Research Article

Impact of Artificial Intelligence in Stock Price Prediction Resulting Wealth Accumulation Consequences

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ARTICLE INFO	ABSTRACT
	The stock market is an area where the prices are not constant; but dynamic, nonlinear and volatile in nature. The price forecasting is a challenging task with the factors including financial performance of the organization impact of government policies unexpected natural and man-made causes, and worldwide economic conditions. In concern to these issues, several analytical techniques already developed by researchers, financial analysts, and data scientists for predicting the nature of stock market trends. Forecasting accurate predictions of stock market analysis remains a persistent challenge due to the ever-shifting and volatile nature of market trends. Recent advancements with machine learning techniques mitigate some uncertainties of stock market forecasting. In this research paper we have to discuss the various ML techniques which will perform good forecast as compare to the previous existing methods. We will prove it by some results provided by above set techniques. **Keywords:** financial analytics, market, forecasting, machine learning techniques, price prediction, methodologies.

1. Introduction

This paper give idea presents an overview of the Stock market The domain of financial market is fluctuating most often based on several conditions like randomness, promulgation of information volatility and volume etc. The previous stock prices are important in deciding the investor's decisions.

In this paper, we are using the following machine learning techniques, LR, ANN, and LSTM and well generate the result separately with different input duration for explicit output duration the comparison of stock output in deciding the users to select the stocks for investment or trading as per their interest.
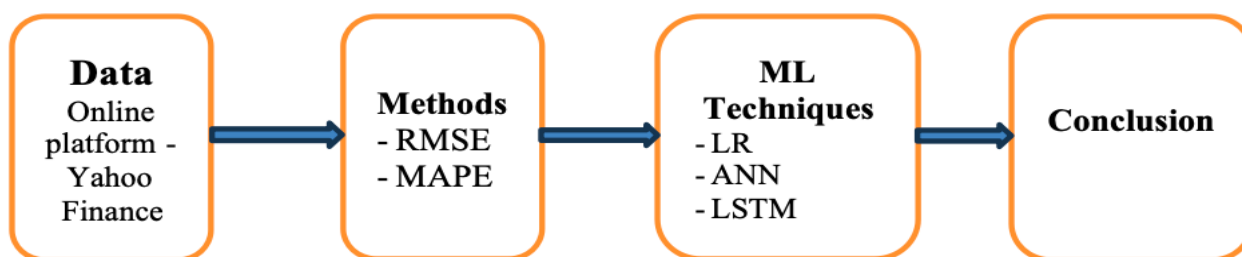

Fig1 (): Model to forecast the future price.

2. Methodology

We are working on stocks with a wide range of values and want a direct, scale-sensitive error metric, **RMSE** is a better choice. While we want to predict the errors in percentage terms and need a more intuitive interpretation, **MAPE** could be the better option.

we used both (**RMSE, MAPE**) in combination to get a well-rounded view of better model performance.

3. Linear Regression:

In this model we are calculating the result of one year input with output has one year growth in a particular stock with respect to the concerned sector and some other stocks in sector. Considering NHPC NTPC, Tata power and Nifty Energy Index. The graph of the considered stocks clearly explain score growth to growth of stock and shown in the picture also we have considered the input value of last three years of the said stock and the concerned growth with respect which is which is reflected in the graph. finally, when input is considered of past five years which conclude the growth of stock in next one year is reflected in the graph. The result reflected in graph for the above said phone stocks will also be represented in the table as shown below. The essence of linear regression method used to calculate the stock growth during a particular period of time in a specific sector helps the users in making their decision of investment in stock market. The result of the table clearly indicates that every store is performing relatively equivalent to the nifty energy index.
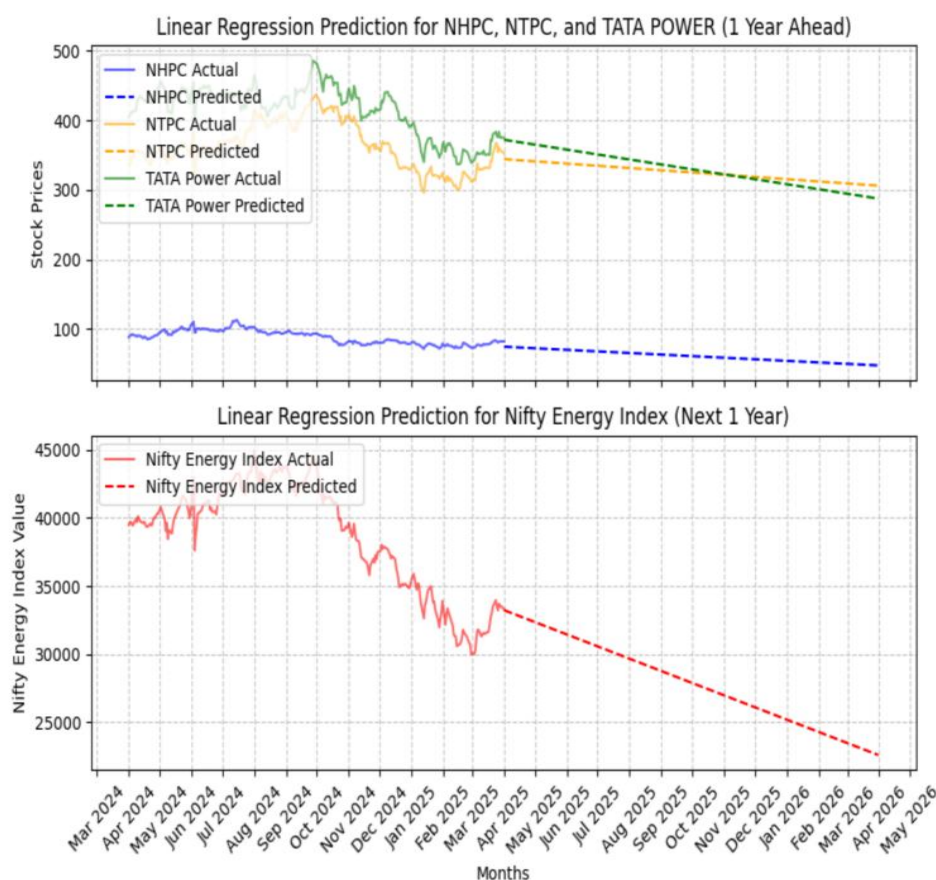

