldncloudpublications.com
https://doi.org/10.47392/IRJAEM.2025.0438
e ISSN: 2584-2854
Volume: 03
Issue: 09 September 2025
Page No: 2786 - 2788

in response to the sentiments for the headlines. [4]

3.2 Discussion

The findings as shown above suggest that the sentiment derived from headlines can play a crucial role on the stock price prediction. The transformer model's ability to capture the dramatic changes as the market changes can act as leading factors for understanding the market direction for the stock price and if it were to remain profitable over the next few months. Moreover, when in compared to traditional models, FinBERT outperforms the accuracy and the predictive reliability is significantly improved for the model. This integration between the transformer and the financial modelling allows actional insights to be gained from the model and helps make trading-based decisions. Figure 2 shows Process Carried Out By FINBERT [5]

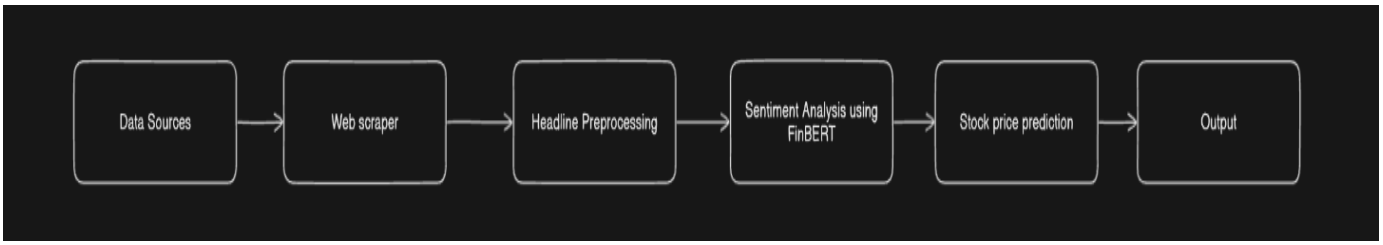

Figure 2 Process Carried Out By FINBERT

Conclusion

Therefore, using FinBERT and sentiment analysis, stock prediction and market modelling can be done accurately and precisely. This gives scope to other advancements in this field and allows a solid foundation which can be leveraged in social media sentiment and other fields such as macroeconomic indicators and signaling shown in the results, with the changes in the financial market, sentiment-driven models can be used in order to predict the stock prices and allow investors to feel more confident and informed while making decisions. [6]

Acknowledgements

The author gratefully acknowledges and appreciates the maintainers of open-source GitHub repositories along with publicly available financial news at Yahoo Finance which was used to scrape the headlines. The author thanks the creators of the FinBERT (hugging face algorithm) for providing a specific domain sentiment analysis

References

[1]. Huang, A., Wang, H., and Yang, Y. FinBERT: A large language model for extracting information from financial text. Contemporary Accounting Research, 40(2):1311 1344, 2023. doi: 10.1111/1911-3846.12835.

[2]. Liu, Z., Huang, D., Huang, K., Li, Z., and Zhao, J. FinBERT: A pre-trained financial language representation model for financial text mining. In Proceedings of the Twenty-Ninth International Joint Conference on Artificial Intelligence, IJCAI-20, pp. 4513–4519. ijcai.org, 2020. doi: 10.24963/ijcai.2020/623.

[3]. Peng, B., Chersoni, E., Hsu, Y.-Y., and Huang, C.-R. Is domain adaptation worth your investment? comparing bert and finbert on financial tasks. pp. 37–44, 01 2021. doi: 10.18653/v1/2021.econlp-1.5.

[4]. Y Yang, K.Z. Zhang, P. K., Uy, M. C. S., and Huang, A. Finbert: A pretrained language model for financial communications. ArXiv, abs/2006.08097, 2020.

[5]. Zhang, Q., Qin, C., Zhang, Y., Bao, F., Zhang, C., and Liu, P. Transformer-based attention network for stock movement prediction. Expert Syst. Appl., 202:117239, 2022.

[6]. Hiew, J. Z.-G., Huang, X., Mou, H., Li, D., Wu, Q., and Xu, Y. Bert-based financial sentiment index and lstm-based stock return predictability. arXiv: Statistical Finance, 2019.