

SYSTEM AND METHOD FOR CONDUCTING TRAIT ASSESSMENT

FIELD OF INVENTION

- 5 The present invention relates to the genetic profiling field. More particularly, the present invention relates to a system and method for conducting trait assessment to predict talent and Howard Gardner's multiple intelligence profile of a subject, and provide a personalised development solution for developing the talent and enhancing learning outcome.

10

BACKGROUND OF THE INVENTION

- Childhood development involves complex interaction between nature and nurture, in which nature refers to biological and genetic factors, and nurture refers to environmental factors and nutritional condition. They are essential components that determine biological, psychological and emotional changes that occur between birth and end of adolescence of an individual, and are keys to shape the individual's behaviour, personality and skills.

- 20 Aptitude and talent of an individual can be influenced by deoxyribonucleic acid (DNA) that contains information that may influence at least one of the talent or aptitude. Some examples of the aptitude and talent include musical aptitude, educational attainment, intelligence, memory, persistence, the ability to communicate in multiple languages, or the ability to solve a problem or a mathematical equation. Thus, the genetic information is useful for predicting an individual's talent, intelligence quotient (IQ), emotional quotient (EQ), and personality-related traits, and then providing a road map for the childhood development. The childhood development can be planned ahead by creating external influences for expanding, shaping or silencing the talent, IQ, EQ, and personality-related traits.

Theory of multiple intelligence developed by Dr. Howard Gardner in 1983 proposes eight different intelligences that accounts for a broad range of human potential, mainly linguistic intelligence (word smart), logical-mathematical intelligence (number/reasoning smart), spatial intelligence (picture smart), bodily-kinaesthetic intelligence (body smart), musical intelligence (music smart), interpersonal intelligence (people smart), intrapersonal intelligence (self-smart), and naturalist intelligence (nature smart). The theory can be used as a guide for constructing an optimal learning method for the individual based on the intelligence quotient of the individual.

10

Genetic testing technology is useful for confirming a suspected genetic condition and identifying chance of developing or passing a genetic disorder. Molecular genetic test is an example of the testing that studies single gene or short length DNA to identify variation or mutation in an individual. Specifically, information on single nucleotide polymorphism gene can be obtained *via* the genetic testing, in which the information is useful for identifying phenotypic traits and providing indication for a disease or a genetic disorder. The genetic testing approach has been disclosed in a granted United States patent, US7127355B2, to determine chances of an individual to develop or exhibit a multifactorial trait corresponding to a disease, a genetic disorder, or a positive or negative response to a drug. The method conducts a genetic testing on single nucleotide polymorphisms in the individual, in which genotype of the individual is assigned with a score and the score is compared to a threshold value prior to determining an appropriate course of treatment. However, the patent neither conducts the same for assessing talent- or intelligence-related traits in the individuals, nor provides an overview for all the traits and further suggests to develop the traits.

25

There exists a need to provide a quick and safe option for assessing talent- and Howard Gardner's multiple intelligence-related traits of an individual through a genetic profiling approach. The assessment generates an overview for all the traits and provides

a prediction for the intelligence and inborn talent based on a valid and comprehensive analysis.

SUMMARY OF INVENTION

5

The main objective of the invention is to provide a quick, non-invasive and safe option for conducting trait assessment of a subject, particularly on talent- and Howard Gardner's multiple intelligence-related traits through deoxyribonucleic acid (DNA) information, to determine at least one superior or less superior trait in the subject, and
10 generates a comprehensive result that provides insight to the Howard Gardner's multiple intelligence profile and inborn talent. The result is valid, consistent and accurate, and useful for education sector, employment sector, talent development industry and sport and fitness sector. The invention also provides a basis for understanding personality, emotional quotient and intelligence quotient of the subject,
15 and generating a personalized trait development roadmap, focusing on at least one superior or less superior trait from either or both of the talent- and Howard Gardner's multiple intelligence-related traits of the subject. Such initiative enables the subject to understand himself/herself better in terms of personality, emotional quotient and intelligence quotient, and optionally strengthen the superior trait or nurture the less
20 superior trait based on the guidance from the personalized trait development roadmap. To achieve this objective, the invention provides a method for conducting the trait assessment that is executed by a system incorporated with the steps of determining the presence of genetic variations corresponds to a talent, or Howard Gardner's multiple intelligence-related trait from the DNA information, and assigning scores accordingly
25 to ensure validity, consistency and accuracy. The method further comprises processing the scores to obtain a rank that indicates strength of the talent-related traits, and/or an amount indicating strength of the Howard Gardner's multiple intelligence-related traits, and then providing a data illustration for the talent- and Howard Gardner's multiple intelligence-related traits.

The invention provides a method for conducting trait assessment of a subject executed by a system having a server with a processor for controlling operation of the system, the method comprising the step of determining either or both of a rank for at least one talent-related trait of the subject and an amount for at least one Howard Gardner's multiple intelligence-related trait of the subject through information on one or more genetic variations obtained from deoxyribonucleic acid of the subject; wherein the information includes presence of the genetic variations corresponding to a talent, or Howard Gardner's multiple intelligence-related trait.

10

Preferably, the method further comprises the step of computing a total score for each trait through summing up individual scores assigned to each genetic variation that corresponds to the same trait prior to the step of determining either or both of the rank for the talent-related trait and the amount for the intelligence-related trait, wherein the individual score for each genetic variation is assigned based on the information.

15

In a preferred embodiment of the invention, the rank for the talent-related trait may be determined through referring the total score to a predetermined reference data of the corresponding talent-related trait. The reference data can be a normal distribution data of a population generated based on their total scores and frequencies of the talent-related trait. Preferably, the reference data is divided into intervals that define different ranks. The method may further comprise a step of recommending a talent for personalised development to the subject based on the rank determined. Preferably, the talent includes any one or combination of academic-learning, art, dancing, language, leadership, mathematics, music, endurance sports and sprint sports.

20
25

In another preferred embodiment, the amount for the Howard Gardner's multiple intelligence-related trait can be determined through an equation that applies a weight assigned to the total score. Preferably, the method comprises the step of generating a

30

data presentation of one or more amounts of the Howard Gardner's multiple intelligence-related traits, in which the data presentation may include chart, table and graph and the amount can be in the form of a percentage, ratio or fraction. The method may further comprise a step of recommending an optimal learning style for personalised development to the subject based on the data presentation determined. Preferably, the intelligence includes any one or a combination of logical intelligence, spatial intelligence, physical intelligence, verbal intelligence, visual intelligence, social intelligence and solitary intelligence.

10 The talent and optimal learning style for personalised development includes an enrichment program, a nurturing program, an employment program and a competition selection program.

The invention also provides a system for conducting trait assessment of a subject comprising a server having a processor for controlling operation of the system; a ranking module for determining a rank for at least one talent-related trait of the subject; and a calculating module for determining an amount for at least one Howard Gardner's multiple intelligence-related trait of the subject through information on one or more genetic variations obtained from deoxyribonucleic acid of the subject; wherein the information corresponding to a talent, or Howard Gardner's multiple intelligence-related trait.

