THE DUAL ROLE OF ARTIFICIAL INTELLIGENCE IN THE SECURITIES MARKET

Priya Rathi, B.Com. LLB (Hons.), Institute of Law, Nirma University

Shruti Agrawal, B.Com. LLB (Hons.), Institute of Law, Nirma University

ABSTRACT

Algo trading is not the future; it is the present. Traders like institutional investors or hedge funds do not trade manually; they have specialised software to trade and execute the orders. Algorithmic trading, or Algo trading, driven by computer programmes, is emerging as a dominant force in the financial market. The shift from traditional trading practices is transforming the structure and speed of the securities market and necessitating a re-evaluation of the existing regulatory framework. Algo trading increases market efficiency and liquidity, however it poses intricate challenges for the regulation of insider trading and unfair trade practices in the financial market.

When a trader uses unpublished price-sensitive information to derive an unfair advantage in the securities market, it constitutes insider trading. Detection of insider trading is becoming more difficult in the technology-driven trading environments, and the integration of artificial intelligence further complicates the regulation of the securities market. Although there exists an intensive regulatory framework governing and prohibiting insider trading, it faces limitations in addressing AI-automated trading, as it may obscure intent and evade traditional regulatory mechanisms.

While the artificial intelligence systems not only pose a risk for market abuse but also serve as a tool for detecting and preventing insider trading and unfair trade practices, particularly used by the Securities and Exchange Board of India to enhance surveillance through data analytics and pattern recognition. This necessitates analysing and examining whether the existing legal and regulatory framework governing insider trading is adequate to adopt algorithmic-driven trading mechanisms.

This paper examines the regulatory gaps and future challenges of algorithmic trading in the context of insider trading and unfair trade practices, and the adequacy of the existing legal and regulatory framework under the Indian Securities Laws. The paper also evaluates the role of SEBI in adopting technological tools for surveillance and regulating these tools in the prevention of market abuse practices, with the promotion of technological

innovation in the securities market. Further, the paper studies cross-border challenges associated with algorithmic trading in identifying the intent in cases of insider trading and unfair trade practices.

1. Introduction

Algorithm trading involves the use of automated systems to execute financial transactions, wherein the trading decisions are made based on monitoring and analysis of market fluctuations. It has transformed financial markets by enhancing efficiency, reducing transaction costs, and increasing liquidity. However, its rapid development has introduced important concerns regarding market manipulation, insider trading, and regulatory oversight. The rise of high-frequency trading (HFT), which allows thousands of transactions per second, has made it increasingly difficult for regulators to detect and prevent fraudulent and unfair trading practices.

In India, the SEBI (Prohibition of Insider Trading) Regulations, 2015 regulate securities trading and aim to prevent misuse of unpublished price-sensitive information (UPSI) by insiders. However, these regulations were designed primarily for conventional trading environments and may not adequately address the complexity of AI-based trading strategies.

While algorithmic trading offers undeniable economic benefits, it also poses complex regulatory and enforcement challenges, particularly related to market abuse. The integrity and fairness of financial markets remain of paramount importance in modern economic systems. However, some trade practices, such as insider trading or unfair trade practices, undermine investor confidence and market efficiency.

The paper examines whether regulating algorithmic trading in the context of insider trading turns on determining intent and attributing liability. The algorithmic system is accompanied by a multi-stakeholder environment operating cross-border, necessitating a balanced legal framework. The use of unpublished price-sensitive information can be built into transaction logic at the design stage, thereby making the detention and enforcement complex as compared to traditional practice.

Furthermore, the rapid cross-border execution of transactions hinders regulatory oversight, monitoring, and enforcement by SEBI. Recognizing these challenges, SEBI has introduced various measures to regulate algorithmic trading, including risk controls,

audit requirements, and monitoring mechanisms.

