IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 2, May 2022
Impact Factor: 6.252

Trading Cryptocurrencies Using Automated Algorithmic Bot

Sarafatema Peerzade[1], Dnyaneshwari Wayal[2], Gauri Kale[3], Prof. S. B. Bhosale[4]
Department of Computer Engineering
Jaihind College of Engineering, Pune, Maharashtra, India

Abstract: *The proposed project work is totally supported and easy yet effective strategy named as Martingale. An automatic system which only requires only some pre-coded instructions to execute trades on variety of market variables starting from asset price to trading volume. The strategy along with each cryptocurrency, the benchmark against which the algorithm is tested is that the market's performance. Returns are compared with the buying and so multiplying the trade volume at each loss and different scenarios are analysed to work out the chance related to the buying compared with an algorithmic strategy. Results are going to be in love with the market's actual trends and also with some alternate possible trends to check all market scenarios. An internet interface will accompany the presentation allowing the users to check the strategies by entering their parameters and instantly seeing the results.*

Keywords: Algorithm, Martingale Strategy, Stock Exchange, Cryptocurrency, Trailing Stop Loss, Crypto-to- Crypto Exchange, API.

I. INTRODUCTION

In 1971, the NASDAQ opened a electronic trading as the world's first electronic stock exchange. At first, the NASDAQ simply provided an electronic quotation system that displayed the value of equities electronically, it didn't provide a particular way to really execute trades electronically. But by the 1990s, electronic trading had rapidly spread, together with the increase of the web and also the availability of cheap personal computers that allowed people to trade from their homes. This opened the doors to a totally new type of trading i.e. trading by algorithm. Once trading had been digitized, the subsequent step was virtually inevitable: not only were computers being employed to trade, but they were also getting used to assist the decisions of when to trade and the way to best execute trades. Today, an estimated 85% of trading within the US stock exchange is driven by algorithms. While the cryptocurrency market is far newer than the normal equity market, cryptocurrencies are ususally traded on online exchanges most of which provide the flexibility to position orders via an API, with algorithmic trading. There's a large variety amongst trading algorithms, starting from the very basic to the incredibly complicated, that produces algorithmic trading a particularly versatile tool in an exceedingly trader's wheelhouse.

II. RESEARCH

Every decision made in trading has two major components: what to buy and when to buy the shares (or coins). Every trading strategy consists of determining the way to work out what to buy and when to buy or sell the stocks (or coins). There are two major ways to guage these questions: fundamental analysis and technical analysis. Fundamental analysis makes an evaluation about the worth of a security by examining many aspects of the economic condition of a corporation. This is often meant to see if this price of the equity is undervalued or overvalued in an endeavour to predict whether the value will increase or decrease. Fundamental analysis requires lots of information about finance . It may also be very time-consuming and requires the analyst to regularly check on all the statistics about the safety (equity) to re-evaluate the security's financial status. Unlike the fundamental analysis, technical analysis is quite the opposite

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 2, May 2022
Impact Factor: 6.252

one. This method uses only the current price of the equity and also the past history of the equity. Unlike fundamental analysis, technical analysis only requires knowledge of the mathematical formulas and doesn't require any in-depth knowledge of the status of the corporate. Technical analysis is additionally way more quantifiable than fundamental analysis, making it much easier to trace the efficiency of a method. Algorithm trading is an improvement on technical analysis. Computers are accustomed automatically to run a technical analysis based on some preset instructions in time to buy and sell a security .Buy and sell signals are automatically generated by the mathematical models which are commonly employed in technical analysis

III. ALGORITHMIC TRADING STRATEGY

3.1 Martingale Strategy

The Martingale Strategy is just a simple strategy introduced by French mathematician Paul Pierre Levy back in 18th century for betting purpose which further applied in roulette also. When the Martingale Strategy is utilized in betting, the gambler must double the bet when faced with a loss. For a situation with an equal probability, like a coin toss, there are two viewpoints about a way to size a trade. The Martingale Strategy states that one must double the scale given a loss. the speculation behind the strategy is that you simply regain whatever's been lost. Similarly, an anti-Martingale Strategy states that one must increase the trade size given a win

