RECOGNIZING ALGORITHM OF ALGO TRADING AS A COPYRIGHT

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ABSTRACT

The financial sector has entered a new age marked by the automation and accuracy of trading techniques carried out by computer programmes with the introduction of algorithmic trading, or algo-trading. A crucial concern has emerged as this technology continues to transform trading procedures: may the algorithms that underlie algo-trading be acknowledged as copyright-protected works? The complex issues surrounding the idea of classifying algo-trading algorithms as copyrighted entities are examined in this article. This article also examines the issues surrounding this query as well as the new difficulties that come with implementing copyright laws on algorithms. Important concerns include the fact that algo-trading algorithms are not human-made, that they serve a utilitarian purpose in trade optimisation, and that it is difficult to define fair usage in this situation. This article attempts to explore the complex relationship between copyright law and software by drawing on relevant legal precedents. By doing so, it hopes to offer light on the present status of the legal environment and how it affects algo-trading. This article also explores the differing international viewpoints on copyright for algorithms used in algorithmic trading, highlighting the necessity for global copyright law to be harmonised in order to address the cross-border aspects of algorithmic trading.

Keywords: Algorithm, Algorithmic Trading, Copyright

Introduction

Financial markets have undergone a transformation thanks to algorithmic trading, sometimes known as "algo trading," which automates and expedites trade. Modern trading methods are based on algorithms since milliseconds may be the difference between success and failure in this day and age. But this technical advancement has brought up a fascinating query: Are the algorithms utilised in algo trading able to be identified and safeguarded as copyrights?

Statutory protection of computer program

The legislation controlling copyright protection is the Copyright Act, 1957. By safeguarding "original" works, it subtly blurs the lines between expression and thought. As long as the computer falls inside the definition of a literary work, it offers protection. The word "computer" and "computer program" been graciously defined.[1] A computer programme is defined in Section 2(ffc) as a collection of instructions that can be written in words, codes, schemes, or any other form, including machine-readable media, and that are intended to cause a computer to carry out a certain job or produce a specific outcome.

To begin with, the definition effectively conveys the idea that computer programmes are utilitarian works by utilising the phrases "a set of instructions" and "capable of causing a computer to perform a particular task or achieve a particular result." Second, the phrase "expressed" indicates that the protection afforded to utilitarian works is limited to their expression. Thus, the idea of the duality between thought and expression is developed. Thirdly, the terms "form" and "medium" imply that focus is necessary[2]. Next, source code and object code protection are covered by the phrases "words, codes, schemes, or in any other form" and "including a machine readable form." The same as with any other work, making a copy of a computer programme or a significant portion of it without permission violates copyright. In India, the notion of "computer programme" may easily handle instances of exact replication. Because of this, circumstances involving non-literal infringement of computer programmes are not expressly protected by statute. As a result, the assessment of nonliteral violation in each particular instance[3]

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[1] Section 2(ffc) of Copyright act
[2] Apple Computers Inc. v. Formula International, Inc., 775 F.2d 521 (Fed. Cir. 1984),
[3] NEC Corp. v. Intel Corp., 645F. Supp. 590 (N.D Cal. 1986) Myiand Inc. v. IBM ,746 F. Supp. 520 (ED Pa. 1990)

In R.G. Anand v. Delux Films and Ors[4]., the Supreme India determined that the idea-expression duality was a well-established theory in copyright law by citing a number of Indian[5] and international sources[6]. It stated clearly that just utterances were protected and that concepts could not be protected. Because the Supreme Court expressly recognised the idea-expression dichotomy, Indian courts were able to sidestep the conflict that existed in UK courts with respect to its existence. Although the Copyright 1957 does not expressly state such a dichotomy, the court was careful enough to consider the conceptual policy underpinnings of the copyright scheme and so approved such a dichotomy. The best way to tell whether there has been a copyright infringement is, in the words of the court, "to see if the reader, spectator, or viewer after having read or seen both the works is clearly of the opinion and gets an unmistakable impression that the subsequent work appears to be a copy of the original."[7] When the court discusses "impression," a layman's reading might imply that it is supporting a "look and feel" approach, even though it has gone to great lengths to recognise that there may be different degrees of abstraction. The court was referring to the impression one gets after seeing both the expressions included in the work and not the thoughts that lie behind, so take a moment to consider how to interpret the phrase "subsequent work appears to be a copy of the original." The phrase "copy of original" reiterates the court's commitment to conducting a rigorous comparison of the two works, or phrases. When compared to the test mentioned above, the next test established by the court has a significant beneficial impact on the protection of computer programmes. The examination states, "Where the theme is the same but is presented and treated differently so that the subsequent work becomes a completely new work, no question of violation of copyright arises"[8].

