TREND ANALYSIS SYSTEM AND METHOD

Field of Invention

The invention relates generally to systems for generating charts. In particular, the invention relates to a system and a method for generating a chart and determining a trend therein.

Background

Charts are widely used to record the performance of the prices of shares traded in a stock market. Fluctuations of the share prices are a result of changes in the supply and demand of shares.

Many traders of shares rely on the charts to monitor the fluctuations of the share prices. Through monitoring of the charts, the traders are better able to appreciate the fluctuations involving share prices. However, as the stock market is known to have a tendency of being volatile and unpredictable, trading of shares inevitably involves financial risks.

Profits are made by traders who are able to minimise the financial risks involved in the trading of shares. Many conventional systems for monitoring share prices have been developed. These conventional systems typically provide an analysis of the charts to predict movements in share prices. However, the financial risks are still undesirably high when actual trading of the shares is conducted due to an absence of proper guidelines and indicators in the conventional systems.

There is therefore a need for determining a trend in a chart that records the performance of share prices for improving investment returns in shares.

Summary

Embodiments of the invention disclosed herein provide a system and a method for determining a trend in a chart that records the performance of share prices for improving investment returns in shares.

Therefore, in accordance with a first embodiment of the invention, in a chart generating system, a method for determining a trend in a chart generatable by the chart generating system is disclosed. The method comprises providing a database, the database containing a plurality of historical values for generating the chart therefrom, the plurality of historical values being associated with a timeline. The method further comprises extracting a first reference data value, a second reference data value and a first plurality of data values from the database, the first plurality of data values occurring prior to the first reference data value and the second reference data value occurring subsequent the first reference data value along the timeline, the first plurality of data values terminating at a last data value. The method yet further comprises identifying occurrence of a first condition, the first condition occurring when the first plurality of data values indicates one of an up-trend and a down-trend and identifying occurrence of a second condition, the second condition occurring when the first reference data value is lower than the second reference value and when the last data value of the first plurality of data values indicates the up-trend. Additionally, the method comprises identifying occurrence of a third condition, the third condition occurring when the first reference data value is higher than the second reference data value and the last data value of the first plurality of data values indicating the down-trend, and providing an event indicator when at least the first condition and one of the second condition and the third condition occur. Specifically, the plurality of historical data values comprises the first reference data value, the second reference data value and the first plurality of data values.

In accordance with a second embodiment of the invention, a system for generating a chart and determining a trend thereof is disclosed. The system comprises a memory for storing a database, the database containing a plurality of historical values for generating the chart

therefrom, the plurality of historical values being associated with a timeline. The system further comprises a processor for extracting a first reference data value, a second reference data value and a first plurality of data values from the database, the first plurality of data values occurring prior to the first reference data value and the second reference data value occurring subsequent the first reference data value along the timeline, the first plurality of data values terminating at a last data value; identifying occurrence of a first condition, the first condition occurring when the first plurality of data values indicates one of an up-trend and a down-trend; identifying occurrence of a second condition, the second condition occurring when the first reference data value is lower than the second reference value and when the last data value of the first plurality of data values indicates the up-trend; identifying occurrence of a third condition, the third condition occurring when the first reference data value is higher than the second reference data value and the last data value of the first plurality of data values indicating the down-trend; and providing an event indicator when at least the first condition and one of the second condition and the third condition occur. More specifically, the plurality of historical data values comprises the first reference data value, the second reference data value and the first plurality of data values.

Brief Description Of The Drawings

Embodiments of the invention are described hereinafter with reference to the drawings, in which:

Fig. 1 is a schematic view of a chart generating system for generating a chart according to a first embodiment of the invention;

Fig. 2 is a graphical representation of a price bar generated by the chart generating system of Fig. 1;

Fig. 3 shows a price bar chart, a risk assessment value chart and a daily volume chart generated by the chart generating system of Fig. 1;

Fig. 4 is a flow diagram of a method for determining a trend in a chart generatable by the chart generating system of Fig. 1, according to a second embodiment of the invention;

Figs. 5a and 5b show a down trend and an up trend respectively in the price bar chart of Fig. 3; and

Figs. 6a to 6c show three different price bar charts, each of the three price bar chart representing a different market condition.

Detailed Description

With reference to the drawings, embodiments of the invention for providing a system and a method for determining a trend in a chart that records the performance of share prices for improving investment returns in shares are described hereinafter.

