

In the system of Fig. 2, client devices 112 may provide inputs to be processed by the processor 124 to implement the method of the invention.

Referring to Figure 3, shown is a schematic diagram of a third embodiment of a computer based system 200 in which the method of the invention may be applied. The computer based system comprises another embodiment of a virtual fund system 200. The 'vFund' system 200 of this embodiment is generally the same as that of Figure 2 save for the aspect that the 'vFund' system 200 comprises a plurality of vFunds 200a to 200n. As before, a plurality of client devices 212 is connected by a communications network such as the internet 214 to the vFund server system 216. The client devices 212 may be directly connected to the server system 216 or may connect through an intermediary system 218 such as a financial advisor system or broker system. The vFund server system 216 is itself again connected to one or more dealer or broker systems 220 through which the vFund managers purchase and sell financial assets from and to financial institutions 222 or the like for the plurality of vFunds. The vFund server system 216 comprises a processor 224, at least one memory 226 storing machine readable instructions which, when implemented by the processor 224, configures the processor 224 to implement the methods of the invention as herein described and to generate a graphical user interface accessible to the client devices 212. The vFund server system 216 also includes a system database 228 for storing client account data, fund asset data, transaction data and all other data necessary for functioning of the vFund server system 216. In addition, the system of Figure 3 may include one or more market information databases 230 for providing real time or near real time asset valuation data to the vFund server system 216 and the advisor and broker systems 218, 220.

In the embodiment of Figure 3, the vFund server system 216 manages a plurality of vFunds 200a to 200n on behalf of a plurality of investors using client devices 212. The processor 224 of the system is configured to receive input data from the plurality of client devices 212 and to receive real time or near real time data defining current financial asset holdings in the plurality of portfolios of the vFund 200a to 200n from the system database 228. In response, the processor 224 adjusts the balance of financial asset holdings in the plurality of portfolios in response to the received client device input data. It then generates for each client device 212 data updating each client's investor account with the fund to replicate in said client account the same adjusted asset holdings as now managed by said plurality of vFund portfolios proportionally in accordance with each client's investment amount(s).

More specifically, the processor 224 is preferably configured to receive real time or near real time market data defining current values for each of the financial asset holdings in the plurality of fund portfolios and preferably other financial assets in the market. The processor 224 is configured to process said received client input data, said data defining current financial asset holdings managed by the plurality of vFund portfolios, and said market data to generate data defining: (i) sell orders for assets to be sold and the value expected when such orders are executed based on the received market data; and (ii) purchase orders for assets to be purchased and the expected cost based on the received market data. The processor 224 is configured to submit said sell orders to a broker system 220 for execution and thereafter to receive data from the broker system 220 on value realized for executed sell orders. The processor 224 may also be configured to receive new real time or near real time market data from the broker system 120 or a market information database 230. The processor 224 defines a difference between the value expected from the execution of sell orders and the value actually realized. The processor 224 is configured to use the value difference data and any new market data to adjust the pre-calculated purchase orders and thereafter to submit the adjusted purchase orders to the broker system for execution. In response, the processor 224 receives data defining newly purchased assets from the broker system 220 and determines from said received data which parts of the newly purchased assets are to be assigned to which of the plurality of the vFund portfolios.

The processor 224 is configured to then allocate said parts of the newly purchased assets to the respective vFund portfolios and to combine data defining said parts of the newly purchased assets with data defining assets remaining in said vFund portfolios to update the portfolio holdings. The processor 224 is configured to then generate data for each client device to update each client's investor account to replicate in said client account the same updated asset holdings as managed by said plurality of vFund portfolios proportionally in accordance with each client's investment amounts in said vFunds.

In the system of Fig. 3, client devices 212 may provide inputs to be processed by the processor 224 to implement the method of the invention.

Figure 5 provides a schematic representation of the general process of the invention illustrating the inputs 400, the optimization process 410 and the outputs 420. The inputs may be inputted by a user on a client device 12, 112, 212 (Figures 1 to 3). The inputs may include session related information 401 such as the user's unique identifier (ID), a selected currency for the session, a selected type of risk assessment, and the user's country of residence among other things. User or customer information 402 may include the user's risk profile, the user's preferred currency, a category of concentration, a concentration limit, a type of recommendation, the user's references for growth and/or income. A further input may comprise the user's current portfolio information 403 including the user's investment goals such as risk level, currency, price, FX conversion rate, current amount and frozen amount in asset currency, rate of return (ROI), cash risk class, etc. Consequently, a plurality of constraints can be derived from the user information 402 and the current portfolio information 403. Further input information may comprise fitness parameter information 404 and fitness parameter weights 405. Eligible product information 405 may also be inputted.

The optimization process 410 comprises in brief a first step 411 of randomly generating a population of individuals or portfolios, a second step 412 of applying a fitness test to each generated portfolio, a third step 413 of keeping only a subset of the generated portfolios comprising those with the upper fitness scores, a fourth step 414 of using the subset of the generated portfolios comprising those with the upper fitness scores to 'reproduce', i.e. to generate a next generation of portfolios, and a fifth step 415 which is to repeat the first to fourth steps a plurality of times until a marginal improvement of a highest ranking next generation portfolio by fitness score falls to below a preset value or amount. The highest ranking next generation portfolio may then be selected as the output 420 for implementation as the user's new rebalanced portfolio where the output data may comprise session related information 421 comprising the user's ID and rebalance status, success scenario information 422 comprising such things as the goal ID, the Sharpe ratios, ROIs, fitness core, fitness function names and corresponding values for current and rebalanced portfolios, and total portfolio. The output 420 may include information 423 defining the user's rebalanced portfolio. Where appropriate, failure scenario output information 424 may also be provided.

