(19) Octrooicentrum Nederland

(11) **1042207**

(12) B1 **OCTROOI**

(21) Aanvraagnummer: **1042207**

(22) Aanvraag ingediend: **01/01/2017**

(51) Int. Cl.:
A61B 5/00 (2017.01) **A61B 5/16** (2017.01)

(41) Aanvraag ingeschreven:
06/07/2018

(43) Aanvraag gepubliceerd:
06/07/2018

(47) Octrooi verleend:
23/07/2018

(45) Octrooischrift uitgegeven:
24/07/2018

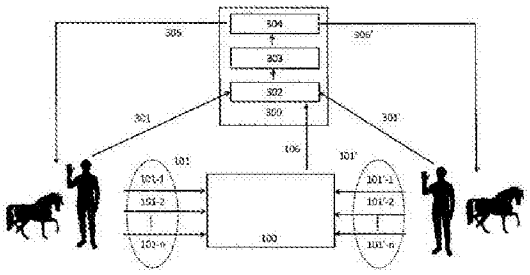
(73) Octrooihouder(s):
Mentech Innovation B.V. te Veldhoven.

(72) Uitvinder(s):
dr Erwin Rinaldo Meinders te Veldhoven.
Mariska Johanna Reitsma te Veldhoven.

(74) Gemachtigde:
Geen.

(54) **An emotion content control system for combining emotion content signals for feedback interaction and a method for enhancing the interaction with the human or animal subject thereof**

(57) An emotion content control system for converting emotion content signals from a human or animal subject into emotion content control signals for feedback interaction, said system comprising at least:
- a first apparatus arranged for sensing from at least a first human or animal subject first subject emotion content signals of at least a first and a second type, processing and converting said first and second type subject emotion content signals into a first emotion content control signal and transmitting said converted first emotion content control signal;
- a subject interaction device arranged in receiving said first emotion content control signal being transmitted by said first apparatus and in performing feedback interaction with said first human or animal subject based on said first emotion content control signal being received.



SURROUND EMOTION

An emotion content control system for combining emotion content signals for feedback interaction and a method for enhancing the interaction with the human or animal subject thereof

Inventors: **Erwin Rinaldo MEINDERS, Mariska Johanna REITSMA**

Applicant: Mentech Innovation B.V., Tonnekeshei 14, 5508 VB Veldhoven, Netherlands

FIELD

[001] The invention relates to an emotion content control system for converting emotion content signals from a human or animal subject into emotion content control signals for feedback interaction, said system comprising at least a first apparatus arranged for sensing from at least a first human or animal subject first subject emotion content signals of at least a first and a second type, processing and converting said first and second type subject emotion content signals into a first emotion content control signal and transmitting said converted first emotion content control signal; and a subject interaction device arranged in receiving said first emotion content control signal being transmitted by said first apparatus and in performing feedback interaction with said first human or animal subject based on said first emotion content control signal being received.

[002] The invention also relates to a system comprising at least a further apparatus arranged for sensing from a further human or animal subject further subject emotion content signals of at least a first and a second type, processing and converting said further first and second type subject emotion content signals into a further emotion content control signal and transmitting said converted further emotion content control signal to said subject interaction device for performing feedback interaction with said further human or animal subject based on said further emotion content control signal being received.

[003] The invention also relates to a system wherein said first apparatus is arranged for sensing from at least a further human or animal subject further emotion content signals of at least a first and a second type, and in processing and converting said first and second type emotion content signals of said first and said further human or animal subject into an combined emotion content control signal and transmitting said converted combined emotion content control signal to said subject interaction device for performing feedback interaction with said first and said further human or animal subject based on said converted combined emotion content control signal being received.

[004] The invention also relates to a system wherein said first and/or further apparatus comprises:

- sensing means for sensing said emotion content signals of said at least first and second type;
- processing means for processing said emotion content signals of said at least first and second type into said emotion content control signal using cross-correlations based on parametric representations and frequency analysis of said emotion content signals of said at least first and second type; and
- transmission means for transmitting said emotion content control signal.

[005] The invention also relates to a system wherein said first and/or further apparatus comprises storage means for storing said emotion content signals of said at least first and second type and said emotion content control signal.