Preferably, the system further comprises a score determining module for computing a total score for each trait through summing up individual scores assigned to all genetic variations that correspond to the same trait, wherein the individual score for each genetic variation is assigned based on the information. The system may further comprise a database for storing a predetermined reference data to determine the rank of the talent-related trait, in which the reference data can be a normal distribution data of

a population generated based on their total scores and frequencies of the talent-related trait. The reference data can be divided into intervals that define different ranks.

5 Preferably, the system further comprises a recommending module for recommending a talent or optimal learning style for personalised development based on the rank or data presentation determined. The talent and optimal learning style for personalised development may include an enrichment program, a nurturing program, an employment program and a competition selection program. Preferably, the talent includes any one or combination of academic-learning, art, dancing, language, leadership, mathematics,
10 music, endurance sports and sprint sports.

Preferably, the system further comprises a presentation generating module for generating a data presentation of one or more amounts of the Howard Gardner's multiple intelligence-related traits. The data presentation may include a chart, a table
15 and a graph, and the amount may be in the form of a percentage, ratio or fraction.

One skilled in the art will readily appreciate that the present invention is well adapted to carry out the objects and obtain the ends and advantages mentioned, as well as those inherent therein. The embodiment described herein is not intended as limitations on the
20 scope of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

For the purpose of facilitating an understanding of the invention, there is illustrated in
25 the accompanying drawing the preferred embodiments from an inspection of which when considered in connection with the following description, the invention, its construction and operation and many of its advantages would be readily understood and appreciated.

Figure 1 is a block diagram showing different module of the server used for conducting the trait assessment, according to a preferred embodiment of the present invention.

- 5 Figure 2 is a flowchart showing the processing steps during conducting trait assessment of a subject, according to an embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

10

As described herein, the term “system” or “computer system” refers to a network system having one or more computers and/or other electronic devices, where each computer of the electronic device may include a computer-readable medium embodying software to operate the computer/electronic device or one or more of its
15 component. Non-limiting examples of a system may include: a distributed computer system for processing information via computer systems linked by a network; and two or more computer systems connected together via a network for transmitting and/or receiving information between the computer systems.

20

As described herein, the term “server” may refer to a device that receives incoming request and sends processed request via a plurality of modules for controlling the operation of the system. The server refers to a device comprising at least one processor and a graphical interface user selected from laptop, desktop, smartphone, tablet, wearable smart device, and any device defined herein as a “computer”.

25

As described herein, the term “processor” may refer to any device or portion of a device or apparatus that processes electronic data from registers and/or memory to transform that electronic data into other electronic data that may be stored in registers and/or memory. A “computer system” may comprise one or more processors.

A “graphical user interface” may refer to all visually identifiable and/or interactable visuals displayed through a display of the server.

- 5 As used herein, the term “network” or “communication networks” or “communication channel” may operate with any of a number of protocols, wireless, WiFi, and such as Internet protocol (IP), asynchronous transfer mode (ATM), and/or synchronous optical network (SONET), user datagram protocol (UDP), IEEE 802.x
- 10 As described herein, the term “genetic variations” may refer to a nucleic acid based genetic variation selected from the group consisting of: a genetic mutation, a gene amplification, a gene rearrangement, a deletion, an insertion, an InDel mutation, a single nucleotide polymorphism (SNP), an epigenetic alteration, a splicing variant, an
- 15 expression, and combinations thereof. In a preferred embodiment of the invention, the genetic variation refers to a variant that affects a gene that involves in production of protein that is responsible for predisposition to any one or combination of the talent- and intelligence-related trait.
- 20 The present invention relates to a system and associated method for conducting trait assessment of a subject, preferably talent- and Howard Gardner’s multiple intelligence-related traits, based on DNA information, to obtain an overview for predicting the traits, and determining superiority or superiority of at least one trait. Particularly, the talent-related trait may include any one or combination of academic-learning, art, dancing,
- 25 language, leadership, mathematics, music, endurance sports and sprint sports; and the Howard Gardner’s multiple intelligence-related traits may include any one or a combination of logical intelligence, aural intelligence, physical intelligence, verbal intelligence, visual intelligence, social intelligence and solitary intelligence.

According to a preferred embodiment of the invention, the system for conducting the trait assessment includes a device and at least one server capable of communicating the device over a communication channel. The system further includes a number of processor executable instructions, which can be embedded into a website or a mobile application. In some instance, the embedding of the processor executable instructions into the website or mobile application enables performing of a number of tasks, and providing an output, preferably interact-able output, such as, but not limited to a data presentation in a form of chart, graph, table, and a recommendation program, through a displaying means of the device. The device may optionally be connected to a printing means to generate a printable output.

The server can be the device as described in the previous embodiment, or any device selected from smartphone, tablet, computer, wearable smart device, and a computer connected to a communication network or the Internet and capable of displaying an interactive graphical user interface of a website or a mobile application for displaying an overview of the trait assessment. The server includes a processor (101) to control operation of the system (100) by processing a number of instructions including the processor executable instructions embedded into the website or the mobile application which enable the user to perform a variety of tasks such as to interact with the data presentation or the recommended program. The server further includes a memory unit for temporarily storing the data and instructions while performing a number of operations by the processor (101) and a storage unit for storing a variety of data. The server further includes a displaying unit to present the interactive graphical user interface, which in turn presents the data presentation or the recommendation program. The user is allowed to interact with the contents presented on the interactive graphical user interface using a keyboard, pointing device such as a mouse, at least one gesture or touch, voice activation, or any other interacting means.

Figure 1 illustrates a block diagram showing different module of the server used for conducting the trait assessment, according to a preferred embodiment of the present invention. The present system (100) for conducting the trait assessment comprises a server having a processor for controlling operation of the system (100); an importing module (102) for importing DNA information of the subject, in a readable genetic variations code, from a source into the system (100) *via* a communication network; a score determining module (103) for determining the presence of genetic variations correspond to a trait and number of variants found in each genetic variation, and assigning an individual score based on the number of variants, based on the DNA information, and computing a total score for each trait by summing up the individual scores; a database (104) storing a predetermined reference data for referring the total score to determine a rank for the talent-related trait; a ranking module (105) for determining a rank for at least one talent-related trait; a recommending module (106) for recommending a talent or an optimal learning style for personalised development to the subject based on the rank or data presentation; a calculating module (107) for processing the total score to determine an amount of the Howard Gardner's multiple intelligence-related trait through an equation that applies with a weight assigned to the total score; and a presentation generating module (108) for generating a data presentation based on the amount.

Preferably, the score determining module (103) detects the genetic variations by inspecting genotypic information of genes responsible for traits associated with academic-learning, art, dancing, language, leadership, mathematics, music, endurance sports, sprint sports, logical intelligence, aural intelligence, physical intelligence, verbal intelligence, visual intelligence, social intelligence and solitary intelligence. In an exemplary embodiment, the score determining module (103) identifies the genes as tabulated in Table 1.