Fig 2(): Composite graph of NHPC NTPC TATA POWER and Nifty Energy Index
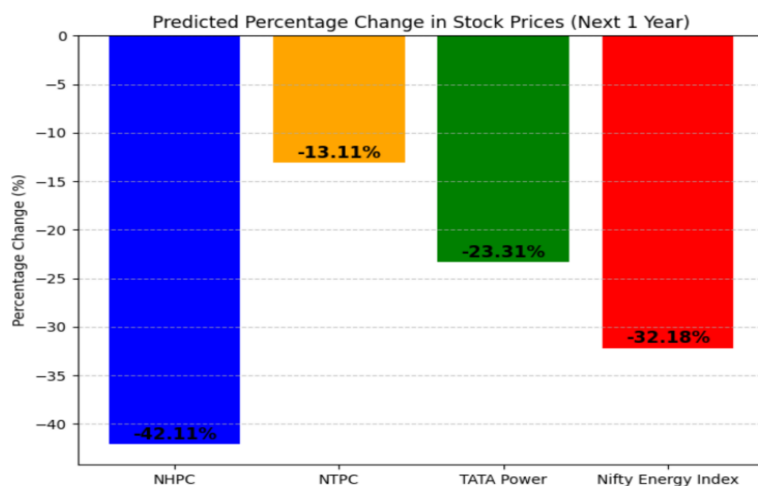
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Chart (1): Result in form of Bar chart with one year data input

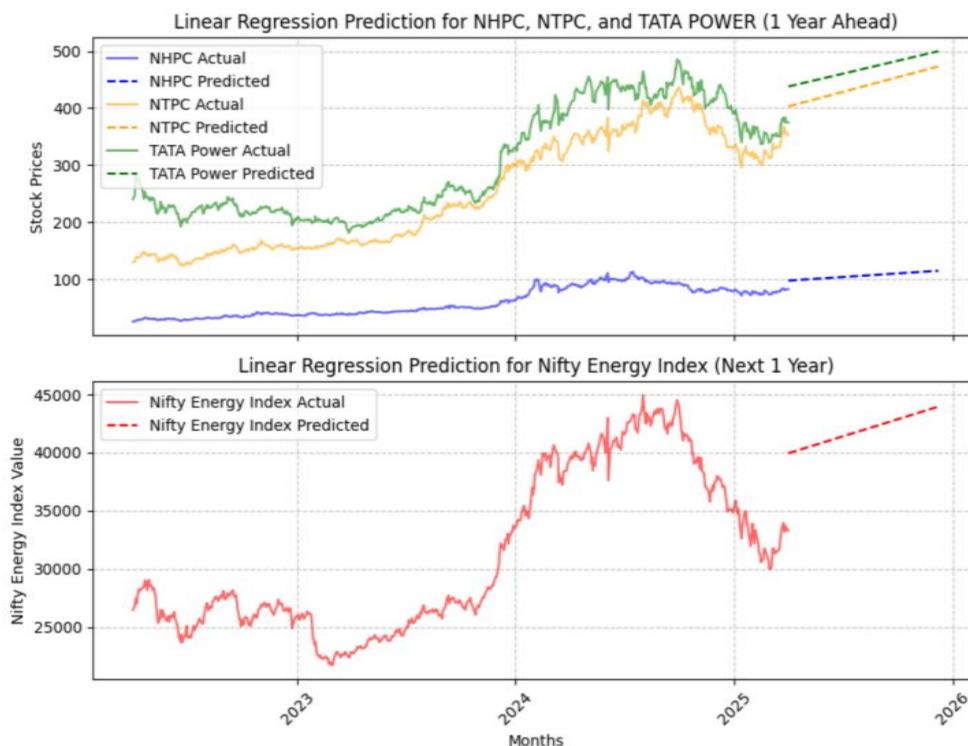Input Three years and output one year:

Fig 3(): Composite graph of NHPC NTPC TATA POWER and Nifty Energy Index
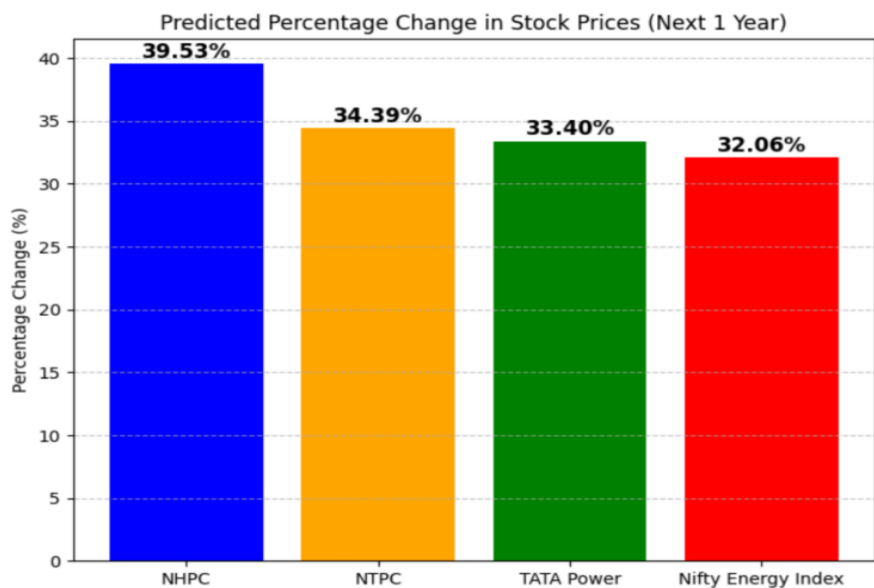
Chart (2): Result in form of Bar chart with Three years data input
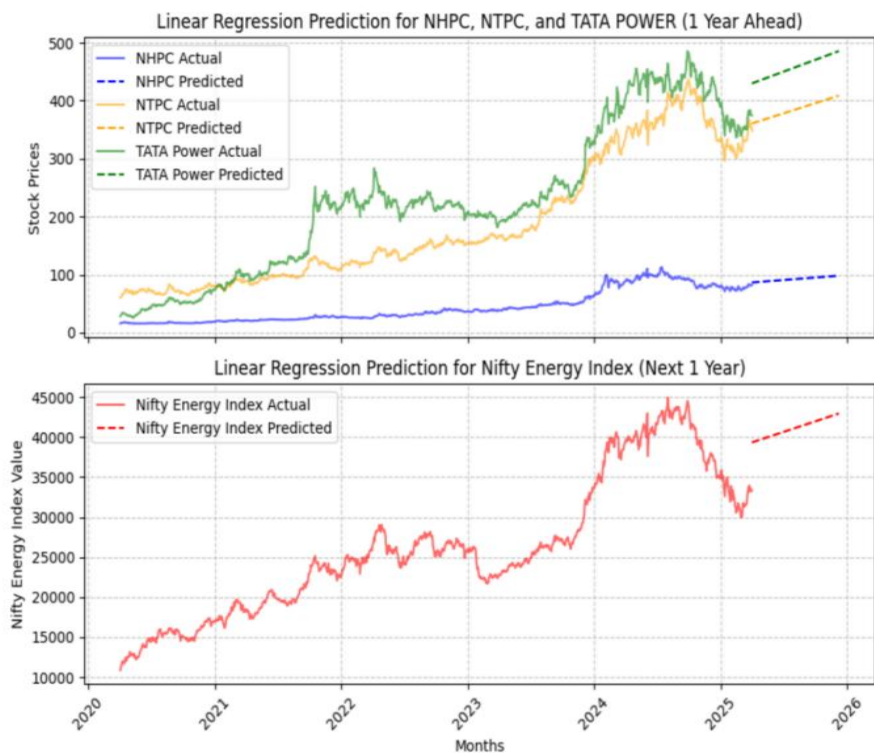
Input Five years and output one year:

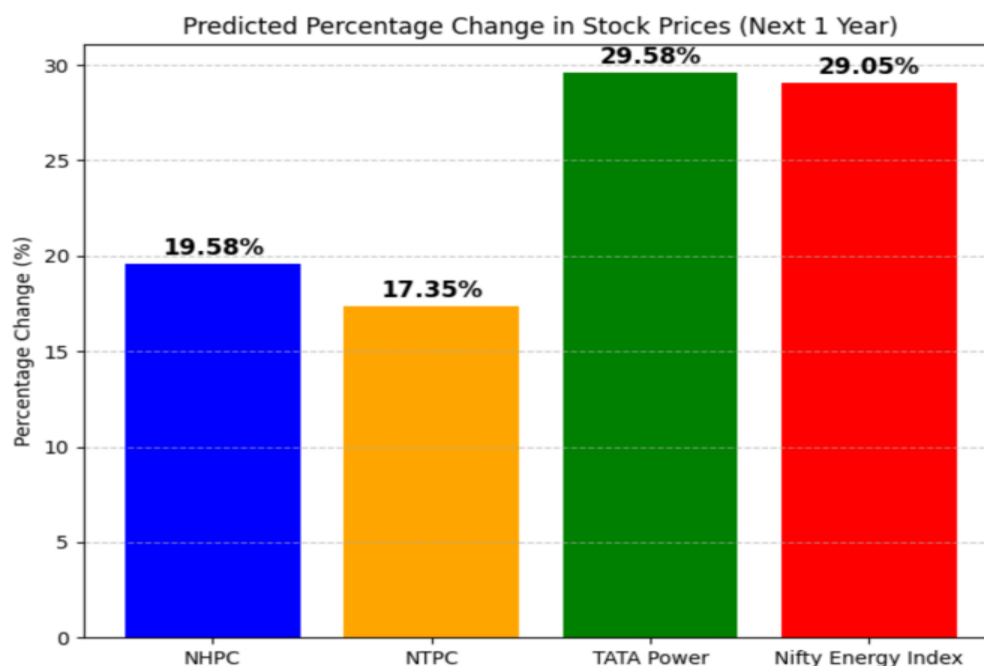Fig 4(): Composite graph of NHPC NTPC TATA POWER and Nifty Energy Index

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Chart (3): Result in form of Bar chart with five years data input

Percentage Growth of Stock using Linear Regression Model:

Stock	1 year	3 years	5years
NHPC	-42.11%	39.53%	19.58%
NTPC	-13.11%	34.39%	17.35%
TATA POWER	-23.31%	33.40%	29.58%
Nifty Energy Index	-32.18%	32.06%	29.05%

Table-1: Result of Stock Price Prediction

4. Artificial Neural Network (ANN):

Here we are using the ANN machine learning technique to predict the future growth of some stocks namely NHPC, NTPC, Tata power and nifty energy index. The figure clearly indicates the result of one year growth in the stock mentioned above when we are taking one-year previous data as input, further we take three years previous data of stock as input and calculate next one year price prediction of the stocks and finally we consider last five-year stocks data input and calculate the growth of respective stocks in next one year. The graph of every period that is one year input, three-year input, and five-year input exclusively reflect the growth in the stock in next one year. This is shown by the pictures of the graph. We have calculated the percentage growth of stock in future for one year duration represented by table number 2.
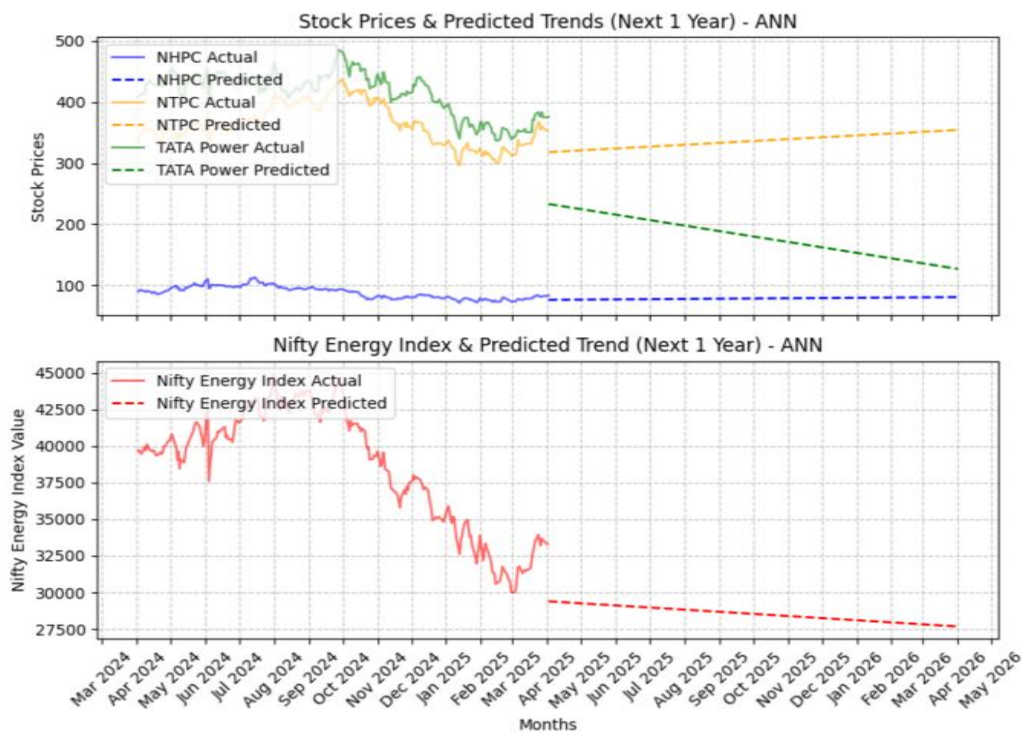
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Fig 5(): Composite graph of NHPC NTPC TATA POWER and Nifty Energy Index