[006] The invention also relates to a system wherein:

- said processing means of said first and/or further apparatus are arranged in extracting reference content information from said emotion content signals of said at least first and second type being stored and/or being received, said reference content information being human and/or animal subject; and
- said reference content information signal being constructed from time and frequency analysis of the said emotion content signal of at least first and second type, or from content analysis of the said emotion content signal of at least first and second type;
- said reference content information signal being constructed via a self-learning algorithm of patterns, via pattern recognition;
- said reference content information is stored in the storage means.

[007] The invention also relates to a system wherein the said processing means of said first and/or further apparatus are capable of generating an emotion content control signal based on a predefined category of event selection.

[008] The invention also relates to a system according to any or more of the preceding claims, wherein said subject interaction device is arranged in receiving feedback signals being input by said first and/or further human or animal subject.

[009] The invention also relates to a system further comprises at least one auxiliary device operable based on said feedback interaction being performed by said subject interaction device.

[010] The invention also relates to a system wherein said auxiliary device comprises at least one of the list comprising:

- a sound emitting module;
- a light emitting module;
- a display screen;
- a tactile actuator;
- a vibration actuator;
- a heat emitting actuator.

[011] The invention also relates to a system wherein said types of emotion content signals comprises at least two of the following signals:

- heart beat;
- blood pressure;
- facial expression;
- body surface temperature;
- body surface conductivity;
- neurotransmitter or hormone profile information;
- vocal speech characteristics;
- body gestures or posture.

[012] The invention also relates to a method for enhancing the interaction with the human or animal subject, the method comprising the steps of:

A. Exposing the human and animal subject to an interactive environmental setting;

B. Sensing and receiving the emotional content signals of a first and second type of the said human or animal subject, said emotional content signals being generated by said subject due to said exposure to the interactive environmental setting;

C. Processing the emotion content signals of said at least first and second type into said emotion content control signal using cross-correlations based on parametric representations and frequency analysis of said emotion content signals of said at least first and second type;

D. Storage said emotion content signals of said at least first and second type and said emotion content control signal;

E. Transmitting the emotion content control signal to a subject interaction device arranged in receiving said first emotion content control signal;

F. Providing feedback interaction with said subject interaction device with first human or animal subject to said interactive environmental setting.

[013] The invention also relates to a computer implemented method that is executed in the emotion content storage apparatus or subject interaction device and consists of executable code compatible with said emotion content storage apparatus enabling the carrying out of a method according to the invention.

[014] The invention also relates to a computer program stored on a non-volatile record carrier, said computer program containing instruction codes, which instruction codes when executed comprising a computer program.

BACKGROUND

[015] In recent years, increased attention for emotion detection is noticed. Emotion states includes states of pleasure (for instance happiness), displeasure (for instance sadness), low arousal (for instance quietness), high arousal (for instance surprised). Social media make use of icons to express emotions. Emotion is expressed by facial, vocal, and postural expressions. Emotion can be determined from physiological reaction (activation or arousal, for instance increases in heart rate), the change in activity in the autonomic nervous system (ANS), blood pressure responses, skin responses, pupillary responses, brain waves, and

heart responses. Examples include the IBM's emotion mouse (Ark, Dryer, & Lu 1999) and a variety of wearable sensors designed by the Affective Computing Group at MIT (e.g. Picard 2000).

[016] In recent years, the availability of measurement devices to measure physiological parameters of users is growing. Examples include heart beat sensors, respiratory sensors, skin conductance sensors, blood pressure sensors, temperature sensors, oxygen sensors, accelerometer sensors, motion sensors, GPS sensors. These sensors are more and more integrated in the human vicinity (for instance integrated in smart watches, clothing, shoes) or are embedded in the body (for instance underneath the human skin, or inside the body). The quality of the content of the signals is also increased.

[017] Further information on content analysis is generally available to the person skilled in the art, see for example the articles:

- 'Activity-aware Mental Stress Detection Using Physiological Sensors' by Sun FT., Kuo C., Cheng HT., Buthpitiya S., Collins P., Griss M. from Carnegie Mellon University and Nokia Research Center, published in: Gris M., Yang G. (eds) Mobile Computing, Applications, and Services. MobiCASE 2010. Lecture Notes of the Institute for Computer Sciences, Social Informatics and Telecommunications Engineering, vol 76. Springer, Berlin, Heidelberg.
- Towards mental stress detection using wearable physiological sensors by Wijsman J1, Grundlehner B, Liu H, Hermens H, Penders J., in Conf Proc IEEE Eng Med Biol Soc. 2011;2011:1798-801. doi: 10.1109/IEMBS.2011.6090512.
- 'Stress Detection Using Wearable Physiological Sensors' by Sandulescu V., Andrews S., Ellis D., Bellotto N., Mozos O.M. (2015). In: Ferrández Vicente J., Álvarez-Sánchez J., de la Paz López F., Toledo-Moreo F., Adeli H. (eds) Artificial Computation in Biology and Medicine. IWINAC 2015. Lecture Notes in Computer Science, vol 9107. Springer, Cham
- 'Stress Recognition Using Wearable Sensors and Mobile Phones' by Akane Sano, Rosalind W. Picard, in: Proceeding ACII '13 Proceedings of the 2013 Humaine Association Conference on Affective Computing and Intelligent Interaction, pages 671-676.

[018] In addition to the increased quantity of emotion content and the increased distribution flexibility of these signals, vocal/sound, facial mages and postural expressions

are sources that provide information about the emotion level of a user. Pattern recognition can be applied to derive emotion levels from these parameters.

[019] In addition to these sources of emotion content, increased attention is given to derive emotion content from neurotransmitters or hormones. Information about the presence and the temporal concentration of these hormones in a human or animal body provides insight in the emotional status. Pattern recognition of the concentration profiles can be applied to derive emotion levels from these parameters. The hormone Dopamine is a feel good hormone, and is created in the brains. The hormone Oxytocine strengthens the bond between persons. Mother's milk contains a large number of this hormone. Endorfine is used to face stress and pain. It's a sort of relieve for pain. Serotonine is the happiness hormone, generated in the gut and brains.

[020] More information about the working principles of neurotransmitters and hormones is given in:

- www.medicalnewstoday.com/kc/serotonin-facts-232248
- en.wikipedia.org/wiki/Serotonin
- www.sciencedirect.com/science/article/pii/S0166432814004768
- www.newhealthadvisor.com/Serotonin-and-Dopamine.html
- www.life-enhancement.com/magazine/article/178-5-htp-enhance-your-mood-your-sleep-and-a-lot-more
- eocinstitute.org/meditation/dhea_gaba_cortisol_hgh_melatonin_serotonin_endorphins

[021] Many means nowadays exist to augment the perception of senses. 3D imaging via virtual reality glasses is for instance used to augment the experience of watching movies. Surround sound is used to augment the sensation of audio. 4D cinema use all kind of tricks to augment the sensation of performance, via movement, water droplets, etc.

[022] The care industry anticipates to these developments by introducing care games to augment the sensing performance of vulnerable people, like mentally disabled persons, retarded elderly etc. Care games for instance can augment the sensation of feeling, or interaction between an image and movement of the body. For example, a care game used

to stimulate the activity of retarded people or dement elderly can be equipped with emotion detection to increase the participation in the game. Excitement can be stimulated by increased complexity of the offered game features, boringness can be avoided by offering different features or levels.

[023] It has also been suggested that improved user experience may be achieved by providing emotion content signals. Queasy live performances of great singers is common practice, by augmenting the experience by showing live recordings, including live voice/sing, live dance/performance and other visual live elements. Augmentation of the performance by live emotion of the remote or passed-away performer will augment the experience of the public. How great will it be to listen to a recorded live performance of Elvis's 'How great thou are', with the sensation of feeling his emotions as well via recorded emotion data from past live performances? Or experience the sensation of making a goal during a world champion soccer game.

[024] It has also been suggested that improved gaming experience may be achieved by providing emotion content signals. If the emotion of a game player is determined and simultaneously provided as input signal to control the course of a game, the gaming experience will be influenced. For example, if a gamer wants to relax it can program the game in such a way that excitement, captured by the emotion content signal, is mitigated by changing the degree of difficulty, the pace of the game, the appearance of the game, the environmental setting, the appearance of the characters and personalities, etc. It may also be programmed to enhance the emotional status via the emotional control signal.

[025] It has also been suggested that improved training performance may be achieved by providing emotion content signals. If the emotion of a person, or a horse or a dog during training is determined and simultaneously provided as input signal to steer the training program, the results of the program may be enhanced. For instance, the emotional status of a dressage horse may be used to influence the training program. If the trainer noticed stress build-up, it can decide to practice a for the horse known exercise to reduce stress and to give the horse confidence. In case the trainer detects happiness or positive emotions, he can decide to increase the degree of difficulty, or practice a difficult element of dressage

programs. The same applies for dogs and other animals. Also for sportsmen, the emotional status may be used to steer the training program, based on positive and negative attributes. Also for soldiers, the emotional status may be used to steer the training program.