In one preferred embodiment of the present invention, the importing module (102) translates the DNA information extracted from a biological sample of the subject into a genetic variations code readable by the system (100), and imports the genetic variations code into the system (100). The genetic variations is a nucleic acid based genetic variation selected from the group consisting of: a genetic mutation, a gene amplification, a gene rearrangement, a deletion, an insertion, an InDel mutation, a SNP, an epigenetic alteration, a splicing variant, an RNA/protein overexpression, and an aberrant RNA/protein expression, and combinations thereof. More particularly, the importing module (102) determines single nucleotide polymorphisms (SNP) that correspond to a talent, or Howard Gardner's multiple intelligence-related trait based on: (a) the presence of SNP and, (b) the number of alleles in each SNP. The genetic variations code is processed by the score determining module (103) to determine the presence of genetic variations correspond to a trait and number of variants found in each of the genetic variation. The score determining module (103) further assigns individual score to the genetic variations according to the number of variants, by assigning a score of 1 to the presence of a variant, and a score of 2 to the presence of two favourable variants; and summing the individual scores to obtain the total score for the talent- and Howard Gardner's multiple intelligence-related trait. The total score can be stored temporarily in the system (100) prior to being processed in the database (104) or the calculating module (107).

In a preferred embodiment of the present invention, the total score of the talent-related trait is referred to the predetermined reference data stored in the database (104) and determined for a rank *via* the rank determining module (105). The reference data can be a normal distribution data for a population generated based on their total scores and their corresponding frequencies, that is divided into intervals that define different ranks. The intervals may be divided by a quartile method, into four defined intervals, each indicates a rank. Accordingly, the lowest total score of the reference data falls into a first rank and the highest total score falls into a fourth rank. The rank determining

module (105) determines the rank for a total score of the talent-related trait, based on the interval that the total score falls therein. For instance, a less superior trait having a low total score may fall into the first rank and being determined as rank 1, and a superior trait having a high total score may fall into the fourth rank and being determined as rank

- 5 4. The rank can be used for recommending at least a talent for personalised development *via* the recommending module (106).

- In another preferred embodiment of the present invention, the calculating module (107) determines the amount of the Howard Gardner's multiple intelligence-related trait, using an equation that applies with a weight assigned to the total score. The amount may be obtained in the form of a percentage, ratio or fraction. Preferably, a trait having a high amount indicates a superior trait, and a trait having a low amount indicates a less superior trait. One or more amounts of the Howard Gardner's multiple intelligence-related traits is processed in the presentation generating module (108) to generate a data presentation of Howard Gardner's multiple intelligence profile in a form of a chart, table or graph. The data presentation provides an overview for the Howard Gardner's multiple intelligence-related trait that is presentable on the interactive graphical user interface on the displaying means of the device. The data presentation may be sent to the recommending module (106), to generate an optimal learning style based on the less superiority and/or superiority of the Howard Gardner's multiple intelligence-related trait, to fabricate a personalized trait development roadmap or a personalized learning method to optimizing the potential of the talent-related traits. The talent and optimal learning style for personalised development may include, but not limited to, an enrichment program for strengthening the superior trait, a nurturing program for developing the less superior trait, an employment program for assigning a short-term or long-term task for workforce planning or predicting a potential career path, and a competition selection program for selecting a fit candidate for a competition.
- 10
15
20
25

Figure 2 is a flowchart showing the method comprising the processing steps during the trait assessment conducted in the present system (100), according to an embodiment of the present invention. The method (200) of conducting the trait assessment starts with the step of importing the readable genetic variations code comprising the DNA information of the subject into the system (100), as in block (201). Genetic variations correspond to the talent- or Howard Gardner's multiple intelligence-related trait can then be determined from the information, and assigned with an individual score based on the number of variants in each of the genetic variation as in block (202) and (203). Particularly, a score of 1 may be assigned to the presence of a single favourable variant, and a score of 2 may be assigned to the presence of two favourable variants. The assignment of the individual scores based on the number of variants avoids bias, and ensures validity, consistency and accuracy in the method, and further contributes to achieving a rapid analysis. A total score for a trait is computed by summing up the individual scores for each of the trait as in block (204). The total score for the trait may be stored in the system (100) and further processed in block (205) or (207). The total score for the talent-related trait is referred to a predetermined reference data, which may be divided into intervals that define different ranks, to obtain a rank for the trait, and a program is recommended based on the rank as in block (205) and (206). For instance, a trait having a low total score that falls into the first rank may be identified as a less superior trait, and a trait having a high total score that falls into the fourth rank may be identified as a superior trait. The rank determination enables the user to identify strength, or superiority, of the talent-related traits in the subject, and then act based on the program recommendation. The less superior trait can be recommended with a nurturing program for developing the trait; whereas the superior trait can be recommended with an enrichment program for strengthening the trait. Meanwhile, the total score of the Howard Gardner's multiple intelligence-related trait is calculated to obtain the amount by using an equation with a weight assigned to the total score, and then generates a data presentation of Howard Gardner's multiple intelligence profile in a form of a chart, graph or table as in block (207) and (208). The data presentation provides an overview

for at least one superior trait and less superior trait correspond to the intelligence quotient. A personalized development roadmap or a personalized optimal learning style can be generated based on the Howard Gardner's multiple intelligence profile as in block (206), such that the user may utilize the roadmap or learning style to design an optimal learning condition, preferably based on a multiple intelligence theory, to develop the superior trait or to nurture the less superior trait. Advantageously, the rank and Howard Gardner's multiple intelligence profile generated from the method can be a quick and safe option for determining superiority of either or both of the talent- and Howard Gardner's multiple intelligence-related trait, and generating a comprehensive result that provides insight and prediction to the Howard Gardner's multiple intelligence profile and inborn talent of the subject. The method also provides a basis for understanding Howard Gardner's multiple intelligence profile of the subject without the hassle of conducting the assessment in a form of questionnaire. The personalized development program also recommends an enrichment program for assigning a short-term or long-term task for workforce planning or predicting a potential career path, or a competition selection program for selecting a fit candidate for a competition.

The present disclosure includes as contained in the appended claims, as well as that of the foregoing description. Although this invention has been described in its preferred form with a degree of particularity, it is understood that the present disclosure of the preferred form has been made only by way of example and that numerous changes in the details of construction and the combination and arrangements of parts may be resorted to without departing from the scope of the invention.

25 **EXAMPLE**

The following non-limiting example has been carried out to illustrate the preferred embodiments of the invention.

EXAMPLE 1

Table 1: Examples of mapped gene and accession number for talent-related and Howard
5 Gardner's multiple intelligence-related traits.

