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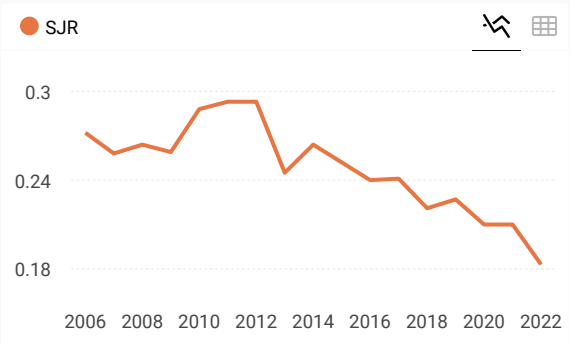

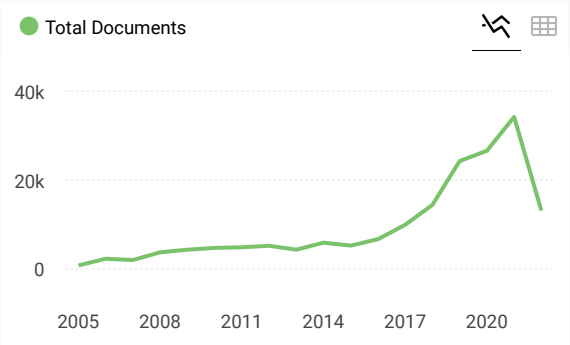

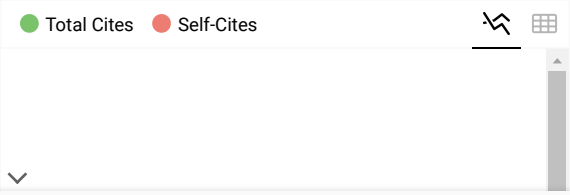

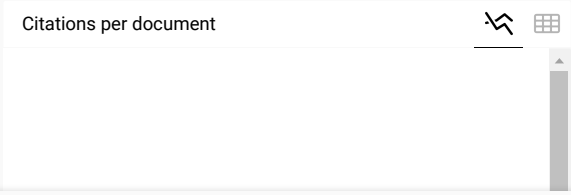

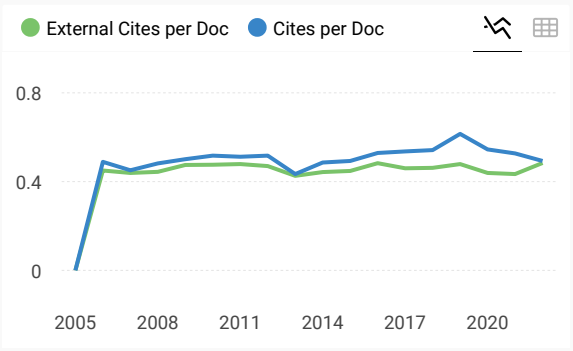

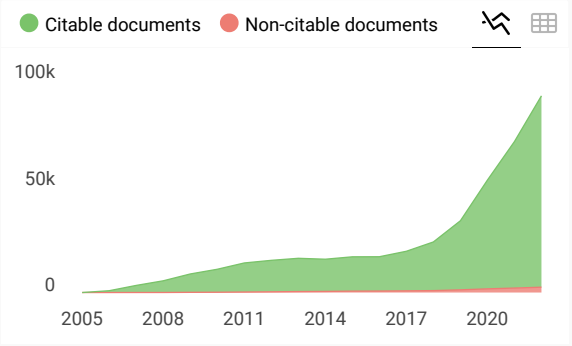

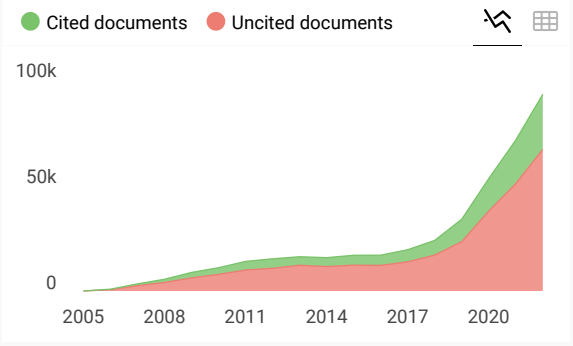

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Stop hunt detection using indicators and expert advisors in the forex market

