

[DESCRIPTION]

[Title of Invention] COMPUTER SYSTEM, METHOD AND PROGRAM
FOR ACCUMULATING ASSET HAVING VALUE WHICH FLUCTUATES OVER
TIME

5 [Technical Field]

[0001]

The present invention relates to a computer system,
method and program for accumulating an asset with a value
fluctuating over time.

10 [Background Art]

[0002]

Periodic accumulation-type foreign exchange margin
transaction systems, which periodically purchase foreign
country currencies (hereinafter, also referred to as
15 "foreign currency") with various currency bases, accumulate
the purchased foreign currencies and transmit profit and
loss evaluation information of the accumulated foreign
currencies to a terminal, are known (e.g., see Patent
Literature 1).

20 [Citation List]

[Patent Literature]

[0003]

[PTL 1] Japanese Laid-Open Publication No. 2004-192587

[Summary of Invention]

25 [Technical Problem]

[0004]

However, conventional systems had a problem of not
analyzing whether the value of a foreign currency to be
purchased is the optimal price at the time of the purchase,
30 or whether or not the time of purchase is optimal, thereby
not attempting optimization of purchase for purchasers of
foreign currencies when the foreign currency is
periodically purchased.

[0005]

35 The present invention was invented in view of such a

problem and the objective of the invention is to provide a computer system, method and program that enables prediction of the time when a value of an asset with a value fluctuating over time reaches the highest value or the lowest value (i.e., local maximum value or local minimum value) or a specific value such as a specific ranking value (e.g., the second lowest value, tenth highest value, and the like) in a predetermined time period.

[Solution to Problem]

10 [0006]

The present invention provides a computer system for accumulating a foreign country currency with a value fluctuating over time, wherein the computer system is configured to carry out: predicting a time when a value of the foreign country currency reaches a low value of a specific rank within a predetermined time period; and purchasing the foreign country currency at the predicted time.

[0007]

20 In one embodiment, the predicting comprises: dividing the predetermined time period into a plurality of time periods; and determining a time period to which a time when a value of the foreign country currency reaches a low value of a specific rank belongs among the plurality of time periods after the dividing.

25 [0008]

In one embodiment, the predicting further comprises repeating: (1) further dividing a time period to which a time when a value of the foreign country currency reaches a low value of a specific rank is determined to belong into a plurality of time periods; and (2) determining a time period to which a time when a value of the foreign country currency reaches a low value of a specific rank belongs among the plurality of time periods after the dividing until a time period to which a time when a value of the

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35

foreign country currency reaches a low value of a specific rank is determined to belong is the same length as a time when a value of the foreign country currency reaches a low value of a specific rank.

5 [0009]

In one embodiment, the determining comprises determining a time period wherein an average value of a value of the foreign country currency is low among the divided plurality of time periods.

10 [0010]

In one embodiment, the determining comprises: determining a time period to which a time when a value of the foreign country currency reaches a low value of a specific rank belongs among the plurality of time periods after the dividing using each of a plurality of prediction models; and deciding that a time period to which a time when a value of the foreign country currency reaches a low value of a specific rank is determined to belong by more prediction models among the plurality of time periods after the dividing is a time period to which a time when a value of the foreign country currency reaches a low value of a specific rank belongs.

[0011]

In one embodiment, the determining comprises: determining a time period to which a time when a value of the foreign country currency reaches a low value of a specific rank belongs among the plurality of time periods after the dividing using each of a plurality of prediction models;

deciding, for each time period of a first half of the plurality of time periods after the dividing, the number of prediction models that determined that said time period is a time period to which a time when a value of the foreign country currency reaches a low value of a specific rank belongs; and deciding that a time period wherein the number

of the prediction models is a predetermined number or more is a time period to which a time when a value of the foreign country currency reaches a low value of a specific rank belongs.

5 [0012]

In one embodiment, the determining further comprises changing the predetermined number in accordance with a relative position of a time periods after the dividing against an entirety of the predetermined time period.

10 [0013]

In one embodiment, the plurality of time periods are 2 time periods.

[0014]

In one embodiment, the predicting comprises restraining
15 from predicting a time during a predetermined restraining time period from a starting point of the predetermined time period as a time when a value of the foreign country currency reaches a low value of a specific rank.

[0015]

20 In one embodiment, the predicting and the purchasing are repeatedly carried out.

[0016]

In one embodiment, the purchasing is automatically carried out without input operation of a user for
25 purchasing the foreign country currency at the predicted time when a value of the foreign country currency reaches a low value of a specific rank.

[0017]

In one embodiment, the low value of a specific rank is
30 the lowest value.

[0018]

In one embodiment, the low value of a specific rank is the n-th lowest value (n is an integral number of 2 or more).

35 [0019]

The present invention provides a method for accumulating a foreign country currency with a value fluctuating over time, wherein the method is performed in a computer system and the method comprises: predicting a time
5 when a value of the foreign country currency reaches a low value of a specific rank within a predetermined time period; and purchasing the foreign country currency at the predicted time.

[0020]

10 The present invention provides a program for accumulating a foreign country currency with a value fluctuating over time, wherein once executed in a computer system, the program cause the computer system to carry out a processing of: predicting a time when a value of the
15 foreign country currency reaches a low value of a specific rank within a predetermined time period; and purchasing the foreign country currency at the predicted time.

[0021]

20 The present invention provides a computer system configured to predict a time when a value of a foreign country currency reaches a value of a specific rank within a predetermined time period based on past value fluctuation of the foreign country currency wherein a value fluctuates over time.

25 [0022]

In one embodiment, the computer system of the present invention is configured to further carry out issuing of a transaction request of the foreign country currency at the predicted time.

30 [0023]

The present invention provides a program performed in a computer system, wherein, once executed, the program cause the computer system to carry out a processing of: predicting a time when a value of a foreign country
35 currency reaches a value of a specific rank within a

predetermined time period based on past value fluctuation of the foreign country currency wherein a value fluctuates over time.

[0024]

- 5 In one embodiment, the processing further comprises: issuing a transaction request of the foreign country currency at the predicted time.

[Advantageous Effects of Invention]

[0025]

- 10 The present invention can provide a computer system, method and program that enables prediction of the highest value or the lowest value (i.e., local maximum value or local minimum value) or a specific value such as a value of a specific rank (e.g., the 2nd lowest value, 10th highest
15 value, and the like) in a predetermined time period, of values of assets wherein the values irregularly fluctuate over time.

[0026]

- 20 Furthermore, the present invention can provide a computer system, method and program that enables enlargement of an evaluated price of the asset by purchasing or accumulating the asset in cycles or in a continuous manner based on prediction of the time when a specific value is reached.

- 25 [Brief Description of Drawings]

[0027]

[Figure 1] A drawing showing one example of a data flow among a user, bank and foreign currency exchange market in an AI foreign currency accumulation deposit.

- 30 [Figure 2] A drawing showing one example of a configuration of a computer system **200** for realizing a new financial product.

- 35 [Figure 3] A drawing showing one example of a data configuration of information regarding accumulation of a value-fluctuating asset stored in a database part **220**.

[Figure 4] A drawing showing one example of a multilayer perceptron **450** utilized by a specific-value prediction AI.

[Figure 5] A flowchart showing one example of the processing **500** in a computer system **200** for realizing a new financial product.

[Figure 6A] A flowchart showing one example of the processing wherein a specific-value prediction AI predicts a time when a value of a value-fluctuating asset reaches the lowest value within a predetermined time period in step **S501**.

[Figure 6B] A flowchart showing one example of the processing of when the processing of step **S602** is carried out utilizing a plurality of prediction models.

[Figure 6C] A flowchart showing one example of the processing of when the processing of step **S602** is carried out utilizing a plurality of prediction models and prediction of the time when a value of a value-fluctuating asset reaches the lowest value within a predetermined time period is restricted in the first half of the predetermined time period.

[Figure 7A] A graph showing one example of time fluctuation of American dollar price (yen).

[Figure 7B] A graph showing one example of time fluctuation of American dollar price (yen).

[Figure 7C] A graph showing one example of time fluctuation of American dollar price (yen).

[Figure 7D] A graph showing one example of time fluctuation of American dollar price (yen).

[Figure 8A] A graph showing one example of time fluctuation of Australian dollar price (yen).

[Figure 8B] A graph showing one example of time fluctuation of Australian dollar price (yen).

[Figure 8C] A graph showing one example of time fluctuation of Australian dollar price (yen).

[Figure 8D] A graph showing one example of time fluctuation

of Australian dollar price (yen).

[Figure 9] A drawing showing one example of a computer system 200' which is an alternative configuration of the computer system 200 for realizing a new financial product.

5 [Description of Embodiments]

[0028]

An embodiment of the present application is explained below while referring to the drawings.

[0029]

10 1. AI foreign currency accumulation deposit

The inventors of the present invention have developed a new financial product called "AI foreign currency accumulation deposit". The AI foreign currency accumulation deposit is an accumulation deposit that predicts the day
15 when a foreign currency of interest reaches the lowest value within a predetermined time period using artificial intelligence (AI) and purchases the foreign currency of interest on the day the foreign currency of interest is predicted to reach the lowest value to accumulate the
20 foreign currency of interest at every said predetermined time period. The AI foreign currency accumulation deposit enables purchase of a foreign currency with an exchange rate that is more advantageous than conventional foreign currency accumulation deposits. As a result, the AI foreign
25 currency accumulation deposit is capable of suppressing risks due to fluctuation of exchange rates to be even lower. In this regard, AI is an abbreviation for "Artificial Intelligence", which refers to a technique for artificially implementing human intelligence (or intelligence superior
30 to human intelligence) on a computer system, or to a computer system to which such a technique is implemented.

[0030]

Figure 1 shows one example of a data flow among a user, bank and foreign country exchange market in the AI foreign
35 currency accumulation deposit. In the example shown in

Figure 1, a foreign currency of interest is accumulated every month from April. Each step shown in Figure 1 is explained below.

[0031]

5 Step **S101**: A user **10** carries out application for an AI foreign currency accumulation deposit to a bank **20**. The application initiates data flow of the AI foreign currency accumulation deposit. The application for the AI foreign currency accumulation deposit can be carried out by, for
10 example, the user **10** accessing the bank system of the bank **20** using a user apparatus (e.g., a smartphone) and the user operating the user apparatus in accordance with a predetermined application procedure. Alternatively, such an application may be carried out by the user **10** submitting a
15 written application for the AI foreign currency accumulation deposit to the counter of the bank **20**. The user **10** sets, for example, accumulation currency, accumulation amount, target amount, and the like upon the application. For example, the user **10** may set to accumulate
20 Australian dollars by 10 thousand yen until the saving reaches 100 thousand yen upon the application. Upon doing so, the user **10** cannot set the timing of accumulation (e.g., which day of every month will the Australian dollars be purchased).

25 [0032]

 The bank **20** receives the AI foreign currency accumulation deposit application and carry out procedures for the application. Once the procedures by the bank **20** is completed, the bank system of the bank **20** performs the
30 processing for the AI foreign currency accumulation deposit.

[0033]

 The bank system of the bank **20** predicts, for example, the day when the foreign currency of interest reaches the lowest value during April on the first day of April. Such a
35 prediction is carried out using AI (artificial

intelligence). For example, it is predicted that April 14 is the day when the foreign currency of interest reaches the lowest value.

[0034]

5 Step **S102**: On April 14, the bank **20** transmits a purchase request for purchasing the foreign currency of interest using Japanese yen in the amount set by the user **10** to a foreign country exchange market **30**.

[0035]

10 Step **S103**: The foreign country exchange market **30** sells the foreign currency of interest to the bank **20** with the exchange rate of April 14 in response to the purchase request from the bank **20**. The bank **20** accumulates the foreign currency of interest purchased from the foreign
15 country exchange market **30** as an April purchase in an account of the user **10**.

[0036]

20 Step **S104**: The bank **20** reports to the user **10** that the foreign currency of interest purchased as the April purchase has been accumulated in the account of the user **10**.

[0037]

25 The bank system of the bank **20** predicts, for example, the day when the foreign currency of interest reaches the lowest value during May on the first day of May. Such a prediction is carried out using AI (artificial intelligence). For example, it is predicted that May 2 is the day when the foreign currency of interest reaches the lowest value.

[0038]

30 Step **S105**: On May 2, the bank **20** transmits a purchase request for purchasing the foreign currency of interest using Japanese yen in the amount set by the user **10** to a foreign country exchange market **30**.

[0039]

35 Step **S106**: The foreign country exchange market **30** sells

the foreign currency of interest to the bank 20 with the exchange rate of May 2 in response to the purchase request from the bank 20. The bank 20 accumulates the foreign currency of interest purchased from the foreign country exchange market 30 as a May purchase in the account of the user 10.