Chart (4): Result in form of Bar chart with one year data input

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Input Three years and output one year

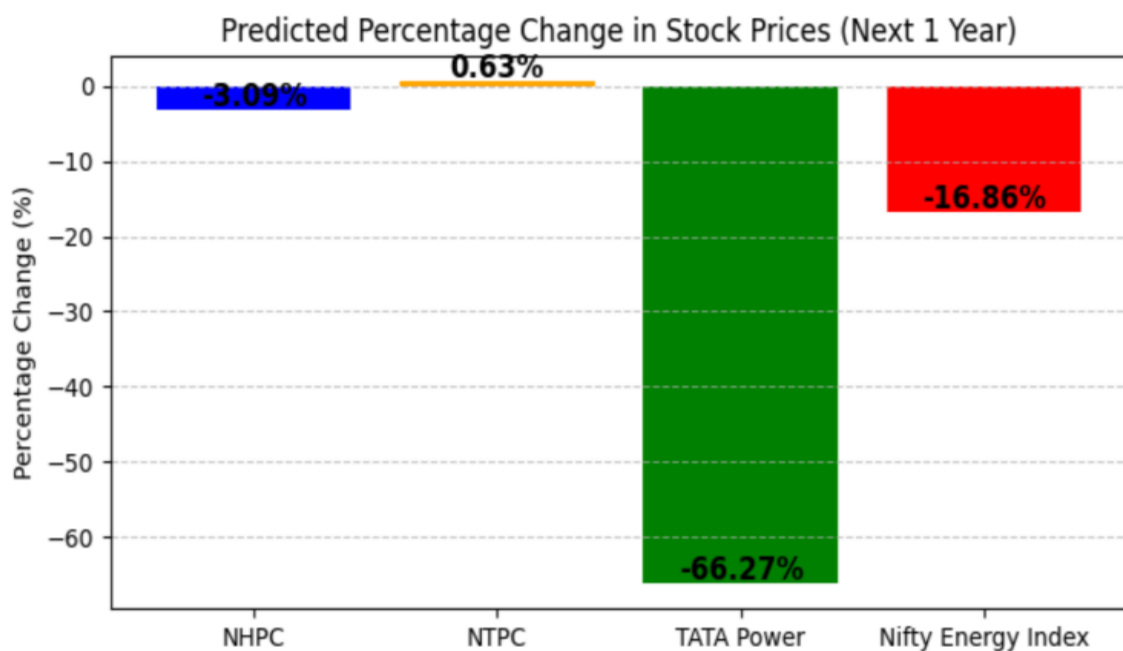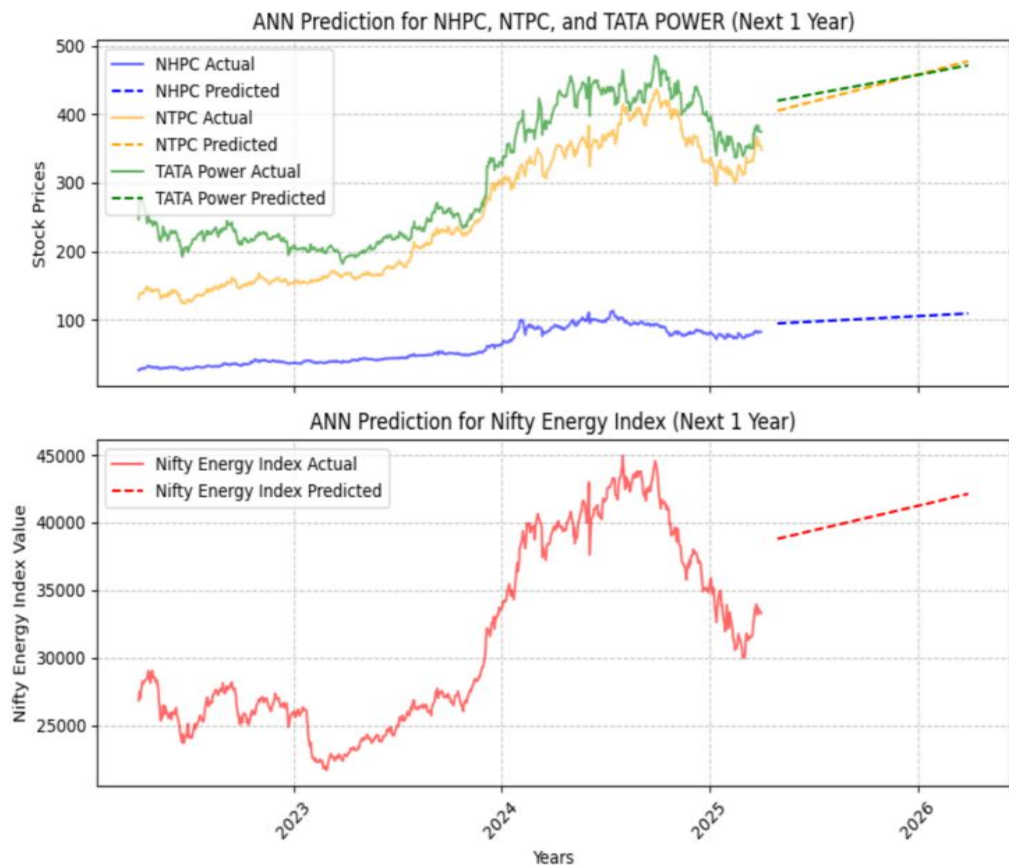Fig 6(): Composite graph of NHPC NTPC TATA POWER and Nifty Energy Index
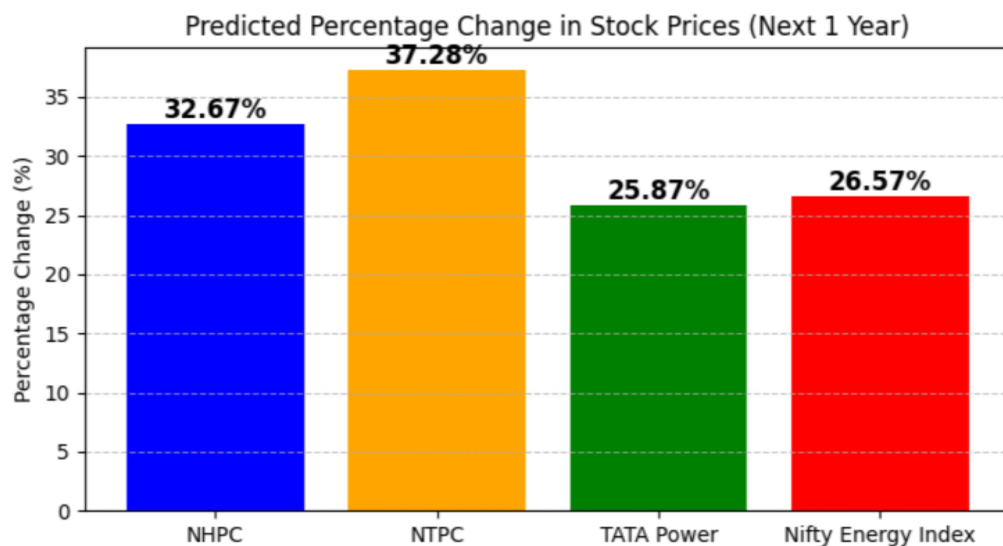

