

CLAIMS:

1. A networked computer system comprising a first client computer, the first client computer comprising:
 - a memory operative to store N genes, each gene characterized by a plurality of conditions and at least one action, wherein N is an integer greater than one;
 - a communication port through which the first client computer recurrently receives data associated with the N genes; and
 - a processor operative to evaluate performance characteristic of each of the N genes by comparing a solution provided by each gene with the recurrently received data associated with that gene, the performance characteristic of each gene being adjusted with each recurrently received data and defining a fitness of the gene.
2. The networked computer system of claim 1 wherein the data associated with the N genes comprise historical trading data and wherein the solution provided by each gene comprises a trading recommendation made by the gene.
3. The networked computer system of claim 2 wherein said first client computer is configured to discard M of the N genes after evaluating the fitness of the N genes for P trading days, each of the discarded genes having a fitness that falls below a first predefined threshold value, each of the remaining N-M genes being a surviving gene, wherein M and P are positive integers and wherein M is smaller than N.
4. The networked computer system of claim 3 wherein said first client computer is further configured to:
 - evaluate, for a plurality of Q trading days in addition to the P trading days, the fitness of the remaining genes;
 - discard genes whose fitness as evaluated during a sum of the P+Q trading days is below a second predefined threshold value; and

repeat the evaluation and the discard operations S times, wherein Q and S are integers, and wherein S is equal to or greater than 1, wherein genes surviving S evaluation and discard operations define a first elitist gene pool; and

transmit the first elitist pool of genes to a server computer.

5. The networked computer system of claim 4 wherein the first and second predefined threshold values are equal.

6. The networked computer system of claim 4, comprising a plurality of client computers including said first client computer, and further comprising said server computer, wherein said server computer is adapted to:

receive the first elitist gene pool from the first client computer;

store the received genes in a server gene pool; and

transmit to each of at least a first subset of the plurality of client computers one or more genes of the server gene pool for fitness evaluation spanning W trading days.

7. The networked computer system of claim 6 wherein each of the at least a first subset of the plurality of client computers is adapted to:

receive the one or more genes of the server gene pool from the server computer;

evaluate a fitness of the received genes by comparing trading recommendations made by each of the received genes with an associated historical trading data spanning the W trading days;

discard genes whose fitness are less than a third threshold value; and

transmit genes that are not discarded to the server computer for consideration for storage in the server gene pool.

8. The networked computer system of claim 7 wherein said W trading days do not overlap the trading days on which the genes in the first elitist gene pool were evaluated.

9. The networked computer system of claim 7 wherein said third threshold value is equal to the first and second threshold values.

10. The networked computer system of claim 7 wherein said genes transmitted to the server computer which were not discarded exclude all genes whose fitness is no higher than the fitness of a least fit gene previously stored in the server gene pool.

11. The networked computer system of claim 2 wherein the N genes stored in the memory of the client computer are generated in accordance with computer instructions stored in the first client computer and executed by the processor of the first client computer.

12. The networked computer system of claim 7 wherein said server gene pool is configured to store a fixed number of genes.

13. The networked computer system of claim 10 wherein said server computer is further adapted to combine a plurality of fitness values associated with each gene the server computer receives from the at least a first subset of the plurality of client computers with a corresponding fitness value stored in the server computer for that gene.

14. A networked computer system comprising a server computer, said server computer configured to:
receive a first gene pool from a first one of a plurality of client computers;
store received genes in a server gene pool; and
transmit to each of at least a first subset of the plurality of client computers one or more genes of the server gene pool for fitness evaluation spanning W trading days, the first gene pool being generated by evaluating performance characteristic of each of N genes by comparing a solution provided by each gene with the recurrently received data associated with the gene, the performance characteristic of each gene being adjusted with each recurrently received data and defining a fitness of the gene, each gene identifying by a plurality of conditions and at least one action.

15. The networked computer system of claim 14 wherein the data associated with each gene comprises historical trading data and wherein the solution provided by each gene comprises a trading recommendation made by the gene.

16. The networked computer system of claim 15 wherein said first one of the plurality of client computers is configured to discard M of the N genes after evaluating the fitness of the N genes for P trading days, each of the discarded genes having a fitness that falls below a first predefined threshold value, each of the remaining N-M genes being a surviving gene, wherein M and P are positive integers and wherein M is smaller than N.

17. The networked computer system of claim 16 wherein said first one of the plurality of client computers is further configured to:

evaluate, for a plurality of Q trading days in addition to the P trading days, the fitness of the remaining genes;

discard the genes whose fitness as evaluated during a sum of the P+Q trading days is below a second predefined threshold value; and

repeat the evaluation and the discard operations S times, wherein Q and S are integers, and wherein S is equal to or greater than 1, wherein genes surviving S evaluation and discard operations define the first gene pool.