[0040]

Step S107: The bank 20 reports to the user 10 that the foreign currency of interest purchased as the May purchase has been accumulated in the account of the user 10.

[0041]

The bank system of the bank 20 predicts, for example, the day when the foreign currency of interest reaches the lowest value during June on the first day of June. Such a prediction is carried out using AI (artificial intelligence). For example, it is predicted that June 28 is the day when the foreign currency of interest reaches the lowest value.

[0042]

Step S108: On June 28, the bank 20 transmits a purchase request for purchasing the foreign currency of interest using Japanese yen in the amount set by the user 10 to a foreign country exchange market 30.

[0043]

Step S109: The foreign country exchange market 30 sells the foreign currency of interest to the bank 20 with the exchange rate of June 28 in response to the purchase request from the bank 20. The bank 20 accumulates the foreign currency of interest purchased from the foreign country exchange market 30 as a June purchase in the account of the user 10.

[0044]

Step S110: The bank 20 reports to the user 10 that the foreign currency of interest purchased as the June purchase has been accumulated in the account of the user 10.

[0045]

As described above, the day when a foreign currency of interest reaches the lowest value within a predetermined time period is predicted using AI (artificial intelligence) and the foreign currency of interest is purchased on the day when the foreign currency of interest is predicted to reach the lowest value in an AI foreign currency accumulation deposit. As described above, a foreign currency is accumulated every predetermined time period. In view of the above, an AI foreign currency accumulation deposit enables purchase and accumulation of a foreign currency with an exchange rate that is more advantageous than a conventional foreign currency accumulation deposit, wherein a foreign currency is purchased on a fixed day every month. As a result, risks due to fluctuation of exchange rates can be suppressed to be even lower. This enables enlargement of a mark-to-market evaluated price of a foreign currency property at a time point in any end of a cycle for purchasing foreign currency.

[0046]

In addition, prediction of the day when a foreign currency of interest reaches the lowest value using AI is only a prediction, which do not ensure that the foreign currency of interest reaches the lowest value on that day. However, improvement of prediction precision using AI enables performance of accumulation with a more certain and more advantageous exchange rate.

[0047]

Although the embodiment discussed above while referring to Figure 1 explained an example wherein prediction of the day when a foreign currency of interest reaches the lowest value using AI is carried out on the first day of the month of transaction, the timing of when the prediction is carried out is not limited thereto. For example, the prediction may be carried out prior to the transaction time

period (e.g., the day before the month of transaction).

[0048]

In the embodiment discussed above whole referring to Figure 1, AI is used to predict the day when the foreign
5 currency of interest reaches the lowest value within a predetermined time period. However, the present invention is not limited thereto. AI may be used to predict days other than the day when the foreign currency of interest reaches the lowest value within a predetermined time period
10 such as the day when the currency of interest reaches the 2nd lowest value, the day when the currency of interest reaches the 5th lowest value, the day when the currency of interest reaches the 10th lowest value, or the day when the currency of interest reaches the 14th lowest value, within
15 the predetermined time period. This is a method that is more effective when accumulating a foreign currency with high randomness of value fluctuation that is difficult to predict. With a foreign currency with high randomness of value fluctuation that is difficult to predict, the
20 ultimate expectation value improves by intentionally not aiming for the lowest value because even though the lowest value is not taken, the highest value can be avoided.

[0049]

In the embodiment discussed above while referring to
25 Figure 1, the bank 20 reported to the user 10 every time the foreign currency of interest is accumulated. However, whether or not a report is made to the user 10 is optional and the timing of the reporting can be at any timing. For example, the bank 20 does not have to actively report to
30 the user 10. The bank 20 can report to the user after a certain amount of accumulations have been completed.

[0050]

In the embodiment discussed above while referring to Figure 1, the AI foreign currency accumulation deposit has
35 been explained as one example of a new financial product.

However, a new financial product is not limited thereto. For example, a transaction is not limited to purchase or accumulation. The transaction may be a transaction of selling. In such a case, AI (artificial intelligence) is
5 used to predict the day when a foreign currency of interest reaches the highest value within a predetermined time period and the foreign currency of interest is sold on the day when the foreign currency of interest is predicted to reach the highest value. For example, a target of
10 transaction is not limited to a foreign currency. A target of transaction may be any asset with a value that fluctuates over time (hereinafter, also referred to as "value-fluctuating asset"). One example of the value-fluctuating asset is, but is not limited to, foreign
15 currency, investment trust, gold, commodity (crude oil, corn, or the like), or the like. In other words, the new financial product is a product enables formation of a portfolio of a value-fluctuating asset by predicting the time (e.g., second, minute, hour, day, week, or the like)
20 when a value-fluctuating asset of interest reaches a specific value (e.g., specific ranking value such as the highest value, the lowest value, 14th lowest value, or 5th highest value) within a predetermined time period using artificial intelligence (AI) and purchasing the value-
25 fluctuating asset of interest within the time when the value-fluctuating asset is predicted to reach the lowest value or a low value of a specific rank, or selling the value-fluctuating asset of interest within the time when the value-fluctuating asset is predicted to reach the
30 highest value or a high value of a specific rank. This new financial product enables purchasing or selling of a value-fluctuating asset at a price that is more advantageous than a conventional accumulation-type financial product. As a result, risks due to value fluctuation is suppressed to be
35 even lower and the evaluation price thereof can be enlarged.

[0051]

2. Configuration of a computer system for realizing a new financial product

Figure 2 shows one example of a configuration of a computer system 200 for realizing the new financial product discussed above.

[0052]

The computer system 200 is, for example, a computer system used in the bank 20.

10 [0053]

The computer system 200 is connected with an asset transaction computer system 300 via a network 400. In this regard, the network 400 can be any type of network. The network 400 may be, for example, the internet, or LAN.

15 [0054]

The asset transaction computer system 300 is a computer system comprising a server apparatus or the like that can perform processing for transaction of a value-fluctuating asset. The asset transaction computer system 300 is a computer system used in, for example, a foreign country exchange market 30. The asset transaction computer system 300 may be, for example, a computer system managed by a sales mediation operator or a party concerned in the sales such as a money market dealer participating in the foreign country exchange market 30. The asset transaction computer system 300 is configured to carry out processing of selling a value-fluctuating asset in response to a request of purchase of the value-fluctuating asset. In addition, the asset transaction computer system 300 is configured to carry out processing of purchasing the value-fluctuating asset in response to a request of selling the value-fluctuating asset. The computer system 200 can carry out transaction of the value-fluctuating asset by being connected to the asset transaction computer system 300.

35 [0055]

The computer system 200 comprises a server apparatus 210 and a database part 220 connected to the server apparatus 210. The server apparatus 210 comprises an interface part 211, processor part 212 and a memory part 213.

[0056]

The interface part 211 is configured to control communication via the network 400. The interface part 211 is capable of transmitting information outside the server apparatus 210 and capable of receiving information from outside the user apparatus 210. For example, the interface part 211 transmits a request of purchasing a value-fluctuating asset to the asset transaction computer system 300 via the network 400. For example, the interface part 211 transmits a request of selling a value-fluctuating asset to the asset transaction computer system 300 via the network 400. For example, the interface part 211 transmits information to the database 220 connected to the server apparatus 210 and receives information from the database 220.

[0057]

The processor part 212 controls operation of the entire server apparatus 210. The processor part 212 reads out a program stored in the memory part 213 and performs the program. This enables the server apparatus 210 to function as an apparatus performing a desired step. For example, the processor part 212 can carry out one part or all of the processing of accumulating a value-fluctuating asset. The processor part 212 may be implemented by a single processor, or may be implemented by a plurality of processors.

[0058]

The memory part 213 stores a program for performing the processing in the server apparatus 210, data necessary for performing the program, and the like. The memory part 213 stores, for example, one part or all of a program for

carrying out transaction of a value-fluctuating asset, or a program for accumulating a value-fluctuating asset (e.g., a program realizing the processing shown in Figure 5 and Figure 6A to Figure 6C discussed below). In this regard, 5 the program can be stored in the memory part 213 in any manner. For example, the program may be pre-installed in the memory part 213. Alternatively, the program may be installed in the memory part 213 by being downloaded through the network 400. The memory part 213 may be 10 implemented by any storage means.

[0059]

The database part 220 stores information related to accumulation of a value-fluctuating asset for each user. The information related to the accumulation of a value- 15 fluctuating asset includes information of a destination of the accumulation of the value-fluctuating asset. The information of the destination of the accumulation of the value-fluctuating asset may include, for example, information related to the value-fluctuating asset 20 accumulated in the destination of the accumulation of the value-fluctuating asset (e.g., the time when the value-fluctuating asset is purchased, purchased price of the value-fluctuating asset, purchased amount of the value-fluctuating asset, accumulated amount of the value- 25 fluctuating asset, or the like). The information of the destination of the accumulation of the value-fluctuating asset may include information related to the value-fluctuating asset sold from the destination of the accumulation of the value-fluctuating asset (e.g., the time 30 when the value-fluctuating asset is sold, sold price of the value-fluctuating asset, sold amount of the value-fluctuating asset, or the like). When the value-fluctuating asset is a foreign currency, the information of the destination of the accumulation of the value-fluctuating 35 asset is the information of an account for foreign currency

accumulation, which may include information related to the foreign currency accumulated in the account for foreign currency accumulation (e.g., date and time of when the foreign currency is sold, purchase price of the foreign currency, amount of purchase of the foreign currency, total amount of accumulation of the foreign currency, or the like) and information related to the foreign currency sold from the account for foreign currency accumulation (e.g., date and time of when the foreign currency is sold, sold price of the foreign currency, sold amount of the foreign currency, or the like).

[0060]

The database part **220** may also store, for example, past value fluctuation data. The past value fluctuation data may be used for the learning of the specific-value prediction AI discussed below in order to predict value fluctuation in the future. The past value fluctuation data that is used for the learning may include value fluctuation data of an asset of interest against a currency for purchase (e.g., Japanese yen) (e.g., in a case of purchasing and accumulating American dollars with Japanese yen, value fluctuation data of American dollars against Japanese yen). In addition to value fluctuation data of an asset of interest against a currency for purchase, the past value fluctuation data used in the learning may include value fluctuation data of the asset of interest against other currencies (e.g., American dollars, Australian dollars, euro, NZ dollars, and the like), or S&P500 index, Nikkei stock average, Deutscher Aktien Index, or WTI crude oil price, or the like. The database part **220** may also store, for example, learned value fluctuation tendency. When the specific-value prediction AI discussed below utilizes a multilayer perceptron, the database part **220** may store a weight vector of each node established by learning.

[0061]

Figure 3 shows one example of a data configuration of information related to accumulation of a value-fluctuating asset stored in the database part 220.

[0062]

- 5 The example shown in Figure 3 shows one example of a data configuration of information stored in the database 220 when a value-fluctuating asset is a foreign currency.

[0063]

- 10 The database part 220 stores information of an account for foreign currency accumulation for each user. The database part 220 comprises a database 221 for storing information of an account for foreign currency accumulation of a 1st user and a database 222 for storing information of an account for foreign currency accumulation of a 2nd user.
- 15 The database 221 for storing information of the account for foreign currency accumulation of the 1st user comprises, for example, the number of the account for foreign currency accumulation, date and time of purchase of the foreign currency, purchase price of the foreign currency, and total
- 20 amount of accumulation of the foreign currency for the 1st user who started a dollar-based accumulation deposit from April 2017. For example, the database 221 may store information of the 1st user purchasing 113 dollars on April 14, 2017 and the total amount of accumulation being 113
- 25 dollars, store information of the 1st user purchasing 119 dollars on May 2, 2017 and the total amount of accumulation being 232 dollars, store information of the 1st user purchasing 125 dollars on June 28, 2017 and the total amount of accumulation being 357 dollars, and store
- 30 information of the 1st user purchasing 110 dollars on July 10, 2017 and the total amount of accumulation being 467 dollars. The database 222 for storing information of the account for foreign currency accumulation of the 2nd user comprises, for example, the number of the account for
- 35 foreign currency accumulation, date and time of purchase of

the foreign currency, purchase price of the foreign currency, and total amount of accumulation of the foreign currency for the 2nd user who started a euro-based accumulation deposit from July 2016. For example, the
5 database **221** may store information of the 2nd user purchasing 520 euro on July 12, 2016 and the total amount of accumulation being 520 euro.

[0064]

An AI that is capable of predicting the time (e.g.,
10 second, minute, hour, day, week, or the like) when a value of a value-fluctuating asset reaches a specific value (e.g., value of a specific rank such as the lowest value, the highest value, the 14th lowest value, or the 5th highest value) within a predetermined time period (hereinafter,
15 referred to as "specific-value prediction AI") is realized by the computer system **200** having the configuration discussed above. The specific-value prediction AI utilizes a multilayer perceptron **450** as a prediction model.