Chart (5): Result in form of Bar chart with three- year data input
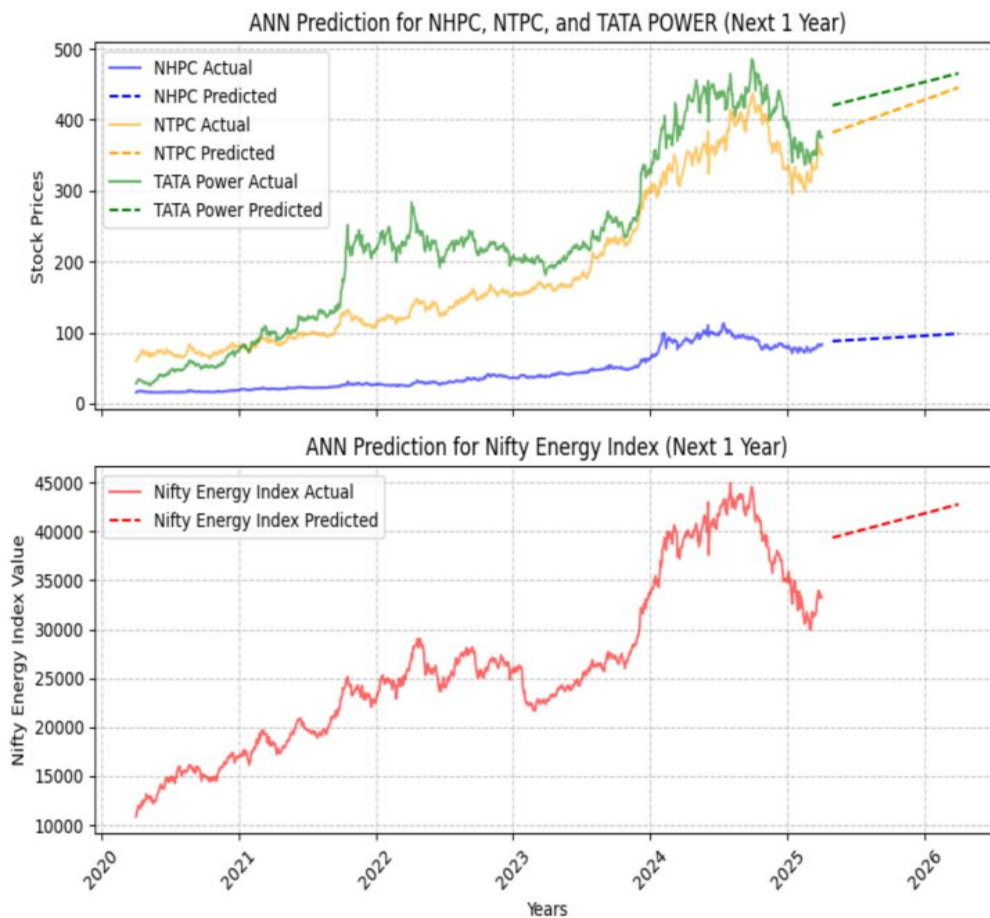
Input Five years and output one year

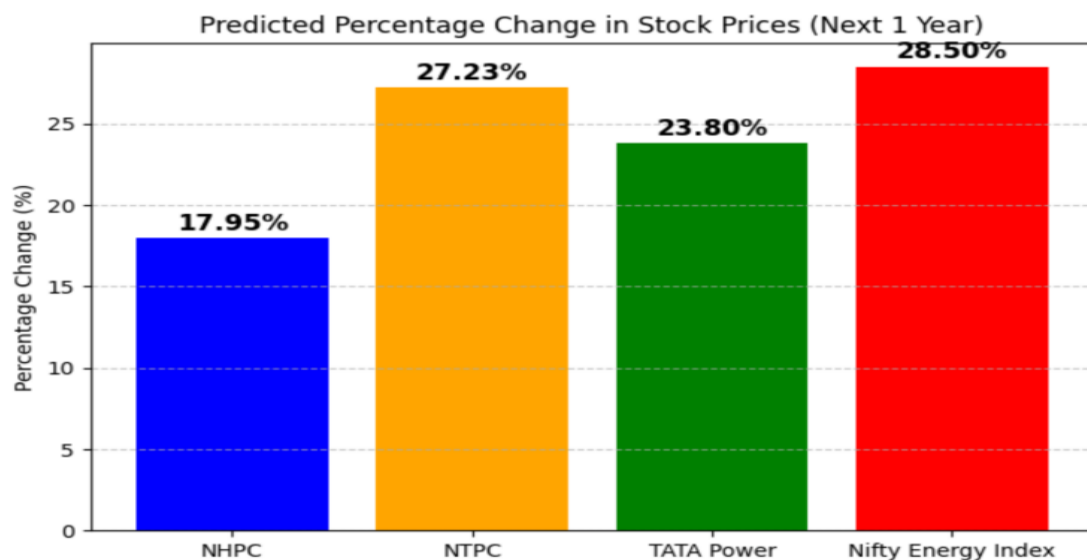Fig 7(): Composite graph of NHPC NTPC TATA POWER and Nifty Energy Index

Chart (6): Result in form of Bar chart with five-years data input

Percentage Growth of Stock using ANN Model:

Stock	1 year	3 years	5years
NHPC	-3.09%	32.67%	17.95%
NTPC	0.63%	37.28%	27.23%
TATA POWER	-66.27%	25.87%	23.80%
Nifty Energy Index	-16.86%	26.57%	28.50%