The paper further analyzes and questions the adequacy of the existing legal framework in detecting misinformation, establishing mens rea, and assigning liability in automated trading scenarios. Algorithmic trading continues to increase its scope. In this context, this paper attempts to critically examine the regulatory gaps and future challenges of algorithmic trading in the context of insider trading and unfair trading practices under the Indian Securities Law. The study evaluates the adequacy of SEBI's current regulatory approach and analyzes the attribution of intent and cross-border enforcement in algorithmic trading cases.

2. Rise and Evolution of Algorithmic Trading

The advent of technological innovations has been remodelling the stock market and the trading mechanism. Algorithmic trading, also known as black box trading or algo trading, has become an intrinsic feature of the financial and securities markets. It uses predefined mathematical rules to analyse the market data, such as price movements, trading volume, timing, and other relevant market factors and trading opportunities to automatically generate financial activities of buying or selling of tradeable financial instruments such as stocks, bonds, commodities, currencies, and derivatives.

In the pre-2000 era, only the large financial institutions and hedge funds had access to algorithmic trading. The trading models were built on statistical arbitrage, simple moving averages, mean reversion, and the market trend. The implementation of such models required huge servers, dedicated and specialised software, and access to private market data feeds. The retail traders had zero access to automation, resulting in a technological divide within the market. The post-2000 era saw a significant transformation in the trading practices, marked by the rise of electronic trading and a shift from floor trading to screen-based trading. This transition enhanced market accessibility and speed. By the early 2000s, a specialised class of algorithmic trading, high-frequency trading, emerged as a dominant force[1].

High-Frequency Trading, used by institutional investors, involves the use of very sophisticated computer programs to analyse and execute trades in microseconds, even exploiting the tiniest

[1] Evolution of Algorithmic Trading – algomojo – Automated Trading Platform for Smarter Algorithmic Trading. Available at: https://algomojo.com/blog/evolution-of-algorithmic-trading/

market inefficiencies, thereby generating rapid and large-volume transactions[2]. These systems further place their reliance on co-location facilities[3], wherein the trading firms place their servers close to the premises of the exchange and relate to the main system of exchange, enabling faster market access and order execution, thereby providing speed-based advantage, and increasing the market liquidity. It is the most rapid form of algorithmic trading. However, it also increases market volatility as the large-scale and speedy transactions can lead to rapid price fluctuations, which increases the concerns regarding market uncertainty.

The technological innovation is increasingly getting involved in the Indian financial market, which has witnessed a tremendous shift from physical trading to electronic trading. Algorithmic trading was introduced and formally recognised by SEBI in the year 2008, accessible by institutional investors. Subsequently, with regulatory developments by 2016, retail traders were permitted to access algorithmic trading systems.

With the rapid technological innovations across the global financial market, algorithmic trading is not confined to pre-determined rules or mathematical formulae. The integration of artificial intelligence (AI) has not only increased the speed and efficiency of trading systems by aiding the SEBI in detecting abusive trading practices. However, the use of black box algorithms imposes significant concerns regarding market abuse and increased potential for the practice of insider trading and unfair trade practices. The blending of artificial intelligence with algorithmic trading has set in new dimensions and is transforming the workings of the financial market[4].

3. Dual Role: Algorithmic Trading, a tool for Market Abuse and Detection of Market Abuse

The entry of algorithmic trading in the Indian Securities market is increasing, and insider trading remains one of the most intricate trading practices to regulate in India. With the advancement of artificial intelligence, the potential for using unpublished price-sensitive information has increased as the trade is executed in microseconds; on the other hand, the SEBI

[2] Anuj Kumar Shah, *How high-frequency trading affects market stability and small investor welfare,* International Journal of Social Impact, 10, (2025) https://ijsi.in/articles/1003013/
[3] Chandragupta Chatterjee, *Algo-based Trading in the Indian Markets: Analysing in the Context of SEBI Regulations,* IJLMH, 7, (2024), https://www.ijlmh.com/
[4] Wilhelmina Afua Addy, Adeola Olusola Ajayi-Nifise, *Algorithmic Trading and AI: A Review of Strategies and Market Impact*, World Journal of Advanced Engineering Technology and Sciences, (2024) https://www.wjaets.com/

(hereinafter referred to as 'Board') heavily relies on different technological tools and AI systems in detecting fraudulent trade practices, which are suspicious to the fair market and trading practice. This dual nature of algorithmic trading creates a paradox and necessitates regulatory reforms to facilitate and prevent such fraudulent activities.