[0065]

20 Figure **4** shows one example of the multilayer perceptron **450** utilized by the specific-value prediction AI.

[0066]

The multilayer perceptron **450** has an input layer, hidden layer and output layer. In the example shown in
25 Figure **4**, the multilayer perceptron **450** is shown to have 2 hidden layers. However, the number of the hidden layers is not limited thereto. The multilayer perceptron **450** can comprise one or more hidden layer. In addition, each layer of the input layer, hidden layer and output layer of the
30 multilayer perceptron **450** can comprise any number of nodes. For example, each layer may comprise nodes in a manner that the nodes decreases from the input layer towards output layer, or each hidden layer may comprise the same number of nodes.

35 [0067]

The specific-value prediction AI can predict future fluctuation of a value of a value-fluctuating asset by learning past value fluctuation data utilizing the multilayer perceptron 450. The learned past value fluctuation data includes, for example, value fluctuation data of an asset subjected to prediction against a currency for purchase (e.g., Japanese yen). In addition, the learned past value fluctuation data may include value fluctuation data of an asset subjected to prediction against currencies other than the currency for purchase (e.g., American dollars, Australian dollars, euro, NZ dollars to the like), or may include asset price data other than the asset subjected to prediction such as S&P500 index, Nikkei stock average, Deutscher Aktien Index, or WTI crude oil price. The specific-value prediction AI can establish a weight vector of each node of the multilayer perceptron 450 by learning with the past value fluctuation data as teacher data. For example, the specific-value prediction AI can learn using data of a fixed time period of at least 1 type of value fluctuation data as teacher input data and using value fluctuation data of an asset subjected to prediction after said fixed time period as teacher output data.

[0068]

The teacher output data may be, for example, an average value of a predetermined time period of an asset subjected to prediction after a fixed time period. A multilayer perceptron 450 having a weight vector of each node established by learning with such teacher output data will be able to output prediction of an average value of a predetermined time period in the future once value fluctuation data of a time period right before is inputted.

[0069]

The teacher output data may be, for example, a binary (0 or 1) showing whether the asset subjected to prediction reaches the lowest value in the first half or the last half

of a certain time period (e.g., 1 month, 10 business days, 6 business days, 2 business days, or the like) after the fixed time period. A multilayer perceptron **450** having a weight vector of each node established by leaning with such teacher output data will be able to output the prediction regarding whether the lowest value is reached in the first half or the lowest value is reached in the last half of a certain time period in the future (e.g., 1 month, 10 business days, 6 business days, 2 business days, or the like); once the value fluctuation data of a time period right before is inputted.

[0070]

The teacher output data may be, for example, a value showing the time period in which an asset subjected to prediction reaches the lowest value among time periods wherein a certain time period after a fixed time period (e.g., 1 month, 10 business days, 6 business days, 2 business days, or the like) is divided into a plurality of time periods. A multilayer perceptron **450** having a weight vector of each node established by leaning with such teacher output data will be able to output prediction regarding the time period in which the lowest value is reached among the time periods wherein a certain time period in the future (e.g., 1 month, 10 business days, 8 business days, 4 business days, or the like) is divided into a plurality of time periods, once the value fluctuation data of a time period right before is inputted.

[0071]

A specific-value prediction AI utilizes a multilayer perceptron **450** to be able to learn value fluctuation tendency based on trends such as, "in a month of a large up-trend, the lowest value tends to be in the first half of the month and the highest value tends to be in the last half of the month", "in a month of a large down-trend, the lowest value tends to be in the last half of the month and

the highest value tends to be in the first half of the month", "during a down-trend, the lowest value is likely to be reached at the beginning of the week rather than at the end of the week", or "during an up-trend, the lowest value is likely to be reached at the end of the week rather than at the beginning of the week" from past value fluctuation data. The specific-value prediction AI can learn value fluctuation tendency based on fluctuation amount such as "a value always drops after a day when the value rises to a certain threshold value or more", or "a value always rises after a day when the value drops to a certain threshold value or more" from past value fluctuation data. The learning result is stored in the database part **220** together with the fluctuation data of the past.

15 [0072]

A specific-value prediction AI utilizes a multilayer perceptron **450** to predict the time (e.g., second, minute, hour, day, week, or the like) when a value of a value-fluctuating asset reaches a specific value (e.g., value of a specific rank such as the lowest value, the highest value, the 14th lowest value, or the 5th highest value) within a predetermined time period based on the leaning result. The input to the multilayer perceptron **450** for processing of the prediction may be the value fluctuation data of a time period right before the predetermined time period subjected to prediction. The input to the multilayer perceptron **450** for processing of the prediction may be value fluctuation data of an asset subjected to prediction against a currency for purchase (e.g., Japanese yen). However, said input may be value fluctuation data of an asset of interest against currencies other than the currency for purchase (e.g., American dollars, Australian dollars, euro, NZ dollars, or the like), or an asset price data of assets other than the asset subjected to prediction such as S&P500 index, Nikkei stock average, Deutscher Aktien Index, or WTI crude oil

price may be an input in the processing of prediction. The input to the multilayer perceptron 450 may be, for example, value fluctuation data during the 16 days right before the predetermined time period subjected to prediction, value fluctuation data during the 32 days right before, or value fluctuation data during the 64 days right before. The more data inputted to the multilayer perceptron 450, the more improved the prediction precision would be. However, it should be noted that increase of data leads to increase of calculation amount. In addition, the more learned past value fluctuation data, the more improved the prediction precision would be. However, it should be noted as well that increase of data leads to increase of calculation amount for the leaning. Furthermore, the more types of the learned past value fluctuation data, the more improved the prediction precision would be. However, it should be noted that if unrelated data is learned for prediction, the specific-value prediction AI would get confused, which may lead to decrease of prediction precision.

[0073]

The multilayer perceptron 450 is one example of a prediction model and the specific-value prediction AI can predict the time when a value of a value-fluctuating asset reaches a specific value by utilizing any other prediction model. For example, the specific-value prediction AI can predict the time when a value of a value-fluctuating asset reaches a specific value by utilizing CNN (convolutional neural network), recurrent neural network (RNN), or the like as a prediction model. In general, CNN has better prediction precision than the multilayer perceptron 450.

[0074]

The specific-value prediction AI can predict the time when a value of a value-fluctuating asset reaches a value of a specific rank by utilizing a plurality of prediction models. The plurality of prediction models may be, for

example, a plurality of prediction models with different types or amount of past value fluctuation data that is used for leaning. The plurality of prediction models may be, for example, a plurality of prediction models with different types or amount of value fluctuation data of a time period right before being inputted for prediction. The plurality of prediction models may be, for example, a plurality of prediction models with different types of neural networks to be used such as a prediction model utilizing a multilayer perceptron **450**, a prediction model utilizing CNN, and a prediction model utilizing RNN. The specific-value prediction AI can improve prediction precision by using each of the plurality of prediction models and deciding by majority of each prediction result to predict the time when a value of a value-fluctuating asset reaches a value of a specific rank.

[0075]

In the example shown in Figure 2, each constituent element of the server apparatus **210** is provided in the server apparatus **210**. However, the present invention is not limited thereto. Any of the constituent elements of the server apparatus **210** can be provided outside the server apparatus **210**. For example, when each of the processor part **212** and memory part **213** is configured with different hardware parts, each hardware part can be connected via any network. In such a case, the network can be any type of network. For example, each hardware part may be connected via LAN, may be wirelessly connected, or may be wire-connected.

[0076]

In the example shown in Figure 2, the database part **220** is provided outside the server apparatus **210**. However, the present invention is not limited thereto. The database part **220** can be provided inside the server apparatus **210**. In such a case, the database part **220** may be implemented by a

storage means identical to a storage means implementing the memory part **213**, or may be implemented by a storage means different from the storage means implementing the memory part **213**. In any case, the database part **220** is configured as a storage part for the server apparatus **210**. The configuration of the database part **220** is not limited to a specific hardware configuration. For example, the database part **220** may be configured with a single hardware part, or may be configured with a plurality of hardware parts. For example, the database part **220** may be configured as an external hard disk apparatus of the server apparatus **210**, or may be configured as a storage on a cloud connected via the network **400**.

[0077]

15 3. Processing in a computer system for realizing a new financial product

Figure **5** shows one example of a processing **500** in the computer system **200** for realizing a new financial product. Explanation is provided herein with the example of the processing **500** for accumulating an asset with a value that fluctuates over time.

[0078]

In step **S501**, a specific-value prediction AI that is realized by the computer system **200** predicts the time when a value of a value-fluctuating asset reaches the lowest value within a predetermined time period. The specific-value prediction AI predicts the time when the value of the value-fluctuating asset reaches the lowest value within the predetermined time period using, for example, the processing discussed below while referring to Figure **5**. In this regard, the predetermined time period may be an interval between accumulations of the value-fluctuating asset. For example, when the value-fluctuating asset is accumulated every month, the predetermined time period may be 1 month (or 23 business days). For example, when the

value-fluctuating asset is accumulated every week, the predetermined time period may be 1 week (or 5 business days). For example, when the value-fluctuating asset is accumulated every day, the predetermined time period may be 1 day (or 9 hours). The time when the value of the value-fluctuating asset reaches the lowest value within the predetermined time period may be in any time unit such as second, minute, hour, day, or week.

[0079]

10 Upon arrival of the predicted time when the value of the value-fluctuating asset reaches the lowest value in step **S501**, the processor part **212** of the server apparatus **210** performs the processing of purchasing the value-fluctuating asset in step **S502**. Specifically, the processor
15 **212** transmits a request to purchase the value-fluctuating asset to the asset transaction computer system **300** via the interface part **211** and performs the processing of purchasing the desired value-fluctuating asset from the asset transaction computer system. The processor part **212**
20 may store information of the purchased value-fluctuating asset in the database part **220**.

[0080]

The value-fluctuating asset is accumulated every predetermined time period by repeating step **S501** and step
25 **S502**. Information of the accumulated value-fluctuating asset is stored in the database part **220**.

[0081]

In addition, a user may carry out input operation after step **S501** and before step **S502** for the user to confirm the
30 purchase of the value-fluctuating asset at the predicted time when the value of the value-fluctuating asset reaches the lowest value in step **S501**. However, step **S502** is preferably carried out automatically without input operation by a user. This is because it is troublesome for
35 the user that there is a need for the user make

confirmation every time the value-fluctuating asset is purchased, which lacks convenience. The user's consent may be obtained for automatically carrying out step **S502** when, for example, the user applies for value-fluctuating asset accumulation.

[0082]

In the example discussed above, the time when the value of the value-fluctuating asset reaches the lowest value within a predetermined time period is predicted in step **S501**. However, the time when the value of the value-fluctuating asset reaches a value of a specific rank (e.g., the 2nd lowest value, the 5th lowest value, the 10th lowest value, the 14th lowest value, i.e., the n-th lowest value (n is an integral number that is 2 or more)) within a predetermined time period may be predicted in step **S501** instead of step **S501**. This is a method that is more effective when a value-fluctuating asset has a high randomness of value fluctuation wherein prediction is difficult. The ultimate expectation value improves by intentionally not aiming for the lowest value because even though the lowest value is not taken, the highest value can be avoided. This enables a more stable asset purchase.

[0083]

In addition, the processing in the computer system **200** may be a processing for selling an asset with a value fluctuating over time. In such a case, when a specific-value prediction AI predicts the time when the value of the value-fluctuating asset reaches the highest value within the predetermined time period in step **S501** and the predicted time when the value of the value-fluctuating asset reaches the highest value arrives, the processor **212** of the server apparatus **210** may perform the processing of selling the value-fluctuating asset in step **S502**. Even in such a case, the time when the value of the value-fluctuating asset reaches a value of a specific rank (e.g.,

the 2nd highest value, the 5th highest value, the 10th highest value, the 14th highest value, i.e., the n-th highest value (n is an integral number that is 2 or more)) within a predetermined time period may be predicted in the same manner as step **S501**' discussed above. This is a method that is more effective when a value-fluctuating asset has a high randomness of value fluctuation wherein prediction is difficult. The ultimate expectation value improves by intentionally not aiming for the highest value because even though the highest value is not taken, the lowest value can be avoided. This enables a more stable asset sales.

[0084]

In other words, the processing in the computer system **200** may be a processing wherein a specific-value prediction AI predicts the time when a value of a value-fluctuating asset reaches a specific value (value of a specific rank such as the highest value, the lowest value, the n-th lowest value, or the n-th highest value (n is an integral value that is 2 or more)) within a predetermined time period in step **S501** and when the predicted time when the value of the value-fluctuating asset reaches the specific value arrives, a processing of the processor part **212** of a server apparatus **210** performs transaction (purchase or sell) of the value-fluctuating asset in step **S502**.

