Automated Trading Platform

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I. INTRODUCTION

We aim to develop an automatic trading platform by composing our own trading strategy. On this platform, a variety of financial instruments and some useful technical analysis tools are provided for the algorithmic trading.

A set of basic strategies are provided for the users on this platform. Once a strategy is chosen, it buys or sells according to the trading signals. Besides, a real-time Profit/Loss (P/L) open is displayed. In addition, users can buy or sell the securities by clicking the ask/bid button.

II. PLATFORM LAYOUT

Fig. 1 shows the layout of the trading platform. It consists of 6 functional areas:

1) Return history: This block shows the total profit and loss of transactions at each point in time, allowing users to keep track of their current investment performance.
2) Candlestick with moving average: This block mainly displays the candle chart and the n-day moving average. If the closing price minus the opening price is greater than zero, it will be red, otherwise it will be green. If they are equal, it will be a line; the n-day moving average is the level of the n-day closing price.
3) Technical indicators: This block allows users to choose the financial indicators they are interested in to assist financial transactions. Here we choose to put in macd. See Eq. (3)(4)(5) for the formula.
4) Current position: This block shows the number of positions currently buy and sell.
5) Trading record: This block shows the point where the user buys/sells when executing the transaction (click button).
6) Trading area: This block is divided into two parts. The top will display the current real-time profit and loss, and the bottom is the button to execute the transaction, as well as the trading strategy that the user can decide the buying and selling conditions by himself.

III. FEATURES

A. Real-time market data

Real-time market data is gathered from a trading platform, XQ全球贏家 [1], via Dynamic Data Exchange (DDE) protocol. DDE is a communication protocol developed by Microsoft that allows applications to share data and messages with each
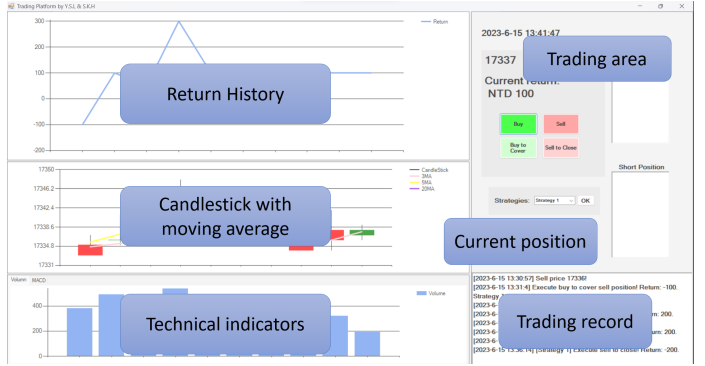

Fig. 1: Layout of the trading platform.

other. It was first introduced in the 1980s and was widely used in the Windows operating system.

In addition, DDE enables two or more applications to establish a dynamic link and exchange information in real-time. It allows one application, called the "client," to request data or perform actions from another application, called the "server." The client application can send commands and receive updates from the server application, allowing for interactive and synchronized data sharing.

Fig. 2 shows the candlestick of a financial instrument. The x-axis represents timestep while y-axis is the corresponding price.

The color of the candlestick shows whether the open price is below the close price or not. If the open price is greater than the close price, the color is red. On the contrary, if the close price is greater than the open price, the color is white.

There are four moving average lines, including 5MA, 10MA, 20MA, and 60MA. Equation (1) is the simple moving average (SMA).

$$\sum_{i=N-n}^{N} close^i/n, \text{ where n is n-interval MA} \quad (1)$$

B. Technical indicators

Fig 3 shows the technical indicators as a trading reference. As a demonstration, there are two sub-figures: volume and moving average convergence/divergence (MACD). The x-axis represents time while y-axis is the corresponding information.
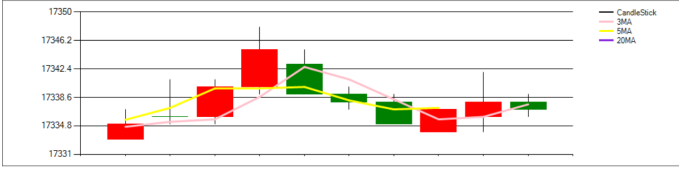
Fig. 2: Example of prices with candlestick.

Volume is the amount of an asset or security that changes hands over some period of time, often over the course of a trading day.

MACD is a trading indicator used in technical analysis of the price of stocks. It is designed to reveal changes in the strength, direction, momentum, and duration of a trend in a stock's price.