Many conventional systems for monitoring share prices have been developed. These conventional systems typically provide an analysis of the charts to predict movements in share prices. However, the financial risks are still undesirably high when actual trading of the shares is conducted.

For purposes of brevity and clarity, the description of the embodiments of the invention is limited hereinafter to applications related to providing a system and a method for determining a trend in a chart that records the performance of share prices for improving investment returns in shares. This however does not preclude other embodiments of the invention from other areas of application that facilitates determining a trend in a chart, such as in foreign exchange or options trading. The functional and operational principles upon which embodiments of the invention are based remain the same throughout the various embodiments.

Embodiments of the invention are described in greater detail hereinafter in accordance to illustrations provided in Figs. 1 to 6c of the drawings, wherein like elements are identified with like reference numerals.

With reference to Fig. 1, a schematic view of a system 100 for generating a chart according to a first embodiment of the invention is shown. The system 100 is capable of generating a chart based on historical data for determining a trend in the chart. The system 100 comprises a memory 102 for storing the historical data. The system 100 further comprises a processor 104 for processing and analysing the historical data prior to generating the chart. The system 100 further comprises an output means 106 for displaying the chart.

An example of the system 100 is a desktop or laptop computer that is preferably connectable to a server 108 for obtaining data online via the server 108. The data are preferably obtained in real time and are stored in a database 110 found in the memory 102, such as the hard disk of the computer. The database 110 is therefore constantly updated with new data obtained through the server 108.

Alternatively, the database 110 and the memory 102 are found in the server 108. The data are sent to the system 100 where the processor 104 of the system 100 processes and analyses the data for generating the chart. The chart is subsequently displayed through the output means 106 of the system 100.

The data preferably comprises daily prices of a given share that is traded on a stock market. More particularly, as shown in Fig.2, the data includes a daily opening price (A) 202 and a daily closing price (B) 204 of the given share when the stock market opens and closes for each trading day. Fig. 2 shows the daily closing price 204 being higher than the daily opening price 202. However, it is known in the art that the daily closing price 204 can alternatively be equal to or lower than the daily opening price 202 for any given trading day.

The data preferably also includes the daily highest execution price (C) 206 as well as the daily lowest execution price (D) 208 of the given share within a trading day. The modulus price difference between the daily highest execution price and the daily lowest execution price C, D is the price range (E) 210 of the given share. The daily opening and closing prices A, B, the daily highest and lowest execution prices C, D as well as the price range E are graphically represented as a price bar 200 as shown in Fig. 2.

Specifically, the price bar 200 is known as an up bar if the daily closing price B is higher than the daily opening price A and a down bar if the daily closing price B is lower than the daily opening price A.

The data further includes the daily trading volume F of the given share that is traded in the stock market within the trading day. The daily trading volume F represents the total number of the given share traded at the end of each trading day. The database 112 therefore contains data types and corresponding data values related to the given share as shown in Table 1.

Data Type	Values Related To A Given Share On A Given Trading Day
Daily Opening Price	A
Daily Closing Price	B
Daily Highest Execution price	C
Daily Lowest Execution price	D
Daily Price Range	$E = \|C - D\|$
Daily Trading Volume	F

Table 1

The system 100 preferably obtains the data in chronological order and stores the data in the memory 102 for subsequent processing. The processor 104 extracts the data from the database 110 for processing and then stores the processed data in the database 110.

In particular, the processor 104 preferably computes a first moving average value M for each trading day. The first moving average value M is an average value of the daily closing price B obtained from the previous twenty-five trading days.

The processor 104 also preferably computes a second moving average value N for each trading day. The second moving average value N is an average value of the daily closing price B obtained from the previous eleven trading days. The processor 104 then computes a risk assessment value O based on the first moving average value M and the second moving average value N.

More specifically, the risk assessment value O is the difference between the first moving average value M and the second moving average value N. The processed data are stored in the database 110 as shown in Table 2.

Processed Data Type	Values Related To A Given Share On A Given Trading Day
First Moving Average	M
Second Moving Average	N
Risk Assessment	O = M – N

Table 2

Each of the price bar 200 and the risk assessment value O corresponding to a given trading day are displayed through the output means 106, for example a monitor for a predetermined number of trading days. As shown in Fig. 3, the price bar 200 and the risk

assessment value O are preferably displayed as a price bar chart 300 and a risk assessment value chart 302 respectively.

