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Algorithmic Trading & High Frequency Trading

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Abstract: Algorithmic trading and high frequency trading are one of the most debated problems disturbing how security trading is shown. Quick execution, accuracy, cost reduction and avoidance of human emotional errors these are some of the reasons for its growing popularity.

And as this high-frequency trading in India is still at a moderately emerging stage, research is also at an emerging stage. This paper provides the basic information of AT and HFT in the stock market and its advantages and disadvantages. Further, it provides the data describing the manual trading and the algo trading with its future development in the Indian stock market.

Keywords: Algorithmic trading, High frequency trading, Security trading Manual trading, Indian stock market.

I. INTRODUCTION

A. What is Algorithmic Trading?

Algorithmic trading is a system of trading which automates either the decision making or the execution or both based on the preconditions defined by the user/strategist.

These can be easy or complex as the user desires.[1] Algorithmic Trading is a method to Buy or Sell security built on some pre-defined set of guidelines which are back-tested on Past data. These rules can be based on Practical Examination, graphs, pointers or even Stock details.[2]

B. Advantages of Algorithmic Trading

1) *Minimize Emotions*: Since it's computer-based program emotions like greed and fear are eliminated.
2) *Ability to Backtest*: Backtesting refers to trade rules to past market data to regulate the feasibility of the concept. All rules must be complete when evolving an automated trading system, with no space for interpretation. These true sets of guidelines can be taken by traders and tested on past information before risking money in a live trade.
3) *Maintain Discipline*: The trade rules are recognized and trade implementation is completed robotically, thus discipline is well-looked-after even in unpredictable markets.
4) *Improved Speed Of Order Entry*: As computers react to changing market situations instantly, operational devices can produce commands as quickly as they meet trade requirements. Getting into or out of a trade a couple of seconds previously can create a large difference in the results of the trade.[3]

C. Disadvantages of algorithmic trading

1) *Mechanical Failures:* The trading concept finds it easy: start up the computer, schedule the rules and observe trade. However, automated trading is, in fact, an advanced and yet not reliable technique of trading. A trading exchange could live on a desktop– and not a server, depending on the trading system. This point toward an item may not be sent to the trade if an Internet connection is lost.
2) *Monitoring:* While turning your laptop on and off for the day would be fantastic, automated trading schemes involve surveillance. This is because of the capacity for mechanical mistakes such as communication problems, electricity losses or software accidents and device disruptions. An automated trading system may be abnormal and may lead to error commands, lack of instructions. By monitoring the system, these occurrences can be rapidly recognized and fixed.[3]

Algorithmic trading is about the use of strategies that are implemented with the purpose of improving trade execution in harmony with some primary logic or rules. In an attempt to do so, usually using short-term signals.

High frequency trading (hft), in which signals and orders are processed in microseconds, involves algorithm trading at much shorter timescale. Automated trade includes decision-making automation and business execution. Both hft and algorithmic trading are included.[4]

D. What is high frequency trading?

Traders use a machine to determine if a record or industry of shares is in a cost mismatch. Trades are done in thousands of seconds or, if the software is activated, even quicker. When high-speed trading is carried out, the trade will be carried out at a heavy velocity, more trading will happen, and individuals expect to get some cash from each of those trades and trading will be in the short term. Overnight, traders occasionally hold many stocks. The algorithmic trade in high-speed trading, a high amount of operations and a very short-term level of income, is high-frequency trading. Special computers are used for high frequency trading to ensure maximum velocity of trading. HFT is very complicated and is thus mainly used by major business institutions, such as investment banks and hedge funds. [5]

E. Advantages Of High Frequency Trading

Along with the trade in big quantities of shares, high frequency trading enables traders to benefit from very tiny changes in prices. Multiple markets and exchanges can be scanned with trade algorithms. It allows traders to discover more business possibilities, including subjective variations in the cost of the same property as traded in various exchanges. Many HFT supporters claim that it improves market liquidity. As trades are performed quicker and the trading quantity considerably rises, HFT obviously improves rivalry in the industry. The enhanced liquidity leads to a decrease in bid tasks, which makes the economies more economic. [5]

F. Risk Of High Frequency Trading

High frequency trading is still argumentative and governments, financial experts and academics are undisputed. HFT is mainly critical of creating' ghost liquidity' in the market. HFT rivals point out that the created liquidity is not "real," as only a few seconds are held. It has been traded several times between high-frequency traders before a frequent investor can purchase the security. The huge liquidity generated by HFT was mainly reduced when the frequent shareholder placed an offer. In addition, high-frequency traders (big economic organizations) are often expected to benefit at the cost of lower business participants (lower economic organizations, personal shareholders). In the end, the volatility and even crashing of the economy have been connected with HFT. Regulators have attracted some high frequency traders involved in illegally manipulating markets, such as spoofing and layering. HFT was shown to contribute significantly to the unnecessary volatility of the economy in the 2010 Flash Crash. [5]

II. BACKGROUND STUDY

A. Manual Trading vs Algorithmic Trading

Comparison table below explains the differences between Algorithmic and Manual Trading: [6]

	MANUAL TRADING	ALGORITHMIC TRADING
1	Human emotions are involved	No emotions are involved
2	No pre-defined rules for buy/sell	Rules are pre-defined and backtested
3	All-time monitoring of the market is required	No all-time monitoring of the market is required if there is an automated algorithm
4	Risk management should be strong to avoid a big loss.	Risk management is the part of the algorithm
5	No validity of success as your trading rules may differ in each execution	Every algorithmic system is backtested on the past date. Hence the possibility of success increases.
6	May lead to heavy slippages	Trades are placed at pre-defined levels, governed by the algorithm. So slippage reduces considerably

B. Future Of Trading In India

India offers a great chance for HFT traders with several changes over the years owing to a variety of variables such as colocation facilities and advanced technology at both main markets; an intelligent demand processing scheme, and well-established and liquid inventory markets. Given HFT and Algorithmic Trading's quickly increasing tendency and request in developing countries & emerging markets, multiple associations have made attempts to train their employees and create the ability sets needed for this technology-driven sector. Quantinsti has entered forces with NSE to provide brief management development programs in algorithmic trading in order to empower the trader to confront the difficulties of trading. These are two-day programs to introduce brokers and traders into this complicated and difficult multidisciplinary sector, including Statistics meetings, composing strategies, and using financial computing instruments. [7]

III. CONCLUSION

Trading in Algo is a highly profitable sector where technology is a key consideration. The trade process becomes quicker with the assistance of the algorithmic trading scheme. But after all, it is completely dependent on technology.

Algorithmic trading is a mix of key statistical techniques and IT. Such trading program is not possible and can not be performed in the lack of either key statistical techniques or data technologies.

Due to a wide variety of analytical and programming trading software (such as trading center, Microsoft Excel, etc.), traders can now perform enormous amount of activities within a few seconds. Any trader wishing to utilize the opportunity of algorithmic trading should know the different types of statistical methods that can be used to analyze the future stability of trading strategies. So, in algorithmic trading, both statistical methods and information technology play a crucial part. [8]

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