Figure 6 illustrates a method 500 for generating a first generation of portfolios. Preferably, the method commences with an initial portfolio of assets 501, although this is not

Claims.

1. A computer implemented method for automatically selecting a portfolio where said portfolio comprises a population of solutions, the method comprising the steps of:

5 generating a plurality of first generation portfolios from a plurality of available solutions, wherein each of said plurality of first generation portfolios is generated by random selection of one or more of said plurality of available solutions;

applying a random percentage weighting to each of said randomly selected solutions, but where the sum of the random percentage weightings is arranged to equal 100%;

10 calculating a score for each of the plurality of first generation portfolios, the score for each of said plurality of first generation portfolios of assets comprising an aggregate of a plurality of different evaluation factors;

ranking the plurality of first generation portfolios by their respective scores; and

15 selecting one or more of said plurality of first generation portfolios based on their respective scores.

2. The method of claim 1, wherein the solutions comprise assets.

3. The method of claim 2, comprising the step of receiving data describing an initial
20 portfolio of assets.

4. The method of claim 3, comprising the step of making said initial portfolio of assets a first one of said plurality of first generation portfolios of assets.

25 5. The method of claim 3 or claim 4, wherein the plurality of available assets comprises assets comprising said initial portfolio of assets and other eligible assets.

6. The method of claim 5, wherein a random percentage weighting applied to a randomly selected asset from said plurality of available assets is limited to a maximum value of its
30 percentage weighting in the initial portfolio of assets or is limited to a predetermined maximum percentage weighting where said asset is one of the other eligible assets.

7. The method of any one of claims 2 to 6, wherein the step of calculating a score for each of the plurality of first generation portfolios of assets comprises calculating a weighted aggregate of the plurality of different evaluation factors.

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8. The method of any one of claims 2 to 7, wherein the step of selecting one or more of said plurality of first generation portfolios of assets comprises selecting a plurality of said first generation portfolios of assets as parent portfolios and using said parent portfolios to generate a plurality of child portfolios.

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9. The method of claim 8, wherein each of the plurality of child portfolios is generated by two parent portfolios which are adjacent to each other by their ranking scores.

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10. The method of claim 9, wherein the assets for a child portfolio are randomly selected from a group of assets comprising the two adjacent parent portfolios.

11. The method of claim 10, wherein a random percentage weighting assigned to a randomly selected asset from the group of parent assets is limited to a maximum value of its original percentage weighting in the respective parent portfolio.

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12. The method of any one of claims 8 to 11, wherein some of the plurality of parent and/or child portfolios are selected to undergo a mutation process whereby, for a selected portfolio, at least one asset of said portfolio is randomly selected and all or a randomly percentage weighted portion of said randomly selected asset is replaced by another asset randomly selected from a union of assets comprising a group of all of assets of existing portfolios and a group of other eligible assets.

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13. The method of claim 12, wherein the parent and/or child portfolios selected to undergo the mutation process are selected by assigning each of said parent and/or child portfolios with a binary value according to a pre-set mutation rate, where the assigned binary value determines whether a portfolio is selected for the mutation process or not.

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14. The method of any one of claims 8 to 13, comprising the steps of:
calculating a score for each of the plurality of parent and child portfolios;
ranking the plurality of parent and child portfolios by their respective scores; and
5 selecting a subset of said plurality of parent and child portfolios based on their respective
scores as next generation parent portfolios and using said next generation parent portfolios to
generate a plurality of next generation child portfolios.

15. The method of claim 14, comprising the steps of:
10 generating each of a plurality of next generation child portfolios from two next
generation parent portfolios which are adjacent to each other by their ranking scores; and
selecting some of the plurality of next generation parent and/or next generation child
portfolios to undergo the mutation process.

15 16. The method of claims 14 or claim 15, comprising the steps of:
calculating a score for each of the next generation parent and next generation child
portfolios.

17. The method of claim 16, comprising repeating the steps of ranking, selecting, generating,
20 and calculating a score for each next generation of portfolios for a plurality of times until a
marginal improvement in a score calculated for a highest ranking portfolio is less than a
predetermined amount over a latter pre-set number of iterations.

18. The method of claim 17, wherein said highest ranking portfolio is selected for
25 implementation.

19. A non-transitory computer readable medium storing machine readable code which, when
executed by a processor, causes an electronic processing device to implement the steps of any
one of the preceding claims.

20. A computer based system for automatically compiling a portfolio of assets, the system comprising:

a computer readable medium storing machine readable code; and

a processor configured to execute said machine readable code to:

5 generate a plurality of first generation portfolios of assets from a plurality of available assets, wherein each of said plurality of first generation portfolios is generated by random selection of one or more of said plurality of available assets;

apply a random percentage weighting to each of said randomly selected assets, but where the sum of the random percentage weightings is arranged to equal 100%;

10 calculate a score for each of the plurality of first generation portfolios of assets, the score for each of said plurality of first generation portfolios of assets comprising an aggregate of a plurality of different evaluation factors;

rank the plurality of first generation portfolios of assets by their respective scores; and

15 select one or more of said plurality of first generation portfolios of assets based on their respective scores.