

# An Efficient Trading Algorithm to Reduce Slippages in Indian Options

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**Abstract** – In Financial markets, there are lot of traders who trades on daily basis. These traders are called Intraday traders. There are lot of traders who trade heavily. They have lot of amount to trade, so as the lot of orders to execute. It will be time taken if they place trade one by one. This causes slippages for those traders. There needs to be a system such that it can place all orders at a time, with less slippages. There are financial institutions such as Foreign Institutional Investors(FIIs) who are trading from other countries and Domestic Institutions Investors(DIIs) who are trading in India. These types of institutions who trades heavily needs such type of system which place all orders at a time with less slippages. This paper mainly focus on avoiding the slippages during the execution of the trades. Thus it reduces the time and slippages in actual trading.

**Keywords** – Discretionary trading, Volatility, FIIs, DIIs.

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## I. INTRODUCTION

This paper mainly discusses about the algorithm trading in Indian options. After the corona pandemic, traders in stock markets has increased drastically. In the same way, the liquidity also increase. Ultimately there will be unusual volatility in the markets. This volatility causes serious losses to the traders. Within seconds there will be huge losses to the traders. The money is flowing into the markets after the pandemic. So, the quantity placed by the traders also increases. The time required to place all the orders is high, when the orders is high. So, huge amount of time, slippages will happen for every trader. This will effect heavily who trades in huge quantities. Big financial institutions who traders also effects with these slippages. To order the time and slippages, we introduced an algorithm .This will effectively reduces the execution time, ultimately reducing the slippages.

There are many algorithmic strategies so that we can use to reduce the risk. Algorithmic strategies are designed to execute with precision, adhering to predefined parameters such as price thresholds, order sizes ,and risk management rules. This precision is particularly vital in options trading, where slight deviations from expected execution prices can have a substantial impact on profitability.

Algo trading also helps in risk management. Algo trading systems can incorporate risk management protocols to ensure that trades are sized appropriately based on predefined risk limits. This reduces the potential for large losses and provides a disciplined approach to trading. Algorithmic trading facilitates the simultaneous execution of multiple strategies across different options contracts and underlying assets. This diversification can help manage risk and capture opportunities in various market conditions[2].

## II. MOTIVATION

In this paper, we proposed a system based on algorithmic trading. This algorithm mainly focuses on reducing the slippages. In the context of options , where slippages can significantly impact profitability, algorithmic trading strategies have emerged as a crucial tool to manage and minimize such execution challenges. This paper presents an overview of algorithmic trading approaches tailored specifically for options trading to effectively avoid slippages. Options trading involves the buying and selling of contracts that grant the holder the right, but not the obligation, to buy or sell an underlying asset at a predetermined price within a specified timeframe. The complex nature of options, combined with market volatility, creates a fertile ground for slippages, which occur when the executed price deviates from the expected price due to market inefficiencies or delays.

Our proposed system mainly focus on reducing the slippages. To address slippages in options trading, algorithmic strategies are designed to achieve swift and precise execution, thus optimizing trade outcomes. These strategies encompass several key components such as volatility, market analysis and prediction, etc. [3].

## III. RELATED WORK

In Financial markets, option selling, also known as option writing or selling options, is a strategy used in financial markets, particularly in options trading. It involves an individual or entity offering options contracts to buyers in exchange for a premium. Options are financial derivatives that give the holder the right to buy or sell an underlying asset at a specified price) before or on a predetermined expiration date[1].

There are several advantages of option such as:

- Income generation: Option selling can be one of the best sources for income generation these days.
- Time decay: One of the main edge of option selling is time decay. It can help in many ways for the income generation.
- High probability of success: As time decay will be in the favour of option sellers, the probability of success is very high in option selling.
- Covered strategies: Option selling offers wide variety of strategies, so that everyone manage risk.
- Diversification: There are many hedging strategies in option selling to diversify the positions to reduce the risk.
- Risk management: This is the key advantage of option selling. Risk management is high helpful to stay profitable in financial markets.