3.2 Applying the Strategy

A. Understanding Martingale with a Trade

The Martingale Strategy is often utilized in any game with an equal probability of a win or a loss. It's important to grasp, that markets aren't zero-sum games. Markets aren't as simple as betting on a roulette table. Therefore, the strategy is often modified before it's applied to crypto markets. Consider the subsequent example, A trader uses the Martingale Strategy and makes an acquisition of $10,000 worth coins when it is trading at $100. Assuming that the price falls in certain period of time and so the trader makes a replacement purchase worth $20,000 at $50, the standard goes up to $60 per coin. Suppose the coin price falls further, the trader makes another purchase worth $40,000 at $25. It takes the everyday cost per share to $33.33. At now, as per the strategy, the trader can successfully exit the trade and make a profit up to the initial bet size at $38.10. The trader then waits for the stock to maneuver to $38.10 and makes a gain of $10,000, which is that the scale of the initial bet. within the case, the trader could exit after the third bet because the stock price reached $38.10. It doesn't always happen, and therefore the trade size can reach extremely high amounts just in case the value falls for an extended period of your time. Within the hope of recovery, lots of cash is put at stake using the strategy. Hence, it's very essential to make sure whether the markets are non-zero markets. It's only with unbounded wealth, bets and time that it would be argued that the martingale becomes a winning strategy. In mathematical terminology, this corresponds to the thought that the win-loss outcomes of each bet are independent and identically distributed random variables, an assumption which is valid in many realistic situations. It follows from this assumption that the expectation of a series of bets is adequate to the sum, over all bets that might potentially occur within the series.

3.3 Mathematical Analysis

Let one trade be defined as a sequence of consecutive losses followed by either a win, or bankruptcy of the trader. After a win, the trader "resets" and is considered to have started a new trade. A continuous sequence of martingale bets can thus be partitioned into a sequence of independent trades. Following is an analysis of the expected value of one trade. Let **"q"** be the probability of losing.

Let **"B"** be the amount of the initial trade. Let **"n"** be the finite number of bets the trader can afford to lose. The probability that the trader will lose all **"n"** trades is "q^n". When all trades lose, the total loss is-

$$\sum_{i=1}^{n} B * 2^{i-1} = B(2^n - 1)$$

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 2, May 2022
Impact Factor: 6.252

The probability the trader does not lose all **"n"** trades is $\mathbf{1} - q^{n}$. In all other cases, the trader wins the initial trade **(B.)** Thus, the expected profit per trade is-

$$(\mathbf{1} - q^{n}) * B - q^{n} * B(2^{n} - 1) = B(1 - (2q)^{n})$$

Whenever $\mathbf{q > 1/2}$, the expression $\mathbf{1 - (2q)^{n} < 0}$ for all $\mathbf{n > 0}$.

In applied mathematics, a martingale may be a sequence of random variables (i.e., a stochastic process) that, at a specific time, the conditional expectation of subsequent value within the sequence is adequate to this value, no matter all prior values. A basic definition of a discrete-time martingale may be a discrete-time model (i.e., a sequence of random variables) **X1, X2, X3, ...** that satisfies for any time **n**,

$$(\mathbf{1} - \mathbf{q^{n}}) * \mathbf{B} - \mathbf{q^{n}} * \mathbf{B}(\mathbf{2^{n}} - \mathbf{1}) = \mathbf{B}(\mathbf{1} - (\mathbf{2q})^{\mathbf{n}})$$

That is, the conditional expected value of the next observation, given all the past observations, is equal to the most recent observation.

IV. TECHNICAL ANALYSIS

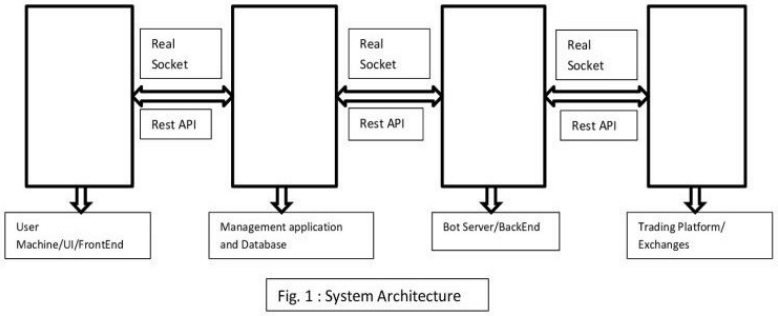

Figure 1: System Architecture

The Automated platform for trading is designed as an bot interface which will take input from the user— allocate the instructions-place the order-check for the market price on crypto-to-crypto exchange through API-if the instructions provided are satisfied automatically place the sell order-else repeat the procedure.

4.1 How does the Bot Works?

1. We have studied the Martingale Strategy, **i.e. "For Every Loss Faced Double The Stake".** In order to execute the strategy, the "Double_Mode" input option is added to the interface, which will do the same task as of the martingale.
2. The trader can choose whether he want the trade to be doubled infinitely until he/she gets a good profit or he/she can allot trading Cycles i.e. a limitation on doubling the trade price based on his/her own technical analysis.
3. Trailing_Stop_Loss: The input option which will prevent the trader from getting Bankrupt in a long run. A trailing stop loss may be a sort of trading order that allows you to set a maximum value or percentage of loss which will incur on a trade. If the security price rises or falls in your favor, the stop price moves with it, on the other hand if the security price rises or falls against you, the stop stays in place. The trader can select as much as maximum trades as he/she wants, there won't be any limitation to that.
4. After the trader inputs all the instructions, place the order. When the order is placed the bot will access the crypto-to-crypto exchanges (e.g. Binance, Huobi, Wazirx, etc.) frequently through API, through which the bot will run a check on the current price of the trade. If the market goes down the bot will check the next order price and if the next order price is greater it will check for the maximum trade limit. If the market trade limit is not reached it will put a limit on the sell order and check for the cycles count.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 2, May 2022
Impact Factor: 6.252