18. The networked computer system of claim 15 wherein said server computer accepts only genes whose fitness is higher than the fitness of a least fit gene previously stored in the server gene pool.

19. The networked computer system of claim 18 wherein said server gene pool is configured to store a fixed number of genes.

20. The networked computer system of claim 18 wherein said server computer is further adapted to combine a plurality of fitness values associated with each gene the server computer receives with a corresponding fitness value stored in the server computer for that gene.

21. The networked computer system of claim 16, further comprising said first client computer.

22. The networked computer system of claim 17, further comprising said first client computer.

23. A method for solving a computational problem using a plurality of client computers, the method comprising:

storing N genes in a memory accessible to a first one of said client computers, each gene characterized by a plurality of conditions and at least one action, wherein N is an integer greater than one;

through a communications port, recurrently receiving data associated with the N genes;
and

said first client computer evaluating performance characteristic of each of the N genes by comparing a solution provided by each gene with the recurrently received data associated with that gene, the performance characteristic of each gene being adjusted with each recurrently received data and defining a fitness of the gene.

24. The method of claim 23 wherein the data associated with each gene comprises historical trading data and wherein the solution provided by each gene comprises a trading recommendation made by the gene.

25. The method of claim 24 further comprising:

discarding M of the N genes after evaluating the fitness of the N genes for P trading days, each of the discarded genes having a fitness that falls below a first predefined threshold value, each of the remaining N-M genes being a surviving gene, wherein M and P are positive integers and wherein M is smaller than N.

26. The method of claim 25 further comprising:

evaluating, for a plurality of Q trading days in addition to the P trading days, the fitness of the remaining genes;

discarding genes whose fitness as evaluated during a sum of the P+Q trading days is below a second predefined threshold value; and

repeating the evaluation and the discard operations S times, wherein Q and S are integers, and wherein S is equal to or greater than 1, wherein genes surviving S evaluation and discard operations define a first elitist gene pool ; and

transmitting the first elitist pool of genes to a server computer.

27. The method of claim 26 wherein the first and second predefined threshold values are equal.

28. The method of claim 26 further comprising:

receiving the first elitist gene pool from the first one of the plurality of client computer;

storing the received genes in a server gene pool; and

transmitting to each of at least a first subset of the plurality of client computers one or more genes of the server gene pool for fitness evaluation spanning W trading days.

29. The method of claim 28 wherein said W trading days and V trading days do not overlap.

30. The method of claim 28 wherein said third threshold value is equal to the first and second threshold values.

31. The method of claim 28 wherein said genes transmitted to the server computer which were not discarded exclude all genes whose fitness is no higher than the fitness of a least fit gene previously stored in the server gene pool.

32. The method of claim 24 wherein the N are generated in accordance with computer instructions stored in the first client computer and executed by the first client computer.

33. The method of claim 28 wherein said server pool is configured to store a fixed number of genes.

34. The method of claim 31 further comprising:
combining a plurality of fitness values associated with each gene the server computer receives from the at least a first subset of the plurality of client computers with a corresponding fitness value stored in the server computer for that gene.

35. A stand alone computer comprising:
a processing core configured as a server;
and a plurality of processing cores configured as clients, each of the plurality of clients comprising:
a memory operative to store N genes, each gene characterized by a plurality of conditions and at least one action, wherein N is an integer greater than one;
a port through which the first client processing core recurrently receives data associated with the N genes; each client processing core configured to evaluate performance characteristic of each of the N genes by comparing a solution provided by each gene with the recurrently received data associated with that gene, the performance characteristic of each gene being adjusted with each recurrently received data and defining a fitness of the gene.

36. The stand alone computer of claim 35 wherein the data associated with each gene comprises historical trading data and wherein the solution provided by each gene comprises a trading recommendation made by the gene.

37. The stand alone computer of claim 36 wherein a first one of the plurality of client computers is configured to discard M of the N genes after evaluating the fitness of the N genes for P trading days, each of the discarded genes having a fitness that falls below a first predefined threshold value, each of the remaining N-M genes being a surviving gene, wherein M and P are positive integers and wherein M is smaller than N.

38. The stand alone computer of claim 37 wherein said first one of the client computers is further configured to:
evaluate, for a plurality of Q trading days in addition to the P trading days, the fitness of the remaining genes;

discard genes whose fitness as evaluated during a sum of the P+Q trading days is below a second predefined threshold value; and

repeat the evaluation and the discard operations S times, wherein Q and S are integers, and wherein S is equal to or greater than 1, wherein genes surviving S evaluation and discard operations define a first elitist gene pool; and

transmit the first elitist pool of genes to the server processing core.