[026] It has also been suggested that improved education and learning experience may be achieved by providing emotion content signals. If the emotion of a student during education or learning experience is determined and simultaneously provided as input signal to steer the educational program (E-learning or school class), the efficiency of the educational effort is increased. If the student experiences stress, the teacher may decide to introduce stress-relaxation exercises, if the student experiences happiness and positive vibe or flow, the teacher may decide to increase the degree of difficulty. The emotion content signal may also be used to change the subject of the learning program, the degree of difficulty of the exercises.

[027] It has also been suggested that improved mission experience may be achieved by providing emotion content signals. If the emotion of a soldier or peace worker during operations and missions is determined and simultaneously provided as input signal to determine the deployment of a soldier or peace worker, the efficiency of the operation is increased. If the soldier experiences stress, the officer in charge may decide to redefine the soldier's deployment in the mission or operation.

[028] It has also been suggested that improved sports experience may be achieved by providing emotion content signals. If the emotion of a sportsmen during exercise, training or real game is determined and simultaneously provided as input signal to steer the sports achievement, the efficiency of the sports achievement is increased. If the sportsman experiences stress, the coach may decide to introduce stress-relaxation exercises, if the sportsman experiences happiness and positive vibe or flow, the coach may decide to increase the degree of difficulty. The emotion content signal may also be used to change the subject of the sports program, the degree of difficulty of the exercises.

[029] It has also been suggested that artificial intelligence of a robotic apparatus may be achieved by providing emotion content signals to it. The robot or autonomous robotic

apparatus can be provided with emotion content control signals to make the robotic apparatus for instance autonomous, interactive with the environment, responsive to emotional situations, sensitive to environmental influences, etc.

[030] United States patent US 9,256,825 B2 discloses an emotion script generating method, which is based on receiving means, generating means, adjusting means and providing means.

[031] However, the system of US 9,256,825 B2 tends to have a number of associated disadvantages including the following. First, the system does not provide means of combining emotion content signals of the same human or animal subject to create emotion content control signals. The system does also not provide means of combining emotion content signals of different human or animal subjects to create emotion content control signals. Furthermore, the system does not make use of smart correlation algorithms to extract the emotion content from the combined emotion content signals to generate the emotion content control signal. Also, the emotion signals are not labelled and coupled to an event or reference. And last but not least, the system does not provide means of storing emotions from remote or remembered person.

SUMMARY

[032] Hence, an emotion content control system for converting emotion content signals from a human or animal subject into emotion content control signals for feedback interaction, said system comprising at least a first apparatus arranged for sensing from at least a first human or animal subject first subject emotion content signals of at least a first and a second type, processing and converting said first and second type subject emotion content signals into a first emotion content control signal and transmitting said converted first emotion content control signal; and a subject interaction device arranged in receiving said first emotion content control signal being transmitted by said first apparatus and in performing feedback interaction with said first human or animal subject based on said first emotion content control signal being received, is advantageous.

[033] Accordingly, the invention preferably seeks to mitigate, alleviate or eliminate one or more of the above mentioned disadvantages singly or in any combination.

[034] According to a first aspect of the invention, the emotion content of the emotion content signal is determined by correlation functions (auto and cross-correlation) based on parametric representations and frequency analysis of one-dimensional (voice, heartbeat, blood pressure), two-dimensional (2D sound and speech, facial expression data) and three-dimensional neurotransmitter data, body temperature) emotion content signals. These data reduction schemes derive in-depth emotion signals from the temporal and geometrical physiological measurements, biometrical measurements and body observations, like the standard deviation, the skewness and the kurtosis of the signal and data. In particularly the higher order data reduction reveals information about repeating data patterns. In addition, the cross-correlation between the emotion content signals determine more accurate emotion signal content. The invention provides means for processing emotion content signals of at least first and second type into said emotion content control signal using cross-correlations based on parametric representations and frequency analysis of these emotion content signals of at least the first and second type. An example is the heartbeat variability, and the correlation between heartbeat level and skin conductance, and heartbeat variation and skin-conductance. Heartbeat variation might be experienced due to several events, like stress, physical activity like sports or excitement. The correlation with the second type of data skin conductance, gives a better estimation of the emotional state of the subject. Another example is the facial expression, and the correlation between facial expression and the heartbeat level and heartbeat variation. Another example is the vocal signal, and the correlation between sound information and the heartbeat level and heartbeat variations. Another example is the concentration of the hormones Dopamine and Serotine, and the correlation between the hormone concentration and facial expressions. An important aspect of this analysis is the subtraction of the temporal reference content information, which is derived from the user data via self-learning algorithms or from meta-data. The meta-data can be retrieved from the emotion content signal or from stored emotion meta-data.