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Abstract. Foreign exchange trading activities are one of the businesses that can generate big profits, and provide freedom for business people without the need to provide a large capital. Traders often suffer losses due to uncertainty in the market. One of them is market manipulation carried out by brokers or banks. For this reason, this research was conducted to detect any manipulation that occurred in the foreign exchange market. This research tries to combine trading systems, indicators and expert advisors that aim to help traders detect fake market price movements to minimize losses that occur due to errors in making transaction decisions. The results of the study produce an indicator that is able to detect the potential of certain patterns used by the market maker to reverse the direction of market prices and is supported by the presence of expert advisors who are able to pinpoint potential market manipulation, so traders can avoid large losses.

1. Introduction

In this modern age, there are so many business opportunities that are increasingly accessible, one being the exchange of currencies in the forex market. Although it can promise big profits, the forex trading business is not easy. It takes the expertise that continues to be developed for months or even years to be able to get consistent profits. The most influential factor in achieving profits is often based on the emotional influence of a trader. Because of the high volume of market fluctuations, traders are often carried away by fear and greed, so they come out and violate the existing trading system. Therefore, expert advisors and indicators are needed, which can help with decision making and automation of trading activities so that trading can take place consistently without being influenced by psychological factors.

Another factor that often brings losses is the market manipulation that is difficult to see for the majority of traders. While the forex market is driven by the level of supply and demand of a currency, prices are also driven by brokers, hedge funds and banks that have large market shares. These parties are able to move prices globally and can often be called market makers. Market makers cannot control the direction of market prices, but they can make significant price movements so that they can confuse lay traders in determining the direction of the actual price. For this reason, it is necessary to develop a system that is able to detect the occurrence of market manipulation that is happening and how to quickly notify traders when currently, there is indeed market manipulation.

2. Literature review

This section discusses some of the terms in forex trading and related research.

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2.1. Market maker

Brokers, hedge-funds and banks with the largest market shares have a huge impact on market price movements. These parties are often referred to as market makers. Market makers are those who are suspected of being behind market manipulation [1].

2.2. Stop hunting method

In forex trading, winning traders benefit from losing traders. Therefore, to gain more profit, some market makers commit fraudulent actions by making large volume transactions that affect market price fluctuations, in order to confuse many ordinary traders [2].

In addition, these price fluctuations also aim to move market prices so that they touch a certain price area that has the highest number of Stop Losses from ordinary traders. This is called Stop Hunting.

After touching the Stop Loss area, usually, the market price will reverse quickly such that lay traders react too late to the price movement [1].

In Figure 1., Stop Hunting occurs in the area of support (the lowest price position), where it is estimated that the price will reverse upwards. In this area, many traders place Buy Orders. When buying orders, traders will place their stop loss points a few pips below the support area just in case the support points are broken. When market makers understand where their stop loss area is, the market maker will move prices down to touch the area and immediately reverse direction.

Figure 1. Example of Stop Hunting Event

2.3. Market structure

The foreign exchange market has a structure / pattern that repeatedly occurs every day [3]. This is the most important aspect in identifying market manipulation because this pattern is used by Market Makers to manipulate Retail Traders. Keep in mind that Forex is a Zero-Sum Game, where profits from winners are obtained from the losing party. Therefore, the Market Maker will try to trap as many Retail Traders as possible to make their parties profit. The purpose of understanding market structure is not to fight the Market Maker, but to join the Market Maker so that it can produce maximum profits in trading on the foreign exchange market.