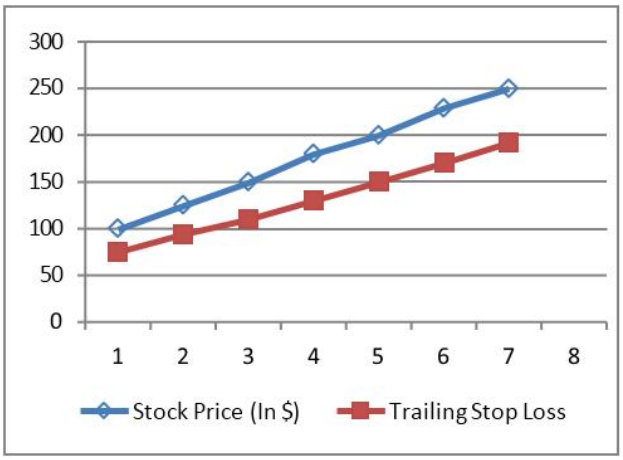

Chart 1: Trailing Stop Loss Order

5. It will repeat the entire process for the remaining cycles unless it reaches the Take Profit level assigned by the trader. When the trade cycles will be completed the bot will automatically place the sell order for the trade.
6. Whereas on the other hand, if the market goes up the bot will run check on the Take Profit level. If the price matched it will place the sell order for the trade or if the price is not matched, then the bot will again run check for the next order price and again repeat the procedure.

IV. Conclusion

The algorithm (/strategy) described above proved to be very profitable. However, it is important to keep in mind that cryptocurrency is extremely volatile and has seen a massive increase in price over the last year. Since cryptocurrency has gained so much value recently, all results displayed on the interactive website are measured in how profitable the algorithm was compared to buying and holding the cryptocurrency. The algorithm (/strategy) described in this paper will greatly outperform buying and holding, but only if the proper parameters are used. Future research will focus on finding new algorithms, improving on existing algorithms, and changing the items traded.

Acknowledgment

We wish to express our sincere thanks to our guide Prof. S.B. Bhosale and our principal Mr. D.J. Garkal, Jaihind College of Engineering for providing us all the facilities, support and wonderful environment to meet our project requirements. We would also take the opportunity to express our humble gratitude to our Head of Department of Computer Engineering Prof. A. A. Khatri for supporting us in all aspects and for encouraging with her valuable suggestions to make our project success. We would also like to acknowledge with much appreciation the role of the staff of Computer Department, especially the Laboratory staff, who gave the permission to use the labs when needed and the necessary material to complete the project. We would like to express our gratitude and appreciate the guidance given by other supervisors and project guides, their comments and tips helped us in improving our presentation skills. Although there may be many who remain unacknowledged in this humble note of appreciation but there are none who remain unappreciated.

References

[1]. Ward Michael, “Algorithmic Trading For Cryptocurrencies”(2018). Undergraduate Honors Capstone Projects, 453. https://digitalcommons.usu.edu/honors/453.

[2]. “Testing The Local Martingale Theory using Cryptocurrencies”. ~Soon Hyeok CHoi (Cornell University) - SC Johnson College Of Business; Robert Jarrow - Cornell SC Johnson College Of Business (October 20, 2020).

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 2, May 2022
Impact Factor: 6.252

[3]. "Forecasting and Trading Cryptocurrencies with Machine Learning under changing market conditions." ~Helder Sebastiao and Pedro Godinho https://doi.org/10.1186/s40854-020-00217-x

[4]. Binance Academy : https://academy.binance.me/en

[5]. Martingale Strategy https://en.wikipedia.org/wiki/Martingale_(betting_system).

[6]. "Deep Reinforcement Learning for Active High Frequency Trading" -Antonio Briola, Jeremy Turiel, Riccardo Marcaccioli, Tomaso Aste-Department of Computer Science, University College London, London, UK

[7]. Farida Sabry, Wadha Labda, Aiman Erbad, and Qutaibah Malluhi -Department of Computer Science and Engineering, Qatar University, Doha, Qatar.

[8]. Thomas E. Koker and Dimitrios Koutmos, Worcester Polytechnic Institute, Worcester, MA 01609, USA; tekoker@wpi.edu 2 Department of Accounting, Finance, and Business Law, College of Business, Texas A&M University–Corpus Christi, Corpus Christi, TX 78412, USA Correspondence: dimitrios.koutmos@tamucc.edu Received: 26 June 2020; Accepted: 31 July 2020; Published: 10 August 2020