3.1. Algo Trading and Market Abuse

The AI technology is not only getting smart but also autonomous, thereby increasing the risk of abusive trading practices in the securities market. The basic algorithm of artificial intelligence functions on programmed instructions and data, enabling it to analyse large sets of market data and execute trading orders with minimal human intervention. While the early development stages of AI enabled human intervention, the fully autonomous AI systems eliminate human intervention and execute orders, learning from previous market fluctuations and development.

The AI enables the spreading of market information in microseconds, fostering different types of trading[5]. Before the actual price of securities is made public, the traders take advantage of AI, and with the help of social media, further increase the transmission of false or misleading information, and such market information falsely manipulates the prices of the tradeable securities, thereby causing market manipulation.

The AI-powered trading has a significant impact on the capital markets, thereby creating responsibility on the traders to act in a fair and transparent manner. Abusive trading practices, such as insider trading, continue to undermine the integrity and fairness of financial markets across the globe and in India, and can be triggered with the help of AI microseconds before the price-sensitive information is published in the market, entering a new and dangerous era of market abuse.

AI also acts as a trader executing the orders within milliseconds of the usual trading time and may be maliciously used for price manipulation, thereby obscuring the price stability and making it look like a regular market activity[6]. Algorithmic trading is increasing the scope of

[5] Eleanor Butler, *Trading bots are evolving: What happens when AI cheats the market,* (May. 18, 2025), https://www.euronews.com/business/2025/05/18/trading-bots-are-evolving-what-happens-when-ai-cheats-the-market

[6] FTI Consulting, *When Algorithmic Trading Meets Allegations of Market Manipulation,* Lexology, (July 28, 2025) https://www.lexology.com/library/detail.aspx?g=c5de7537-9787-4244-8333-0b5af06245e2

the crime, insider trading, and making the application of the existing regulations more difficult.

Insider trading has been about one thing: gaining an unfair advantage from the market. Traditionally, for such practice, the insider has been a person, but in the era of algorithmic trading, it is not the same; AI plays a crucial role as the analyst, functioning on predictive logic[7]. These systems can absorb massive data sets and volumes of documents in minutes and not in months.

The AI acts as an insider by using sentiment analysis and natural language processing to dissect the pattern of conversations and plans between the executives of the company, which increases the speed compared to humans and frequency of, and utilising such information for trading with illicit intention. However, the interplay between data collected by the AI and the final order executed renders the intent ambiguous, as the transaction is done within seconds of time[8].

3.2. Algo Trading: A tool for the detection of abusive practices

The advanced artificial intelligence technology and machine learning, as discussed above, though they impose a black-box problem, also assist in the detection and prevention of such abusive trading practices. The Securities and Exchange Board of India (SEBI) uses several AI tools for the detection of insider trading and unfair trade practices.

SEBI, to improve its capability and to identify and regulate fraudulent activities, by utilising an advanced data analytics system[9] analyse historical market data, media trends, and other information to take necessary steps and actions for preventing future threats. The learning nature of artificial intelligence authenticates it as an effective tool for digging out the price inconsistencies and material information as to unusual trading activity in the securities market.

However, the cryptic nature of AI-surveillance tools may lead to intricate and non- accountable transactions despite SEBI's initiative to introduce an AI–driven surveillance and supervision system to protect the interests of investors and detect any odd trading activity in the securities

[7] Rajnish Kewat, *What Is the Future of AI-Driven Insider Trading in Financial Markets,* Cybersecurity, (Aug 25, 2025), https://www.cybersecurityinstitute.in/blog/what-is-the-future-of-ai-driven-insider-trading-in-financial-markets

[8] Rajnish Kewat, *What Is the Future of AI-Driven Insider Trading in Financial Markets,* Cybersecurity, (Aug 25, 2025), https://www.cybersecurityinstitute.in/blog/what-is-the-future-of-ai-driven-insider-trading-in-financial-markets

[9] B. Sudhakar Reddy, *Role of Artificial Intelligence in SEBI: Protection of Investors*, IJRASET, 12, (2024) https://www.ijraset.com/best-journal/role-of-artificial-intelligence-in-sebi-protection-of-investors

market. Thereby, necessitating vigorous and adaptive regulatory frameworks.