The price bar chart 300 and the risk assessment value chart 302 preferably share a common time axis 304 or timeline. Fig. 3 further shows a daily volume chart 306 that uses the same time axis 304. Each unit 308 of the time axis 304 preferably represents a given trading day. Additionally, the price bar chart 300 has a price axis 310 while the risk assessment value chart 302 has a volume axis 312 for price and volume indications respectively.

The system 100 is for implementing a method 400 as shown in Fig. 4 for determining a trend in the price bar chart 300. The method 400 is further used for determining a desirable buying price and a desirable selling price of the given share. The desirable buying and selling prices are determined through analysing the price bar, risk assessment value and daily volume charts 300, 302, 306.

Alternatively, the server 108 comprises the database 110 and the processor 104 for processing and analysing historical data stored on the database 110. The server 108 is further used for determining a trend in the price bar chart 300 that is displayed through the output means 106 of the system 100.

To determine the desirable buying price of the given share, the method 400 first involve a step 402 of providing the database 110. The method 400 then involves a step 404 where the processor 104 first obtain a first daily highest execution price C1, a second daily highest execution price C2, a third daily highest execution price C3 and a fourth daily highest execution price C4. The first to fourth daily highest execution prices C1 to C4 are preferably obtained in chronological order, with the fourth daily highest execution price C4 being the latest price of the given share.

The method 400 subsequently involves a step 406 of identifying a trend in the price bar chart 300 by the processor 104 of the system 100. The trend is one of an up trend or a down trend.

The method 400 further involves a step 408 of providing an indication by the processor 104 when the up tend or down trend is identified. The processor 104 preferably indicates the up tend or down trend through an event indicator on the display means 106 by highlighting the desirable buying and selling prices, as well as the necessary conditions for buying and selling the given share.

In a first strategy, Fig. 5a shows an example of the down trend. The down trend occurs when the first daily highest execution price C1 (502) is higher or equal to each of the second daily highest execution price C2 (504), the third daily highest execution price C3 (506) and the fourth daily highest execution price C4 (508). In this case, the first daily highest execution price C1 (502) is known as a peak price.

Additionally, the peak price is preferably the highest price of the given share within a predetermined period of time. For example, the peak price is the highest price in the preceding year if the given share has been traded in the stock market for a period of between one to two years.

The processor 104 then compares each of the second to fourth daily highest execution prices C2 to C4 with the first daily highest execution price C1 for identifying the down trend and the peak price. The peak price is then used as a criterion for determining the desirable buying price of the given share.

To determine the desirable selling price after the given share is bought, the processor 104 first obtain a first daily lowest execution price D1 (510), a second daily lowest execution price D2 (512), a third daily lowest execution price D3 (514) and a fourth daily lowest execution price D4 (516). The first to fourth daily lowest execution prices D1 to D4

(510, 512, 514, 516) are obtained in chronological order, with the fourth daily lowest execution price D4 being the latest price of the given share.

Fig. 5b shows an example of the up trend. The up trend occurs when the first daily lowest execution price D1 (510) is lower or equal to each of the second daily lowest execution price D2 (512), the third daily highest execution price D3 (514) and the fourth daily highest execution price C4 (516). In this case, the first daily highest execution price D1 (510) is known as a trough price.

The processor 104 then compares each of the second to fourth daily lowest execution prices D2 to D4 with the first daily lowest execution price D1 for identifying the up trend and the trough price. The trough price is then used as a criterion for determining the desirable selling price of the given share.

With reference to Figs. 5a and 5b, the peak or trough prices are preferably compared with the daily lowest or highest execution prices of the previous trading day 418. This allows the determination of the peak and trough prices as local minima and maxima prices respectively. More specifically, the peak price is preferably a local maxima price when it is greater than each of the second to fourth daily highest execution price C2 to C4 and the highest execution price of the previous trading day.

The trough price is preferably a local minima price when it is less than each of the second to fourth daily lowest execution price D2 to D4 and the lowest execution price of the previous trading day 420.

