ijamrsd.com
ISSN: 2583-6404
Journal of Advanced Multidisciplinary Research Studies and Development
Peer Reviewed Referred Journal | Bi-monthly | Open Access

ARTIFICIAL INTELLIGENCE-BASED CANDLESTICK PATTERN ANALYSIS FOR PREDICTING PRICE MOVEMENTS OF THE NIFTY 50 INDEX

Mr. Tushar Ashok Wankhede[1], Dr. Ramesh J. Sardar[2]
[1] *Research Scholar, School of Commerce, KBCNMU, Jalgaon.*
Email: tusharawankhade@gmail.com
[2] *Director, School of Commerce, KBCNMU, Jalgaon.*

Abstract
Identifying the buy and sell time is the most challenging for the short-term trader and long-term investor in the stock market. If investors get the right time to buy and sell, it directly influences the investment risk and return. Technical analysis plays an important role in predicting price movement by analyzing past data price behavior, particularly through candlestick patterns that reflect market conditions. Now, with updated technology in artificial intelligence, it helps to forecast the complex pattern of historical market data. This study applies AI techniques in combination with candlestick pattern analysis to predict price movements of India's benchmark stock market index. The Nifty 50 Index covers the period from April 2020 to January 2026.With the help of artificial intelligence, candlestick pattern identifying bearish and bullish market trends. The findings suggest that integrating AI with candlestick pattern analysis enhances the accuracy of trend identification, such as bearish and bullish, and improves decision-making for investors and traders in the short term and long-term like buying and selling in the stock market based on the biases of the Nifty 50 Index price movement.
Keywords: Artificial Intelligence (AI), Candlestick Pattern, Technical Analysis, Nifty 50 Index.

► *Corresponding Author: Mr. Tushar Ashok Wankhede*

I. Introduction:

The stock market plays an important role in the economic development of a country, providing facilities for capital generation and giving investment opportunities for individuals and institutions. Due to stock market volatility, uncertainty, and various economic and behavioral factors, it is very difficult to predict it.

Technician analysis is used for predicting price movement by analyzing historical price data, trading volume, and market trends. There are so many technical tools to analyze the stock market, but one technical tool is an effective tool for understanding stock market psychology by representing the opening, closing, high & low prices. These patterns help investors identify bullish and bearish signals.

Traditional technical analysis gives us human error. After introducing and updating AI with technical analysis, an intelligent system is capable of processing large volumes of data and identifying complex market patterns.

This study applies AI techniques combined with candlestick pattern analysis to forecast price movements of the NIFTY 50 index during April 2020 to January 2026, a period of high market volatility.

2. Objectives of the Study:

- To analyze the price movement behavior of the NIFTY 50 index using historical market data.
- To identify key support, resistance, and target price levels.
- To assess the impact of AI-integrated candlestick analysis on investment decision-making.

3. Literature Review:

Mehtab et al. (2020) proposed a hybrid machine learning and Long Short-Term Memory (LSTM) model for predicting NIFTY 50 price movements and found improved prediction accuracy.
Barua et al. (2024) compared deep learning models such as RNN, CNN, LSTM, and GRU for predicting Indian stock prices and reported superior performance of hybrid models.
Sisodia et al. (2023) developed an ensemble deep learning model combining CNN and Deep Neural Networks, improving forecasting accuracy.
Sharma and Sharma (2024) applied Artificial Neural Networks with technical indicators like RSI, MACD, and EMA to predict NIFTY 50 returns and achieved strong predictive performance.

4. Research Gap:

Limited studies have combined Artificial Intelligence with candlestick pattern analysis for predicting Nifty 50 price movements in the National Stock Exchange of India. Most AI models also require coding knowledge, which makes them difficult for general traders to use. This study addresses this gap by providing a simple AI-based approach that supports non-coders in making trading decisions.

5. Research Design:

5.1. Research Type: -

The study adopts a descriptive and analytical research design to examine the role of Artificial Intelligence–based candlestick pattern analysis in predicting price movements of the NIFTY 50 Index. The descriptive approach helps in understanding the characteristics and applications of AI in market trend analysis, while the analytical approach evaluates its effectiveness in forecasting price trends and supporting investment decisions.

5.2. Research Approach:

The research follows a mixed-method approach, integrating both qualitative and quantitative methods:

- **Qualitative Approach:**

This approach is used to understand the application of Artificial Intelligence in market trend analysis, including the identification of uptrends and downtrends, bullish and bearish market conditions, and their role in supporting investment decision-making processes.

- **Quantitative Approach:**

This approach is used to measure and evaluate the effectiveness of technical indicators such as support and resistance levels, target price identification, and risk–return ratio analysis. It also assesses how these factors contribute to investment decision-making through statistical and data-based evaluation.

6. Data Collection:

6.1 Nature of Data:

The study is based on secondary data consisting of:

- Opening price
- Closing price
- High price
- Low price
- Trading volume
- Market trends

These data were used to construct candlestick charts and train AI models.

6.2 Sources of Data:

- Official website of the National Stock Exchange of India.
- Financial databases and stock market portals.
- Research publications and reports.
- Online platforms such as Trading view, Yahoo Finance, and Investing.com.