The same themes or concepts can be found in computer programmes at multiple levels of abstraction, and presenting them in a different way passes muster. According to the court, every programme that is written in a different language and isn't an exact replica of the purportedly copied work is technically an entirely new work. assertion should not be taken at face value

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[4] AIR 1978 SC 1613

[5] N. T Raghunathan v. All India Reporter Ltd., Bombay, AIR 1971 Bom 48; C. Cinniah and Co. v. Balraj and Co. AIR 1961 Mad 111; K R. Venugopal Sharma v. Sangu Ganesan, 1972 Cr LJ 1098; Mohendra Chandra Nath Gosh v. Emperor, AIR 1928 Cal 359; Mohini Mohan Singh v. Sita Nath Basak, AIR 1931 xCal 230; Ramesh Chowdhry v. Kh. Ali Md. Nowsheri, AIR 1965 J&K 101; S.K Dutt v. Law Book Co. AIR 1954 All 570; The Daily Calendar Supplying Bureau, Sivakasi v. The United Concern, AIR 1967 Mad 381.

[6] Donoghue v. Allied Newspapers, (1973) 3 All ER 503; Ladbroke (football) Ltd v. William Bill (football) Ltd, (1964) 1 All ER 465; Macmillan &Co. Ltd v. K. & J Cooper, 51 1. A 109; Tate v. Fullbrook 77 L.J.R 577; Sheldon v. Metro-Golden Pictures Corporation, 81 F2d 40.

[7] R G Anand at pg 823

[8] ibid

given the well-known "look and feel," which has the significant drawback of stealing concepts that must remain inside the "terminus ad quem." When the prior test was read in connection with this one, the avowal court was solely referring to statements that made a clear distinction between ideas—that is, "themes" and expressions—and how they were handled differently. Therefore, the "impression" that was mentioned in the previous test clearly refers to impression "expressions" rather than "ideas/themes." We can conclude with certainty that the judge implicitly approved the "abstraction" test as developed in Nichols v. Universal Pictures[9], by applying it to related facts, supporting our understanding of it. This is because the judge legitimately interpreted "impression" in relation to the "expression."[10] In the context of computer programmes, this appears to be a relieving aspect of the choice, allowing it to be free from the evil of "look and feel."

The court's declaration that "there can be no copyright in an idea, themes, plots, historical or legendary facts and violation of copyright is confined to form, manner and arrangement and expression of the idea by the author of the copyright work" is another crucial test in this case. It expressly approved some sort of filtration to be carried out.[11] It is evident that the court intended for these categories to never be used in finding infringement because the document has already determined the rationale behind their exclusion. Additionally, it implicitly advances the theory of merger when it supports the additional viewpoint that "no copyright infringement occurs where, apart from the similarities appearing in the two works, there are also material and broad dissimilarities which negative the intention to copy the original and coincidences appearing in the two works are clearly incidental." In this case, the court is taken to suggest that some terms used in the later "allegedly copied" work that are incidental to the original work (i.e., fused with the concept) should not be included in the infringement analysis. Once more, the court has made it clear that it is evaluating the likenesses and differences in the modes of expression rather than the concepts. The comprehension of meaning related to "work" in the previous assessments serves as the foundation for an interpretation. As a result, the term "work" as it appears in this exam must likewise be rigorously interpreted to refer to expressions rather than thoughts. Ultimately, by detailing each similarity and difference between the two works, the court attempted to compare them in the later portion of the ruling for assessing

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[9] 34 F.2d 145 (S.D.N.Y. 1929
[10] R G Anand at 825-826
[11] Ibid at 823

significant duplication. Once more, the court has mandated that the comparison must clearly entail an evaluation of the two works' modes of expression.

According to the test, "similarities are certain to arise when the same idea is being developed in a different way, as it is evident that the source is common. In a situation like this, the courts have to decide if the similarities pertain to basic or significant elements of the method of expression used in the copyrighted work. It would be considered a copyright infringement if the defendant's work is only a faithful replica of the work protected by copyright, with sporadic modifications. Put otherwise, a copy must to be significant and relevant enough to immediately conclude that the defendant is guilty of piracy in order for it to be actionable.[12] In this case, in addition to the court's clear declaration that modes of expression should be compared, the court has gone a step further and said that the violation ought to be a "literal imitation" with a few little modifications. Firstly, the idea/expression distinction has been aggressively evoked by using the phrase "literal imitation," and in the context of computer programme infringement, they indicate that functional interfaces are not part of this "literal imitation". Secondly, there shouldn't be any significant differences in the degree of 'literal mimicry'.