We can also hedge a portfolio using option selling. Hedging a portfolio using option strategies involves using options contracts to protect the portfolio from potential losses due to adverse market movements. This is done to manage risk and reduce the impact of market volatility on the portfolio's value. Common strategies include buying put options, selling covered calls, or employing collar strategies. These approaches help investors safeguard their investments during market downturns while potentially generating income. However, it's crucial to carefully consider the costs, timing, and suitability of these strategies, as they can limit potential upside gains and require ongoing monitoring and adjustments to be effectively [4].

Risk management strategies are implemented to mitigate potential losses. It's important to remember that predicting stock market movements is inherently uncertain [5].

Algorithmic trading using indicators is a strategy that involves the use of technical indicators to make automated trading decisions in financial markets. Technical indicators are mathematical calculations based on historical price, volume, or open interest data, and they help traders assess market trends, momentum, volatility, and potential buy or sell signals. When combined with algorithmic trading, these indicators can inform trading decisions without human intervention [6].

#### **IV. SPECIFICATION AND IMPLEMENTATION**

Algorithmic trading has revolutionized financial markets by enabling automated and efficient execution of trading strategies. Options trading involves the buying and selling of contracts that grant the holder the right, but not the obligation, to buy or sell an underlying asset at a predetermined price within a specified timeframe. In the context of options trading, where slippages can significantly impact profitability, algorithmic trading strategies have emerged as a crucial tool to manage and minimize such execution challenges. This paper presents an overview of algorithmic trading for options trading to effectively avoid slippages. The complex nature of options, combined with market volatility, creates a fertile ground for slippages, which occur when the executed price deviates from the expected price due to market inefficiencies or delays[8]. Our proposed system mainly focus on reducing the slippages. To address slippages in options trading, algorithmic strategies are designed to achieve swift and precise execution, thus optimizing trade outcomes. In this paper, we discussing about an option strategy called Iron fly. It is basically a straddle with two buying options. The straddle is combination of same strike call option and put option. Slippages causes drawdown to the trading account. Drawdown is calculated in percentages. The drawdown should be very low to be in the profitability side[7].

#### **V. ALGORITHM**

- Install jupyter in your system. This will makes us to install the required packages very easily.
- And the install the packages such as norenapi . Norenapi is the package used to install the packages of the stock broker's api.It is very useful for connecting the website
- Install pyotp package which is useful for the two factor authentication. It gives a new otp which we can access the brokers site.
- Construct a class called ShoonyaApi() which takes the user details as the arguments. We have to redirect the code in the class to the Stock broker website. Call the class
- Define a new function called GetToken which is used to get the token of the required script

- Define another function called GetLTP which is used to get the last traded price of the given script \*Define a function called OrderPlace() .This function is used to place the order.
- Define a new strategy to create a position. This function will use the previous function.
- Define a new strategy to close the position. This function will close the existing position

## V. RESULTS AND DISCUSSIONS

### 5.1 Number of orders vs Time

The number of orders vs time taken is depicted in the following image below Fig 1. From the graph, We can analyse that the execution time increase as the number of orders increases in discretionary trading. While the execution time remains the same as the number of orders increases.