Table 2: Result of Stock Price Prediction

5. Long Short-Term Memory (LSTM):

We are using the LSTM machine learning technique to predict the future price of some stocks for next one year with input values as one-year previous data. To calculate one-year future growth of stock while we will also consider three-year previous data as input and try to find out the future growth of store for next one year. In the same way the input is considered as five years previous data to forecast price in next one year. The graph of result reflected in three different cases as shown above clearly explain the percentage growth in every stock which are NHPC NTPC Tata Power and Nifty Energy Index. The table conclude the percentage growth of every stock considering three different input duration as one year three year and five years to predict the future growth of every stock in next one year.
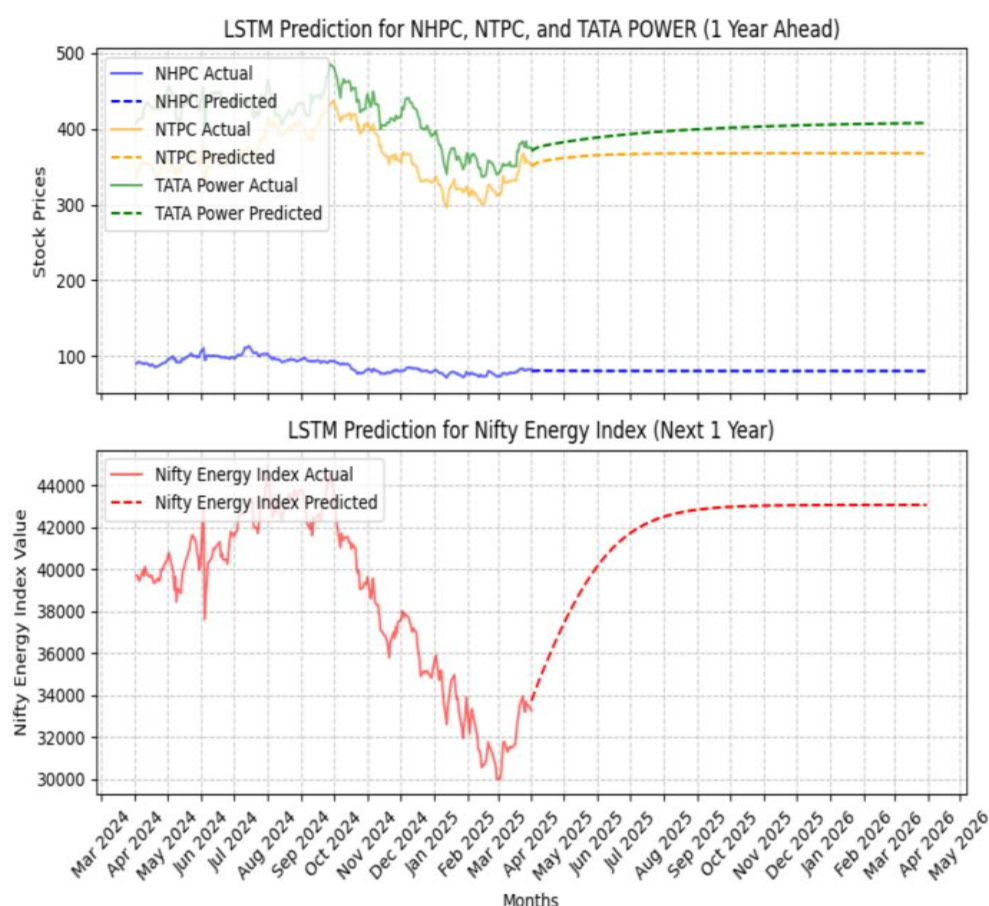

Fig 8(): Composite graph of NHPC NTPC TATA POWER and Nifty Energy Index
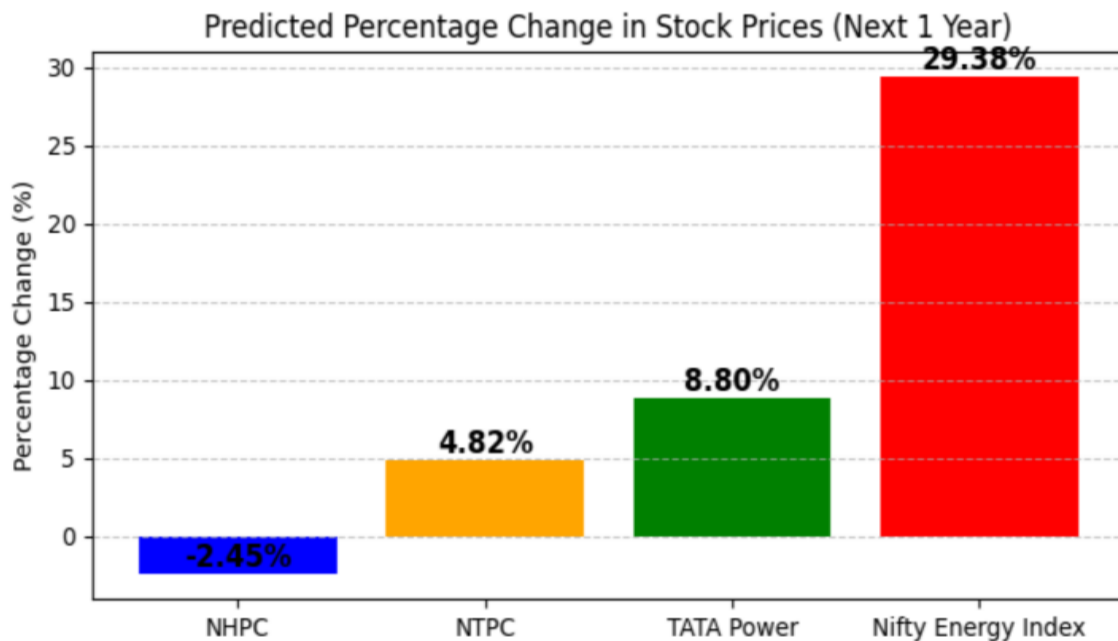
Chart (7): Result in form of Bar chart with one-year data input