Market structure occurs every week, which usually starts on Monday. However, this can happen at any time, as long as the pattern is appropriate [4]–[6]. First, the structure begins with market trends that are very clear at the beginning of the week. This trend is used by the Market Maker to lure Retail Traders to follow trends. For example, in Figure 2., a downtrend is seen at the beginning of the week that causes Retail Traders to place Sell Orders in the hope that prices will continue to fall. When enough people sell, the Market Maker will make a W pattern in the middle of the week for the last time, trapping Retail Traders to sell. After that, the Market Maker reverses the market trend by making a Buy Order at the lowest price point to touch the Stop Loss point of the Retail Traders who sell at the beginning of the week, while making a profit as market prices move as they want.

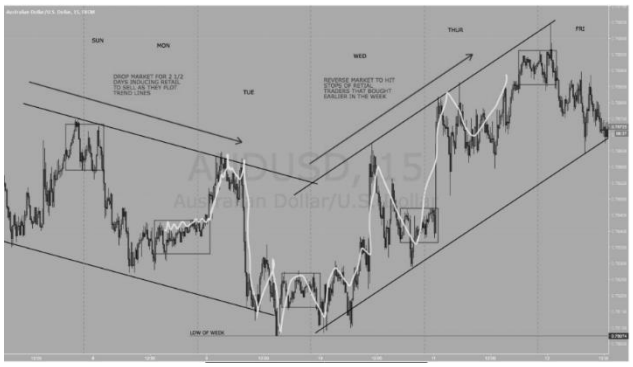

Figure 2. Weekly Market Structure

2.4. Related work

Moving averages have been widely used in research related to stock predictions. The stock market and currency have similarities in methods, so traders often use the same methods in determining predictions of stocks and money markets. Some researchers use the moving average method in predicting price movements in the money market or in stocks[1], [6]–[13]. Another method developed by several researchers is by combining artificial intelligence, including fuzzy, genetic algorithm and neural network [14]–[22]. All methods aim to predict stock prices or currency movements, but what is never discussed is determining whether the current price is the result of price manipulation or not. This research was developed based on the moving average method and looked for patterns that could be used to determine whether or not there was market manipulation.

3. Methodology

3.1. System analysis

Stage one: begin with identifying price trends that are clearly visible. The clear price trend is used by market makers to persuade / trap retail traders to follow trends. This price trend must be determined in advance because without it, the market maker cannot profit because there are no parties trapped. This process is run at a 15m timeframe and is usually done at the beginning of the week.

The second stage is identifying the trap zone area, where the market maker will push the price trend for the last time so that retail traders who think that the trend is still continuing are getting trapped. Retail traders are lured to Sell Orders towards the Trap Zone. The usual Trap Zone is at the lowest / highest price point on the previous day, or the previous week or current week.

The last step is to identify the existence of stop hunting, which is the entry point for executing Buy / Sell Orders. Stop hunting events occur very quickly and can occur at any time so that retail traders do not have the opportunity to close their order positions while market makers reap profits from retail traders. Stop hunting events occur in the Trap Zone, and after stop hunting occurs, the Buy / Sell orders are executed and form like the letters M / W as shown in Figure 3.

3.2. Trading plan analysis

Trading is a business. For this reason, planning is needed to benefit consistently. The setup trading used is to use the ECR strategy after the M / W pattern or after a stop hunting event occurs.

First of all, determining the market structure is the first thing to do. The Market Structure starts with a clear price trend. In Figure 3, there is a downtrend that can be described by the trendline. Second, determine the existence of a stop hunting event or the existence of an M or W pattern at the lowest / highest point of the previous day / this week / previous week. The price appears to form a W pattern at the lowest point of the previous day. After these two things are determined, the market structure is valid.

Next, to determine the entry point, we use the ECR strategy by looking for a cross from EMA-48 & EMA-96. Finally, we can enter when the price is retesting at the fastest EMA (48) with a stop of 10 pips and Take Profit of 30 pips or more.

Figure 3. Example of Stop Hunt Pattern

3.3. System workflow

The implementation of market manipulation strategies uses two different workflows.