[035] A second aspect of the invention is that emotions from current or past times are stored in emotion content signals on a personal emotion box. These emotions are characterized via tags or labels, such as type of events, time stamp, type of emotions. These emotions are also characterized by meta-data descriptions. For example, an event of happiness or celebration can be characterized by specific emotion content signals and thereby labeled as such. In case these emotion content signals are captured, emotion content signals related to these specific events can be retrieved. Another example is a moment of sadness which relates to specific characterizations of speech, facial expression, heartbeat, skin conductance and specific neurotransmitter concentration. The measured parameters of a such an event can be labeled and stored as a sadness moment, related to a specific human or animal subject.

[036] A third aspect of the invention is the augmentation of user interaction by using the generated emotion control signals for feedback interaction with an subject interaction device. The control signals are generated from emotion content signals stemming from one or more human or animal subjects and used to generate emotion control signals. These emotion control signals can stem from one or more humans or animals. An example is a care game for people with a mental disability, like dement elderly. In this game, the human subject is exposed to video content. Depending on the mental status of the human subject, and the response of the human subject to the exposed video images, the content of the video images is changed to create augmented interaction. If the human subject is happy, and experiences excitement by watching the video content, the system can use the emotion signals of the human subject expressing happiness to generate emotion control signals to influence the video content, for instance by changing the scene, the persons/personages in the video content, the colors, the dynamics of the activities inside the video content, etc. In this case, the happiness state of the human subject can be maintained or increased. In another example is a care game based on light. Depending on the emotional status of the human subject, the light color or light intensity in the room exposed to the human subject is changed to interact with the human subject. For instance, if the human subject experiences high stress levels, the emotion signals of the human subject are combined to generate the emotion control signal to change the color and intensity of the light in the room such that the stress level of the human subject is lowered.

[037] A fourth aspect is related to operate at least one auxiliary device based on the feedback interaction being performed by said subject interaction device. Such an auxiliary device can comprises a sound emitting module, a light emitting module, a display screen, a tactile actuator, a vibration actuator, or a heat emitting actuator. An example is for instance the interaction between two human subjects communicating remotely via telephone and video connection. The emotion signals of both human subjects are combined to generate emotion control signals that for instance operate heat and vibration generating devices. The level of vibration and the temperature of the device is sensed by the human subjects and reflects the level of love experienced by the human subjects.

[038] The emotion content signal may specifically comprise meta-data which indicates the current reference status. For example, the meta-data may indicate that the emotion status of a person follows a certain trajectory, for instance a periodic change in happiness during the day (low in the morning, higher in the afternoon, low in the evening) or during the year (low in winter, high in spring and summer), or change in emotion status during holidays. For instance the time-averaged reference level of happiness of a human subject is 10 during summer, during autumn and spring and 5 during winter. Measured happiness levels during the year are then relative to these reference levels. For instance, a measured level of happiness of 10 in winter is indicative for a happy person, a measured level of happiness of 10 in summer is indicative for a normal day. The meta-data may also directly indicate reference characteristics or objects, the data may for example indicate specific events like Xmas or periods in life. For instance, the happiness level of a human subject is on average 5 during winter, except Xmas, where a happiness level of 10 is more common for the human subject.

[039] The analysis of the emotion content signal may allow for a fully automated extraction of the reference content information without requiring any additional information to be included. For example, possible seasonal variation in the emotion content signal may become apparent from analysis of the time-dependent emotion content signal.

[040] The reference content information is adapted to the current and temporal emotion content signal via a self-learning algorithm. This self-learning ensures up-to-date reference content information. For example, the self-learning algorithm identifies repeating periods of low happiness from the time-dependent emotion content signals. This information can be used to predict the reference level in time.

[041] According to a different feature of the invention, the means adapted to extract is operable to extract real time reference content information from the emotion content signal, and the means adapted to generate the emotion control data is operable to generate an emotion control signal in response to the real time reference content information.

