CLAIMS

What is claimed is:

1. An autodidactic method for ~~cognitive~~ personalized memory training comprising:

obtaining sensor data of a subject during a memory exercise;

determining whether the sensor data includes predetermined information indicative of cognitive functions used for remembering, wherein a subject's cognitive functions used for remembering comprise immediate memory, visuospatial memory, attention memory and delayed memory, and wherein the memory exercise is configured to evaluate at least two of the subject's cognitive functions used for remembering;

advancing the memory exercise when it is determined that the sensor data includes predetermined information indicative of cognitive functions used for remembering; and

calculating an objective cognitive assessment of the subject in response to completion of the memory exercise, the objective cognitive assessment of the subject measuring the subject's performance of cognitive functions used for remembering during the memory exercise,

wherein the objective cognitive ~~training~~ assessment of the subject is also ~~measured~~ calculated at least partially in response to the advancing the memory exercise.

2. The method according to claim 1, further comprising revising the memory exercise in response to the objective cognitive assessment of the subject.

3. The method according to any one of the preceding claims, wherein the memory exercise will not advance when it is determined that the sensor data does not include the predetermined information indicative of cognitive functions used for remembering.

4. The method according to any one of the preceding claims, wherein determining whether the sensor data includes the predetermined information indicative of cognitive functions used for remembering comprises determining the sensor data includes the predetermined information indicative of cognitive functions used for remembering when a predetermined portion of the memory exercise is completed in a predetermined time duration.

5. The method according to any one of the preceding claims, further comprising determining whether a score is achieved for a current level of the memory exercise before the advancing step, the score being indicative of a time taken to complete the memory exercise.

6. The method according to claim 2~~any one of the preceding claims~~, wherein revising the memory exercise comprises revising the memory exercise to test for an adjusted set of the subject's cognitive functions used for remembering ~~further comprising adjusting the predetermined information~~ in response to the calculated objective cognitive assessment of the subject.

~~7. The method according to any one of the preceding claims, wherein the cognitive functions used for remembering includes immediate memory, visuospatial memory, attention memory and delayed memory.~~

~~8.~~7. The method according to any one of the preceding claims~~Claim 7~~, wherein the memory exercise comprises matching of ~~picture~~ pictures and/or words and determining the sensor data includes the predetermined information indicative of cognitive functions used for remembering comprises determining the sensor data obtained during the memory exercise includes ~~the~~ predetermined information indicative of at least visuospatial memory and immediate memory.

~~9.~~8. The method according to any one of the preceding claims, wherein the step of determining whether the sensor data includes the predetermined information indicative of cognitive functions used for remembering comprises passing the sensor data through a filter to determine whether the sensor data includes the predetermined information indicative of cognitive functions used for remembering.

9. The method according to any one of the preceding claims, wherein the sensor data comprises electroencephalography (EEG) data obtained from the subject by one or more EEG electrodes.

10. The method according to any one of the preceding claims, wherein the sensor data comprises visual information of the subject during the memory exercise obtained from a video camera ~~and/or electroencephalography (EEG) electrode~~.

11. An autodidactic ~~cognitive~~ personalized memory training device comprising:

an input device for receiving sensor data of a subject during a memory exercise;

a cognitive function evaluator adapted to receive the sensor data from the input device and determine whether the sensor data includes predetermined information indicative of cognitive functions used for remembering, wherein a subject's cognitive functions used for remembering comprise immediate memory, visuospatial memory, attention memory and delayed memory, and wherein the memory exercise is configured to evaluate at least two of the subject's cognitive functions used for remembering; and

an exercise device adapted to advance the memory exercise when it is determined that the sensor data includes the predetermined information indicative of cognitive functions used for remembering, the exercise device comprising a calculating device adapted to calculate an objective cognitive assessment of the subject in response to completion of the memory exercise, the objective cognitive assessment of the subject measuring the subject's performance of cognitive functions used for remembering during the memory exercise, wherein the calculating device is further adapted to calculate the objective cognitive assessment of the subject at least partially in response to the advancing of the memory exercise.

12. The autodidactic ~~cognitive~~ personalized memory training device according to claim 11, wherein the exercise device is adapted not to advance the memory exercise when it is determined that the sensor data does not include the predetermined information indicative of cognitive functions used for remembering.

13. The autodidactic ~~cognitive~~ personalized memory training device according to ~~any~~ either of ~~the preceding~~ claims 11 or 12, wherein the cognitive function evaluator is further adapted to determine the sensor data

includes the predetermined information indicative of cognitive functions used for remembering when a predetermined portion of the memory exercise is completed in a predetermined time duration.

14. The autodidactic ~~cognitive~~ personalized memory training device according to any of ~~the preceding~~ claims 11 to 13, wherein the exercise device is further adapted to determine whether a score is achieved for a current level of the memory exercise and advance the memory exercise when it is determined the score is achieved for the current level of the memory exercise.

15. The autodidactic ~~cognitive~~ personalized memory training device according to any of ~~the preceding~~ claims 11 to 14, wherein the input device comprises ~~a video camera and/or~~ an electroencephalography (EEG) electrode.

16. The autodidactic personalized memory training device according to any of claims 11 to 15, wherein the input device comprises a video camera.