Understanding Copyright Law in the Context of Algorithms

Authors of unique literary, artistic, and musical works are granted exclusive rights under copyright, a type of intellectual property protection. This protection applies to computer programmes in the digital era, which includes the algorithms that underlie algo trading methods. Although copyright is widely recognised for safeguarding creative works such as music, artwork, and written works, it is crucial to examine its implications for algorithmic trading systems.

Using little to no human participation, computer programmes carry out trading techniques in an approach known as algorithmic trading. The main concept is to automate trading choices with algorithms, making advantage of computer analysis and responding instantly to market situations. This development in technology has upended conventional trading methods and become a powerful influence in the world's financial markets.

Algo trading's main benefits are its speed and accuracy. Algorithms can do intricate calculations, handle enormous volumes of data, and place orders in a matter of milliseconds.

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[12] ibid

By following predetermined guidelines, this high-speed trading helps limit risk in addition to seizing momentous possibilities.

Additionally, by guaranteeing a steady stream of trading activity even during tumultuous periods, algorithmic trading adds liquidity to the markets. To supply this liquidity, market makers and high-frequency traders mostly rely on algorithms. Algo trading algorithms therefore have a significant effect on the efficiency and dynamism of the market.

The features of intellectual property in algorithmic trading are three-folds:

1) Research and development (R&D) for trading algorithms is a journey of trial and error that mostly depends on skills comparable to those sought after by pharmaceutical corporations in the quest for novel medications. The process of discovering new successful algorithms is difficult, unpredictable, and heavily dependent on creativity. As a result, important staff members may get attached to or feel entitled to their innovations. When their company does not provide them with the same compensation as the industry, key employees have great incentives to leave and prove their worth at a competitor's location. Because of this, intellectual capital is essential to algorithmic trading, and there is a skills shortage in this industry.

2) After the R&D process is over, duplicating trading algorithms has a low marginal cost, and information loses value quickly owing to technological advancements. Reproductions operate exactly as well as the original code; it does not vanish or become less functional as it is duplicated. Employees with technical expertise and access to lucrative trading algorithms are therefore encouraged to learn them in order to replicate them in the future. Some may create new algorithms to outperform the original code when they change jobs, some may rewrite the original code to compete for the same profit stream, and yet others may publicise the ideas for monetary or reputational benefit. This is a disruptive process of innovation, and as the market continues to shift, the advantage of profitable trading algorithms gradually erodes.

3) It is difficult to establish and defend algorithmic trading's intellectual property rights. Because patents require public disclosure but do not prohibit rivals from finding better ways to execute the same ideas, very few trading algorithms were filed as patents. The majority of trading algorithms are classified as trade secrets and kept behind closed doors. Other than fiduciary responsibilities that owners might place on workers, trade secrets are not particularly protected by statute. It is lawful for rivals to imitate the algorithms. Trade secrets become trade

knowledge if information is made public, and legal safeguards disappear. Trading algorithms are usually sold as proprietary in order to maintain protection, even if they eventually become obsolete or industry standard.

Differentiating Between Code and Underlying Ideas in Algo Trading Algorithms

Differentiating between the code that executes the algorithm and the underlying trading strategy or concept is an important part of algo trading. Although the fundamental trading notion is an abstract concept that is not covered by copyright, the code is a real object that is. Knowing this distinction is essential to safeguarding algo trading techniques.

Ideas are not protected by copyright law; only their expression is. Algo trading code's particular implementation and structure can be protected by copyright like a literary work. Nevertheless, the practical components of the programme, such trading methods and mathematical models, are not covered by copyright laws. Since these concepts are not covered by conventional copyright rules, it might be difficult to protect them. For this reason, it is essential to look into alternate forms of protection, including trade secrets or patents.

Legal Implications

If algo trading algorithms are deemed copyrights, traders and financial organisations may face serious legal repercussions. It may offer a way to safeguard proprietary trading methods, which are frequently treated as carefully held trade secrets. Traders and businesses may be able to legally defend themselves against unapproved use or duplication of their algorithms by securing copyright protection.

Algorithms are mostly created with certain financial markets and trading circumstances in mind, and they are somewhat functionally necessary. This begs the question of whether algo trading algorithms are genuinely unique in their representation, or if they are more like practical instruments.