The first workflow describes the trading activity workflow by using a full-automatic system that runs after the trader has input. Figure 4. shows the system workflow, which runs a full-automatic expert advisor. Traders first determine which currency pair input is intended, how many lots are risked, what reward ratio is obtained and the minimum size of the stop candle. Then, the expert advisor will look for the highest & lowest points from 1 day ago, the current week and the previous week, which will be positioned as an area of potential price reversal (Trap Zone).

Then, when the price moves, touches the area and reverses the minimum input height, the expert advisor will place a Buy / Sell order to position and adjust the stop point & take profit according to the input.

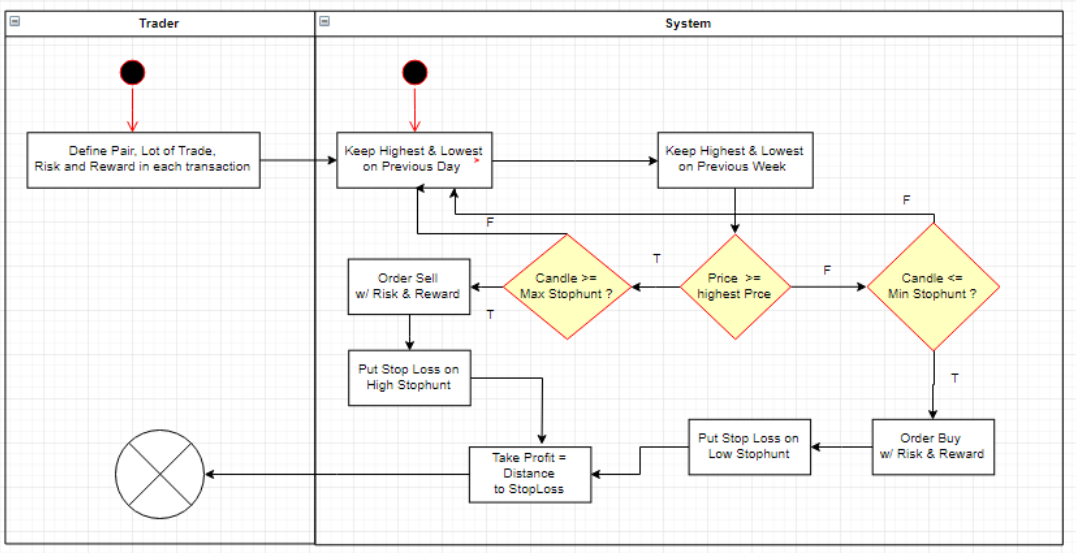

Figure 4. System Workflow

4. System result

4.1. Stop hunt indicator

The indicator made is used to detect the stop candle or candlestick, which is the second leg of the M / W pattern, which indicates that market price movements will immediately reverse direction; this can be seen in Figure 5.

The indicator is green & red arrow that points to the candlestick, which is a potential that the price movement will immediately reverse. The green arrow indicates that the price is forming a W pattern; this indicates the price will turn upwards, and the red arrow indicates that the price indicates the M pattern, which indicates the price will turn downwards. The indicator is designed as simple as possible to make it easier for traders analyzing the market because the more indicators there are, the more difficult it is for traders to see market conditions, thus, potentially bring harm to them.

Figure 5. Stop Hunt Indicator Sign

4.2. MW to telegram expert advisor

The expert advisor is made to read the output from the indicator and report it to the Telegram channel if the indicator has detected potential market manipulation. Furthermore, expert advisors are also able to carry out automated trading activities based on these outputs.

In the MetaTrader 4 application, the expert advisor only gives a view of the amount of equity that the trader has, as shown in the dark blue arrow in Figure 6. Expert advisors can be actively executed if the amount of equity displays in the upper left corner. In the upper right corner with a light blue arrow, there is a symbol of a sullen face, which means the expert advisor is not ready to do auto-trading. To activate the feature, it is necessary to set the input settings on the expert advisor by giving the value "True" to the input “activate auto-trading”.