6.3 Study Period:

April 2020 to January 2026.

6.4 Data Processing:

- Data cleaning and validation.
- Time-series structuring.
- Candlestick chart construction.
- Identification of support and resistance levels.
- Dataset preparation for AI analysis.

6.5 Tools for Data Analysis:

Artificial Intelligence tools such as ChatGPT were used to recognize candlestick patterns and predict market trends.

Input – Processing – Output Model: -

Input Data	Processing of Data	Output of Data
NIFTY 50 Index data from April 2020 to January 2026	ChatGPT processes the data by applying commands to identify support levels, resistance levels, target prices, and risk–return analysis.	ChatGPT provides support levels, resistance levels, target prices, and risk–return results for investment decision-making.

Flow Process:

Input Data

NIFTY 50 Index data from April 2020 to January 2026.

⬇

Processing of Data

ChatGPT processing through command-based analysis for support levels, resistance levels, target prices, and risk–return evaluation.

⬇

Output of Data

Support levels, resistance levels, target prices, and risk–return results.

7. Data Analysis:

Historical price data of the NIFTY 50 index was provided as input to AI tools for technical analysis using candlestick pattern charts. The system analyzed price behavior, market trends, and candlestick formations to identify support levels, resistance levels, target prices, and risk–return ratios. The AI-generated outputs helped interpret market movements and identify optimal entry and exit points.

(Source: Nifty 50 index chart period from April 2020 to January 2026. on the Trading view website.)

8. Technical Analysis Results (Based on Chart):

8.1 Trend Analysis: -

- **Primary Trend:** Long-term bullish trend.
- **Structure:** Higher highs and higher lows visible.
- **Current Phase:** Consolidation near all-time high zone (~26,000).

Market Phases Observed: -

- **2020–2021:** Strong bullish rally after market recovery.
- **2022:** Market correction and sideways movement.
- **2023–2024:** Strong breakout and trend continuation.
- **2025–2026:** Price consolidation near the resistance zone.

8.2 Support Levels:

- **Immediate Support:** 24,500 – 24,800.
- **Major Support:** 22,800 – 23,000.
- **Long-Term Support:** 21,500 – 22,000.

8.3 Resistance Levels:

- **Immediate Resistance:** 25,800 – 26,000 (current supply zone).
- **Major Resistance:** 26,500 – 27,000.

8.4 Target Levels: -

- **Short-Term Target:** 26,000 – 26,500.
- **Medium-Term Target:** 27,500 – 28,000.
- **Long-Term Target:** 30,000.

8.5 Downside Targets: -

- **Break below 24,500** → 23,000 level.
- **Break below 23,000** → 22,000 level.

8.6 Risk–Return Analysis: -

❖ **Buy Near Support Strategy**

- Entry: 24,500 – 24,800.
- Stop Loss: 23,800.
- Target: 26,500 – 27,000.
- Risk–Reward Ratio: ~1:3.

❖ **Breakout Strategy**

- Entry: Monthly close above 26,000.
- Target: 27,500 – 28,000.

8.7 Volatility & Volume Analysis:

- Volume expansion is visible during an uptrend.
- Lower volatility during the consolidation phase.
- Indicates accumulation before a potential breakout.

9. Investment Interpretation: -

❖ **For Long-Term Investors**

- Buy near strong support zones.
- Hold for long-term targets.
- Market structure remains bullish.

❖ **For Traders**

- Trade within the support–resistance range.
- Wait for breakout confirmation above resistance.

10. Overall Market Outlook: -

Factor	**Interpretation**
Trend	Strong Bullish
Momentum	Positive
Risk Level	Moderate
Investment Outlook	Positive

❖ **Final View:** Bullish long-term trend with consolidation before next breakout.
(Response from ChatGPT)

11. Finding:

The study provides actionable data to help traders and investors make informed decisions in the Nifty 50 index by identifying support, resistance, and target levels. Based on this data, traders can buy and sell in the Nifty 50 index. The proposed model does not require extensive technical knowledge, making it accessible to non-programmers and individuals with limited expertise in technical analysis. Overall, it simplifies stock market decision-making and makes trading more convenient and accessible to a wider range of users.

12. Suggestion:

The study can be further enhanced by introducing an automated trading system to minimize manual intervention and enhance trading efficiency. Future research may also incorporate fundamental analysis along with technical analysis to provide more comprehensive and reliable trading signals. Additionally, integrating real-time market data and advanced AI techniques can enhance prediction accuracy and support better decision-making. Providing proper training or guidance for users can also help traders utilize the model more effectively and improve overall trading performance.

13. Challenges:

The buying and selling of the Nifty 50 index are performed manually, which can be challenging for traders and investors. Since the trading process is not fully automated, it requires continuous market monitoring and timely decision-making. Traders must regularly track price movements, support and resistance levels, and market trends to execute appropriate buy or sell orders. This manual intervention increases the possibility of human error, delays in execution, and emotional bias, which may ultimately reduce trading efficiency and affect overall performance.