In the first strategy, the other criteria for determining the desirable buying price of the given share are the risk assessment value O and the daily trading volume F. More specifically, the desirable buying price occurs after the down trend is identified by the processor 104 and has a value that is higher than the peak price. Additionally, the desirable buying price preferably occurs when the corresponding risk assessment value O

indicates a low risk for buying the given share. Furthermore, the daily trading volume F of the given share prior to the trading day of the desirable buying price is preferably at least twice the average daily volume for the previous six months.

The foregoing criteria of the first strategy are therefore used as guideline for determining the desirable buying price of the given share where the price of the given share is generally increasing or trending up. The first strategy is applicable in a first market condition represented by a first market price bar chart 600 as shown in Fig. 6a. The first strategy allows a trader to buy the given share at a lower price than the selling price for profit.

The sale of the given share under the first strategy is determined by at least one of four market conditions. Firstly, the given share is sold when a relatively large down bar is identified by the processor 104 and the corresponding risk assessment value O is high. Secondly, the given share is sold when the price of the given share is lower than a trough price that occurred after the given share is bought. Thirdly, the given share is sold when the price of the given share is decreased by more than 7 or 8% from the desirable buying price. Fourthly, the given share is sold when a profit of 70 or 80% is made with respect to the desirable buying price.

In a second strategy, the desirable buying price of the given share is determined after the first market condition of Fig. 6a is met. The price trend of the given share under the first market condition generally falls after reaching the peak price prior to rebounding. The determination of the desirable buying price of the given share using the second strategy first involves the processor 104 identifying a peak price when the price of the given share begins to rebound.

The peak price under the second strategy is identified similarly as that of the first strategy, except that the down trend occurs when the first daily highest execution price is higher or equal to the next two, instead of the next three daily highest execution prices.

In this case, the first daily highest execution price is the peak price under the second strategy. The desirable buying price under the second strategy occurs after the down trend is identified by the processor 104 and has a value that is higher than the peak price. Additionally, the desirable buying price under the second strategy preferably occurs when the corresponding risk assessment value O indicates a low risk situation for buying the given share.

The conditions for sale and determination of the desirable selling price of the given share under the second strategy are identical to that of the first strategy. The second strategy is applicable in a second market condition represented by a second market price bar chart 602 as shown in Fig. 6b. The second strategy allows the trader to buy the given share at a lower price after the price of the given share has fallen from the peak price and subsequently sell the given share at a higher price for profit.

In a third strategy and with reference to a third market price bar chart 604 as shown in Fig. 6c, a desirable short selling price of the given share is determined. The third strategy is applicable when the price of the given share is generally trending downwards. In particular, the processor 104 identifies three latest consecutive peak prices of a falling price trend. The desirable short selling price is the daily closing price B of a down bar 606 occurs after the latest peak price. Additionally, the desirable short selling price preferably occurs when the corresponding risk assessment value O indicates a high risk, when selling or short selling of the given share is most appropriate.

Alternatively, the desirable short selling price of the given share under the third strategy is determined when the price of the given share is generally down trending and is lower than the trough price. The corresponding risk assessment value O of the desirable short selling price preferably indicates a high risk situation.

The given share is subsequently bought back at a desirable buying price under the third strategy. The desirable buying price of the given share is determined by at least one of two market conditions.

Firstly, with reference to the third market price bar chart 604 of Fig. 6c, a reference or down trend line 608 is formed by the processor 104 from the three consecutive peak prices. The given share is bought back when the down trend line 608 is exceeded or a relatively large up bar 610 is identified that exceeds the down trend line 608. Additionally, the desirable buying price preferably occurs when the corresponding risk assessment value O indicates a low risk situation, where buying of the given share is most appropriate.

Secondly, the given share is bought back when the price of the given share is higher than the latest peak price after the given share is short sold to prevent further losses. The two criteria are therefore used as guideline for determining the desirable buying price of the given share and is applicable in the third market condition 604 of Fig. 6c. The third strategy allows the trader to short sell the given share at a higher price than the buying price for profit.

In the foregoing manner, a system and a method for determining a trend in a chart that records the performance of share prices for improving investment returns in shares are disclosed. Although only a few embodiments of the invention are disclosed, it becomes apparent to one skilled in the art in view of this disclosure that numerous changes and/or modification can be made without departing from the scope and sprit of the invention.