4. Current Legal Framework

The Securities and Exchange Board of India (SEBI) is the regulator in the financial market. It provides a comprehensive regulation prohibiting insider trading and unfair trade practices, protecting the investor's interests, and maintaining market integrity. However, with algorithmic trading and technologies including artificial intelligence, it becomes essential to analyse whether the existing legal framework is adequate and relevant in addressing future challenges.

4.1. SEBI (Prohibition of Insider Trading) Regulations, 2015

The SEBI (Prohibition of Insider Trading) Regulations, 2015, were recently amended in 2025, which deal with matters concerning insider trading and mandate every listed company on the relevant stock exchange and market intermediaries to follow the prescribed code of conduct. To prevent the use of unpublished price-sensitive information known as insider trading and promote transparency in trading securities in the market, these regulations were implemented and introduced by SEBI.

SEBI, under Regulation 7(2)[10] of the Insider Trading Regulations, has enhanced its system-driven disclosures, provision for real-time tracking of trading activities carried out by the designated person and their immediate relatives.[11] So if the trader is involved in any suspicious activity or has used unpublished price-sensitive information with fraudulent intention, the system automatically spots such odd and unusual trading activity without relying on the companies to make self-disclosure. These technological and automated surveillance systems ensure the timely detection of any abnormal trading activity, enabling the board to initiate investigation and enforcement actions.

[10] Securities and Exchange Board of India (Prohibition of Insider Trading) Regulations, 2015, Gazette of India, pt. III, sec. 4, reg. 7(2) (Jan 15, 2015) https://www.sebi.gov.in/legal/circulars/aug-2021/automation-of-continual-disclosures-under-regulation-7-2-of-sebi-prohibition-of-insider-trading-regulations-2015-system-driven-disclosures-ease-of-doing-business_51848.html

[11] Akila Agrawal & Vidya Sunderam, *Strengthening Compliance: SEBI's Recent Enforcement Strategies Against Insider Trading,* (Apr 8, 2025) https://corporate.cyrilamarchandblogs.com/2025/04/strengthening-compliance-sebis-recent-enforcement-strategies-against-insider-trading/#:~:text=Regulatory%20scrutiny%20extends%20to%20transactions,Compliance%20with%20Trading%20Window%20Norms

4.2. SEBI (Prohibition of Fraudulent and Unfair Trade Practice) Regulations, 2003

The PFUTP regulations provide a robust framework prohibiting persons associated with the securities market from directly or indirectly dealing fraudulently. The regulations prohibit transactions that are misleading or create false information in the securities market, or transactions that are intended to create fluctuations in the price of securities, or transactions that are intended to wrongfully gain or manipulate the market to cause financial loss to the company. The black box nature of artificial intelligence makes it harder for SEBI to investigate and collect evidence if there is any utilization of illicit market-sensitive information. The board must rely on circumstantial evidence and strengthen its AI-surveillance system.

4.3. SEBI (Algo Trading) Circular, 2025

SEBI issued a circular providing for a stringent legal framework for retail algorithmic trading in India[12]. It states that all retail trading algorithms must be approved by the relevant stock exchanges and registered where the securities are listed, guaranteeing safety and accountability for API-based trading while preventing fraud.

The intermediaries associated with the security market, including brokers, are fully responsible for the algorithms deployed by their clients, acting as the controller. The research analyst must register with the board and should bifurcate algorithms into "white box" (transparent) and "black box" (hidden) strategies. The black box algorithms should be registered and ensure compliance with the requirements as prescribed. The regulation aims to promote a safe and transparent environment for retail investors, thereby reducing the risks of price manipulation.