Another major challenge is that the model is primarily based on technical analysis rather than fundamental analysis. It primarily focuses on price patterns, market trends, historical data, and technical indicators without considering fundamental factors such as company performance, financial statements, economic conditions, or market news. As a result, important macroeconomic and financial variables that influence market behavior may not be fully incorporated into the decision-making process. This limitation may impact the accuracy and reliability of trading signals, particularly during periods of market volatility or significant economic shifts.

Additionally, dependence on technical indicators alone may not always provide a comprehensive understanding of market dynamics. Market movements are influenced by various external factors such as government policies, global economic events, and investor sentiment, which cannot always be predicted through technical analysis. Therefore, traders relying solely on this approach may face challenges in managing risk and achieving consistent returns.

Furthermore, the absence of automation limits the scalability and speed of trading operations. In fast-moving markets, delays in manual execution may result in missed trading opportunities or unfavorable price movements. Although the model simplifies trading decisions, users must still possess a basic understanding of market behavior and trading strategies to effectively utilize the system.

Overall, while the model supports trading decisions and simplifies the process, challenges such as manual execution, reliance on technical analysis, limited consideration of fundamental factors, and the risk of human error highlight areas where further improvement and automation can enhance trading efficiency and effectiveness.

14. Conclusion:

Artificial Intelligence (AI) plays a significant role in simplifying trading activities by supporting effective and data-driven decision-making in the stock market. The application of AI in trading helps traders and investors identify important market indicators such as support, resistance, and target levels, which guide them in making appropriate buying and selling decisions. By analyzing market data and patterns, AI reduces uncertainty and enhances the accuracy of trading decisions.

The study shows that AI-based models make the trading process more efficient, systematic, and accessible. The system does not require advanced technical knowledge or programming skills, allowing even non-technical users and beginners to participate in stock market trading with greater confidence. This ease of use broadens market participation and supports informed investment decisions.

Furthermore, AI helps reduce emotional bias and human error in trading by providing logical and data-based recommendations. It assists traders in taking timely long or short positions, improving overall trading efficiency and risk management. Although the trading execution may still require manual intervention, AI significantly supports the decision-making process and enhances the effectiveness of trading strategies.

Overall, the integration of Artificial Intelligence in stock market trading simplifies the buying and selling process, improves decision quality, and increases opportunities for traders and investors to earn better returns. The use of AI-driven tools represents an important advancement in modern financial markets and contributes to more informed, efficient, and accessible trading practices.

15. References:

1. S. Mehtab, Sen, J., & Dutta, A. (2020). Stock price prediction using machine learning and deep learning techniques. *Journal of Risk and Financial Management*.
2. M. Barua, Kumar, T., Raj, K., & Roy, A. M. (2024). Comparative analysis of deep learning models for stock price prediction in the Indian market. *FinTech, 3*(4), 551–568.
3. J. Sisodia, Nayak, A., & Boghey, R. (2023). An improved index price/movement prediction by using ensemble CNN and DNN deep learning techniques. *Journal of Applied Artificial Intelligence*.
4. R. Sharma, & P. Sharma. (2024). Stock market prediction using artificial neural networks with technical indicators. *International Journal of Financial Studies*.
5. National Stock Exchange of India. (2023). *Nifty 50 index methodology and market data reports*. Retrieved fromhttps://www.nseindia.com
6. Technical Analysis of the Financial Markets – John J. Murphy. (1999). New York: New York Institute of Finance.
7. Artificial Intelligence: A Modern Approach – Stuart Russell & Peter Norvig. (2010). Pearson Education.
8. Securities and Exchange Board of India. (2022). *Stock market guidelines and trading regulations*. Retrieved fromhttps://www.sebi.gov.in
9. Advances in Financial Machine Learning – Marcos López de Prado. (2018). Wiley.
10. Eugene F. Fama. (1970). Efficient capital markets: A review of theory and empirical work. *Journal of Finance, 25*(2), 383–417.
11. Tim Bollerslev. (1986). Generalized autoregressive conditional heteroskedasticity. *Journal of Econometrics, 31*(3), 307–327.
12. Sepp Hochreiter & Jürgen Schmidhuber. (1997). Long short-term memory. *Neural Computation, 9*(8), 1735–1780.

13. Ian Goodfellow, Yoshua Bengio, & Aaron Courville. (2016). Deep Learning. MIT Press.
14. Burton G. Malkiel. (1973). A Random Walk Down Wall Street. W. W. Norton & Company.
15. Charles P. Jones. (2013). Investments: Principles and Concepts. Wiley.
16. Stephen A. Ross, Westerfield, R., & Jaffe, J. (2013). Corporate Finance. McGraw-Hill Education.
17. Reserve Bank of India. (2022). *Annual report*. Retrieved fromhttps://www.rbi.org.in
18. David Ruppert. (2011). Statistics and Data Analysis for Financial Engineering. Springer.
19. https://www.tradingview.com
-TradingView -*Nifty 50 index chart data for the period April 2020 to April 2022*.
20.https://www.chatgpt.com-OpenAI ChatGPT*: Artificial intelligence language model*.