The expert advisor will access the API from Telegram when the indicator detects potential market manipulation. Each message is designed as compact as possible so that any new notifications that come don't cover the old ones. Information given via Telegram includes currency pairs where market manipulation occurs, types of market manipulation patterns, locations of occurrence, size of Stop Hunt candle, probabilities and times of occurrence. The first and most important output on Telegram is a currency pair where potential market manipulation occurs. This is the most important thing so that traders can immediately see the currency pair and get ready to analyze immediately.

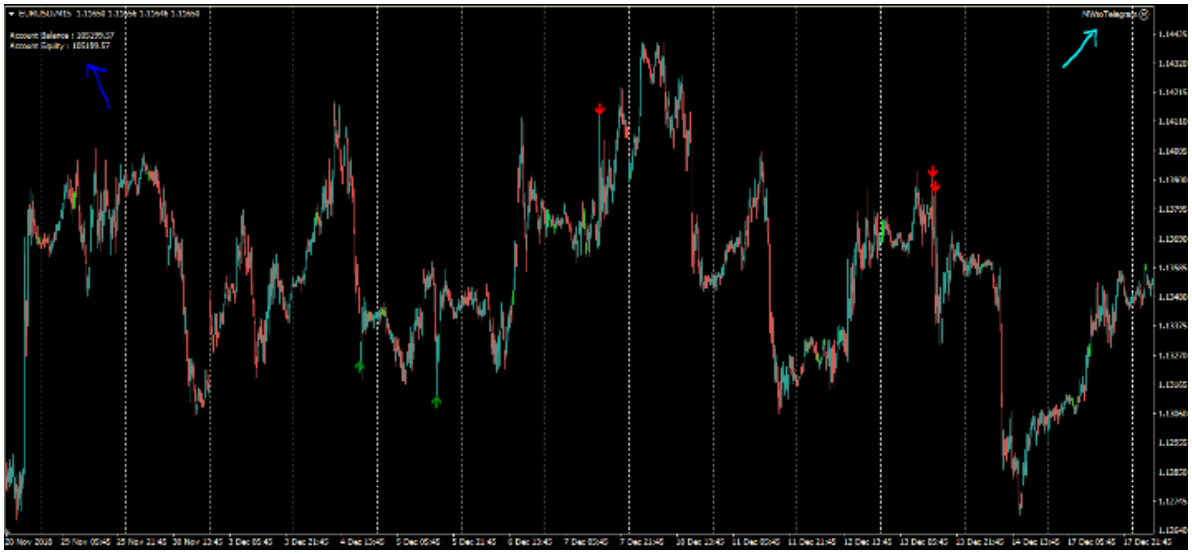

Figure 6. Expert Advisor Result

4.3. BackTest result

Backtest is done by entering the input into the expert advisor & indicator and running it on the strategy tester feature in the MetaTrader 4 application. This feature will test the expert advisor in the time that has been entered. The time of testing is carried out in various time periods. Each entry by an expert advisor is entered when the indicator detects potential market manipulation. A stop point is placed right at the lowest / highest point of the candle stop, and the risk ratio used is 1: 3.

One of Backtest was done for the past 3 years (2016-2018) in the EUR / USD pair using inputs with a minimum size of a candle stop hike as high as 250 points and a fixed lot size of 1.0. The initial capital used is $ 10,000. Figures 7 and Figure 8 show the Backtest process that produces a profit of 124.15%.

Bars in test	75424	Ticks modelled	68956300	Modelling quality	90.00%
Mismatched charts errors	0				
Initial deposit	10000.00			Spread	Current (11)
Total net profit	12415.60	Gross profit	32581.40	Gross loss	-20165.80
Profit factor	1.62	Expected payoff	86.22		
Absolute drawdown	110.00	Maximal drawdown	3107.70 (18.36%)	Relative drawdown	18.36% (3107.70)
Total trades	144	Short positions (won %)	84 (39.29%)	Long positions (won %)	60 (38.33%)
		Profit trades (% of total)	56 (38.89%)	Loss trades (% of total)	88 (61.11%)
	Largest	profit trade	909.00	loss trade	-375.60
	Average	profit trade	581.81	loss trade	-229.16
	Maximum	consecutive wins (profit in money)	5 (3077.00)	consecutive losses (loss in money)	8 (-1900.80)