5. CHALLENGES AND GAPS IN THE CURRENT LEGAL FRAMEWORK

5.1.Market manipulation- The Adani-Hindenburg report controversy

One of the major challenges that regulators face is the detection and prevention of AI-driven market manipulation. For example, Hindenburg Research, a US-based investment research firm, published a report alleging unethical practices and stock manipulation by the Adani Group, an Indian multinational conglomerate. The investigation accused Adani of inorganically raising stock values via secret offshore firms and high-frequency trading tactics.

[12] *SEBI Algo Trading Rules 2026: What Every Retail Trader Must Know Before April,* (Feb 25, 2026) https://www.sahi.com/blogs/sebi-algo-trading-rules-2026-what-every-retail-trader-must-know-before-april

SEBI investigated the allegations, concentrating on algorithmic trading trends and the potential exploitation of unpublished information. [13]

This dispute highlighted questions about India's regulatory capacity to detect large-scale algorithm tampering.

5.2.Uneven playing field

Institutional traders who have access to co-location services and advanced technology obtain a significant speed benefit over retail traders. SEBI has taken measures to lessen time-based arbitrage, including restrictions on tick-by-tick data access and increased surveillance of high-frequency trades, but disparities continue.

5.3. Systemic risks and Flash crashes

The increasing dependence on automated trading raises the risk of unanticipated market disruptions due to algorithmic errors and faulty implementation techniques. Global incidents such as the 2020 U.S. Flash crash, where HFT contributed to ultimate market volatility, show the risks of automated trading. SEBI has mandated stringent circuit breakers, but the challenge of algorithm-induced volatility remains, especially in low-liquidity scenarios.[14]

5.4.Lack of transparency

AI-powered trading models process large amounts of data and make trades in milliseconds. This makes it tough to tell if a deal relies on public data or undisclosed price-sensitive information. Unlike human traders, AI does not choose to act on insider information; it simply identifies patterns and reacts accordingly.

6. COMPARATIVE ANALYSIS OF GLOBAL REGULATORY APPROACHES

Distinct jurisdictions implemented distinct regulatory frameworks to regulate risk and maintain market integrity. A comparative review of the regulatory frameworks in the United States, the

[13]Anurag Singh, *Algorithmic Trading And Market Manipulation: A Legal Perspective On Insider Trading Regulations*, 3 LIJDLR. 367 (2025).
[14]*Navigating the Legal Landscape of Algorithmic Trading in India*, https://amlegals.com/navigating-the-legal-landscape-of-algorithmic-trading-in-india/#.

European Union, and the United Kingdom is critical.

6.1. United States- SEC Regulations

The ultimate objective of the SEC is to guarantee that markets in the US are fair and effective. The major functions of the SEC work towards safeguarding the interest of investors, maintaining the integrity of the market, and promoting the creation of capital. With the rise of algorithm trading, the SEC from time to time introduces and amends a number of regulations to address some of the risks, which are associated with market abuse, fluctuations, and error trading, which are systemic risks of a high level.[15]

The market access regulation (Rule 15c3-5)[16] is focused on brokers and dealers who offer direct access of market to trading customers. The requirement under this rule is that every firm adopts risk management strategies to reduce the effect of erroneous trades. Additionally, Rule 10b-5 prohibits any action or failure to act that leads to fraud related to the buying or selling of any security. The Commodity Futures Trading Commission (CFTC) oversees spoofing and layering to safeguard market integrity.