No.	Trait	Mapped Gene	Accession Number
1	Academic learning (Talent)	AC104782.3	rs13018645
2		AMT	rs9859536
3		ARPP21	rs1523041
4		BARHL2	rs6669072
5		CENPO	rs76114856
6		LOC100129158	rs9320913
7		LOC150577	rs4851266
8		LRRN2	rs11584700
9		MIR2115	rs9375188
10		PCDH17	rs1334297
11		RP11-315I14.2	rs7029718
12	Artistic potential (Talent)	BACE2	rs2410417
13		ERBB4	rs1879637
14		FUNDC1	rs6610953
15		HTR5A	rs1561176
16		PTPRD	rs2146180
17		ZNF285B	rs644148
18	Dance potential (Talent)	AVPR1A	RS1
19		AVPR1A	RS3
20		SLC6A4	HTTLPR
21		SLC6A4	VNTR
22	Language (Talent)	ABCC13	rs2192161
23		CCDC136	rs59197085
24		CNTNAP2	rs17236239
25		DAZAP1	rs4807927
26		RBFOX2	rs5995177, rs12158565
27		ROBO2	rs7642482

28	Leadership (Talent)	CHRNA3	rs4950
29		ZNF285B	rs644148
30	Mathematics (Talent)	ARID1B	rs12199332
31		DLD	rs6947045
32		DNAH5	rs17278234
33		FAM43A	rs789859
34		GRIK1-AS2	rs363449
35		MMP7	rs11225308
36		NRCAM	rs2300052
37		NUAK1	rs1215605
38		SPOCK1	rs1012694, rs11743006, rs177778739, rs17777541
39	Musical aptitude (Talent)	ASAP1	rs20057
40		GATA2	rs9854612
41		LRRIQ3	rs4630083
42		UGT8	rs12510781 , rs4148254
43		UNC5C	rs9307160
44	Endurance sports (Talent)	ACE	rs4343
45		ACTN3	rs1815739
46		ESRRB	rs12893597
47		HFE	rs1799945
48		NFIA-AS2	rs1572312
49		PPARA	rs4253778
50	Sprint sports (Talent)	ACE	rs4343
51		ACTN3	rs1815739
52		AGT	rs699
53		HIF1A	rs11549465
54		IL6	rs1800795
55		MTHFR	rs1801131
56		PPARG	rs1801282
57		SOD2	rs4880
58	Logical intelligence (Howard Gardner's Multiple Intelligence)	ARID1B	rs12199332
59		COMT	rs4633
60		DLD	rs6947045
61		DNAH5	rs17278234
62		FAM43A	rs789859

63		GRIK1-AS2	rs363449
64		MMP7	rs11225308
65		NRCAM	rs2300052
66		NUAK1	rs1215603
67		SPOCK1	rs1012694, rs11743006, rs17778739, rs17777841
68	Aural intelligence (Howard Gardner's Multiple Intelligence)	ASAP1	rs3057
69		GATA2	rs9854612
70		LRRIQ3	rs4630083
71		UGT8	rs12510781, rs4148254
72		UNC5C	rs9307160
73	Physical intelligence (Howard Gardner's Multiple Intelligence)	ACE	rs4345
74		ACTN3	rs2815739
75		AGT	rs699
76		ESRRB	rs12893597
77		HFE	rs1799945
78		HIF1A	rs11549465
79		IL6	rs1800795
80		MTFR	rs1801131
81		NF1A-AS2	rs1572312
82		PPARA	rs4253778
83	Verbal intelligence (Howard Gardner's Multiple Intelligence)	ABCC13	rs2192161
84		CCDC136	rs59197085
85		CNTNAP2	rs17236239
86		DAZAP1	rs4807927
87		NPTN	rs7171755
88		RBFOX2	rs5995177, rs12158565
89		ROBO2	rs7642482
90		TESC	rs7294919
91	Visual intelligence (Howard Gardner's Multiple Intelligence)	BDNF	rs6265
92		CHRNA4	rs1044396
93		ZNF804A	rs1344706
94	Social intelligence (Howard Gardner's Multiple Intelligence)	BDNF	rs6265
95		OXTR	rs53576
96		ZNF285B	rs644148
97		BDNF	rs6265

98	Solitary intelligence (Howard Gardner's Multiple Intelligence)	OXTR	rs53576
99		ZNF285B	rs644148

CLAIMS

1. A method for conducting trait assessment of a subject, the method comprising the steps of:
 - 5 importing DNA information of the subject, determining single nucleotide polymorphisms (SNP) that correspond to a talent, or Howard Gardner's multiple intelligence-related trait,
assigning individual scores to each SNP that corresponds to the talent, or Howard Gardner's multiple intelligence-related traits based on:
 - 10 (a) the presence of SNP and,
(b) the number of alleles in each SNP;
computing a total score by summing up individual scores for each talent, or Howard Gardner's multiple intelligence-related trait; and,
in the case of talent-related traits, determining the total score of talent-related traits and
15 determining the rank of a talent-related traits through referring to a reference data and,
in the case of Howard Gardner's multiple intelligence-related traits, determining the amount of Howard Gardner's multiple intelligence-related traits through an equation with a weight assigned to the total score, and present the Howard Gardner's multiple intelligence profile.
- 20 2. A trait assessment method as claimed in claim 1, wherein in either of said cases of talent-related traits or Howard Gardner's multiple intelligence-related traits, comprises a further step of recommending talent or optimal learning style for personalized development.
- 25 3. The method according to claim 2, wherein the talent and optimal learning style for personalised development includes an enrichment program, a nurturing program, an employment program and a competition selection program.

4. The method according to claim 1, wherein the reference data is a normal distribution data of a population generated based on their total scores of the talent-related traits and their corresponding frequencies.
- 5 5. The method according to claim 1, 2 or 4, wherein the reference data is divided into intervals that define different ranks.
6. The method according to claim 1 or 2, wherein the talent includes any one or combination of academic-learning, art, dancing, language leadership, mathematics,
10 music, endurance sports and sprint sports.
7. The method according to claim 1, further comprising the step of generating a data presentation of the Howard Gardner's multiple intelligence profile.
15
8. The method according to claim 7, wherein the data presentation includes chart, table and graph.
9. The method according to claim 1, wherein the Howard Gardner's multiple
20 intelligence-related traits includes any one or a combination of logical intelligence, aural intelligence, physical intelligence, verbal intelligence, visual intelligence, social intelligence and solitary intelligence.
10. A system for conducting trait assessment of a subject comprising
25 a server having a processor for controlling operation of the system;
an importing module for importing DNA information of the subject, determines single nucleotide polymorphisms (SNP) that correspond to a talent or Howard Gardner's multiple intelligence-related trait and assigning individual scores to each SNP that corresponds to the talent or Howard Gardner's multiple intelligence-related traits based
30 on: (a) the presence of SNP and, (b) the number of alleles in each SNP;

a score determining module for computing a total score for each trait through summing up individual scores assigned to all genetic variations that correspond to the same trait, wherein the individual score for each genetic variation is assigned based on the information;

- 5 a calculating module for determining the amount of Howard Gardner's intelligence-related traits through an equation with a weight assigned to the total score;
a ranking module for determining a rank for at least one talent-related trait of the subject through referring total scores to the reference data; and
a presentation generating module for generating a data presentation of Howard
10 Gardner's multiple intelligence profile based on the amount.

11. The system according to claim 10, further comprising a database for storing a predetermined reference data to determine the rank of the talent-related trait.

- 15 12. The system according to claim 11, wherein the reference data is a normal distribution data of a population generated based on their total scores of talent-related traits and their corresponding frequencies.

13. The system according to claim 12, wherein the reference data is divided into
20 intervals that define different ranks.

14. The system according to claim 10, further comprising a recommending module for recommending a talent or optimal learning style for personalised development based on the rank or data presentation determined.