39. The stand alone computer of claim 38 wherein the first and second predefined threshold values are equal.

40. The stand alone computer of claim 38 wherein said server processing core is adapted to:

receive the first elitist gene pool from the first client processing core;

store the received genes in a server processing core gene pool; and

transmit to each of at least a first subset of the plurality of client processing cores one or more genes of the server processing core gene pool for fitness evaluation spanning W trading days.

41. The stand alone computer of claim 38 wherein each of the at least a first subset of the plurality of client processing cores is adapted to:

receive the one or more genes of the first elitist gene pool from the server processing core;

evaluate a fitness of the received genes by comparing trading recommendations made by each of the received genes with an associated historical trading data spanning the W trading days;

discard genes whose fitness are less than a third threshold value; and

transmit genes that are not discarded to the server processing core for consideration for storage in a server processing core gene pool.

42. The stand alone computer of claim 41 wherein said W trading days do not overlap the trading days on which the genes in the first elitist gene pool were evaluated.

43. The stand alone computer of claim 41 wherein said third threshold value is equal to the first and second threshold values.

44. The stand alone computer of claim 41 wherein said genes transmitted to the server processing core which were not discarded exclude all genes whose fitness is no higher than the fitness of a least fit gene previously stored in the server processing core gene pool.

45. The stand alone computer of claim 36 wherein the N genes stored in each client processing core are generated in accordance with computer instructions stored in and executed by the stand alone computer.

46. The stand alone computer of claim 41 wherein said server processing core gene pool is configured to store a fixed number of genes.

47. The stand alone computer of claim 44 wherein said server processing core is further adapted to combine a plurality of fitness values associated with each gene the server processing core receives from the at least first subset of the plurality of client processing cores with a corresponding fitness value stored in the server processing core for that gene.

48. The stand alone computer of claim 35 wherein said plurality of conditions are evaluated as a logical expression conjoined by logical AND and/or modified by logical NOT operations.

49. The stand alone computer of claim 48 wherein the at least one action of each gene is selected from a group consisting of buy, sell, hold, long exit and short exit recommendations.

50. The stand alone computer of claim 35 wherein said stand alone computer is a mainframe computer.

CLAIMS:

1. A computer-implemented data mining system, comprising:
 - a data processor; and
 - a memory accessible to the data processor and identifying a candidate database having a pool of individuals, each of the individuals further having associated therewith an indication of a respective fitness estimate,
 - for use with a data mining training database accessible to the data processor and identifying training data,
 - the data processor configured to:
 - test on a first subset of the training data each individual in a testing subset of at least one of the individuals;
 - calculate a fitness estimate for each of the individuals in the testing subset in dependence upon the tests on the first subset of the training data;
 - discard individuals from the pool of individuals in dependence upon their fitness estimates;
 - test on a second subset of the training data, each individual in the testing subset which remains after the discarding of individuals, the second subset including at least one datum not included in the first subset;
 - update, in dependence upon the tests on the second subset of the training data, the fitness estimate for each individual tested on the second subset of the training data; and
 - discard further individuals from the pool of individuals in dependence upon their updated fitness estimates.
2. A system according to claim 1, wherein the first subset of the training data also includes at least one datum not included in the second subset of the training data.
3. A system according to claim 1, wherein each individual in the pool identifies a respective set of at least one condition and at least one corresponding proposed output in dependence upon the conditions.
4. A system according to claim 3 wherein the training database contains historical market data for one or more financial assets,

wherein each individual indicates a plurality of conditions resolvable in dependence upon the market data in the training database, the outputs identified by the individuals including trading instructions for one or more of the financial assets,

and wherein the data processor is further configured to provide, for use in generating trading recommendations in dependence upon production data, individuals from the pool of individuals not discarded from the pool in dependence upon their updated fitness estimates.

5. A system according to claim 1, wherein the data processor is further configured to transmit to a server computer system individuals remaining after the discarding of further individuals from the pool of individuals in dependence upon their updated fitness estimates.

6. A system according to claim 5, further comprising the server computer system, wherein the server computer system comprises:

a server data processor; and

a memory accessible to the data processor, the server data processor configured to transmit selected received individuals to a client computer system for further testing on the training data.

7. A system according to claim 6, wherein the server data processor is further configured to discard selected received individuals in dependence upon their fitness estimates.

8. A system according to claim 1, wherein the data processor includes first and second computer systems,

wherein the first computer system is configured to perform the testing on the first subset of the training data and the second computer system is configured to perform the discarding of individuals in dependence upon their fitness estimates.

9. A system according to claim 1, wherein the data processor is further configured to produce new individuals by reproduction in dependence upon one or more individuals remaining after the discarding of further individuals.

10. A system according to claim 1, wherein the discarding of individuals from the pool of individuals in dependence upon their fitness estimates, operates further in dependence upon the quantity of testing that has been experienced by the individuals.