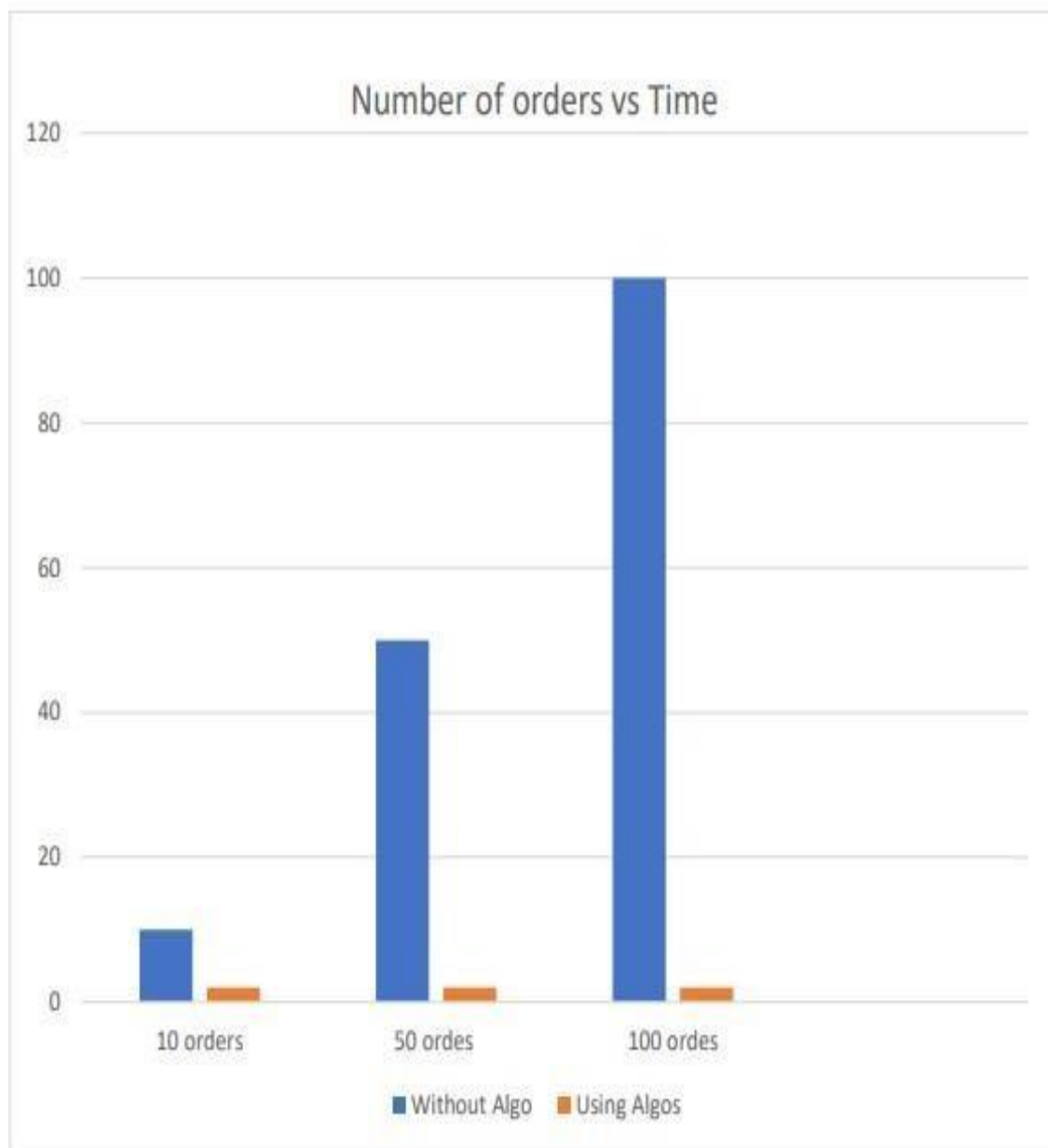


Fig 1: Number of Orders v/s Time

### 5.2 Straddle Prices

We can analyse the straddle prices in fig 2. As shown below the straddle prices changes with respect to time very fast[1].



Fig 2: Straddle Prices

### 5.2 Slippages

We can also analyse the drawdown with respect to slippages from the fig3 below. With slippages the drawdown will be high. By reducing slippages, we can reduce the drawdown.