- 25 15. The system according to claim 14, wherein the talent and optimal learning style for personalised development includes an enrichment program, a nurturing program, an employment program and a competition selection program.

16. The system according to claim 14, wherein the talent includes any one or combination of academic-learning, art, dancing, language, leadership, mathematics, music, endurance sports and sprint sports.

5 17. The system according to claim 10, wherein the data presentation includes chart, table and graph.

18. The system according to claim 17, wherein the amount is in the form of a percentage, ratio or fraction.

10

19. The system according to claim 10, wherein the Howard Gardner's multiple intelligence-related traits includes any one or a combination of logical intelligence, aural intelligence, physical intelligence, verbal intelligence, visual intelligence, social intelligence and solitary intelligence.

15

SYSTEM AND METHOD FOR CONDUCTING TRAIT ASSESSMENT

FIELD OF INVENTION

- 5 The present invention relates to the genetic profiling field. More particularly, the present invention relates to a system and method for conducting trait assessment to predict talent and intelligence of a subject, and provide a solution for enhancing the talent and intelligence.

10 BACKGROUND OF THE INVENTION

- Childhood development involves complex interaction between nature and nurture, in which nature refers to biological and genetic factors, and nurture refers to environmental factors and nutritional condition. They are essential components that
15 determine biological, psychological and emotional changes that occur between birth and end of adolescence of an individual, and are keys to shape the individual's behaviour, personality and skills.

- Aptitude and talent of an individual can be influenced by deoxyribonucleic acid (DNA)
20 that contains information that may influence at least one of the talent or aptitude. Some examples of the aptitude and talent include musical aptitude, educational attainment, intelligence, memory, persistence, the ability to communicate in multiple languages, or the ability to solve a problem or a mathematical equation. Thus, the genetic information is useful for predicting an individual's talent, intelligence quotient (IQ), emotional
25 quotient (EQ), and personality-related traits, and then providing a road map for the childhood development. The childhood development can be planned ahead by creating external influences for expanding, shaping or silencing the talent, IQ, EQ, and personality-related traits.

- Theory of multiple intelligence developed by Dr. Howard Gardner in 1983 proposes eight different intelligences that accounts for a broad range of human potential, mainly linguistic intelligence (word smart), logical-mathematical intelligence (number/reasoning smart), spatial intelligence (picture smart), bodily-kinaesthetic intelligence (body smart), musical intelligence (music smart), interpersonal intelligence (people smart), intrapersonal intelligence (self-smart), and naturalist intelligence (nature smart). The theory can be used as a guide for constructing an optimal learning method for the individual based on the intelligence quotient of the individual.
- Genetic testing technology is useful for confirming a suspected genetic condition and identifying chance of developing or passing a genetic disorder. Molecular genetic test is an example of the testing that studies single gene or short length DNA to identify variation or mutation in an individual. Specifically, information on single nucleotide polymorphism gene can be obtained *via* the genetic testing, in which the information is useful for identifying phenotypic traits and providing indication for a disease or a genetic disorder. The genetic testing approach has been disclosed in a granted United States patent, US7127355B2, to determine chances of an individual to develop or exhibit a multifactorial trait corresponding to a disease, a genetic disorder, or a positive or negative response to a drug. The method conducts a genetic testing on single nucleotide polymorphisms in the individual, in which genotype of the individual is assigned with a score and the score is compared to a threshold value prior to determining an appropriate course of treatment. However, the patent neither conducts the same for assessing talent- or intelligence-related traits in the individuals, nor provides an overview for all the traits and further suggests to develop the traits.
- There exists a need to provide a quick and safe option for assessing talent- and intelligence-related traits of an individual through a genetic profiling approach. The assessment generates an overview for all the traits and provides a prediction for the intelligence and inborn talent based on a valid and comprehensive analysis.

SUMMARY OF INVENTION

The main objective of the invention is to provide a quick, non-invasive and safe option for conducting trait assessment of a subject, particularly on talent- and intelligence-related traits through deoxyribonucleic acid (DNA) information, to determine at least one superior or less superior trait in the subject, and generates a comprehensive result that provides insight to the intelligence and inborn talent. The result is valid, consistent and accurate, and useful for education sector, employment sector, talent development industry and sport and fitness sector. The invention also provides a basis for understanding personality, emotional quotient and intelligence quotient of the subject, and generating a personalized trait development roadmap, focusing on at least one superior or less superior trait from both of the talent- and intelligence-related trait of the subject. Such initiative enables the subject to understand himself/herself better in terms of personality, emotional quotient and intelligence quotient, and optionally strengthen the superior trait or nurture the less superior trait based on the guidance from the personalized trait development roadmap. To achieve this objective, the invention provides a method for conducting the trait assessment that is executed by a system incorporated with the steps of determining the presence of genetic variations corresponds to a trait and the number of variants in each genetic variation from the DNA information, and assigning scores accordingly to ensure validity, consistency and accuracy. The method further comprises processing the scores to obtain a rank that indicates strength of the talent-related traits, and/or an amount indicating strength of the intelligence-related traits, and then providing a data illustration for the talent- and intelligence-related traits and recommending a personalized trait development roadmap based on the rank and the amount determined.

The invention provides a method for conducting trait assessment of a subject executed by a system having a server with a processor for controlling operation of the system, the method comprising the step of determining both of a rank for at least one talent-

related trait of the subject and an amount for at least one intelligence-related trait of the subject through information on one or more genetic variations obtained from deoxyribonucleic acid of the subject; wherein the information includes presence of the genetic variations and number of variants found in each genetic variation.

5

Preferably, the method further comprises the step of computing a total score for each trait through summing up individual scores assigned to each genetic variation that corresponds to the same trait prior to the step of determining both of the rank for the talent-related trait and the amount for the intelligence-related trait, wherein the individual score for each genetic variation is assigned based on the information.

In a preferred embodiment of the invention, the rank for the talent-related trait may be determined through referring the total score to a predetermined reference data of the corresponding talent-related trait. The reference data can be a normal distribution data of a population generated based on their total scores and frequencies of the talent-related trait. Preferably, the reference data is divided into intervals that define different ranks. The method may further comprise a step of recommending a program to the subject based on the rank determined. Preferably, the talent includes any one or combination of academic-learning, art, dancing, language, leadership, mathematics, music, endurance sports and sprint sports.

In another preferred embodiment, the amount for the intelligence-related trait can be determined through an equation that applies a weight assigned to the total score. Preferably, the method comprises the step of generating a data presentation of one or more amounts of the intelligence-related traits, in which the data presentation may include chart, table and graph and the amount can be in the form of a percentage, ratio or fraction. Preferably, the intelligence includes any one or a combination of logical intelligence, aural intelligence, physical intelligence, verbal intelligence, visual intelligence, social intelligence and solitary intelligence.

30

The invention also provides a system for conducting trait assessment of a subject comprising a server having a processor for controlling operation of the system; a ranking module for determining a rank for at least one talent-related trait of the subject; and a calculating module for determining an amount for at least one intelligence-related trait of the subject through information on one or more genetic variations obtained from deoxyribonucleic acid of the subject; wherein the information includes presence of the genetic variations and number of variants found in each genetic variation.