[042] According to a different feature of the invention, the emotion content signal may be used to control an subject interaction device, such as a lighting device, a computer device, a display apparatus, an audio apparatus, a sense device (massage chair) to interact with the human or animal subject. The emotion content control signal of a human subject can be used to augment the interaction with the subject interaction device. Also user interface information may be provided to the subject interaction device for increased interaction. For example, by using the emotion content control signal of a human subject, the color and level of light intensity (brightness) of a light source can be changed to change the emotional status of a sad person into a status of happiness, by mimicking for instance a rising sun. A similar effect may occur in case of controlling the content of a display apparatus, audio apparatus, sense device, or lighting device.

[043] According to a different feature of the invention, the emotion content signal may be used to generate an emotion content control signal to control an interactive game. The emotion control signal is for instance used to pre-set or change the level of the game, the speed, the intensity, the difficulty degree or level, etc. It may be a gradual or a sudden change. In case of a sad person, the game may be programmed by the emotion control signal to let the person experience a winning feeling, by easier assignments or by faster character building. In case of a happy person, the game may be programmed by the emotion control signal to give the person more challenges, via difficulty levels, less bonus points, less fast character building.

[044] According to a different feature of the invention, the emotion content signal may be used to generate an emotion content control signal to control a learning or training device. The emotions invoked by using the learning device (E-learning, training, etc.) are detected, processed and used via an emotion content control signal to adapt the learning or training device accordingly. The device can be programmed to flatten emotion levels, strengthen emotion levels, etc.

[045] According to a different feature of the invention, the emotion content signal may be used to generate an emotion content control signal to control an actuator to enhance body or physiological parameters. Heartbeat acceleration mimics excitement, an imposed reduction of heartbeat might lead to relaxation and release of stresses. Also, the emotion content control signal may be used to expose a human subject to heat or vibration.

[046] These and other aspects, features and advantages of the invention will be apparent from and elucidated with reference to the embodiment(s) described hereinafter.

BRIEF DESCRIPTION OF THE DRAWINGS

[047] An embodiment of the invention will be described, by way of example only, with reference to the drawings, in which

FIG. 1 illustrates an emotion content signal storage apparatus and ways in accordance with an embodiment of the invention to generate an emotion content control signal;

FIG. 2 illustrates the working principle of data analysis of emotion content signals, thereby providing an in-depth analysis of the emotion content;

FIG. 3 illustrates the working principle of controlling an subject interaction device adapted to use the emotion content control signal thereby providing an enhanced or interactive function of the said apparatus;

FIG. 4 illustrates the working principle of controlling an subject interaction device adapted to receive user interface data and to use the emotion content control signal thereby providing an enhanced or interactive function of the said apparatus;

FIG. 5 illustrates the working principle of controlling an subject interaction device adapted to use the emotion content control signal thereby providing an enhanced or interactive function of the said apparatus for a second user;

FIG. 6 illustrates the working principle of controlling an subject interaction device adapted to use the emotion content control signal thereby providing an enhanced or interactive function of the said apparatus for a second user;

FIG. 7 illustrates the working principle of controlling an subject interaction device adapted to use the emotion content control signals of more than one users thereby providing an enhanced or interactive function of the said apparatus to more than one users; and

FIG. 8 illustrates the working principle of controlling an subject interaction device adapted to use the emotion content control signals of more than one users thereby providing an enhanced or interactive function of the said apparatus to more than one users.

DETAILED DESCRIPTION OF THE DRAWINGS

[048] The following description focuses on an embodiment of the invention applicable to an emotion content system particularly suited for a professional consumer environment but it will be appreciated that the invention is not limited to this application. For brevity, the term content signal has in the description been used to include both single signal sequences and multiple signal sequences.

[049] FIG. 1 illustrates an emotion content storage apparatus (100) in accordance with an embodiment of the invention.

[050] The emotion content storage apparatus (100) comprises a receiver (102), a processor (103) coupled to the receiver (102), a storage device (104) coupled to the processor (103), and a transmitter (105) coupled to the processor (103). The processor (103) is operable to process multiple emotion content signals and to generate the emotion control signal (106). In the preferred embodiment, the receiver (102), the processor (103), the transmitter (104) are embedded in conventional smart watches or other wearable devices.