Claims

1. In a chart generating system, a method for determining a trend in a chart generatable by the chart generating system, the method comprising:

providing a database, the database containing a plurality of historical values for generating the chart therefrom, the plurality of historical values being associated with a timeline;

extracting a first reference data value, a second reference data value and a first plurality of data values from the database, the first plurality of data values occurring prior to the first reference data value and the second reference data value occurring subsequent the first reference data value along the timeline, the first plurality of data values terminating at a last data value;

identifying occurrence of a first condition, the first condition occurring when the first plurality of data values indicates one of an up-trend and a down-trend;

identifying occurrence of a second condition, the second condition occurring when the first reference data value is lower than the second reference value and when the last data value of the first plurality of data values indicates the up-trend;

identifying occurrence of a third condition, the third condition occurring when the first reference data value is higher than the second reference data value and the last data value of the first plurality of data values indicating the down-trend; and

providing an event indicator when at least the first condition and one of the second condition and the third condition occur,

wherein the plurality of historical data values comprising the first reference data value, the second reference data value and the first plurality of data values.

2. The method as in claim 1, the event indicator being a buy indicator when the first condition and the second condition occur and a short-sell indicator when the first condition and the second condition occur.

3. The method as in claim 1, wherein the up-trend is indicated when the first plurality of data values are substantially increasing and the down-trend is indicated when the first plurality of data values are substantially decreasing.

4. The method as in claim 1, further comprising:

extracting a second plurality of data values from the database, the second plurality of data values occurring between the first plurality of data values and the first reference data value along the timeline; and

identifying a fourth condition, the fourth condition occurring when each of the second plurality of data values is higher than the first reference data value in response to the second condition occurring and lower than the last data value of the first plurality of data values,

wherein the event indicator is provided further when the fourth condition occurs.

5. The method as in claim 4, further comprising:

identifying a fifth condition, the fifth condition occurring when the second reference data value is higher than the last data value of the first plurality of data values,

wherein the event indicator is provided further when the fifth condition occurs.

6. The method as in claim 4, further comprising:

identifying a fifth condition, the fifth condition occurring when the last data value is the highest of the first plurality of data values, the first plurality of data values occurring within a pre-determined duration,

wherein the event indicator is provided further when the fifth condition occurs.

7. The method as in claim 2, wherein each of the plurality of historical values being one of an opening price and a closing price of one of a plurality of trading days constituting at least a portion of the timeline.

8. The method as in claim 7, further comprising:

obtaining price difference between the opening price and the closing price of the plurality of historical values in response and subsequent to the buy indicator being provided and providing a sell indicator for one of the plurality of trading days when the price difference exceeds a predetermined value and when the closing price is higher than the opening price of the one of the plurality of trading days.

9. The method as in claim 8, further comprising:

extracting a second plurality of data values from the database, the second plurality of data values occurring prior to the first plurality of data values along the timeline; and

identifying occurrence of a fourth condition, the fourth condition occurring when the second plurality of data values initiates with a sell indicator and is substantially down trending,

wherein the event indicator is further provided when the fourth condition occurs, the event indicator being a buy indicator.

10. The method as in claim 1, further comprising:

extracting a second plurality of data values from the database, the second plurality of data values occurring between the first plurality of data values and the first reference data value along the timeline; and

identifying a fourth condition, the fourth condition occurring when each of the second plurality of data values is lower than the first reference data value in response to the third condition occurring and higher than the last data value of the first plurality of data values,

wherein the event indicator is provided further when the fourth condition occurs.

11. The method as in claim 10, further comprising:

identifying a fifth condition, the fifth condition occurring when the second reference data value is lower than the last data value of the first plurality of data values,

wherein the event indicator is provided further when the fifth condition occurs.

12. The method as in claim 10, further comprising:

identifying a plurality of peak data values from the first plurality of data values, each of the plurality of peak data values having a lower immediately preceding data value and a lower immediately succeeding data value along the timeline,

wherein the event indicator is provided further when the plurality of peak data values are identified.

13. The method as in claim 12, further comprising:

providing a reference line extending from the latest of the plurality of peak data values, the reference line being downward trending along the timeline; and

identifying a sixth condition, the sixth condition occurring when a data value subsequent the latest of the plurality of peak data values is higher than a corresponding point along the reference line,

wherein the event indicator being a buy back indicator is provided further when the sixth condition occurs.