Tester | Settings | Results | Graph | Report | Journal |

Figure 7. EUR/USD pair in 3 years' backtest process

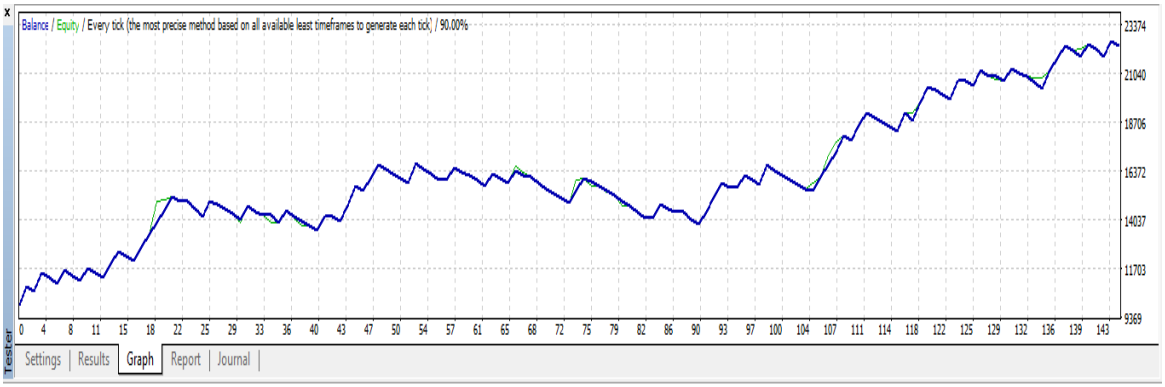

Figure 8. Profit Rate on EUR/USD pair in 3 years

5. Conclusion

From the results of implementing detection of potential foreign exchange market manipulations on forex indicators and forex market expert advisors, conclusions can be made that the trading system created, as well as indicators and expert advisors, can reduce trading risk and generate profits that are consistent with expectations of 5-20% per month. Expert advisors and indicators can provide information about potential market manipulation accurately.

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References

[1] V. Vajda, "Could a Trader Using Only 'Old' Technical Indicator be Successful at the Forex Market?," *Procedia Econ. Financ.*, vol. 15, no. 14, pp. 318–325, 2014.

[2] J. Miśkiewicz, A. Tadla, and Z. Trela, "Does the monetary policy influenced cross-correlations on the main world stocks markets? Power Law Classification Scheme analysis," *Phys. A Stat. Mech. its Appl.*, vol. 519, pp. 72–81, 2019.

[3] J. Carapuço, R. Neves, and N. Horta, "Reinforcement learning applied to Forex trading," *Appl. Soft Comput. J.*, vol. 73, pp. 783–794, 2018.

[4] R. Arévalo, J. García, F. Guijarro, and A. Peris, "A dynamic trading rule based on filtered flag pattern recognition for stock market price forecasting," *Expert Systems with Applications*, vol. 81. pp. 177–192, 2017.

[5] H. Wang, S. Lu, and J. Zhao, "Aggregating multiple types of complex data in stock market prediction: A model-independent framework," *Knowledge-Based Syst.*, vol. 164, pp. 193–204, Jan. 2019.

[6] J. A. Batten, B. M. Lucey, F. McGroarty, M. Peat, and A. Urquhart, "Does intraday technical trading have predictive power in precious metal markets?," *J. Int. Financ. Mark. Institutions Money*, vol. 52, pp. 102–113, Jan. 2018.

[7] D. J. Bodas Sagi, F. J. Soltero, J. I. Hidalgo, P. Fernández, and F. Fernandez, "A technique for the optimization of the parameters of technical indicators with multi-objective evolutionary algorithms," *2012 IEEE Congr. Evol. Comput. CEC 2012*, pp. 10–15, 2012.