[051] The emotion content storage apparatus (100) comprises a receiver (102) which receives the emotion content signal (101) from an external source (the human or animal subject). The receiver (102) comprises all necessary functionality required for receiving the emotion content signal and to extract or convert this into a suitable format. For example, for a heartbeat sensor signal the receiver (102) comprises all required functionality for amplifying, filtering demodulating and decoding the received signal to generate a base band emotion content signal.

[052] The emotion content signal (101) consists of more than one emotion content signals (101-1), (101-2) ... (101-n) at least of a first and a second type, being body signals, physiological signals, vocal signals, facial expression signals, or pre-processed emotion content signals. The emotion content signals (101-1), (101-2) ... (101-n) come typically from the human or animal subject. Auto-correlation analysis determines the variability, the skewness and the kurtosis of the individual signals, embedded in the emotion content signal (101), cross-correlation between the signals (101-1), (101-2) ... (101-n) determine more accurate emotion signal content. An example is the heartbeat variability, and the correlation between heartbeat level and skin conductance, and heartbeat variation and skin-conductance. Another example is the facial expression, and the correlation between facial expression and the heartbeat level and heartbeat variation. Another example is the vocal signal, and the correlation between sound information and the heartbeat level and heartbeat variations. Another example is the concentration of the hormones Dopamine and Serotine, and the correlation between the hormone concentration and facial expressions.

[053] The processor (103) receives the processed emotion content signal (101). The processer (103) determines via correlations (autocorrelation for the individual signals and cross-correlations between the signals) and smart self-learning algorithms the emotional content. It extracts the reference content information from the emotion content signal via pattern recognition of the emotion content signal or via meta-data embedded in the emotion content signal. The meta-data can also be retrieved from the storage device (104). The meta-data comprises information which is indicative of the emotion history of user. In the preferred embodiment, the reference content information relates to signal sections which related to events that have characteristic emotion profiles. For example, the meta-

data file can contain heartbeat signals that relate for instance to watching a scary movie, or relate to a specific season, like winter or summer.

[054] In the preferred embodiment, the meta-data relates to long-term emotion characteristics of the emotion content signal. For example, meta-data may indicate that the person concerned is currently in a positive emotional status, experiences happiness, and is in a positive vibe or flow. Alternatively, the meta-data may indicate that the person concerned is currently in a transitional phase, for instance caused by the seasonal changes (from summer to autumn), which occurs every year. This meta-data is stored on the storage device (104).

[055] The generated emotion content control signal (106) is transmitted via the transmitter (104). The emotion content control signal (106) is fed into an subject interaction device (200) to augment the interaction with the human or animal subject.

[056] An example of an data analysis of emotion content signals (101-1), (101-2) ... (101-n), is given in FIG. 2. Shown are two emotion content signals, (101-1) and (101-2), and a schematic representation of the cross-correlation between these two signals. The upper signal (101-1) is the elapse of the heartbeat signal of a user, during physical and emotional exercise. The second signal (101-2) is a measure for the physical exercise of the person. The third sketch (110) is a graphical representation of the cross-correlation between the heartbeat (101-1) and the physical exercise (101-2), indicating periods of physical stress and mental stress.

[057] To further illustrate the preferred embodiment, FIG. 3 illustrates an arrangement comprising an emotion signal storage apparatus (100) and an subject interaction device (200) for enhanced interaction with said subject interaction device.

[058] The emotion content control signal (106) is fed into the subject interaction device (200). The subject interaction device comprises a receiver (202), a core function (203), a transmitter (204) and creates an output signal (206) used to influence the emotion of the respective user from which the emotion content signal (101) originated.

[059] The core function (203) is the essential function of the subject interaction device (200) and may comprise a storage device with recorded images, recorded video or audio content, text documents, E-book content, cartoons, game content, lighting content, meta-data, reference data, position data, sense data. It may also comprise a processor to process the received or recorded content, in relation to the emotion content control signal (106). It may also comprise a data content generating function, like the generation of game features, interactive video games, data scripts, interactive drawings and cartoons, etc. It may also use stored reference data or meta-data to create the output signal (206).

[060] In a possible embodiment, the subject interaction device (200) comprises a data projector which is operable to display the emotion content signals (101) or the emotion content control signals (106) via the output signal (206). The data projector can be used to display the emotional status of a user via the output signal (206). The output signal (206) can also serve as input to control an auxiliary apparatus.