14. A system for generating a chart and determining a trend thereof, the system comprising:

a memory for storing a database, the database containing a plurality of historical values for generating the chart therefrom, the plurality of historical values being associated with a timeline; and

a processor for:

extracting a first reference data value, a second reference data value and a first plurality of data values from the database, the first plurality of data values occurring prior to the first reference data value and the second reference data value occurring subsequent the first reference data value along the timeline, the first plurality of data values terminating at a last data value;

identifying occurrence of a first condition, the first condition occurring when the first plurality of data values indicates one of an up-trend and a down-trend;

identifying occurrence of a second condition, the second condition occurring when the first reference data value is lower than the second reference value and when the last data value of the first plurality of data values indicates the up-trend;

identifying occurrence of a third condition, the third condition occurring when the first reference data value is higher than the second reference data value and the last data value of the first plurality of data values indicating the down-trend; and

providing an event indicator when at least the first condition and one of the second condition and the third condition occur,

wherein the plurality of historical data values comprising the first reference data value, the second reference data value and the first plurality of data values.

15. The system as in claim 14, the event indicator being a buy indicator when the first condition and the second condition occur and a short-sell indicator when the first condition and the second condition occur.

16. The system as in claim 14, wherein the up-trend is indicated when the first plurality of data values are substantially increasing and the down-trend is indicated when the first plurality of data values are substantially decreasing.

17. The system as in claim 14, wherein the processor is further for:

extracting a second plurality of data values from the database, the second plurality of data values occurring between the first plurality of data values and the first reference data value along the timeline; and

identifying a fourth condition, the fourth condition occurring when each of the second plurality of data values is higher than the first reference data value in response to the second condition occurring and lower than the last data value of the first plurality of data values,

wherein the event indicator is provided further when the fourth condition occurs.

18. The system as in claim 17, wherein the processor is further for:

identifying a fifth condition, the fifth condition occurring when the second reference data value is higher than the last data value of the first plurality of data values,

wherein the event indicator is provided further when the fifth condition occurs.

19. The system as in claim 17, wherein the processor is further for:

identifying a fifth condition, the fifth condition occurring when the last data value is the highest of the first plurality of data values, the first plurality of data values occurring within a pre-determined duration,

wherein the event indicator is provided further when the fifth condition occurs.

20. The system as in claim 15, wherein each of the plurality of historical values being one of an opening price and a closing price of one of a plurality of trading days constituting at least a portion of the timeline.

21. The system as in claim 20, wherein the processor is further for:

obtaining price difference between the opening price and the closing price of the plurality of historical values in response and subsequent to the buy indicator being provided and providing a sell indicator for one of the plurality of trading days when the price difference exceeds a predetermined value and when the closing price is higher than the opening price of the one of the plurality of trading days.

22. The system as in claim 21, wherein the processor is further for:

extracting a second plurality of data values from the database, the second plurality of data values occurring prior to the first plurality of data values along the timeline; and

identifying occurrence of a fourth condition, the fourth condition occurring when the second plurality of data values initiates with a sell indicator and is substantially down trending,

wherein the event indicator is further provided when the fourth condition occurs, the event indicator being a buy indicator.

23. The system as in claim 14, wherein the processor is further for:

extracting a second plurality of data values from the database, the second plurality of data values occurring between the first plurality of data values and the first reference data value along the timeline; and

identifying a fourth condition, the fourth condition occurring when each of the second plurality of data values is lower than the first reference data value in response to the third condition occurring and higher than the last data value of the first plurality of data values,

wherein the event indicator is provided further when the fourth condition occurs.

24. The system as in claim 23, wherein the processor is further for:

identifying a fifth condition, the fifth condition occurring when the second reference data value is lower than the last data value of the first plurality of data values,

wherein the event indicator is provided further when the fifth condition occurs.

25. The system as in claim 23, wherein the processor is further for:

identifying a plurality of peak data values from the first plurality of data values, each of the plurality of peak data values having a lower immediately preceding data value and a lower immediately succeeding data value along the timeline,

wherein the event indicator is provided further when the plurality of peak data values are identified.

26. The system as in claim 25, wherein the processor is further for:

providing a reference line extending from the latest of the plurality of peak data values, the reference line being downward trending along the timeline; and

identifying a sixth condition, the sixth condition occurring when a data value subsequent the latest of the plurality of peak data values is higher than a corresponding point along the reference line,

wherein the event indicator being a buy back indicator is provided further when the sixth condition occurs.