[0085]

Switching to predicting the time when a value of a specific rank is reached instead of predicting the time when the lowest value/highest value is reached may be carried out for every predetermined time period. For example, the time when the lowest value/highest value is reached may be predicted when a trend is predicted to be strongly exhibited (the value fluctuation is linear) in a certain month, or the time when a value of a specific rank is reached may be predicted instead of predicting the time when the lowest value/highest value is reached when a trend

is not predicted to be exhibited (the value fluctuation goes up and down in a curved manner) in another month. This prediction may be carried out using, for example, any trend expectation method and/or volatility prediction method.

5 [0086]

Switching to predicting the time when a value of a specific rank is reached instead of predicting the time when the lowest value/highest value is reached may be carried out for every value-fluctuating asset of interest.

10 For example, when past value fluctuation data is analyzed and it is determined that a trend will not be exhibited in 9 or more months out of 12 in 1 year in a certain value-fluctuating asset, the time when a value of a specific rank is reached may be predicted instead of predicting the time

15 when the lowest value/highest value is reached when said value-fluctuating asset is targeted.

[0087]

When the time when a value of a specific rank is reached is predicted, the specific rank may be set by a

20 specific-value prediction AI, or may be set manually, while considering the value fluctuation of the value-fluctuating asset. In addition, the specific rank may be separately set for each value-fluctuating asset of interest. The rank of the specific rank may be determined, for example, by

25 considering the optimal rank using a back test.

[0088]

Figure 6A shows one example of the processing of a specific-value prediction AI predicting the time when a value of a value-fluctuating asset reaches the lowest value

30 within a predetermined time period in step S501. The specific-value prediction AI predicts the time when a value of a value-fluctuating asset reaches the lowest value within the predetermined time period by carrying out a binary search as explained below. The binary search enables

35 prediction with excellent accuracy since the binary search

can utilize an appropriate prediction model in accordance with the width of the search. For example, when the width of the search is throughout a long period, a prediction model for predicting fluctuation of a long period can be utilized and as the width of the search becomes a short period, a prediction model for predicting fluctuation of a short period can be utilized. The prediction precision is generally better with the prediction model for predicting fluctuation of a short period than the prediction model for predicting fluctuation of a long period.

[0089]

In step **S601**, the specific-value prediction AI divides the predetermined time period into 2 time periods. For example, when the predetermined time period is 2 months (46 business days), the specific-value prediction AI may divide the 46 business days into a 1st time period comprising the 1st business day to the 23rd business day and a 2nd time period comprising the 24th business day to the 46th business day. For example, when the predetermined time period is 1 month (23 business days), the specific-value prediction AI may divide the 23 business days into a 1st time period comprising the 1st business day to the 12th business day and a 2nd time period comprising the 13th business day to the 23rd business day. For example, when the predetermined time period is 1 week (5 business days), the specific-value prediction AI may divide the 5 business days into a 1st time period comprising the 1st business day to the 3rd business day and a 2nd time period comprising the 4th business day to the 5th business day. The 2 time periods after the division may be the same length or different lengths as described above. Each of the 2 time periods after the division may comprise any length of time period.

[0090]

In step **S602**, the specific-value prediction AI determines the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs between the 2 time periods after the division in
5 step **S601**. The period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs may be determined by utilizing, for example, a prediction model that predicts fluctuation of a time period subjected to prediction. In order to determine the time
10 period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs, the specific-value prediction AI determines, for example, the time period wherein the average value of the value of the value-fluctuating asset is lower between the 2 time periods
15 after the division. This is based on the fact that the time when a value of a value-fluctuating asset reaches the lowest value is statistically highly likely to belong to the time period wherein the average value of the value of the value-fluctuating asset is lower. In such a case, the
20 specific-value prediction AI has learned with the past value fluctuation data as a teacher data so that prediction of the average value of the predetermined time period in the future can be outputted.

[0091]

25 In step **S602**, the specific-value prediction AI may determine the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs between the 2 time periods after the division in step **S601** by utilizing a plurality of prediction models. In
30 such a case, for example, the processing shown in Figure **6B** may be carried out.

[0092]

Figure **6B** shows one example of the processing of when the processing of step **S602** is carried out utilizing a
35 plurality of prediction models.

[0093]

In step **S602-1**, the specific-value prediction AI uses each of the plurality of prediction models to determine the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs between the 2 time periods after the division in step **S601**. For example, when the specific-value prediction AI utilizes 5 prediction models, the 1st prediction model is used to determine the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs between the 2 time periods after the division in step **S601**, the 2nd prediction model is used to predict the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs between the 2 time periods after the division in step **S601**...and the 5th prediction model is used to predict the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs between the 2 time periods after the division in step **S601**. The determination of the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs may be carried out by determining the time period wherein the average value of the value of the value-fluctuating asset is lower between the 2 time periods after the division using the specific-value prediction AI that has learned with the past value fluctuation data as teacher data so as to enable, for example, output of prediction of the average value of a predetermined time period in the future. The determination of the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs may be carried out using the specific-value prediction AI that has learned with the past value fluctuation data as teacher data so as to enable, for example, output of prediction of whether the lowest value

is reached in the first half or the last half of a certain time period in the future.

[0094]

Next, in step **S602-2**, the specific-value prediction AI
5 decides that the time period, which was determined by the most number of prediction models to be the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs between the 2 time periods after the division in step **S601**, is the time period
10 to which the time when the value of the value-fluctuating asset reaches the lowest value belongs. By determining the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs by utilizing a plurality of prediction models, the prediction
15 precision can be improved. For example, when the 1st prediction model determines that the time period of the first half of the 2 time periods after the division in step **S601** is the time period to which the time when the value of the value-fluctuating asset reaches the lowest value
20 belongs, the 2nd prediction model determines that the time period of the first half of the 2 time periods after the division in step **S601** is the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs, the 3rd prediction model determines
25 that the time period of the last half of the 2 time periods after the division in step **S601** is the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs, the 4th prediction model determines that the time period of the first half of the 2
30 time periods after the division in step **S601** is the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs, and the 5th prediction model determines that the time period of the last half of the 2 time periods after the division in step
35 **S601** is the time period to which the time when the value of

the value-fluctuating asset reaches the lowest value belongs, the number of prediction models that determined that the time period of the first half of the 2 time periods after the division in step **S601** is the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs is larger than the number of prediction models that determined that the time period of the last half of the 2 time periods after the division in step **S601** is the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs, from which the specific-value prediction AI makes a majority decision that the time period of the first half of the 2 time periods after the division in step **S601** is the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs.

[0095]

For example, when the number of prediction models that determined that the time period of the first half is the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs and the number of prediction models that determined that the time period of the last half is the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs are the same, the time period determined beforehand may be decided to be the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs. However, it is preferable to decide that the time period of the last half is the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs. This is because the time period of the first half has a potentially larger risk as discussed below.

[0096]

Returning back to Figure 6A, in step S603, the specific-value prediction AI determines whether or not the time period that was determined to be the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs in step S602 is the same length as the time when the value of the value-fluctuating asset reaches the lowest value. When the time period that was determined to be the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs in step S602 is determined not to be the same length as the time when the value of the value-fluctuating asset reaches the lowest value (No), the processing proceeds to step S604. When the time period that was determined to be the time period to which the day when the value of the value-fluctuating asset reaches the lowest value belongs in step S602 is determined to be the same length as the time when the value of the value-fluctuating asset reaches the lowest value (Yes), the processing proceeds to step S606 and ends. This is because the time period that was determined to be the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs in step S602 can be decided to be the time when the value of the value-fluctuating asset reaches the lowest value.

[0097]

In step S604, the specific-value prediction AI further divides the time period that was determined to be the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs into 2 time periods. For example, when the time period that was determined to be the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs is 11 business days, the specific-value prediction AI may divide the 11 business days into a 1st time period comprising the 1st business day to the 6th

business day and a 2nd time period comprising the 7th business day to the 11th business day. For example, when the time period that was determined to be the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs is 6 business days, the specific-value prediction AI may divide the 6 business days into a 1st time period comprising the 1st business day to the 3rd business day and a 2nd time period comprising the 4th business day to the 6th business day. The 2 time periods after the division may be the same length or different lengths as described above. Each of the 2 time periods after the division may comprise any length of time period.

[0098]

15 In step **S605**, the specific-value prediction AI determines the time period to which the time when the value of the fluctuating-value asset reaches the lowest value belongs between the 2 time periods after the division in step **S604**. The time period to which the time when the value of the fluctuating-value asset reaches the lowest value belongs may be determined, for example, utilizing a prediction model that predicts fluctuation of a time period subjected to prediction. In order to determine the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs, the specific-value prediction AI determines, for example, the time period wherein the average value of the value of the value-fluctuating asset is lower between the 2 time periods after the division. This is based on the fact that the time when a value of a value-fluctuating asset reaches the lowest value is statistically highly likely to belong to a time period wherein the average value of the value of the value-fluctuating asset is lower. In such a case, the specific-value prediction AI has learned with the past value fluctuation data as a teacher data so that prediction

of the average value of the predetermined time period in the future can be outputted.

[0099]

In step **S605**, the specific-value prediction AI may
5 determine the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs between the 2 time periods after the division in step **S604** by utilizing a plurality of prediction models. In such a case, for example, the processing shown in Figure **6B**
10 may be carried out.

[0100]

In step **S605-1**, the specific-value prediction AI uses each of the plurality of prediction models to determine the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs between
15 the 2 time periods after the division in step **S604**. For example, when the specific-value prediction AI utilizes 5 prediction models, the 1st prediction model is used to determine the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs between
20 the 2 time periods after the division in step **S604**, the 2nd prediction model is used to predict the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs between
25 the 2 time periods after the division in step **S604**...and the 5th prediction model is used to predict the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs between the 2 time periods after the division in step **S604**. The determination
30 of the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs may be carried out by determining the time period wherein the average value of the value of the value-fluctuating asset is lower between the 2 time periods after the
35 division using the specific-value prediction AI that has

learned with the past value fluctuation data as teacher data so as to enable, for example, output of prediction of the average value of a predetermined time period in the future. The determination of the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs may be carried out using the specific-value prediction AI that has learned with the past value fluctuation data as teacher data so as to enable, for example, output of prediction of whether the lowest value is reached in the first half or the last half of a certain time period in the future.

[0101]

Next, in step **S605-2**, the specific-value prediction AI decides that the time period, which was determined by the most number of prediction models to be the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs between the 2 time periods after the division in step **S604**, is the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs. For example, when the 1st prediction model determines that the time period of the last half of the 2 time periods after the division in step **S604** is the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs, the 2nd prediction model determines that the time period of the first half of the 2 time periods after the division in step **S604** is the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs, the 3rd prediction model determines that the time period of the last half of the 2 time periods after the division in step **S604** is the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs, the 4th prediction model determines that the time period of the first half of the 2 time periods after the division in step

S604 is the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs, and the 5th prediction model determines that the time period of the last half of the 2 time periods after the division in step **S604** is the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs, the number of prediction models that determined that the time period of the last half of the 2 time periods after the division in step **S604** is the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs is larger than the number of prediction models that determined that the time period of the first half of the 2 time periods after the division in step **S604** is the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs, from which the specific-value prediction AI makes a majority decision that the time period of the last half of the 2 time periods after the division in step **S604** is the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs.

[0102]

For example, when the number of prediction models that determined that the time period of the first half is the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs and the number of prediction models that determined that the time period of the last half is the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs are the same, the time period determined beforehand may be decided to be the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs. However, it is preferable to decide that the time period of the last half is the time period to which the time when the value of the

value-fluctuating asset reaches the lowest value belongs. This is because the time period of the first half has a potentially larger risk as discussed below.

[0103]

5 After step **S605**, the processing proceeds to step **S603** again. In step **S603**, the specific-value prediction AI determines whether or not the time period that was determined to be the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs in step **S605** is the same length as the time when the value of the value-fluctuating asset reaches the lowest value. When the time period that was determined to be the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs in step **S602** is determined not to be the same length as the time when the value of the value-fluctuating asset reaches the lowest value (No), the processing proceeds to step **S604** again. Step **603** to step **305** are repeated until the time period that was determined to be the time period to which the day when the value of the value-fluctuating asset reaches the lowest value belongs in step **S605** is determined to be the same length as the time when the value of the value-fluctuating asset reaches the lowest value. When the time period that was determined to be the time period to which the day when the value of the value-fluctuating asset reaches the lowest value belongs in step **S605** is determined to be the same length as the time when the value of the value-fluctuating asset reaches the lowest value (Yes), the processing proceeds to step **S606** and ends. This is because the time period that was determined to be the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs can be decided to be the time when the value of the value-fluctuating asset reaches the lowest value.

