CLAIMS

What is claimed is:

1. A computer-implemented method executed using a computer and comprising:

receiving a plurality of account specifications;

training a machine-learning model using training data derived from the account specifications to produce a trained machine-learning model capable of outputting a recommendation of a particular asset portfolio;

determining an asset portfolio by inputting a particular account specification into the machine-learning model;

determining a performance metric for the asset portfolio based on synthetic data and historic data associated with a plurality of assets;

determining a reference performance metric based on a reference asset portfolio and the synthetic and historic data;

comparing the performance metric for the asset portfolio with the reference performance metric to result in a decision of whether to re-train the machine-learning model;

re-training the machine-learning model based on updated training data and the synthetic and historic data;

automatically executing one or more trades for an updated asset portfolio determined by the re-trained machine-learning model; and

repeating the re-training of the machine-learning model continuously based on a specified frequency or timing.

2. The computer-implemented method of claim 1, wherein each account specification comprises one or more of an objective, an uncertainty parameter, an account setting, a user preference, a candidate asset, model information associated with the machine-learning model, a reallocation frequency, a rebalancing frequency, or a tax harvesting goal.

3. The computer-implemented method of claim 1, wherein each account specification is associated with a time.

4. The computer-implemented method of claim 1, wherein the asset portfolio comprises one or more assets, each of the assets being associated with one or more of a weight value, a monetary value, an asset type, an asset identifier, a factor, or a factor value.

5. The computer-implemented method of claim 4 further comprising:

determining a plurality of candidate assets based on one or more objectives and one or more criteria; and

selecting the one or more assets from the plurality of candidate assets.

6. The computer-implemented method of claim 1 further comprising:

generating one or more factors based on the synthetic and historic data; and

determining the performance metric for the asset portfolio and the reference performance metric based on the one or more factors.

7. The computer-implemented method of claim 1, wherein the synthetic data comprises synthetic market data comprising realizations of market data that mimic overall characteristics of real market data, wherein the realizations of market data have been benchmarked to a time period, and wherein the realizations of market data have different distributions compared to the real market data.

8. The computer-implemented method of claim 1, wherein the performance metric comprises one or more of Sharpe ratio, Sortino ratio, Treynor ratio, Calmar ratio, Martin ratio, upside potential ratio, information ratio, or absolute return.

9. The computer-implemented method of claim 1 further comprising comparing the performance metric for the asset portfolio with the reference performance metric to result in a decision to re-train the machine-learning model based on the reference performance exceeding the performance metric for the asset portfolio.

10. The computer-implemented method of claim 1 further comprising:

comparing the performance metric for the asset portfolio with the reference performance metric based on the performance metric for the asset portfolio exceeding the

reference performance metric to result in a decision to not re-train the machine-learning model; and

selecting the asset portfolio for executing the one or more trades.

11. The computer-implemented method of claim 1 further comprising determining the specified frequency or timing based on the particular account specification.

12. The computer-implemented method of claim 1 further comprising:

determining one or more objectives associated with the particular account specification; and

comparing the asset portfolio with the reference asset portfolio based on the objectives to result in a decision of whether to re-train the machine-learning model.

13. The computer-implemented method of claim 1 further comprising:

determining a performance distribution associated with the asset portfolio;

determining a reference performance distribution associated with the reference asset portfolio; and

comparing the performance distribution associated with the asset portfolio with the reference performance distribution to result in a decision of whether to re-train the machine-learning model.

14. One or more non-transitory computer-readable storage media storing one or more sequences of instructions which, when executed using one or more processors, cause the one or more processors to execute the steps of any of claims 1 to 13.