Preferably, the system further comprises a score determining module for computing a total score for each trait through summing up individual scores assigned to all genetic variations that correspond to the same trait, wherein the individual score for each genetic variation is assigned based on the information. The system may further comprise a database for storing a predetermined reference data to determine the rank of the talent-related trait, in which the reference data can be a normal distribution data of a population generated based on their total scores and frequencies of the talent-related trait. The reference data can be divided into intervals that define different ranks.

The system further comprises a recommending module for recommending a personalised trait development roadmap to the subject based on the rank determined from the ranking module and the amount determined from the calculating module.

Preferably, the system further comprises a recommending module for recommending a program to the subject based on the rank determined. The program may include an enrichment program, a nurturing program, an employment program and a competition selection program. Preferably, the talent includes any one or combination of academic-learning, art, dancing, language, leadership, mathematics, music, endurance sports and sprint sports. The program can be a part of a personalised trait development roadmap to the subject.

Preferably, the system further comprises a presentation generating module for generating a data presentation of one or more amounts of the intelligence-related traits. The data presentation may include a chart, a table and a graph, and the amount may be in the form of a percentage, ratio or fraction. Preferably, the intelligence includes any
5 one or a combination of logical intelligence, aural intelligence, physical intelligence, verbal intelligence, visual intelligence, social intelligence and solitary intelligence.

One skilled in the art will readily appreciate that the present invention is well adapted to carry out the objects and obtain the ends and advantages mentioned, as well as those
10 inherent therein. The embodiment described herein is not intended as limitations on the scope of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

15 For the purpose of facilitating an understanding of the invention, there is illustrated in the accompanying drawing the preferred embodiments from an inspection of which when considered in connection with the following description, the invention, its construction and operation and many of its advantages would be readily understood and appreciated.

20

Figure 1 is a block diagram showing different module of the server used for conducting the trait assessment, according to a preferred embodiment of the present invention.

Figure 2 is a flowchart showing the processing steps during conducting trait assessment of a subject, according to an embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

As described herein, the term “system” or “computer system” refers to a network system having one or more computers and/or other electronic devices, where each computer of the electronic device may include a computer-readable medium
5 embodying software to operate the computer/electronic device or one or more of its component. Non-limiting examples of a system may include: a distributed computer system for processing information *via* computer systems linked by a network; and two or more computer systems connected together *via* a network for transmitting and/or receiving information between the computer systems.

10

As described herein, the term “server” may refer to a device that receives incoming request and sends processed request *via* a plurality of modules for controlling the operation of the system. The server refers to a device comprising at least one processor and a graphical interface user selected from laptop, desktop, smartphone, tablet,
15 wearable smart device, and any device defined herein as a “computer”.

As described herein, the term “processor” may refer to any device or portion of a device or apparatus that processes electronic data from registers and/or memory to transform that electronic data into other electronic data that may be stored in registers and/or
20 memory. A “computer system” may comprise one or more processors.

A “graphical user interface” may refer to all visually identifiable and/or interact-able visuals displayed through a display of the server.

25 As used herein, the term “network” or “communication networks” or “communication channel” may operate with any of a number of protocols, wireless, WiFi, and such as Internet protocol (IP), asynchronous transfer mode (ATM), and/or synchronous optical network (SONET), user datagram protocol (UDP), IEEE 802.x.

As described herein, the term “genetic variations” may refer to a nucleic acid based genetic variation selected from the group consisting of: a genetic mutation, a gene amplification, a gene rearrangement, a deletion, an insertion, an InDel mutation, a single nucleotide polymorphism (SNP), an epigenetic alteration, a splicing variant, an
5 ribonucleic acid (RNA)/protein overexpression, and an aberrant RNA/protein expression, and combinations thereof. In a preferred embodiment of the invention, the genetic variation refers to a variant that affects a gene that involves in production of protein that is responsible for predisposition to any one or combination of the talent- and intelligence-related trait.

10

The present invention relates to a system and associated method for conducting trait assessment of a subject, preferably talent- and intelligence-related traits, based on DNA information, to obtain an overview for predicting the traits, and determine less superiority or superiority of at least one trait. Particularly, the talent-related trait may
15 include any one or combination of academic-learning, art, dancing, language, leadership, mathematics, music, endurance sports and sprint sports; and the intelligence-related trait may include any one or a combination of logical intelligence, aural intelligence, physical intelligence, verbal intelligence, visual intelligence, social intelligence and solitary intelligence.

20

According to a preferred embodiment of the invention, the system for conducting the trait assessment includes a device and at least one server capable of communicating the device over a communication channel. The system further includes a number of processor executable instructions, which can be embedded into a website or a mobile
25 application. In some instance, the embedding of the processor executable instructions into the website or mobile application enables performing of a number of tasks, and providing an output, preferably interact-able output, such as, but not limited to a data presentation in a form of chart, graph, table, and a recommendation program, through

a displaying means of the device. The device may optionally be connected to a printing means to generate a printable output.

The server can be the device as described in the previous embodiment, or any device
5 selected from smartphone, tablet, computer, wearable smart device, and a computer
connected to a communication network or the Internet and capable of displaying an
interactive graphical user interface of a website or a mobile application for displaying
an overview of the trait assessment. The server includes a processor (101) to control
operation of the system (100) by processing a number of instructions including the
10 processor executable instructions embedded into the website or the mobile application
which enable the user to perform a variety of tasks such as to interact with the data
presentation or the recommended program. The server further includes a memory unit
for temporarily storing the data and instructions while performing a number of
operations by the processor (101) and a storage unit for storing a variety of data. The
15 server further includes a displaying unit to present the interactive graphical user
interface, which in turn presents the data presentation or the recommendation program.
The user is allowed to interact with the contents presented on the interactive graphical
user interface using a keyboard, pointing device such as a mouse, at least one gesture
or touch, voice activation, or any other interacting means.

20

Figure 1 illustrates a block diagram showing different module of the server used for
conducting the trait assessment, according to a preferred embodiment of the present
invention. The present system (100) for conducting the trait assessment comprises a
server having a processor for controlling operation of the system (100); an importing
25 module (102) for importing DNA information of the subject, in a readable genetic
variations code, from a source into the system (100) *via* a communication network; a
score determining module (103) for determining the presence of genetic variations
correspond to a trait and number of variants found in each genetic variation, and
assigning an individual score based on the number of variants, based on the DNA

information, and computing a total score for each trait by summing up the individual scores; a database (104) storing a predetermined reference data for referring the total score to determine a rank for the talent-related trait; a ranking module (105) for determining a rank for at least one talent-related trait; a recommending module (106)
 5 for recommending a personalized trait development roadmap to the subject based on the rank and amount; a calculating module (107) for processing the total score to determine an amount of the intelligence-related trait through an equation that applies with a weight assigned to the total score; and a presentation generating module (108) for generating a data presentation based on the amount.

10

Preferably, the score determining module (103) detects the genetic variations by inspecting genotypic information of genes responsible for traits associated with academic-learning, art, dancing, language, leadership, mathematics, music, endurance sports, sprint sports, logical intelligence, aural intelligence, physical intelligence, verbal
 15 intelligence, visual intelligence, social intelligence and solitary intelligence. In an exemplary embodiment, the score determining module (103) identifies the genes as tabulated in Table 1.