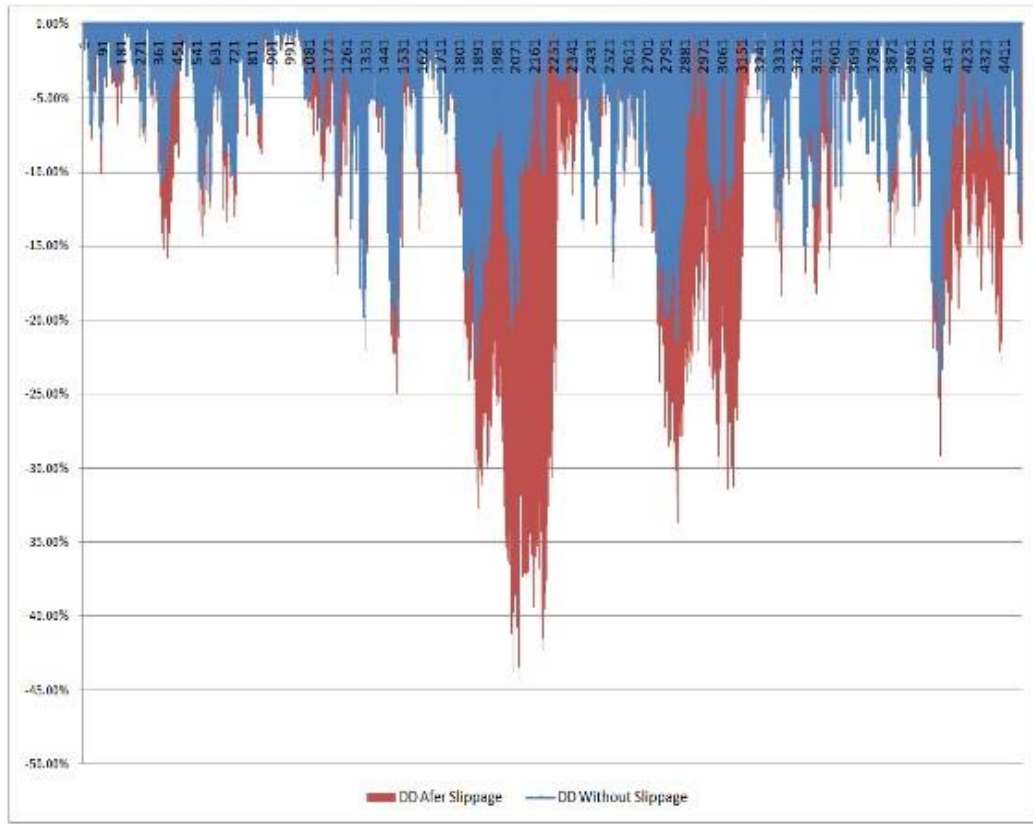


Fig 3: Slippages

**5.4 Drawdown vs profitabilily required:**

We can also find the relation between the drawdown and the profitabilily required to grow the account again from Table1 below.

Table 1: Drawdown and Profitability Required

Drawdown in %	Profitability required
1	1.01
5	5.26
10	11.1
15	17.6
20	25
25	33.3
50	100
75	300
90	900

**VI. CONCLUSION AND FUTURE WORK**

^ In conclusion, the paper on algorithmic trading in Indian options to reduce slippages provided valuable insights into the dynamic and intricate world of financial markets. Throughout this paper, we have dived deep into the options trading, exploring the challenges posed by market volatility, slippages. The algorithmic strategies has emerged as a powerful tool to address these challenges, optimizing trading outcomes and enhancing overall profitability. The implementation and analysis of algorithmic trading strategies for options have revealed the significant advantages they offer.. It is worth acknowledging that the success of algorithmic trading in options is not without its challenges. As we conclude this paper, it is evident that algorithmic trading in options presents a promising avenue for traders while managing risks[9]. The paper has shed light on the intricate interplay between advanced technologies, financial instruments. In sum, this paper underscores the transformative potential of algorithmic trading in options, highlighting its capacity to minimize slippages, enhance trading efficiency, and contribute to more informed and strategic decision-making. Through comprehensive research, practical implementation, we have taken significant strides toward unraveling the complexities of options trading. The findings and insights presented in this report contribute to the broader discourse surrounding algorithmic trading's role in shaping the future of financial markets[10].

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