Input three year and output one year

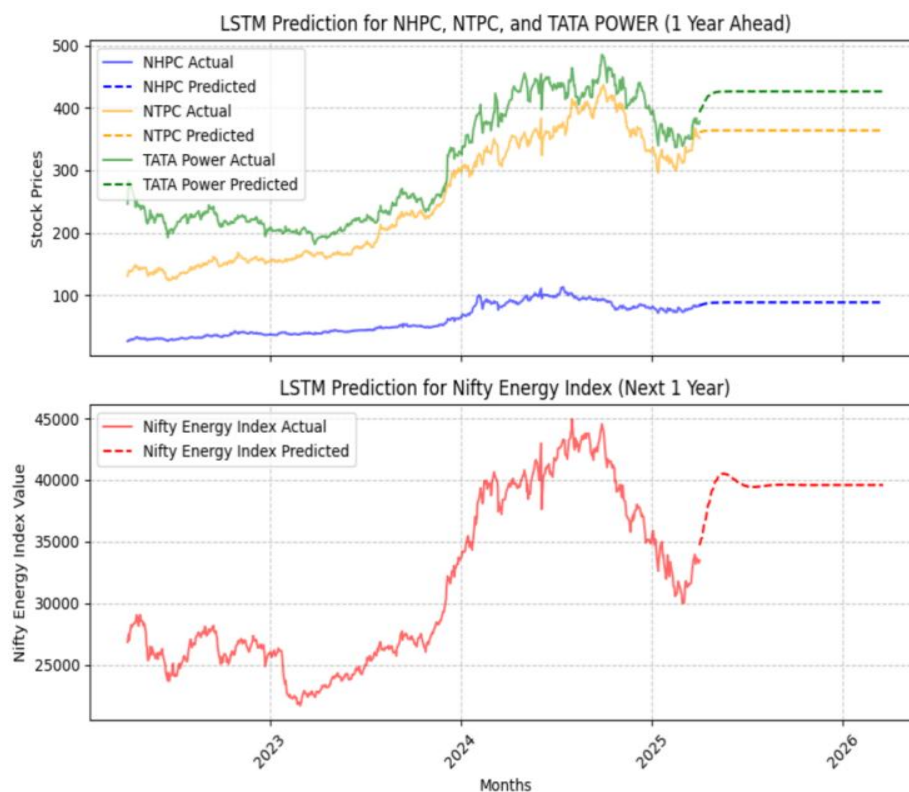Fig 9(): Composite graph of NHPC NTPC TATA POWER and Nifty Energy Index
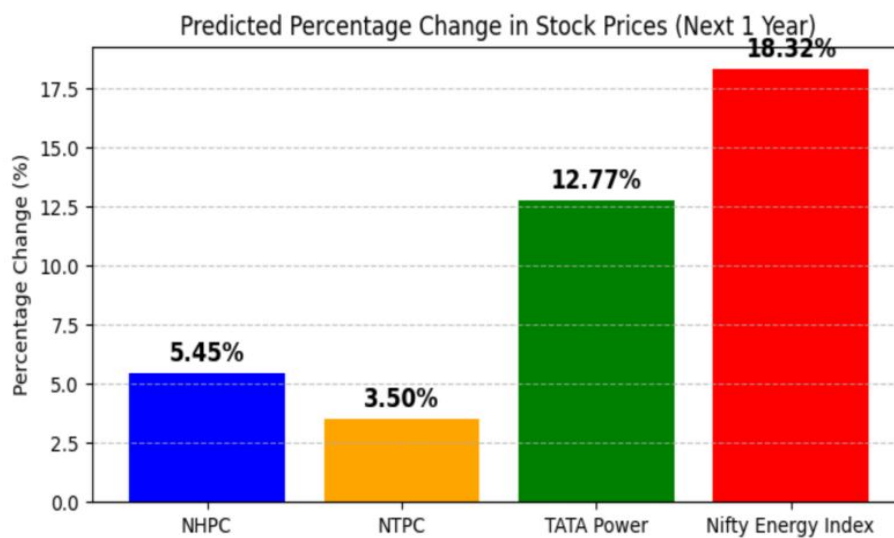
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Chart (8): Result in form of Bar chart with three-years data input
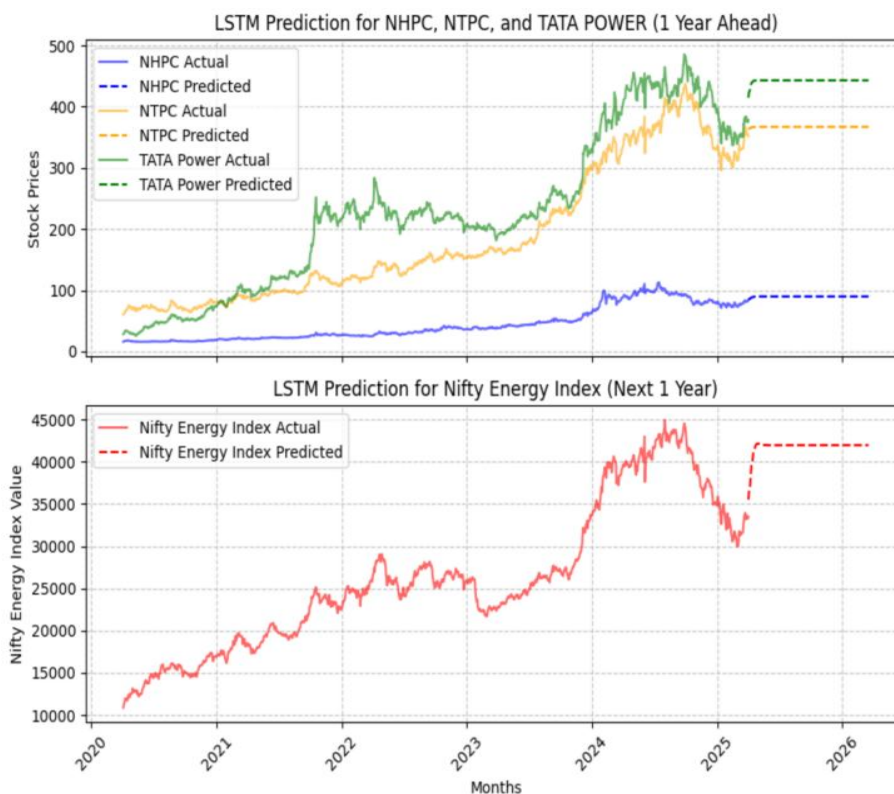
Input Five years and output one year

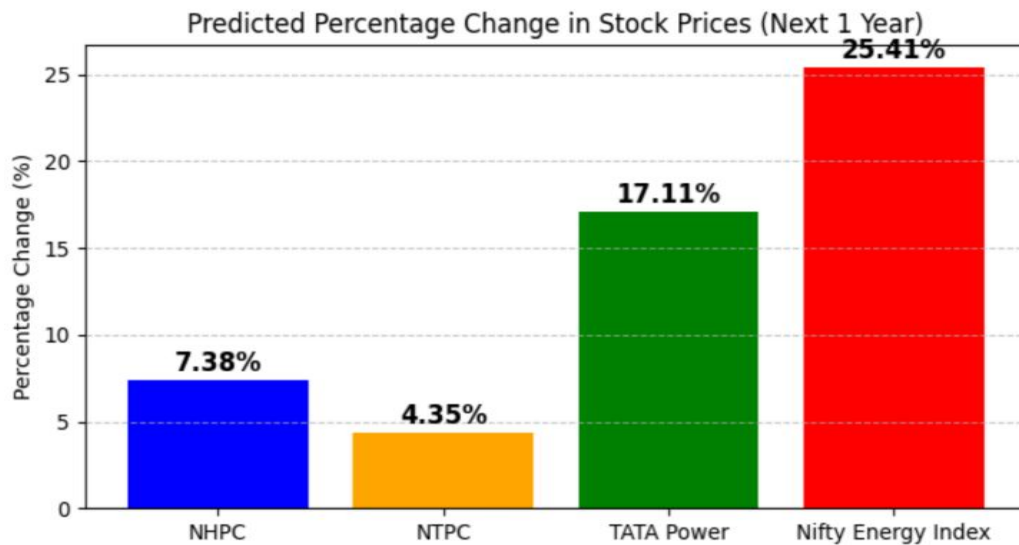Fig 9(): Composite graph of NHPC NTPC TATA POWER and Nifty Energy Index