It consists of DIFF, DEM, and OSC. The formulas are shown in Eq. (3)(4)(5).

$$EMA(i,n) = \frac{EMA(i-1,n) \times (n-1) + close^i \times 2}{n+1} \quad (2)$$

$$DIFF = EMA(i,12) - EMA(i,26) \quad (3)$$

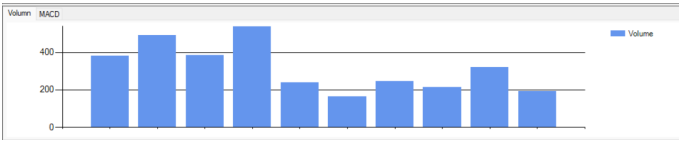$$DEM = EMA(DIFF,9) \quad (4)$$

$$OSC = DIFF - DEM \quad (5)$$

Fig. 3: Example of technical indicators.

C. Profit/Loss (P/L) open

P/L Open is the amount of money made or lost on the position since the inception of the trade. Fig. 4 is a line chart of profit/loss.
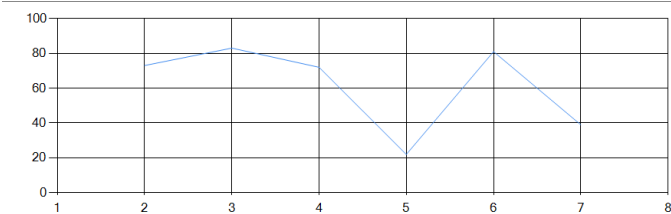

Fig. 4: P/L open

D. Strategy

Fig. 5 shows the dropdown menu of the trading strategies. We provide two basic trading strategies and it is customizable by the users. Two basic trading strategies are based on financial indicators to signal the buy/sell moments.

Two strategies are provided. Strategy 1 (fig. 6) focuses on long position. It is advantageous when the prices continue going up. If there is no buy position and the condition is satisfied, the platform create a new long position (buying the futures at current price). When the return ratio is greater than 0.02% or less than -0.02%, it will sell the long position and wait for the next trading signal is met.

Strategy 2 (fig. 7) is applicable when the overall direction of the market is bearish (not optimistic about future prices). The triggering condition is that the close minus the open is less than zero for three consecutive times, and the stop loss or stop profit condition is when the profit or loss exceeds 5%

Fig. 5: Buttons and strategies with drop-down menu.

IV. CONCLUSION

In this report, we create a automatic trading platform that is easy-to-use and provides two trading strategies. Currently, our trading only supports a single commodity. In the future, we will include multiple commodities for trading and compose more trading strategies based on mathematical models.

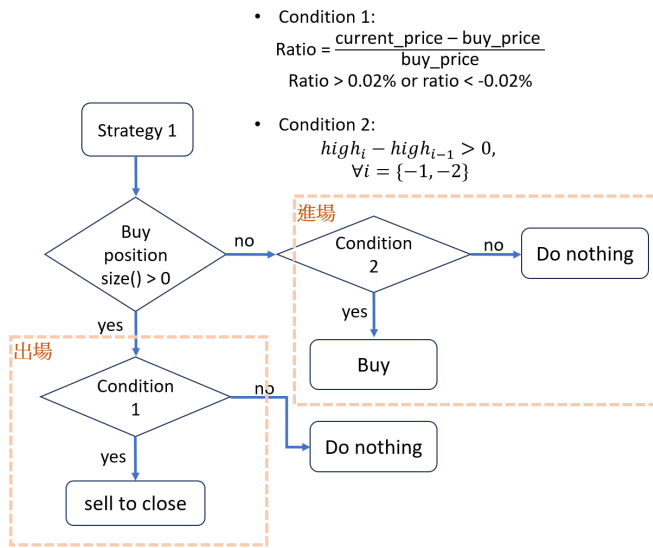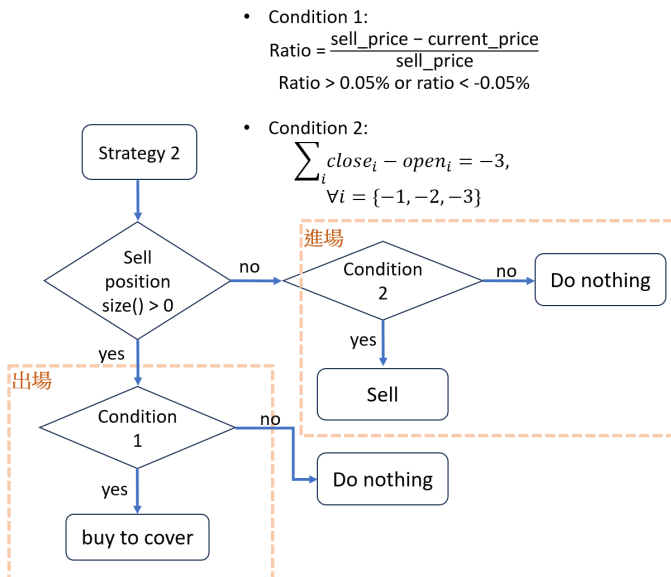REFERENCES

[1] https://www.xq.com.tw/XQlite-Download.aspx

Fig. 6: Flowchart of strategy 1.

Fig. 7: Flowchart of strategy 2.