[8] S. Chen, S. Bao, and Y. Zhou, "The predictive power of Japanese candlestick charting in Chinese stock market," *Phys. A Stat. Mech. its Appl.*, vol. 457, pp. 148–165, Sep. 2016.

[9] C.-H. Chen, X.-Q. Su, and J.-B. Lin, "The role of information uncertainty in moving-average technical analysis: A study of individual stock-option issuance in Taiwan," *Financ. Res. Lett.*, vol. 18, pp. 263–272, Aug. 2016.

[10] L. Ming-Ming and L. Siok-Hwa, "The profitability of the simple moving averages and trading range breakout in the Asian stock markets," *J. Asian Econ.*, vol. 17, no. 1, pp. 144–170, Feb. 2006.
[11] F. Papailias and D. D. Thomakos, "An improved moving average technical trading rule," *Phys. A Stat. Mech. its Appl.*, 2015.
[12] G. Durantin, S. Scannella, T. Gateau, A. Delorme, and F. Dehais, "Moving Average Convergence Divergence filter preprocessing for real-time event-related peak activity onset detection : Application to fNIRS signals," *2014 36th Annu. Int. Conf. IEEE Eng. Med. Biol. Soc. EMBC 2014*, pp. 2107–2110, 2014.
[13] T.-H. Lu, "The profitability of candlestick charting in the Taiwan stock market," *Pacific-Basin Financ. J.*, vol. 26, pp. 65–78, Jan. 2014.
[14] D. Pradeepkumar and V. Ravi, "Soft computing hybrids for FOREX rate prediction: A comprehensive review," *Comput. Oper. Res.*, vol. 99, pp. 262–284, 2018.
[15] X. Liu, H. An, L. Wang, and Q. Guan, "Quantified moving average strategy of crude oil futures market based on fuzzy logic rules and genetic algorithms," *Phys. A Stat. Mech. its Appl.*, vol. 482, pp. 444–457, Sep. 2017.
[16] H. Talebi, W. Hoang, and M. L. Gavrilova, "Multi-scale foreign exchange rates ensemble for classification of trends in forex market," *Procedia Comput. Sci.*, vol. 29, pp. 2065–2075, 2014.
[17] E. Ahmadi, M. Jasemi, L. Monplaisir, M. A. Nabavi, A. Mahmoodi, and P. Amini Jam, "New efficient hybrid candlestick technical analysis model for stock market timing on the basis of the Support Vector Machine and Heuristic Algorithms of Imperialist Competition and Genetic," *Expert Syst. Appl.*, vol. 94, pp. 21–31, Mar. 2018.
[18] S. R. Das, Kuhoo, D. Mishra, and M. Rout, "An optimized feature reduction based currency forecasting model exploring the online sequential extreme learning machine and krill herd strategies," *Phys. A Stat. Mech. its Appl.*, vol. 513, pp. 339–370, 2019.
[19] G. Iovane, A. Amorosia, M. Leone, M. Nappi, and G. Tortora, "Multi indicator approach via mathematical inference for price dynamics in information fusion context," *Information Sciences*, vol. 373. pp. 183–199, 2016.
[20] F. C. R. Marques, M. Gomes, and P. E. M. De Almeida, "Maximisation of Investment Profits : An Approach to MACD based on Genetic Algorithms and Fuzzy Logic," 2010.
[21] D. H. Setiabudi, G. S. Budhi, I. W. J. Purnama, and A. Noertjahyana, "Data mining market basket analysis' using hybrid-dimension association rules, case study in Minimarket X," in *Proceedings of the International Conference on Uncertainty Reasoning and Knowledge Engineering, URKE 2011*, 2011.
[22] A. Marszałek and T. Burczyński, "Modeling and forecasting financial time series with ordered fuzzy candlesticks," *Inf. Sci. (Ny).*, vol. 273, pp. 144–155, Jul. 2014.