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Chart (9): Result in form of Bar chart with three-years data input

Percentage Growth of Stock using LSTM Model:

Stock	1 year	3 years	5years
NHPC	-2.45%	5.45%	7.38%
NTPC	4.82%	3.50%	4.35%
TATA POWER	8.80%	12.77%	17.11%
Nifty Energy Index	29.38%	18.32%	25.41%

Table 3: Result of Stock Price Prediction

The result of mentioned stocks in the table below are average value of stocks for the stated duration calculated using the machine learning techniques Linear Regression ANN and LSTM.

Stock	1 year	3 years	5years
NHPC	-15.88%	25.88%	14.97%
NTPC	-2.55%	25.05%	16.31%
TATA POWER	-26.92%	24.01%	23.49%
Nifty Energy Index	-6.55	25.65%	27.65%

Table 4: Average result of Stock Price Prediction for future one-year duration

Conclusion:

We have calculated the output of NHPC NTPC Tata power and nifty energy index for next one year price prediction with input value of stocks forecast one year three year and five- year data. As the result in table 4 clearly reflects that the user may invest for a return of 23% - 24% in Tata power line, the nifty energy index may provide 25% - 27% return in next one year. Easily, it may be selected by the user in taking the decision to select stock for investment in the specific sector. As in this paper we have considered energy sector and the stock related to it.

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Future Scope:

This research paper helps in deciding the stock to invest for a varied time period in stock market with estimated growth. The forecast results reveals that the automated application or bot based on this idea may result in profit realization.

References:

[1] M. Nabipour, P. Nayyeri, H. Jabani, A. Mosavi, E. Salwana, and S. Shahab, "Deep learning for stock market prediction," Entropy, vol. 22, no. 8, 2020, doi: 10.3390/E22080840.

[2] I. Valova, N. Gueorguieva, T. Aayushi, P. Nikitha, and H. Mohamed, "Hybrid Deep Learning Architectures for Stock Market Prediction," Proceedings of the World Congress on Electrical Engineering and Computer Systems and Science, pp. 1–8, 2023, doi: 10.11159/cist23.121.

[3] G. Li, "Information sharing and stock market participation: Evidence from extended families," Review of Economics and Statistics, vol. 96, no. 1, pp. 151–160, 2014.

[4] L. Cao and F. E. H. Tay, "Financial forecasting using support vector machines," Neural Computing and Application, no. 10, pp. 184–192, 2001, doi: 10.1016/S0925-2312(03)00372-2.

[5] A. Sebastian and V. Tantia, "Transforming Finance With Deep Learning Predictions," in Navigating the Future of Finance in the Age of AI, 2024, ch. 12, pp. 227–252. doi: 10.4018/979-8-3693-4382-1.ch012.

[6] F. A. Sortino, The Sortino Framework for Constructing Portfolios: Focusing on Desired Target ReturnTM to Optimize Upside Potential Relative to Downside Risk. Elsevier, 2009.

[7] O. B. Ansari and F. M. Binninger, "A deep learning approach for estimation of price determinants," International Journal of Information Management Data Insights, vol. 2, no.2,p.100101,2022,doi:0.1016/j.jjimei.2022.100101.

[8] I. H. Shakri, "Time series prediction using machine learning: a case of Bitcoin returns," Studies in Economics and Finance, vol. 39, no. 3, pp. 458–470, 2022, doi: 10.1108/SEF-06-2021-0217.

[9] P. Singh and M. Jha, "Portfolio Optimization Using Novel EW-MV Method in Conjunction with Asset Preselection," Comput Econ, 2024,doi: 10.1007/s10614-024-10583-8.

[10] P. Singh and M. Jha, "Portfolio Optimization Using Novel EW-MV Method in Conjunction with Asset Preselection," Comput Econ, no. 0123456789, 2024, doi: 10.1007/s10614-024-10583-8.

[11] W. Chen, H. Zhang, M. K. Mehlawat, and L. Jia, "Mean–variance portfolio optimization using machine learning-based stock price prediction," Appl Soft Comput, vol. 100, p. 106943, 2021, doi: 10.1016/j.asoc.2020.106943.

[12] H. M. Markowitz, "Portfolio selection," Journal of finance, vol. 7, no. 1, pp. 71–91, 1952.

[13] Z. Zhang, S. Zohren, and S. Roberts, "Deep Learning for Portfolio Optimization," Journal of Financial Data Science, vol. 2, no. 4, pp. 8–20, 2020, doi: 10.3905/jfds.2020.1.042.

[14] Z. Zhou, Z. Song, T. Ren, and L. Yu, "Two-Stage Portfolio Optimization Integrating Optimal Sharp Ratio Measure and Ensemble Learning," IEEE Access, vol. 11, no. December 2022, pp. 1654–1670, 2023, doi: 10.1109/ACCESS.2022.3232281.

[15] Y. H. Chou, S. Y. Kuo, and Y. T. Lo, "Portfolio Optimization Based on Funds Standardization and Genetic Algorithm," IEEE Access, vol. 5, pp. 21885–21900, 2017, doi: 10.1109/ACCESS.2017.2756842.

[16] J. B. Guerard, H. Markowitz, and G. Xu, "Earnings forecasting in a global stock selection model and efficient portfolio construction and management," Int J Forecast, vol. 31, no. 2, pp. 550–560, 2015, doi: https://doi.org/10.1016/j.ijforecast.2014.10.003.

[17] Y. Zhang, X. Li, and S. Guo, "Portfolio selection problems with Markowitz's mean–variance framework: a review of literature," Fuzzy Optimization and Decision Making, vol. 17, no. 2, pp. 125–158, 2018, doi: 10.1007/s10700-017-9266-z.

[18] M. Johnson, "Forecasting in Emerging Markets: Challenges and Solutions," Journal of Emerging Market Finance, vol. 18, no. 1, pp. 1–14, 2019.