6.2. European Union- MIFID-II Regulations

MIFID-II introduced detailed requirements to mitigate the risks for credit institutions and investment firms engaged in algorithmic trading. It mandates registration of algorithms, notification to national regulators, and maintenance of records. The requirements are resilience, surveillance, trade control, security, and reporting.[17]

6.3.United Kingdom- FCA regulations

The UK Financial Conduct Authority (FCA) has set significant rules and best practices for algorithmic trading. The FCA looked at a sample of principal trading firms (PTFs) to check if they follow MiFID Regulatory Technical Standards (RTS) 6. The FCA assessed the firms' RTS

[15]*Understanding SEC Regulations for Algorithmic Trading*, https://bluechipalgos.com/blog/understanding-sec-regulations-for-algorithmic-trading/.
[16]*Rule 15c3-5 — Risk Management Controls for Brokers or Dealers with Market Access,* https://www.sec.gov/files/rules/final/2010/34-63241-secg.htm.
[17]*Algorithmic trading: trends and existing regulation*, https://www.bankingsupervision.europa.eu/press/supervisory-newsletters/newsletter/2019/html/ssm.nl190213_5.en.html#:~:text=The%20Markets%20in%20Financial%20Instruments,ALGO%20trading%20on%20financial%20markets.

6 self-assessments, validation reports, and supporting materials, ran data requests and held meetings with the firms. The focus areas were governance, market development and testing, risk controls, and market abuse surveillance.[18]

7. POLICY RECOMMENDATIONS

7.1.Imposition of liability

If SEBI were granted the authority to impose automatic civil fines based on the demonstrable harm or unfair trading practice in algorithmic trading solely on the market outcome, it would reduce the burden of proving human intent. This would align with the international regulatory framework of imposing strict liability, like Rule 10b-5 of the SEC. The focus would shift completely from the subjective procedure to the objective consequence of the trade, distortion of market integrity, or informational exploitation.

7.2. Increased disclosure requirements

It should be mandated for firms using AI models to disclose their algorithm strategies, and if firms are unwilling or unable to disclose their algorithms as required would automatically incur substantial fines. To mitigate the "black-box" issue, SEBI must mandate features that ensure that they delineate and comprehend high-risk algorithms used in capital markets.

7.3.Compulsory system audits

SEBI should mandate algorithm models to undergo a compulsory and neutral third-party audit before deployment of these models on a periodic basis. They should also check, along with these audits, that these algorithms are not taking advantage of informational gaps and verify that their conduct is not manipulative.

7.4. Strengthening of organizational requirements and human accountability

India must use the successful governance approaches used in the US and EU to build clear human accountability links within the regulated organizations. Regulations like MIFID-II require firms to have a kill switch mechanism that can immediately halt trading when

[18]*FCA multi-firm review of algorithmic trading controls – implications and next steps*, https://www.reedsmith.com/articles/fca-multi-firm-review-of-algorithmic-trading-controls/.

necessary.[19]

7.5. Mandatory governance frameworks

SEBI should impose regulatory regulations compelling firms that use advanced AI to establish cross-disciplinary teams. This committee should include representatives from risk, compliance, legal, and development teams who have been given the task of holistic assessment and management of algorithmic risks.[20] This ensures effective communication and periodic evaluation of compliance tools.

7.6. System validation and testing requirements

SEBI should mandate statutory standards for rigorous pre-production testing and system validation, same as the FINRA framework. This involves ongoing monitoring processes and explicit communication mandates between compliance workers and those in charge of strategic development.

8. CONCLUSION

The integration of artificial intelligence in algorithmic trading has become an integral part of the financial markets, not only in the present realities of the securities market, but it is also shaping the landscape for future financial markets. The artificial intelligence not only increases the risk for abusive practices of insider trading, price manipulation, and non-transparent trading activities. Although the existing legal framework laid down by SEBI on insider trading and unfair trade practices provides a strong foundation, the increase in technological advancement stresses the attribution of liability and intent, particularly where black box algorithms are utilized for such practices. Further, the dual role as detector of market abuse and a platform for promoting such abusive practices complicates regulatory oversight. Therefore, the board needs to come up with robust and adaptive regulations and a legal framework addressing artificial intelligence trading systems, balancing technological innovation with regulatory adaptation.

[19]*Regulatory Compliance in Algorithmic Trading*, https://chronicle.software/regulatory-compliance-in-algorithmic-trading/.
[20]Anoushka Sinha, *The Algorithmic Advantage: AI-Driven Insider Trading And Regulatory Gaps In Indian Regulation*, 7 IJLLR. (2026).