35 [0104]

When the time predicted by the specific-value prediction AI in step **S501** (step **S601** to step **S605**) is the first half of the predetermined time period, specifically, a time around the beginning of the predetermined time period (e.g., beginning of the month), and the processing of purchasing the value-fluctuating asset is carried out at the predicted time in step **S502**, such processing may bear the risk of the value fluctuating during the rest of the predetermined time period. In other words, when a value-fluctuating asset is purchased in the first half of the predetermined time period, specifically, at a time around the beginning of the predetermined time period (e.g., beginning of the month), the uncertainty of the value fluctuation in the rest of the predetermined time period is large and it is possible that the risk and return do not meet. This is especially significant in an asset with strong randomness of value fluctuation. For example, when it is predicted that the lowest value will be reached at the beginning of the month and a value-fluctuating asset is purchased at the beginning of the month, if the trend of the value-fluctuating asset changes in the middle of the month, the value of the purchased value-fluctuating asset which was predicted to be the lowest value, may end up being the highest value. This would render the prediction result by the specific-value prediction AI unstable, which consequently renders the accumulation result of the value-fluctuating asset unstable as well.

[0105]

In order to avoid such a case wherein the risk and return do not meet, it is preferable that the time of prediction be limited to when the confidence degree of the prediction model is high when the specific-value prediction AI predicts that the time when the value-fluctuating asset reaches the lowest value within the predetermined time period is the first half of the predetermined time period,

specifically, a time around the beginning of the predetermined time period, in step **S501**. When the confidence degree of the prediction model is high, the risk of grabbing the highest value as a result of change in the trend of the value-fluctuating asset in the middle of the month is understood to be extremely low. This enables avoidance of a case wherein the risk and return do not meet and obtainment of a stable prediction result even with an asset with strong randomness of value fluctuation.

10. [0106]

A case wherein the confidence degree of a prediction model is high is, for example, a case wherein a predetermined number or more of a plurality of prediction models make the same prediction. This is because the precision of a prediction is understood to be high when more prediction models make the same prediction. For example, the processing shown in Figure **6C** may be carried out when the time of predicting the first half of the predetermined time period to be the time when the value of the value-fluctuating asset reaches the lowest value within the predetermined time period is limited to when the confidence degree of the prediction model is high in step **S602**.

[0107]

25 Figure **6C** shows one example of the processing when a plurality of prediction models are utilized for the processing of step **S602** and the time of predicting the first half of the predetermined time period to be the time when the value of the value-fluctuating asset reaches the lowest value within the predetermined time period is limited to when the confidence degree of the prediction model is high.

[0108]

35 Step **S602-1** is the same processing as step **S602-1** shown in Figure **6B**. The specific-value prediction AI uses each of

the plurality of prediction models to determine the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs between the 2 time periods after the division in step **S601**.

5 [0109]

In step **S602-2'**, the specific-value prediction AI decides the number of prediction models that determined that the time period of the first half of the 2 time periods after the division in step **S601** is the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs. For example, in a case wherein each of 5 prediction models is used, when the 1st prediction model determines that the time period of the first half of the 2 time periods after the division in step **S601** is the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs, the 2nd prediction model determines that the time period of the first half of the 2 time periods after the division in step **S601** is the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs, the 3rd prediction model determines that the time period of the last half of the 2 time periods after the division in step **S601** is the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs, the 4th prediction model determines that the time period of the first half of the 2 time periods after the division in step **S601** is the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs, and the 5th prediction model determines that the time period of the last half of the 2 time periods after the division in step **S601** is the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs, it is decided that the number of prediction models that determined that the time period of the first half of

the 2 time periods after the division in step **S601** is the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs is 3.

[0110]

Next, in step **S602-3**, the specific-value prediction AI determines whether or not the number of the prediction models determined in step **S602-2** is a predetermined number or more. When the number of the prediction models is the predetermined number or more, the processing proceeds to step **S602-4**. When the number of the prediction models is less than the predetermined number, the processing proceeds to step **S602-5**. In this regard, the predetermined number may be any number larger than the half of the total number of prediction models that are used. For example, the predetermined number may be the total number of the prediction models that are used, 80% of the total number, or the like.

[0111]

In step **S602-4**, the specific-value prediction AI decides that the time period of the first half of the 2 time periods after the division in step **S601** is the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs. This is because the confidence degree of the plurality of prediction models is high and the risk due to selecting the time period of the first half is understood to be low.

[0112]

In step **S602-5**, the specific-value prediction AI decides that the time period of the last half of the 2 time periods after the division in step **601** is the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs. This is because the confidence degree of the plurality of prediction models is low and the risk due to selecting the time period of the first half is understood to be high.

[0113]

In step **S605**, the same processing as the processing shown in Figure **6C** may be carried out also in a case wherein the time of predicting the time period of the first half of the predetermined time period to be the time when the value of the value-fluctuating asset reaches the lowest value is limited to when the confidence degree of the prediction model is high.

[0114]

Step **S605-1** is the same processing as the step **S605-1** discussed above. The specific-value prediction AI uses each of the plurality of prediction models to determine the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs between the 2 time periods after the division in step **S604**.

[0115]

In step **S605-2'**, the specific-value prediction AI decides the number of prediction models that determined that the time period of the first half of the 2 time periods after the division in step **S604** is the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs. For example, in a case wherein each of 5 prediction models is used, when the 1st prediction model determines that the time period of the first half of the 2 time periods after the division in step **S604** is the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs, the 2nd prediction model determines that the time period of the first half of the 2 time periods after the division in step **S604** is the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs, the 3rd prediction model determines that the time period of the last half of the 2 time periods after the division in step **S604** is the time period to which the time when the value of the value-fluctuating asset

reaches the lowest value belongs, the 4th prediction model determines that the time period of the first half of the 2 time periods after the division in step **S604** is the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs, and the 5th prediction model determines that the time period of the first half of the 2 time periods after the division in step **S604** is the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs, it is decided that the number of prediction models that determined that the time period of the first half of the 2 time periods after the division in step **S604** is the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs is 4.

[0116]

Next, in step **S605-3**, the specific-value prediction AI determines whether or not the number of the prediction models determined in step **S605-2** is a predetermined number or more. When the number of the prediction models is the predetermined number or more, the processing proceeds to step **S605-4**. When the number of the prediction models is less than the predetermined number, the processing proceeds to step **S605-5**. In this regard, the predetermined number may be any number larger than the half of the total number of prediction models that are used. For example, the predetermined number may be the total number of the prediction models that are used, 80% of the total number, or the like.

[0117]

The predetermined number may be changed in accordance with, for example, the position of the time period after the division with respect to the entirety of the predetermined time period. For example, when the 2 time periods after the division in step **S604** is any time period of the first half of the predetermined time period (e.g.,

the predetermined time period is 23 business days, and the 2 time periods after the division in step **S604** are a 1st time period comprising the 1st business day to the 6th business day and a 2nd time period comprising the 7th business day to the 11th business day), the predetermined number may be high. Specifically, the closer the time periods after the division is to the starting point of the predetermined time period, the higher the predetermined number preferably be. This is because the closer the time periods after the division is to the starting point of the predetermined time period, the larger the risk to be bore. For example, when the predetermined time period is 23 business days and the 2 time periods after the division in step **S604** are a 1st time period comprising the 1st business day and a 2nd time period comprising the 2nd business day, it is preferable that the predetermined number be the maximum number. For example, even when the time periods after the division are somewhat apart from the starting point of the predetermined time period (e.g., the predetermined time period is 23 business days and the 2 time periods after the division in step **S604** are a 1st time period comprising the 3rd business day to the 4th business day and a 2nd time period comprising the 5th business day to the 6th business day), the predetermined number may be the maximum number, considering the risk. For example, when the 2 time periods after the division in step **S604** are any time period of the last half of the predetermined time period (e.g., the predetermined time period is 23 business days and the 2 time periods after the division in step **S604** are a 1st time period comprising the 13th business day to the 15th business day and a 2nd time period comprising the 16th business day to the 18th business day), the predetermined number may be low. When the predetermined number is the minimum value, the processing will be a processing equivalent to step **S602-2**.

[0118]

The predetermined number may be set by the specific-value prediction AI, or may be set manually, while considering the value fluctuation of the value-fluctuating asset. In addition, the predetermined number may be

[0119]

In step **S605-4**, the specific-value prediction AI decides that the time period of the first half of the 2 time periods after the division in step **604** is the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs. This is because the confidence degree of the plurality prediction models is high and the risk by selecting the time period of the first half is understood to be low.

[0120]

In step **S605-5**, the specific-value prediction AI decides that the time period the last half of the 2 time periods after the division in step **604** is the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs. This is because the confidence degree of the plurality prediction models is low and the risk due to selecting the time period of the first half is understood to be high.

[0121]

In order to avoid a case wherein the risk and return do not meet, the specific-value prediction AI may additionally or alternatively restrain from predicting that the first half of the predetermined time period, specifically, a time around the beginning of the predetermined time period, is the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs within a predetermined time period in step **S501**. This is achieved by, for example, providing a predetermined restraining time period and restraining from predicting the

time when the value of the value-fluctuating asset reaches the lowest value within a predetermined time period during the predetermined restraining time period.

[0122]

5 The predetermined restraining time period is a time period starting from the starting point of the predetermined time period and the length of the time period may be any length. For example, the length of the predetermined restraining time period may be changed in
10 accordance with the asset of interest. For example, in a case of an asset with a trend that is easy to read (e.g., when euro is purchased with Japanese yen), the length of the predetermined restraining time period can be short. For example, in a case of an asset with a trend that is
15 difficult to read (e.g., when NZ dollar is purchased with Japanese yen), the length of the predetermined restraining time period can be long.

[0123]

20 The following table is one example of the length of the predetermined restraining time period when the predetermined time period is 1 month.

[Table 1]

	Length of the predetermined restraining time period
When American dollar is purchased with Japanese yen	5 days
When NZ dollar is purchased with Japanese yen	7 days
When Australian dollar is purchased with Japanese yen	3 days
When euro is purchased with Japanese yen	1 day
When South African rand is purchased with Japanese yen	2 days

[0124]

The length of the predetermined restraining time period

may be set by the specific-value prediction AI, or may be set manually, while considering the value fluctuation of the value-fluctuating asset.

[0125]

5 In this regard, the processing of step **S501** in the computer system **200** of when American dollars are accumulated every month is explained as one example while referring to Figure **7A** to Figure **7D**. The predetermined time period will be 1 month (23 business days). The unit for the
10 time when the value of the value-fluctuating asset reaches the lowest value will be a day. Figure **7A** to Figure **7D** show graphs of one example of time fluctuation of American dollar price (yen). The solid line shows the actual fluctuating value and the broken line shows the fluctuating
15 value that is predicted utilizing a prediction model that predicts fluctuation during the time period subjected to prediction.

[0126]

 In step **601**, the specific-value prediction AI divides
20 the predetermined time period (23 business days) into 2 time periods on the first day of the month. As shown in Figure **7A**, the specific-value prediction AI divides the predetermined time period (23 business days) into a 1st time period **701** consisting of the 1st business day to the
25 12th business day and a 2nd time period **702** consisting of the 13th business day to the 23rd business day.

[0127]

 In step **S602**, the specific-value prediction AI determines the time period to which the day when the
30 American dollar price reaches the lowest value belongs between the 1st time period **701** and the 2nd time period **702**. The specific-value prediction AI determines the time period wherein average value of the American dollar price is lower between the 1st time period **701** and the 2nd time period **702**
35 utilizing a prediction model that predicts fluctuation

during the 23 days and determines that the time period wherein average value of the American dollar price is lower is the time period to which the day when the American dollar price reaches the lowest value belongs. In the present example, the specific-value prediction AI compares the average value **710** of the 1st time period **701** that was predicted utilizing the prediction model that predicts fluctuation during the 23 days and the average value **720** of the 2nd time period **702** that was predicted utilizing the prediction model that predicts fluctuation during the 23 days and determines that the 2nd time period **702** is the time period to which the day when the American dollar price reaches the lowest value belongs.

[0128]

As one example, the following maximum prediction precision was obtained when the processing of determining the time period wherein the average value of the American dollar price is lower between the 1st time period **701** and the 2nd time period **702** and determining that the time period wherein the average value of the American dollar price is low is the time period to which the day when the American dollar price reaches the lowest value belongs is carried out by the specific-value prediction AI utilizing a multilayer perceptron comprising an input layer, 3 layers of hidden layers and an output layer, wherein each node number decreases as 31, 16, 8, 4, 1 from the input layer towards the output layer, as a prediction model that predicts fluctuation during the 23 days. The value fluctuation data that was used for the leaning of the specific-value prediction AI is only the value fluctuation data of American dollars against Japanese yen.