In one preferred embodiment of the present invention, the importing module (102)
 20 translates the DNA information extracted from a biological sample of the subject into a genetic variations code readable by the system (100), and imports the genetic variations code into the system (100). The genetic variations is a nucleic acid based genetic variation selected from the group consisting of: a genetic mutation, a gene amplification, a gene rearrangement, a deletion, an insertion, an InDel mutation, a SNP,
 25 an epigenetic alteration, a splicing variant, an RNA/protein overexpression, and an aberrant RNA/protein expression, and combinations thereof. The genetic variations code is processed by the score determining module (103) to determine the presence of genetic variations correspond to a trait and number of variants found in each of the genetic variation. The score determining module (103) further assigns individual score

to the genetic variations according to the number of variants, by assigning a score of 1 to the presence of a variant, and a score of 2 to the presence of two favourable variants; and summing the individual scores to obtain the total score for the talent- and intelligence-related trait. The total score can be stored temporarily in the system (100) prior to being processed in the database (104) or the calculating module (107).

In a preferred embodiment of the present invention, the total score of the talent-related trait is referred to the predetermined reference data stored in the database (104) and determined for a rank *via* the rank determining module (105). The reference data can be a normal distribution data for a population generated based on their total scores and frequencies of the talent-related traits, that is divided into intervals that define different ranks. The intervals may be divided by a quartile method, into four defined intervals, each indicates a rank. Accordingly, the lowest total score of the reference data falls into a first rank and the highest total score falls into a fourth rank. The rank determining module (105) determines the rank for a total score of the talent-related trait, based on the interval that the total score falls therein. For instance, a less superior trait having a low total score may fall into the first rank and being determined as rank 1, and a superior trait having a high total score may fall into the fourth rank and being determined as rank 4. The rank can be used for recommending at least one program *via* the recommending module (106). The program may include, but not limited to, an enrichment program for strengthening the superior trait, a nurturing program for developing the less superior trait, an employment program for assigning a short-term or long-term task for workforce planning or predicting a potential career path, and a competition selection program for selecting a fit candidate for a competition. As shown in Figure 2, such program can be a part of a personalized trait development roadmap for the subject.

In another preferred embodiment of the present invention, the calculating module (107) determines the amount of the intelligence-related trait, using an equation that applies with a weight assigned to the total score. The amount may be obtained in the form of a

percentage, ratio or fraction. Preferably, a trait having a high amount indicates a superior trait, and a trait having a low amount indicates a less superior trait. One or more amounts of the intelligence-related traits is processed in the presentation generating module (108) to generate a data presentation in a form of a chart, table or graph. The data presentation provides an overview for the intelligence-related trait that is presentable on the interactive graphical user interface on the displaying means of the device. Optionally, the data presentation may be sent to an external analysing unit, to generate a learning method based on the less superiority and/or superiority of the intelligence-related trait, to fabricate a personalized trait development roadmap or a personalized learning method to optimizing the potential of the traits.

Figure 2 is a flowchart showing the method comprising the processing steps during the trait assessment conducted in the present system (100), according to an embodiment of the present invention. The method (200) of conducting the trait assessment starts with the step of importing the readable genetic variations code comprising the DNA information of the subject into the system (100), as in block (201). Genetic variations correspond to the talent- or intelligence-related trait can then be determined from the information, and assigned with an individual score based on the number of variants in each of the genetic variation as in block (202) and (203). Particularly, a score of 1 may be assigned to the presence of a single favourable variant, and a score of 2 may be assigned to the presence of two favourable variants. The assignment of the individual scores based on the number of variants avoids bias, and ensures validity, consistency and accuracy in the method, and further contributes to achieving a rapid analysis. A total score for a trait is computed by summing up the individual scores for each of the trait as in block (204). The total score for the trait may be stored in the system (100) and further processed in block (205) or (207). The total score for the talent-related trait is referred to a predetermined reference data, which may be divided into intervals that define different ranks, to obtain a rank for the trait, and a program is recommended based on the rank as in block (205) and (206). For instance, a trait having a low total

score that falls into the first rank may be identified as a less superior trait, and a trait having a high total score that falls into the fourth rank may be identified as a superior trait. The rank determination enables the user to identify strength, or superiority, of the talent-related traits in the subject, and then act based on the program recommendation.

- 5 The less superior trait can be recommended with a nurturing program for developing the trait; whereas the superior trait can be recommended with an enrichment program for strengthening the trait. The program also recommends an enrichment program for assigning a short-term or long-term task for workforce planning or predicting a potential career path, or a competition selection program for selecting a fit candidate
- 10 for a competition. Meanwhile, the total score of the intelligence-related trait is calculated to obtain the amount by using an equation with a weight assigned to the total score, and then generates a data presentation in a form of a chart, graph or table as in block (207) and (208). The data presentation provides an overview for at least one superior trait and less superior trait correspond to the intelligence quotient. A
- 15 personalized trait development roadmap or a personalized learning method can be generated based on the data presentation, such that the user may utilize the roadmap or learning method to design an optimal learning condition, preferably based on a multiple intelligence theory, to develop the superior trait or to nurture the less superior trait. Advantageously, the rank and data presentation generated from the method can be a
- 20 quick and safe option for providing a personalized trait development roadmap by determining superiority of either or both of the talent- and intelligence-related trait, and generating a comprehensive result that provides insight and prediction to the intelligence and inborn talent of the subject. The method also provides a basis for understanding personality, emotional quotient and intelligence quotient of the subject
- 25 without the hassle of conducting the assessment in a form of questionnaire.

The present disclosure includes as contained in the appended claims, as well as that of the foregoing description. Although this invention has been described in its preferred form with a degree of particularly, it is understood that the present disclosure of the

preferred form has been made only by way of example and that numerous changes in the details of construction and the combination and arrangements of parts may be resorted to without departing from the scope of the invention.

5

EXAMPLE

The following non-limiting example has been carried out to illustrate the preferred
10 embodiments of the invention.

EXAMPLE 1

Table 1: Examples of mapped gene and accession number for talent-related and
15 intelligence-related traits.