~~16~~17. The autodidactic ~~cognitive~~ personalized memory training device according to any of ~~the preceding~~ claims 11 to 16, wherein the ~~autodidactic cognitive training~~ input device is coupled to a sensor signal translator, the sensor signal translator operable to translate the sensor data received from the input device, and wherein the cognitive function evaluator is coupled to the sensor signal translator and operable to receive the translated sensor data and determine whether the translated sensor data includes the predetermined information indicative of cognitive functions used for remembering.

~~17~~18. The autodidactic ~~cognitive~~ personalized memory training device according to any of ~~the preceding~~ claims 11 to 17, further comprising a cognitive assessor, the cognitive assessor coupled to the exercise device and operable to receive and assess the calculated objective cognitive assessment of the subject.

~~18~~19. The autodidactic ~~cognitive~~ personalized memory training device according to claim ~~17~~18, further comprising an optimizer coupled to the cognitive assessor and adapted to store information, the information comprising the sensor data, the memory exercise and a subject

profile corresponding to the subject, and wherein the cognitive assessor is adapted to transmit the assessed objective cognitive assessment of the subject to the optimizer, the optimizer adapted to receive the objective cognitive assessment and update the subject profile of the subject in response to the received objective cognitive assessment of the subject.

~~19. The autodidactic cognitive training device according to claim 18, wherein the cognitive assessor is adapted to transmit the assessed objective cognitive assessment of the subject to the optimizer, and wherein the optimizer is adapted to receive the objective cognitive assessment and update the subject profile of the subject in response to the objective cognitive assessment.~~

20. The autodidactic ~~cognitive~~ personalized memory training device according to claim ~~18 or claim~~ 19, further comprising a configurator coupled to the optimizer, the configurator adapted to configure the memory exercise in response to the received assessed objective cognitive assessment of the subject and the subject profile.

21. The autodidactic ~~cognitive~~ personalized memory training device according to claim 20, wherein the configurator is further adapted to adjust the predetermined information indicative of cognitive functions used for remembering corresponding to the subject in response to the updated subject profile.

~~22. The autodidactic cognitive training device according to any of the preceding claims, wherein the cognitive functions used for remembering includes immediate memory, visuospatial memory, attention memory and delayed memory.~~

~~23~~22. The autodidactic ~~cognitive~~ personalized memory training device according ~~to claim 22~~ any of claims 11 to 21, wherein the memory exercise comprises matching of ~~picture~~ pictures and/or words, and wherein the exercise device is further adapted to determine whether the sensor data received during the memory exercise includes ~~the~~ predetermined information indicative of at least visuospatial memory and immediate memory.

~~24~~23. The autodidactic ~~cognitive~~ personalized memory training device according to any of ~~the preceding~~ claims 11 to 22, wherein the cognitive function evaluator comprises a filter, and wherein the cognitive function evaluator is further adapted to pass the sensor data through the filter so as to determine whether the sensor data includes the predetermined information indicative of cognitive functions used for remembering.

~~25~~24. The autodidactic ~~cognitive~~ personalized memory training device according to any of ~~the preceding~~ claims 11 to 23, wherein the exercise device is further adapted to advance the memory exercise in accordance with machine learning techniques.

~~26~~25. The autodidactic ~~cognitive~~ personalized memory training device according to any of ~~the preceding~~ claims 11 to 24, wherein the calculating device is further adapted to calculate the objective cognitive assessment of the subject in accordance with probabilistic modeling.

~~27~~26. The autodidactic ~~cognitive~~ personalized memory training device according to any of ~~the preceding~~ claims 11 to 25, wherein the calculating device is further adapted to calculate the objective cognitive assessment of the subject in response to time taken to complete the memory exercise.

~~28~~27. A system comprising:

~~a~~ an autodidactic personalized memory training device as claimed in any of claims ~~11~~19 to ~~27~~26; and

a server coupled to the autodidactic personalized memory training device and comprising a receiver operable to receive the objective cognitive assessment of the subject from the autodidactic personalized memory training device.

~~29~~28. The ~~server~~system according to claim ~~28~~27, wherein the server is operable to receive and store the subject profile.

~~30~~29. ~~A~~ The system according to either claim 27 or claim 28 comprising two or more autodidactic personalized memory training devices as claimed in any of claims ~~11~~19 to ~~27~~26, wherein the receiver is further operable to receive the objective cognitive assessment of two or more subjects corresponding to the two or more autodidactic personalized memory training devices, and wherein the server is further operable to correlate the two or more subjects with their respective objective cognitive assessments.

~~31. The server according to claim 30, wherein the server is operable to receive and store the subject profile.~~

~~32~~30. A computer readable medium for autodidactic ~~cognitive~~ personalized memory training, the computer readable medium having stored thereon computer program code which when executed by a computer causes the computer to perform at least the following:

~~obtaining sensor data of a subject during a memory exercise;~~

determining whether ~~the~~ sensor data obtained from a subject during a memory exercise includes predetermined information indicative of cognitive functions used for remembering, wherein a subject's cognitive functions used for remembering comprises immediate memory, visuospatial memory, attention memory and delayed memory, and wherein the memory

exercise is configured to evaluate at least two of the subject's cognitive functions used for remembering;

advancing the memory exercise when it is determined that the sensor data includes predetermined information indicative of cognitive functions used for remembering; and

calculating an objective cognitive assessment of the subject in response to completion of the memory exercise,

wherein the objective cognitive ~~training~~ assessment of the subject measures the subject's performance of cognitive functions used for remembering during the memory exercise, and

wherein the objective cognitive assessment of the subject is also measured at least partially in response to the advancing the memory exercise.