Trading Expert System for stock trend analysis

Alghamdi Amjad Ahmed (M2016721)
school of computer science,kookmin university
[Survey paper]

The trading system is a group of specific rules, or parameters, that determine entry and exit points for a given equity [5]. The points are known as signals and marked on a chart in real time. These prompt decisions and actions relating to the trade [5].

An expert system is a computer-based program that is built to solve the problems in a specialized domain [4]. The program attempts to mimic human capabilities i.e. learning, teaching, performing intelligent tasks, etc. [4] The rapid progress in computer technology has enabled program trading, which allows arbitrageurs to take advantage of the disparities in the futures market and the stock market to make risk-free profits [1]. Due to the volatile nature of both markets, the probability associated with each decision needs to be dynamically determined every time the system is used [1]. This makes the development of an expert system for trading different from traditional applications[1].

The success of the overall system depends on how well the rule performs. Therefore, system traders spend time optimizing the rules in order to manage risk, increase gain, and attain long-term stability [5]. The advantages of adopting a trading system are several and include the following:

a) Emotionless trading- it takes away the emotions from a trade and the individual's tendencies of doubt. The decision making process is reduced and the trading process becomes automated,

b) Timesaving- once the system is optimized, little to no effort is required by the trader,

c) Outsourcing- it allows for the job to be outsourced to experts [5].

Thus, the trading system is a useful tool for stock trend analysis. However, the question may arise to the effect what markets can "trading systems" be used in? The trading systems can be used in Equity Markets, Foreign Exchange Markets, and in the Futures market. However, while implementing trading systems in various markets, some key factors must be borne in mind:

a) In the equity market, the effectiveness of equity systems can be limited by the low liquidity of some equities, especially OTC and Pink Sheet issues,

b) In the Foreign exchange market compared to the amount of equities or commodities available, the number of currencies to trade is limited. Therefore, the range in terms of volatility is not necessarily limited,

c) In the Futures market, the trading systems require much greater customization, and require advanced indicators. Thus, the system takes much longer to develop [5].

There are several types of trading systems; an in-depth study of the various types allows one to gauge the most appropriate form of trading system that can be used in a particular market or for a commodity: [5]

1) Trend Following Systems- this system, simply waits for a significant price movement, then follows the trend and buys or sells in that direction [5]. The system is based on the hope that the price movements will maintain the trend. The Moving Average System is an example of the trend following system [9]. It is an indicator that shows the average price of a stock over a period of time [5]. The essence of the trend is derived from this movement [5]. Another form of trend following system is the Breakout

system. This system follows the assumption that when a new high or low is reached, the price movement is likely to continue in the direction of the breakout [5].

2) Countertrend systems- this system follows the practice of buying at the lowest low and selling at the highest high[5]. This trend is not self-correcting. Therefore, the system results in an unlimited downside potential [5]. The idea is to buy when the momentum in one direction starts fading [5]. This is calculated with the help of oscillators [5].

A combination of the following technical analysis tools is used most commonly to form the parameters of a rule: Moving averages, Stochastic, Oscillators, Relative strength and Bollinger Bands [8]. Technical analysis is a mathematical based trading tool employed to evaluate securities and to forecast their future movement. This is done by analyzing statistics gathered from trading activity, such as price movement and volume [7].

These technical analysis tools are used to analyze the past and predict the future price trends and patterns [2]. Fundamentalists track Economic Reports and annual reports, whereas technical traders rely upon indicators to help interpret the market [2]. For instance, a moving average crossover often predicts a trend change [2]. Strategies on the other hand employ indicators in order to determine entry, exit or trade management rules[2]. Therefore, indicators and strategies work together to help investors develop parameters[2].

The main assumption behind technical analysis is that price discounts everything, which essentially means that the market price of a security at any given point of time reflects all the information available in relation to that security and hence, represents its true value [7]. The second assumption is that price changes are not random and thus,

market trends, both short and long-term can be identified [7]. This leads to the assumption that market traders can profit by following the trend[7].