No.	Trait	Mapped Gene	Accession Number
1	Academic learning	AC104782.3	rs13018640
2		AMT	rs9859556
3		ARPP21	rs1523041
4		BARHL2	rs6669072
5		CENPO	rs76114856
6		LOC100129158	rs9320913
7		LOC150577	rs4851266
8		LRRN2	rs11584700
9		MIR2113	rs9375188
10		PCDH17	rs1334297
11		RP11-315I14.2	rs7029718
12	Artistic potential	BACE2	rs2410417
13		ERBB4	rs1879637
14		FUNDCl	rs6610953
15		HTR5A	rs1561176

16		PTPRD	rs2146180
17		ZNF285B	rs644148
18	Dance potential	AVPR1A	RS1
19		AVPR1A	RS3
20		SLC6A4	HTTLPR
21		SLC6A4	VNTR
22	Language	ABCC13	rs2192161
23		CCDC136	rs59197085
24		CNTNAP2	rs17236239
25		DAZAP1	rs4807927
26		RBFOX2	rs5995177, rs12158565
27		ROBO2	rs7642482
28	Leadership	CHRNA3	rs4950
29		ZNF285B	rs644148
30	Mathematics	ARID1B	rs12199332
31		DLD	rs6947045
32		DNAH5	rs17278234
33		FAM43A	rs789859
34		GRIK1-AS2	rs363449
35		MMP7	rs11225308
36		NRCAM	rs2300052
37		NUAK1	rs1215603
38		SPOCK1	rs1012694, rs11743006, rs17778739, rs17777541
39	Musical aptitude	ASAP1	rs3057
40		GATA2	rs9854612
41		LRRIQ3	rs4630083
42		UGT8	rs12510781 , rs4148254
43		UNC5C	rs9307160
44	Endurance sports	ACE	rs4343
45		ACTN3	rs1815739
46		ESRRB	rs12893597
47		HFE	rs1799945
48		NFIA-AS2	rs1572312
49		PPARA	rs4253778

50	Sprint sports	ACE	rs4343
51		ACTN3	rs1815739
52		AGT	rs699
53		HIF1A	rs11549465
54		IL6	rs1800795
55		MTHFR	rs1801131
56		PPARG	rs1801282
57		SOD2	rs4880
58	Logical intelligence	ARID1B	rs12199332
59		COMT	rs4633
60		DLD	rs6947045
61		DNAH5	rs17278234
62		FAM43A	rs789859
63		GRIK1-AS2	rs363449
64		MMP7	rs11225308
65		NRCAM	rs2300052
66	Aural intelligence	NUAK1	rs1215603
67		SPOCK1	rs1012694, rs11743006, rs17778739, rs17777541
68		ASAP1	rs3057
69		GATA2	rs9854612
70		LRRIQ3	rs4630083
71		UGT8	rs12510781 , rs4148254
72		UNC5C	rs9307160
73	Physical intelligence	ACE	rs4343
74		ACTN3	rs1815739
75		AGT	rs699
76		ESRRB	rs12893597
77		HFE	rs1799945
78		HIF1A	rs11549465
79		IL6	rs1800795
80		MTHFR	rs1801131
81		NFIA-AS2	rs1572312
82		PPARA	rs4253778
83	Verbal intelligence	ABCC13	rs2192161
84		CCDC136	rs59197085

85		CNTNAP2	rs17236239
86		DAZAP1	rs4807927
87		NPTN	rs7171755
88		RBFOX2	rs5995177, rs12158565
89		ROBO2	rs7642482
90		TESC	rs7294919
91	Visual intelligence	BDNF	rs6265
92		CHRNA4	rs1044396
93		ZNF804A	rs1344706
94	Social intelligence	BDNF	rs6265
95		OXTR	rs53576
96		ZNF285B	rs644148
97	Solitary intelligence	BDNF	rs6265
98		OXTR	rs53576
99		ZNF285B	rs644148

CLAIMS

1. A method for conducting trait assessment of a subject executed by a system having a server with a processor for controlling operation of the system, the method comprising
5 the step of
determining both of a rank for at least one talent-related trait of the subject and an amount for at least one intelligence-related trait of the subject through information on one or more genetic variations obtained from deoxyribonucleic acid of the subject, wherein the intelligence includes any one or a combination of logical intelligence, aural
10 intelligence, physical intelligence, verbal intelligence, visual intelligence, social intelligence and solitary intelligence;
wherein the information includes presence of the genetic variations and number of variants found in each genetic variation;
a step of generating a data presentation of one or more amounts of the intelligence-
15 related traits; and
a step of recommending a personalized trait development roadmap to the subject based on the rank and the amount determined.
2. The method according to claim 1, further comprising the step of computing a total
20 score for each trait through summing up individual scores assigned to each genetic variation that corresponds to the same trait prior to the step of determining both of the rank for the talent-related trait and the amount for the intelligence-related trait, wherein the individual score for each genetic variation is assigned based on the information.
- 25 3. The method according to claim 2, wherein the rank for the talent-related trait is determined through referring the total score to a predetermined reference data of the corresponding talent-related trait.

4. The method according to claim 3, wherein the reference data is a normal distribution data of a population generated based on their total scores and frequencies of the talent-related trait.
- 5 5. The method according to claim 3, wherein the reference data is divided into intervals that define different ranks.
6. The method according to claim 1, wherein the step of recommending a personalized trait development roadmap to the subject based on the rank includes recommending an enrichment program, a nurturing program, an employment program and a competition selection program.
- 10
7. The method according to claim 1, wherein the step of recommending a personalized trait development roadmap to the subject based on the amount determined includes a learning method.
- 15
8. The method according to claim 1, wherein the talent includes any one or combination of academic-learning, art, dancing, language, leadership, mathematics, music, endurance sports and sprint sports.
- 20
9. The method according to claim 2, wherein the amount for the intelligence-related trait is determined through an equation that applies a weight assigned to the total score.
10. The method according to claim 1, wherein the data presentation includes chart, table and graph.
- 25
11. The method according to claim 1, wherein the amount is in the form of a percentage, ratio or fraction.

12. A system for conducting trait assessment of a subject comprising
a server having a processor for controlling operation of the system;
a ranking module for determining a rank for at least one talent-related trait of the subject;
and
5 a calculating module for determining an amount for at least one intelligence-related trait
of the subject through information on one or more genetic variations obtained from
deoxyribonucleic acid of the subject, wherein the intelligence includes any one or a
combination of logical intelligence, aural intelligence, physical intelligence, verbal
intelligence, visual intelligence, social intelligence and solitary intelligence;
10 wherein the information includes presence of the genetic variations and number of
variants found in each genetic variation;
a presentation generating module for generating a data presentation of one or more
amounts of the intelligence-related traits; and
a recommending module for recommending a personalized trait development
15 roadmap to the subject based on the rank determined from the ranking module and the
amount determined from the calculating module.
13. The system according to claim 12, further comprising a score determining module
for computing a total score for each trait through summing up individual scores
20 assigned to all genetic variations that correspond to the same trait, wherein the
individual score for each genetic variation is assigned based on the information.
14. The system according to claim 12, further comprising a database for storing a
predetermined reference data to determine the rank of the talent-related trait.
25
15. The system according to claim 14, wherein the reference data is a normal
distribution data of a population generated based on their total scores and frequencies
of the talent-related trait.

16. The system according to claim 14, wherein the reference data is divided into intervals that define different ranks.

17. The system according to claim 12, wherein personalized trait development
5 roadmap to the subject based on the rank determined from the ranking module includes an enrichment program, a nurturing program, an employment program and a competition selection program.

18. The system according to claim 12, wherein the personalized trait development
10 roadmap to the subject based on the amount determined from the calculating module includes a learning method.

19. The system according to claim 12, wherein the talent includes any one or combination of academic-learning, art, dancing, language, leadership, mathematics,
15 music, endurance sports and sprint sports.

20. The system according to claim 12, wherein the data presentation includes chart, table and graph.

20
21. The system according to claim 12, wherein the amount is in the form of a percentage, ratio or fraction.