[0129]

[Table 2]

Model	Maximum prediction precision
Random	53%

Multilayer perceptron to which the value fluctuation data during the 16 days right before is inputted	56%
Multilayer perceptron to which the value fluctuation data during the 32 days right before is inputted	58%
Multilayer perceptron to which the value fluctuation data during the 64 days right before is inputted	61%

In this regard, random is a model that predicts the day when the lowest value is reached in a random manner, which was used for comparison. It can also be understood from this result that the more the data inputted to the
5 multilayer perceptron, the more the prediction precision improves.

[0130]

As another example, the following maximum prediction precision was obtained when the value fluctuation data used
10 for learning is varied in a case wherein the processing of determining a time period wherein the average value of the American dollar price is lower between the 1st time period **701** and the 2nd time period **702** and determining that the
15 time period wherein the average value of the American dollar price is low is the time period to which the day when the American dollar reaches the lowest value belongs is carried out by the specific-value prediction AI utilizing CNN as a prediction model.

[0131]

20 [Table 3]

Value fluctuation data	Maximum prediction precision
Value fluctuation data of American dollar to Japanese yen + Value fluctuation data of euro to American dollar	59.8%

Value fluctuation data of American dollar to Japanese yen + WTI crude oil price	61.9%
Value fluctuation data of American dollar to Japanese yen	66.3%
Value fluctuation data of American dollar to Japanese yen + Value fluctuation data of euro to American dollar + WTI crude oil price + S&P500 index + Nikkei stock average + Deutscher Aktien Index	67.0%
Value fluctuation data of American dollar to Japanese yen + S&P500 index	69.9%
Value fluctuation data of American dollar to Japanese yen + S&P500 index + Nikkei stock average + Deutscher Aktien Index	73.6%

As described above, the prediction model to be used and the value fluctuation data to be learned are closely associated to prediction precision. Prediction precision of over 70% can be achieved by selecting the appropriate prediction model and value fluctuation data to be learned.

5 [0132]

In step **S603**, the specific-value prediction AI

determines whether or not the 2nd time period **702** is for 1 day. Since the 2nd time period **702** is a time period of 11 days consisting of the 13th business day to the 23rd business day, the processing proceeds to step **S604**.

5 [0133]

In step **S604**, the specific-value prediction AI divides the 2nd time period **702** into 2 time periods on the first day of the 2nd time period **702**. As shown in Figure **7B**, the specific-value prediction AI divides the 2nd time period
10 **702** into a 3rd time period **703** consisting of the 13th business day to the 17th business day and a 4th time period **704** consisting of the 18th business day to the 23rd business day.

[0134]

15 In addition, although the example shown in Figure **7B** shows that step **S604** is performed on the first day of the 2nd time period **702**, the timing of each step of processing of step **S501** can be at any timing. For example, all of the processing of step **S501** (processing of predicting the day
20 when the value of the value-fluctuating asset reaches the lowest value within a predetermined time period) may be completed on the first day of the month, or one part of the processing of step **S501** (processing of predicting the day when the value of the value-fluctuating asset reaches the
25 lowest value within a predetermined time period) may be carried out at every arrival of the time period to which the value of the value-fluctuating asset is determined to belong.

[0135]

30 In step **S605**, the specific-value prediction AI determines the time period to which the day when the American dollar price reaches the lowest value belongs between the 3rd time period **703** and the 4th time period **704**. The specific-value prediction AI determines the time period
35 wherein average value of the American dollar price is lower

between the 3rd time period **703** and the 4th time period **704** utilizing a prediction model that predicts fluctuation during the 13 days and determines that the time period wherein average value of the American dollar price is lower
5 is the time period to which the day when the American dollar price reaches the lowest value belongs. In the present example, the specific-value prediction AI compares the average value **730** of the 3rd time period **703** that was predicted utilizing the prediction model that predicts
10 fluctuation during the 13 days and the average value **740** of the 4th time period **704** that was predicted utilizing the prediction model that predicts fluctuation during the 13 days and determines that the 3rd time period **703** is the time period to which the day when the American dollar price
15 reaches the lowest value belongs.

[0136]

Returning back to step **S603**, the specific-value prediction AI determines whether or not the 3rd time period **703** is for 1 day. Since the 3rd time period **703** is a time
20 period of 5 days consisting of the 13th business day to the 17th business day, the processing proceeds again to step **S604**.

[0137]

In step **S604**, the specific-value prediction AI divides
25 the 3rd time period **703** into 2 time periods. As shown in Figure **7C**, the specific-value prediction AI divides the 3rd time period **703** into a 5th time period **705** consisting of the 13th business day to the 14th business day and a 6th time period **706** consisting of the 15th business day to the
30 17th business day.

[0138]

In step **S605**, the specific-value prediction AI determines the time period to which the day when the American dollar price reaches the lowest value belongs
35 between the 5th time period **705** and the 6th time period **706**.

The specific-value prediction AI determines the time period wherein average value of the American dollar price is lower between the 5th time period **705** and the 6th time period **706** utilizing a prediction model that predicts fluctuation during the 5 days and determines that the time period wherein average value of the American dollar price is lower is the time period to which the day when the American dollar price reaches the lowest value belongs. In the present example, the specific-value prediction AI compares the average value **750** of the 5th time period **705** that was predicted utilizing the prediction model that predicts fluctuation during the 5 days and the average value **760** of the 6th time period **706** that was predicted utilizing the prediction model that predicts fluctuation during the 5 days and determines that the 5th time period **705** is the time period to which the day when the American dollar price reaches the lowest value belongs.

[0139]

Returning back to step **S603**, the specific-value prediction AI determines whether or not the 5th time period **705** is for 1 day. Since the 5th time period **705** is a time period of 2 days consisting of the 13th business day to the 14th business day, the processing proceeds again to step **S604**.

[0140]

In step **S604**, the specific-value prediction AI divides the 5th time period **705** into 2 time periods. As shown in Figure **7D**, the specific-value prediction AI divides the 5th time period **705** into a 7th time period **707** consisting of the 13th business day and an 8th time period **708** consisting of the 14th business day.

[0141]

In step **S605**, the specific-value prediction AI determines the time period to which the day when the American dollar price reaches the lowest value belongs

between the 7th time period **707** and the 8th time period **708**. The specific-value prediction AI determines the time period wherein average value of the American dollar price is lower between the 7th time period **707** and the 8th time period **708** utilizing a prediction model that predicts fluctuation during the 2 days and determines that the time period wherein average value of the American dollar price is lower is the time period to which the day when the American dollar price reaches the lowest value belongs. In the present example, the specific-value prediction AI compares the average value **770** of the 7th time period **707** that was predicted utilizing the prediction model that predicts fluctuation during the 2 days and the average value **780** of the 8th time period **708** that was predicted utilizing the prediction model that predicts fluctuation during the 2 days and determines that the 8th time period **708** is the time period to which the day when the American dollar price reaches the lowest value belongs.

[0142]

Returning back to step **S603**, the specific-value prediction AI determines whether or not the 8th time period **708** is for 1 day. Since the 8th time period **708** is a time period of 1 day consisting of the 14th business day, the processing proceeds to step **S606** and ends.

[0143]

With the processing of the above, it is predicted that the day when American dollar reaches the lowest value in this month is on the 14th business day. When the 14th business day arrives, the processor part **212** purchases and accumulates the American dollars in step **S502**.

[0144]

As another example, the processing of step **S501** in the computer system **200** of when Australian dollars are accumulated every month is exemplified while referring to Figure **8A** to Figure **8D**.

[0145]

Figure **8A** to Figure **8D** are graphs showing one example of time fluctuation of Australian dollar (yen). The solid line shows the actual fluctuating value and the broken line shows the fluctuating value that is predicted utilizing a prediction model that predicts fluctuation during the time period subjected to prediction. The predetermined time period will be 1 month (23 business days). The unit for the time when the value of the value-fluctuating asset reaches the lowest value will be a day. The length of the predetermined restraining time period will be 4 days. The specific-value prediction AI will carry out prediction utilizing 5 prediction models. The predetermined number will fluctuate as below.

[Table 4]

Time period of the first half	Predetermined number
Up to the 6th business day	5
Up to the 9th business day	4
Up to the 12th business day	3

[0146]

In step **601**, the specific-value prediction AI divides the predetermined time period (23 business days) into 2 time periods on the first day of the month. As shown in Figure **8A**, the specific-value prediction AI divides the predetermined time period (23 business days) into a 1st time period **801** consisting of the 1st business day to the 12th business day and a 2nd time period **802** consisting of the 13th business day to the 23rd business day.

[0147]

In step **S602-1**, the specific-value prediction AI determines the time period to which the day when the Australian dollar price reaches the lowest value belongs between the 1st time period **801** and the 2nd time period **802** using each of the 5 prediction models. The specific-value

prediction AI utilizes each of the 5 prediction models that predicts fluctuation during the 23 days to determine the time period to which the day when the Australian dollar price reaches the lowest value belongs between the 1st time period **801** and the 2nd time period **802**. The prediction models may be, for example, a plurality of prediction models with different type or amount of past value fluctuation data used for learning, or, for example, a plurality of prediction models with different type or amount of past value fluctuation data inputted for prediction, or, for example, a plurality of prediction models with different types of neural network to be utilized such as a prediction model utilizing a multilayer perceptron **450**, a prediction model utilizing CNN, a prediction model utilizing RNN, and the like. In the present example, the following predictions were made by each prediction model.

[Table 5]

Prediction model No.	The time period to which the day when the Australian dollar reaches the lowest value belongs between the 1st time period 801 and the 2nd time period 802
1	1st time period 801
2	2nd time period 802
3	1st time period 801
4	1st time period 801
5	2nd time period 802

[0148]

In step **S602-2'**, the specific-value prediction AI decides the number of prediction models that determined that the 1st time period **801**, which is the time period of the first half between the 1st time period **801** and the 2nd time period **802**, is the time period to which the day when the Australian dollar price reaches the lowest value belongs. In view of the results of Table 5, the number of the prediction models is decided to be 3.

[0149]

In step **S602-3**, the specific-value prediction AI determines whether or not the number of the prediction models determined in step **S602-2'** is a predetermined number or more. Since the predetermined number of the 1st business day to the 12th business day is 3, and the number of predicted models decided in step **S602-2'** is 3 or more, the processing proceeds to step **S602-4**.

[0150]

In step **S602-4**, the specific-value prediction AI decides that the 1st time period **801** is the time period to which the day when the Australian dollar price reaches the lowest value belongs.

[0151]

In step **S603**, the specific-value prediction AI determines whether or not the 1st time period **801** is for 1 day. Since the 1st time period **801** is a time period of 12 days consisting of the 1st business day to the 12th business day, the processing proceeds to step **S604**.

[0152]

In step **S604**, the specific-value prediction AI divides the 1st time period **801** into 2 time periods. As shown in Figure **8B**, the specific-value prediction AI divides the 1st time period **801** into a 3rd time period **803** consisting of the 1st business day to the 6th business day and a 4th time period **804** consisting of the 7th business day to the 12th business day.

[0153]

In addition, although the example shown in Figure **8B** shows that step **S604** is performed on the first day of the 3rd time period **803**, the timing of each step of processing of step **S501** can be at any timing. For example, all of the processing of step **S501** (processing of predicting the day when the value of the value-fluctuating asset reaches the lowest value within a predetermined time period) may be completed on the first day of the month, or one part of the

processing of step **S501** (processing of predicting the day when the value of the value-fluctuating asset reaches the lowest value within a predetermined time period) may be carried out at every arrival of the time period to which

5 the value of the value-fluctuating asset is determined to belong.

[0154]

In step **S605**, the specific-value prediction AI determines the time period to which the day when the

10 Australian dollar price reaches the lowest value belongs between the 3rd time period **803** and the 4th time period **804**. The specific-value prediction AI determines the time period to which the day when the Australian dollar price reaches the lowest value belongs between the 3rd time period **803**

15 and the 4th time period **804** utilizing 5 prediction models that predict fluctuation during the 13 days. In the present example, the following predictions were made by each prediction model.

[Table 6]

Prediction model No.	The time period to which the day when the Australian dollar reaches the lowest value belongs between the 3rd time period 803 and the 4th time period 804
1	3rd time period 803
2	4th time period 804
3	3rd time period 803
4	3rd time period 803
5	3rd time period 803

20 [0155]

In step **S605-2'**, the specific-value prediction AI decides the number of prediction models that determined that the 3rd time period **803**, which is the time period of the first half between the 3rd time period **803** and the 4th

25 time period **804**, is the time period to which the day when the Australian dollar price reaches the lowest value belongs. In view of the results of Table 6, the number of the prediction models is decided to be 4.