The next question that arises is how does one create an efficient stock trading system. The first step is to recognize that the market situation changes from upward trend to sideways to downward movement [3]. The market usually spends time on sideways trading, based on long-term statistics [3]. Therefore, it is important to develop several different strategies each for bullish markets, for trading range, short selling strategies for bear markets, etc. [3]. An efficient stock trading system requires the trader to define a good entry price, where to stop loss, possible targets for realizing profits, and the risk: reward ratio [3]. The steps required to make an efficient stock trading system are as follows:

1. The Stock rules such as avoiding herd mentality, take informed decisions, following a disciplined approach [6].

2. Setting up- for this purpose one needs to collect information. The first is data collection. The system designer must use extensive backtesting and past price history. This data can be fed into the trading system development software [5]. The second aspect of setting up is acquiring the required software. The software features allow the traders to undertake the following: automatically place trades, code a trading system, and backtest the strategy [5].

3. Design- the design is the concept or the fundamentals behind the system, the way in which the parameters are used to generate a profit or loss [5]. The designing can be done with the help of a graphical user interface. In this way, one can avoid learning the programming language [5].

The Application Programme Interface ("API") is the interface that allows the trader's platform to connect with the market ("Investopedia"). API companies providing services in the Middle East are as follows: Horizon Core, SAP Cloud Platform, Investment Technology Group, etc.

4. Decision Making- the decisions that are required to be made by the trader include the market in which one wants to trade, the time period for which the trades should last, the price series within which one will trade and the kind of equities that one wants to trade in or wants to set as the basis for all testing[5].

5. Practice and Repeat- Practice is essential for the development of successful trading systems. Repeatedly backtesting with the help of Paper trading is also an essential; using imaginary money the trader should look for consistent profitability. Stock simulations can help assess volatile scenarios ("Warrants Paper Trading").

The factors that may negatively affect the results of a trading system are: transaction costs, the lack of watchfulness, tailoring the system to a very specific market environment, and risks [5].

Upon the development of an expert trading system based on the steps above, a trader can begin trading. However, one must always be vary of unexpected results. It is always prudent to use non-automated trading until one is convinced of the system's efficiency [5].

References :

[1]-Chen, K. C. & Liang, Ting-Peng. "Pro-trader: An Expert system for program Trading" *Managerial Finance,* Vol. 15, No. 5, 1989, pp. 1-6.

[2]-Folger, Jean. *"*Using Technical Indicators To Develop Trading Strategies*"* *Investopedia,* www.investopedia.com/articles/trading/11/indicators-and-strategies-explained.asp?ad=dirN&qo=investopediaSiteSearch&qsrc=998&o=40186*.* Accessed on 21 Nov. 2017.

[3]-"How to create the best stock trading system" *Simple Stock Trading,* www.simple-stock-trading.com/how-to-create-best-stock-trading-system/. Accessed on 21 Nov. 2017.

[4]-Kamley, Sachin and Thakur, R.S. and Jaloree Shailesh. "Rule Based Approach For Stock Selection: An Expert System" *International Conference on Computing and Intelligence Systems,* Vol. 4, Special Issue, March, 2015, pp. 1142-1146.

[5]-Kuepper,Justin."Trading_Systems"*Investopedia,*www.investopedia.com/university/tradingsystems/tradingsytems6.asp*.* Accessed on 21 Nov. 2017.

[6]-Sinha, Sanjeev. "10 Golden rules of investing in stock markets" *EconomicTimes,* 1 Nov. 2016,www.economictimes.indiatimes.com/slideshows/investments-markets/10-golden-rules-of-investing-in-stock-markets/slideshow/18570969.cms. Accessed on 21 Nov. 2017.

[7]-"Technical_Analysis"*Investopedia,*www.investopedia.com/terms/t/technicalanalysis.asp*. Accessed on 21 Nov. 2017."*Warrants Paper Trading" *Australian Securities Exchange*. Accessed on 21 Nov. 2017.

[8]-"What_is_a_Bollinger_Band"*Investopedia,*www.investopedia.com/terms/b/bollingerbands.asp. Accessed on 21 Nov. 2017.

*[9]-"*What_is_a_Moving_Average-MA"*Investopedia,*www.investopedia.com/terms/m/movingaverage.asp. Accessed on 21 Nov. 2017.