In the case of Goldman Sachs vs. Aleynikov[13] "code theft", intellectual property rights have three profound impacts on this industry.Because algorithmic trading is a knowledge-based sector that depends on trade secrets, the business generously rewards intellectual prowess.

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[13] 11-1126 (2d Cir. 2012)

Individuals with trade secrets are highly valued, and those capable of creating lucrative new secrets turn into treasures. Serge Aleynikov made more money than any of his contemporaries as an algorithmic trading programmer at Goldman Sachs, rising from $270,000 to $400,000 in only one year. He received a $1.2 million offer to join Teza Technologies as an executive one more year later. In this field, Aleynikov's predicament was not exceptional. Compensation for those who demonstrate their abilities can rise rapidly, and this would not have been feasible without the intellectual property "secrecy" of algorithmic trading.

The distinction between trade secrets and trade knowledge was sometimes hazy in algorithmic trading because of the rapid depreciation of information and the historically lax intellectual property protection afforded to trade secrets. Some trading algorithms are not internally protected due to the disruptive innovation of this dynamic business, as they do not provide a competitive advantage over rivals. Employers, however, continue to insist on external secrecy since they don't want third parties to know whether they are employing trade secrets or information. To determine appropriate remedies in the Goldman Sachs v. Aleynikov case, the court will determine what proportion of the modified open source code that Aleynikov removed is trade secret and what proportion is trade knowledge. This is significant because trade knowledge may be transferred between jobs by employees and marginally altered open source code might be seen as non-proprietary. Ultimately, throughout Aleynikov's two years of employment at Goldman Sachs, the company showed no concern for the altered open source code he uploaded to online version control software, nor did it request that Aleynikov sign non-disclosure or non-competition agreements when he left. Since Goldman Sachs is the party suing for "code theft," it was their responsibility to demonstrate that the altered open source code was marked as a trade secret by all internal personnel and that Aleynikov was made aware of the fiduciary obligation of secrecy at the time of his employment. Employers must clearly define the difference between trade knowledge and trade secrets for their staff. More negative outcomes would befall the algorithmic trading business if there was insufficient training on intellectual property rules.

Firm collaboration is uncommon in algorithmic trading due to its intense competition and limited intellectual property lifespan. This industry is experiencing a situation similar to that of the prisoners: whereas individuals strive to further their own interests, the industry as a whole suffers. Nobody keeps their own trade secrets when every employer wants to hire employees from rival companies in order to obtain trade secrets. Employee "speeding"

becomes the norm when employers identify their own materials as secret and demand fiduciary obligations on everything. In the Goldman Sachs v. Aleynikov case, the media may not have been as understanding of Aleynikov's failure to uphold his fiduciary obligation if Goldman Sachs had developed a positive company culture within and projected an ethical image outside. A fundamental shift in the industry's culture is required, even if the US Congress's "Theft of Trade Secrets Clarification Act of 2012" would undoubtedly assist to prevent future exploitation of private information. A workable legal framework for intellectual property should uphold the fair rights of all parties, encourage sincere business partnerships, and forbid excessive restrictions on trade secrets. In the long run, the algorithmic trading business will gain from more clarity surrounding intellectual property rights.

Conclusion: A Complex and Evolving Issue

In conclusion, because the algorithmic trading sector primarily relies on intellectual property that is swiftly depreciated and only loosely protected as trade secrets, it presents particular difficulties for international intellectual property law. As the Goldman Sachs v. Aleynikov case illustrates, these traits result in excessively competitive corporate cultures, a blurred line between trade secrets and trade expertise, and lavish rewards for important personnel. Improving the "sticks" for unethical code theft on its own won't address the underlying source of the issue. Enhancing inter-firm cooperation and augmenting transparency regarding trade knowledge might facilitate the industry's cultural transformation in algorithmic trading. To assist the algorithmic trading business avoid such roadblocks, capital markets and regulatory authorities must work together to create a fair and transparent intellectual property legal framework.

The subject of whether algorithms should be recognised as copyrights is a complicated and developing legal matter in the field of algo trading, where algorithms constitute the foundation of financial strategies. While copyright law offers a foundation for safeguarding unique works, it can be challenging to apply because of the subtle differences between code, mathematical ideas, and functionality when it comes to algo trading algorithms. The future of financial markets may be significantly impacted if algo trading algorithms are acknowledged as copyrights, given the rapid advancement of technology.