[0156]

In step **S605-3**, the specific-value prediction AI determines whether or not the number of the prediction models determined in step **S605-2'** is a predetermined number or more. Since the predetermined number of the 1st business day to the 6th business day is 5, and the number of predicted models determined in step **S605-2'** is not 5 or more, the processing proceeds to step **S605-5**.

[0157]

10 In step **S605-5**, the specific-value prediction AI decides that the 4th time period **804**, which is the period of the last half, is the time period to which the day when the Australian dollar price reaches the lowest value belongs.

15 [0158]

Returning back to step **S603**, the specific-value prediction AI determines whether or not the 4th time period **804** is for 1 day. Since the 4th time period **804** is a time period of 6 days consisting of the 7th business day to the 12th business day, the processing proceeds again to step **S604**.

[0159]

25 In step **S604**, the specific-value prediction AI divides the 4th time period **804** into 2 time periods. As shown in Figure **8C**, the specific-value prediction AI divides the 4th time period **804** into a 5th time period **805** consisting of the 7th business day to the 9th business day and a 6th time period **806** consisting of the 10th business day to the 12th business day.

30 [0160]

In step **S605**, the specific-value prediction AI determines the time period to which the day when the Australian dollar price reaches the lowest value belongs between the 5th time period **805** and the 6th time period **806**.
35 The specific-value prediction AI determines the time period

to which the day when the Australian dollar price reaches the lowest value belongs between the 5th time period **805** and the 6th time period **806** utilizing 5 prediction models that predict fluctuation during the 5 days. In the present example, the following predictions were made by each prediction model.

[Table 7]

Prediction model No.	The time period to which the day when the Australian dollar reaches the lowest value belongs between the 5th time period 805 and the 6th time period 806
1	5th time period 805
2	5th time period 805
3	5th time period 805
4	5th time period 805
5	5th time period 805

[0161]

In step **S605-2'**, the specific-value prediction AI decides the number of prediction models that determined that the 5th time period **805**, which is the time period of the first half between the 5th time period **805** and the 6th time period **806**, is the time period to which the day when the Australian dollar price reaches the lowest value belongs. In view of the results of Table 7, the number of the prediction models is decided to be 5.

[0162]

In step **S605-3**, the specific-value prediction AI determines whether or not the number of the prediction models determined in step **S605-2'** is a predetermined number or more. Since the predetermined number of the 7th business day to the 9th business day is 4, and the number of predicted models determined in step **S605-2'** is 4 or more, the processing proceeds to step **S605-4**.

25 [0163]

In step **S605-4**, the specific-value prediction AI decides that the 5th time period **805** is the time period to which the day when the Australian dollar price reaches the

lowest value belongs.

[0164]

Returning back to step **S603**, the specific-value prediction AI determines whether or not the 5th time period **805** is for 1 day. Since the 5th time period **805** is a time period of 3 days consisting of the 7th business day to the 9th business day, the processing proceeds again to step **S604**.

[0165]

In step **S604**, the specific-value prediction AI divides the 5th time period **805** into 2 time periods. As shown in Figure **8D**, the specific-value prediction AI divides the 5th time period **805** into a 7th time period **807** consisting of the 7th business day and an 8th time period **808** consisting of the 8th business day to the 9th business day.

[0166]

In step **S605**, the specific-value prediction AI determines the time period to which the day when the Australian dollar price reaches the lowest value belongs between the 7th time period **807** and the 8th time period **808**. The specific-value prediction AI determines the time period to which the day when the Australian dollar price reaches the lowest value belongs between the 7th time period **807** and the 8th time period **808** utilizing 5 prediction models that predict fluctuation during the 2 days. In the present example, the following predictions were made by each prediction model.

[Table 8]

Prediction model No.	The time period to which the day when the Australian dollar reaches the lowest value belongs between the 7th time period 807 and the 8th time period 808
1	7th time period 807
2	8th time period 808
3	7th time period 807
4	7th time period 807
5	7th time period 807

[0167]

In step **S605-2'**, the specific-value prediction AI decides the number of prediction models that determined that the 7th time period **807**, which is the time period of the first half between the 7th time period **807** and the 8th time period **808**, is the time period to which the day when the Australian dollar price reaches the lowest value belongs. In view of the results of Table 8, the number of the prediction models is decided to be 4.

10 [0168]

In step **S605-3**, the specific-value prediction AI determines whether or not the number of the prediction models determined in step **S605-2'** is a predetermined number or more. Since the predetermined number of the 7th business day is 4, and the number of predicted models determined in step **S605-2'** is 4 or more, the processing proceeds to step **S605-4**.

[0169]

In step **S605-5**, the specific-value prediction AI decides that the 4th time period **804**, which is the period of the last half, is the time period to which the day when the Australian dollar price reaches the lowest value belongs.

[0170]

25 Returning back to step **S603**, the specific-value prediction AI determines whether or not the 7th time period **807** is for 1 day. Since the 7th time period **807** is a time period of 1 day consisting of the 7th business day, the processing proceeds to step **S606** and ends.

30 [0171]

With the processing of the above, it is predicted that the day when Australian dollar reaches the lowest value in this month is on the 7th business day. When the 7th business day arrives, the processor part **212** purchases and accumulate Australian dollar in step **S502**.

[0172]

When the time when the value of a specific rank is reached is predicted instead of predicting the time when the lowest value is reached, the time period to which the time when the value of an asset reaches a specific rank belongs may be determined in step **S602**, step **S605**. For example, a case of determining the time period to which the time when the value of an asset reaches the 14th lowest value belongs within 23 business days is explained.

10 [0173]

After dividing the 23 business days into 2 time periods in step **S601**, the time period wherein the lowest value does not exist is selected between the 2 time periods after the division in step **S602**. This is because $14 > 23/2$.

15 [0174]

Next, after step **S603**, the 11 or 12 business days are divided into 2 time periods in step **S604** to later select the time period wherein the low value (local minimum value) exists between the 2 time periods after the division in step **S605**. This is because $(14 - 23/2) < 23/4$.

[0175]

Next, after step **S603**, the 5 or 6 business days are divided into 2 time periods in step **S604** to later select the time period wherein the low value (local minimum value) exists between the 2 time periods after the division in step **S605**. This is because $(14 - 23/2) < 23/8$.

[0176]

Next, after step **S603**, the 2 or 3 business days are divided into 2 time periods in step **S604** to later select the time period wherein the low value (local minimum value) does not exist between the 2 time periods after the division in step **S605**. This is because $(14 - 23/2) > 23/16$.

[0177]

This is repeated until it is determined Yes in step **S603**.

35

[0178]

Accordingly, the time period to which the time when the value of an asset reaches a specific rank belongs can be determined in the same manner as the binary search
5 discussed above.

[0179]

Although the example discussed above explained that the time when a value of a value-fluctuating asset reaches a value of a specific rank within a predetermined time period
10 is predicted by the binary search that divides a time period of interest into 2 time periods, the present invention is not limited to the binary search. Prediction of the time when a value of a value-fluctuating asset reaches a value of a specific rank within a predetermined
15 time period by dividing a time period of interest into more than 2 time periods is also within the scope of the present invention.

[0180]

For example, the specific-value prediction AI may
20 divide the predetermined time period into m time periods (m is an integral value that is more than 2) instead of dividing the predetermined time period into 2 time periods in step S601, and the specific-value prediction AI may determine the time period to which the time when the value
25 of the value-fluctuating asset reaches a value of a specific rank (e.g., the lowest value, the highest value, the n -th lowest value, the n -th highest value) belongs among the m time periods after the division in step S602. When the time period to which the time when the value of
30 the value-fluctuating asset reaches the lowest value belongs is determined, this determination may be carried out, for example, by determining the time period wherein the average value of the value of the value-fluctuating asset is the lowest among the m time periods after the
35 division using the specific-value prediction AI having

learned past value fluctuation data as teacher data so as to enable output of prediction of the average value of a predetermined time period in the future. The determination of the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs may be carried out, for example, by using the specific-value prediction AI having learned past value fluctuation data as teacher data so as to enable output of prediction regarding which time period among the time periods, wherein a certain time period in the future was divided into a plurality of time periods, reaches the lowest value. When the time period to which the time when the value of the value-fluctuating asset reaches the highest value belongs is determined, this determination may be carried out, for example, by determining the time period wherein the average value of the value of the value-fluctuating-asset is the highest among the m time periods after the division using the specific-value prediction AI having learned past value fluctuation data as teacher data so as to enable output of prediction of the average value of a predetermined time period in the future. The determination of the time period to which the time when the value of the value-fluctuating asset reaches the highest value belongs may be carried out, for example, by using the specific-value prediction AI having learned past value fluctuation data as teacher data so as to enable output of prediction regarding which time period among the time periods, wherein a certain time period in the future was divided into a plurality of time periods, reaches the highest value. When the time period to which the time when the value of the value-fluctuating asset reaches a value of a specific rank belongs is determined, this determination may be carried out, for example, by determining the time period wherein the average value of the value of the value-fluctuating-asset is at the specific rank among the m time periods after the division

using the specific-value prediction AI having learned past value fluctuation data as teacher data so as to enable output of prediction of the average value of a predetermined time period in the future. The determination of the time period to which the time when the value of the value-fluctuating asset reaches the value of the specific rank belongs may be carried out, for example, by using the specific-value prediction AI having learned past value fluctuation data as teacher data so as to enable output of prediction regarding which time period among the time periods, wherein a certain time period in the future was divided into a plurality of time periods, reaches the value of the specific rank.

[0181]

For example, the specific-value prediction AI may further divide the time period to which the time when a value of the value-fluctuating asset reaches a value of a specific rank is determined to belong into m time periods in step **S604** and the specific-value prediction AI may determine the time period to which the time when the value of the value-fluctuating asset reaches a value of a specific rank (e.g., the lowest value, the highest value, the n -th lowest value, the n -th highest value) belongs among the m time periods after the division in step **S605**. When the time period to which the time when the value of the value-fluctuating asset reaches the lowest value belongs is determined, this determination may be carried out, for example, by determining the time period wherein the average value of the value of the value-fluctuating asset is the lowest among the m time periods after the division using the specific-value prediction AI having learned past value fluctuation data as teacher data so as to enable output of prediction of the average value of a predetermined time period in the future. The determination of the time period to which the time when the value of the

value-fluctuating asset reaches the lowest value belongs may be carried out, for example, by using the specific-value prediction AI having learned past value fluctuation data as teacher data so as to enable output of prediction

5 regarding which time period among the time periods, wherein a certain time period in the future was divided into a plurality of time periods, reaches the lowest value. When the time period to which the time when the value of the value-fluctuating asset reaches the highest value belongs

10 is determined, this determination may be carried out, for example, by determining the time period wherein the average value of the value of the value-fluctuating asset is the highest among the m time periods after the division using the specific-value prediction AI having learned past value

15 fluctuation data as teacher data so as to enable output of prediction of the average value of a predetermined time period in the future. The determination of the time period to which the time when the value of the value-fluctuating asset reaches the highest value belongs may be carried out,

20 for example, by using the specific-value prediction AI having learned past value fluctuation data as teacher data so as to enable output of prediction regarding which time period among the time periods, wherein a certain time period in the future was divided into a plurality of time

25 periods, reaches the highest value. When the time period to which the time when the value of the value-fluctuating asset reaches a value of a specific rank belongs is determined, this determination may be carried out, for example, by determining the time period wherein the average

30 value of the value of the value-fluctuating-asset is at the specific rank among the m time periods after the division using the specific-value prediction AI having learned past value fluctuation data as teacher data so as to enable output of prediction of the average value of a

35 predetermined time period in the future. The determination

of the time period to which the time when the value of the value-fluctuating asset reaches the value of the specific rank belongs may be carried out, for example, by using the specific-value prediction AI having learned past value
5 fluctuation data as teacher data so as to enable output of prediction regarding which time period among the time periods, wherein a certain time period in the future was divided into a plurality of time periods, reaches the value of the specific rank.

10 [0182]

In such a case, for example, in step **S602-2** or step **S605-2**, the specific-value prediction AI decides that among the m time periods after the division, the time period to which the time when the value of the value-fluctuating
15 asset reaches the value of the specific rank is determined to belong by the most number of prediction models is determined as the time period to which the time when the value of the value-fluctuating asset reaches the value of the specific rank belongs.

20 [0183]

For example, in step **S602-2'** or step **S605-2'**, for each time period of the first half of the m time periods after the division, the specific-value prediction AI decides the number of prediction models that determined that said time
25 period is the time period to which the time when the value of the value-fluctuating asset reaches the value of the specific rank belongs, and then in step **S602-3** or step **S605-3**, the specific-value prediction AI determines whether or not the decided number of prediction models is a predetermined number or more for each time period of the
30 first half. When the number is the predetermined number or more, it is decided that the time period thereof is the time period to which the time when the value of the value-fluctuating asset reaches the value of the specific rank
35 belongs.

[0184]

For example, when $m = 6$, in step **S602-2'** or step **S605-2'**, for each of the first 3 time periods of the time periods divided into 6, the specific-value prediction AI decides the number of prediction models that determined that said time period is the time period to which the time when the value of the value-fluctuating asset reaches the value of the specific rank belongs. Next, in step **S602-3** or step **S605-3**, the specific-value prediction AI decides whether or not the determined number of prediction models is a predetermined number or more for each of the first 3 time periods. When the number is the predetermined number or more, it is decided that the time period thereof is the time period to which the time when the value of the value-fluctuating asset reaches the value of the specific rank belongs. For example, when each of the decided number of prediction models for the 1st time period among the first 3 time periods and the decided number of prediction models for the 3rd time period among the first 3 time periods is less than the predetermined number but the decided number of prediction models for the 2nd time period among the first 3 time periods is the predetermined number or more, it is decided that the 2nd time period among the first 3 time periods is the time period to which the time when the value of the value-fluctuating asset reaches the value of the specific rank belongs.

[0185]

In such a case, when there is no time period wherein the number of prediction models are the predetermined number or more, for example, it may be decided that the entire time period of the last half among the plurality of time periods is the time period to which the time when the value of the value-fluctuating asset reaches the value of the specific rank belongs and the processing may proceed to step **S603**, or it may be decided that the entire time period

except for the earliest time period among the plurality of time periods is the time period to which the time when the value of the value-fluctuating asset reaches the value of the specific rank belongs and the processing may proceed to
5 step **S603**. This enables avoidance of selecting a time around the beginning of the predetermined time period when the confidence degree of the prediction model is low and, as a result, enables avoidance of a case wherein the risk and return do not meet.

10 [0186]

4. Alternative configuration of a computer system for realizing a new financial product.

Figure 9 shows one example of a computer system **200'** which is an alternative configuration of the computer
15 system **200** for realizing the new financial product discussed above. In Figure 9, the same reference numbers are given to the same elements as the elements shown in Figure 2 and the explanations thereof are omitted herein. The computer system **200'** is a configuration wherein a user
20 apparatus **100** predicts the time when a value of a value-fluctuating asset reaches a specific value within a predetermined time period and a server apparatus **210** carries out transaction of the value-fluctuating asset at the predicted time when the value of the value-fluctuating
25 asset reaches the specific value.

[0187]

The computer system **200'** comprises a server apparatus **210**, a database part **220** connected to the server apparatus **210** and a user apparatus **100**. The server apparatus **210**,
30 user apparatus **100** and asset transaction computer system **300** are connected to each other via a network **400**. In this regard, the network **400** can be any type of network. The network **400** may be, for example, the internet, or LAN.

[0188]

35 The user apparatus **100** is a terminal used by a user **10**

that utilizes a service for accumulating a value-fluctuating asset, which may be any terminal apparatus such as a smartphone, tablet, or personal computer. The user apparatus 100 comprises an interface part 111, processor part 112 and a storage part 113.

[0189]

The interface part 111 is configured to control communication via the network 400. The interface part 111 can transmit information outside the user apparatus 100 and can receive information from outside the user apparatus 100. For example, the interface part 111 transmits prediction of the day when a value of a value-fluctuating asset reaches the lowest value within a predetermined time period to the server apparatus 210 via the network 400.

[0190]

The processor part 112 controls the operation of the entirety of the user apparatus 100. The processor part 112 reads a program stored in the storage part 113 and performs the program. This enables the user apparatus 100 to function as an apparatus performing a desired step. For example, the processor part 112 can carry out one part of the processing of accumulating a value-fluctuating asset. The processor part 112 may be implemented with a single processor, or may be implemented with a plurality of processors.

[0191]

The storage part 113 stores a program for performing the processing in the user apparatus 100, data necessary for performing the program, and the like. The storage part 113 stores, for example, one part of a program for carrying out transaction of a value-fluctuating asset, or a program for accumulating a value-fluctuating asset (e.g., a program realizing the processing shown in Figure 5 and Figure 6A to Figure 6C discussed above). In this regard, the program can be stored in the storage part 113 in any manner. For

example, the program may be pre-installed in the storage part 113. Alternatively, the program may be installed in the storage part 113 by being downloaded through the network 400. The storage part 113 may be implemented by any storage means.

[0192]

The storage part 113 may also store, for example, past value fluctuation data. The past value fluctuation data may be used to predict value fluctuation in the future. In addition to value fluctuation data of an asset of interest against a currency for purchase (e.g., Japanese yen), the past value fluctuation data that is used for learning may include value fluctuation data of an asset of interest against other currencies (e.g., American dollars, Australian dollars, euro, NZ dollars, and the like), or data of S&P500 index, Nikkei stock average, Deutscher Aktien Index, or WTI crude oil price, or the like. The database part 220 may also store, for example, learned value fluctuation tendency. The database part 220 may store a weight vector of each node of a multilayer perceptron 450 established by learning.

[0193]

The specific-value prediction AI may be realized by a user apparatus 100 having the configuration discussed above. The specific-value prediction AI can predict the time when a value of a value-fluctuating asset reaches the lowest value utilizing any prediction model as discussed above.

[0194]

In the example shown in Figure 9, each constituent element of the user apparatus 100 is provided in the user apparatus 100. However, the present invention is not limited thereto. Any of the constituent elements of the user apparatus 100 can be provided outside the user apparatus 100. For example, when each of the processor part 112 and storage part 113 is configured with different

hardware parts, each hardware part can be connected via any network. In such a case, the network can be any type of network. For example, each hardware part may be connected via LAN, may be wirelessly connected, or may be wire-
5 connected.

[0195]

The processing in the computer system **200'** is the same as the processing **500** in the computer system **200**. However, said processing is different from the processing **500** in the
10 computer system **200** in that the processing of step **S501** is carried out by the specific-value prediction AI realized by the user apparatus **100** and the processing of step **S502** is carried out by the processor part **212** of the server apparatus **210**.

15 [0196]

While the example discussed above explained the prediction of the day when a value of a value-fluctuating asset reaches the lowest value, it is also within the scope of the present invention that a time unit shorter than
20 "day" (e.g., hour, minute, second, or the like) is predicted and a time unit longer than "day" (e.g., week, month, or the like) is predicted. For example, when a value-fluctuating asset is accumulated every day, the computer system **200** or **200'** can predict the time when a
25 value of a value-fluctuating asset reaches the lowest value during 1 day and purchase the value-fluctuating asset at the predicted time when the value of the value-fluctuating asset reaches the lowest value with the processing that is similar to the processing discussed above while referring
30 to Figure **5** and Figure **6A** to Figure **6C**. In this regard, the time when the value of the value-fluctuating asset reaches the lowest value may be any time unit. The time when the value of the value-fluctuating asset reaches the lowest value may be, for example, in seconds, minutes, or hours.

35 [0197]

The present invention is not limited to the embodiment discussed above. It is understood that the scope of the present invention should be interpreted by the Claims alone. It is understood that those skilled in the art can perform an equivalent scope based on the description of the present invention and common general knowledge from the description of the specific and preferable embodiment of the present application.

[Industrial Applicability]

10 [0198]

The present application is useful as an invention providing a computer system, method and program that enables prediction of the highest value or the lowest value (i.e., local maximum value or local minimum value) or a specific value such as a value of a specific rank (e.g., the 2nd lowest value, 10th highest value, and the like) in a predetermined time period, of values of assets wherein the values irregularly fluctuate over time. Furthermore, the present invention is useful as an invention providing a computer system, method and program that enables enlargement of an evaluated price of the asset by purchasing or accumulating the asset in cycles or in a continuous manner based on prediction of the time when a specific value is reached.

25 [Reference Signs List]

[0199]

10 User

20 Bank

30 Foreign country exchange market

100 User apparatus

200, 200' Computer system

210 Server apparatus

220 Database part

300 Asset transaction computer system

35 400 Network

[Claims]

[Claim 1]

A computer system configured to carry out:
predicting a time when a value of the foreign country
5 currency reaches a low value of a specific rank within a
predetermined time period; and
purchasing the foreign country currency at the
predicted time.

[Claim 2]

10 The computer system of claim 1, wherein the predicting
comprises:

dividing the predetermined time period into a plurality
of time periods; and

determining a time period to which a time when a value
15 of the foreign country currency reaches a low value of a
specific rank belongs among the plurality of time periods
after the dividing.

[Claim 3]

The computer system of claim 2, wherein the predicting
20 further comprises repeating:

(1) further dividing a time period to which a time when
a value of the foreign country currency reaches a low value
of a specific rank is determined to belong into a plurality
of time periods; and

25 (2) determining a time period to which a time when a
value of the foreign country currency reaches a low value
of a specific rank belongs among the plurality of time
periods after the dividing

until a time period to which a time when a value of the
30 foreign country currency reaches a low value of a specific
rank is determined to belong is the same length as a time
when a value of the foreign country currency reaches a low
value of a specific rank.

[Claim 4]

35 The computer system of claim 2 or 3, the determining

comprises determining a time period wherein an average value of a value of the foreign country currency is low among the divided plurality of time periods.

[Claim 5]

5 The computer system of any one of claims 2 to 4, wherein the determining comprises:

 determining a time period to which a time when a value of the foreign country currency reaches a low value of a specific rank belongs among the plurality of time periods
10 after the dividing using each of a plurality of prediction models; and

 deciding that a time period to which a time when a value of the foreign country currency reaches a low value of a specific rank is determined to belong by more
15 prediction models among the plurality of time periods after the dividing is a time period to which a time when a value of the foreign country currency reaches a low value of a specific rank belongs.

[Claim 6]

20 The computer system of any of claims 2 to 4, wherein the determining comprises:

 determining a time period to which a time when a value of the foreign country currency reaches a low value of a specific rank belongs among the plurality of time periods
25 after the dividing using each of a plurality of prediction models;

 deciding, for each time period of a first half of the plurality of time periods after the dividing, the number of prediction models that determined that said time period is
30 a time period to which a time when a value of the foreign country currency reaches a low value of a specific rank belongs; and

 deciding that a time period wherein the number of the prediction models is a predetermined number or more is a
35 time period to which a time when a value of the foreign

country currency reaches a low value of a specific rank belongs.

[Claim 7]

5 The computer system of claim 6, wherein the determining further comprises changing the predetermined number in accordance with a relative position of a time periods after the dividing against an entirety of the predetermined time period.

[Claim 8]

10 The computer system of any one of claims 2 to 7, wherein the plurality of time periods are 2 time periods.

[Claim 9]

15 The computer system of any one of claims 1 to 8, wherein the predicting comprises restraining from predicting a time during a predetermined restraining time period from a starting point of the predetermined time period as a time when a value of the foreign country currency reaches a low value of a specific rank.

[Claim 10]

20 The computer system of any one of claims 1 to 9 wherein the predicting and the purchasing are repeatedly carried out.

[Claim 11]

25 The computer system of any one of claims 1 to 10 wherein the purchasing is automatically carried out without input operation of a user for purchasing the foreign country currency at the predicted time when a value of the foreign country currency reaches a low value of a specific rank.

30 [Claim 12]

The computer system of any one of claims 1 to 11, wherein the low value of a specific rank is the lowest value.

[Claim 13]

35 The computer system of any one of claims 1 to 11,

wherein the low value of a specific rank is the n-th lowest value (n is an integral number of 2 or more).

[Claim 14]

5 A method performed in a computer system, wherein the method comprises:

predicting a time when a value of the foreign country currency reaches a low value of a specific rank within a predetermined time period; and

10 purchasing the foreign country currency at the predicted time.

[Claim 15]

A program performed in a computer system, wherein once executed in a computer system, the program cause the computer system to carry out a processing of:

15 predicting a time when a value of the foreign country currency reaches a low value of a specific rank within a predetermined time period; and

purchasing the foreign country currency at the predicted time.

20 [Claim 16]

A computer system configured to predict a time when a value of a foreign country currency reaches a value of a specific rank within a predetermined time period based on past value fluctuation of the foreign country currency
25 wherein a value fluctuates over time.

[Claim 17]

The computer system of claim 16 configured to further carry out issuing of a transaction request of the foreign country currency at the predicted time.

30 [Claim 18]

A program performed in a computer system, wherein, once executed, the program cause the computer system to carry out a processing of:

35 predicting a time when a value of a foreign country currency reaches a value of a specific rank within a

predetermined time period based on past value fluctuation of the foreign country currency wherein a value fluctuates over time.

[Claim 19]

5 The program of claim 18, wherein the processing further comprises:

issuing a transaction request of the foreign country currency at the predicted time.