[061] In another possible embodiment, the subject interaction device (200) comprises a display projector which is operable to visual images. The emotion content control signal can be used to augment the emotion of a person by changing the visual content signal (206) of the display apparatus (200).

[062] In another possible embodiment, the subject interaction device (200) comprises an audio apparatus which is operable to vocal and sound content. The emotion content control signal (106) can be used to augment the emotion of a person by changing the audio contents signal (206) of the audio apparatus (200).

[063] In another possible embodiment, the subject interaction device (200) comprises a lighting apparatus which is operable to light content. The emotion content control signal (106) can be used to augment the emotion of a person by changing the light contents signal (206) of the lighting apparatus (200).

[064] In another possible embodiment, the subject interaction device (200) comprises an electronic nose apparatus which is operable to data content. The emotion content control

signal (106) can be used to operate the artificial electronic nose apparatus, by steering the sensing of specific gasses or molecules, by controlling the smell contents signal (206) of the electronic nose apparatus (200).

[065] In another possible embodiment, the subject interaction device (200) comprises a robotic apparatus which is operable to data content. The emotion content control signal (106) can be used to operate the robotic apparatus, to steer the movement of the robotic apparatus, to steer actuators, to control intelligent operation of the robot, to create vocal signals or sound (for instance talking), to control an electronic nose for molecule or gas detection, to control touch sensors, to control vision sensors, to control temperature sensors, to control radiation sensors.

[066] In another possible embodiment, the subject interaction device (200) comprises a micro electro-mechanical system apparatus which is operable to data content. The emotion content control signal (106) can be used to operate the micro electro-mechanical system apparatus, to steer actuators, to control a microprocessor, to control sensors, by controlling the output signal (206) of the micro electro-mechanical system apparatus (200). In a possible embodiment, the actuating system can be placed inside the body (internal) or attached to a body (external) to control the heartbeat of a person, to control the dosing of a hormone or neurotransmitter.

[067] In another possible embodiment, the subject interaction device (200) comprises a global position system apparatus which is operable to data content. The emotion content control signal (106) can be used to operate the global positioning system device, to steer direction and motion via a data signal (206) of the global positioning system apparatus (200).

[068] FIG. 4 illustrates an arrangement comprising an emotion signal storage apparatus (100) and an subject interaction device (300) for increased interaction with the subject interaction device.

[069] The emotion content control signal (106) is fed into an subject interaction device (300). In addition, a user interface content signal (301) is fed into the subject interaction device. The subject interaction device comprises a receiver (302), a core function (303), a transmitter (304) and creates an output signal (306) is used for increased interaction with the human or animal subject from which the emotion content signal (101) originated.

[070] The core function (303) is the essential function of the subject interaction device (300) and may comprise a storage device with recorded images, recorded video or audio content, text documents, E-book content, cartoons, game content, lighting content, meta-data, reference data, position data, sense data. It may also comprise a processor to process the received or recorded content, in relation to the emotion content control signal (106). It may also comprise a data content generating function, like the generation of game features, interactive video games, data scripts, interactive drawings and cartoons, etc. It may also use the user interface signal (301) in addition to the emotion content control signal (106) to create the output signal (306). It may also use stored reference data or meta-data to create the output signal (306).

[071] In a possible embodiment, the subject interaction device (300) comprises a gaming apparatus. The emotion content control signal (106) can be used to influence the emotion of a person by changing the game content signal (306) of the gaming apparatus (300). The gaming apparatus also receives a user interface signal (301), which is used to operate the gaming apparatus.

[072] In a possible embodiment, the subject interaction device (300) comprises an advertisement apparatus. The emotion content control signal (106) can be used to influence the emotion of a person by changing the advertisement content signal (306) of the advertisement apparatus (300). The advertisement apparatus also receives a user interface signal (301), which is used to operate the advertisement apparatus.

[073] FIG.5 illustrates an arrangement comprising an emotion signal storage apparatus (100) and an subject interaction device (300) to increase the interaction of a second human or animal subject with the subject interaction device.

[074] The emotion content control signal (106) is fed into the subject interaction device (300). In addition, a user interface content from a signal (301) is fed into the subject interaction device. The subject interaction device comprises a receiver (302), a core function (303), a transmitter (304) and creates an output signal (306), which is used to influence the interaction of the second human or animal subject with the subject interaction device.

[075] FIG.6 illustrates an arrangement comprising an emotion signal storage apparatus (100) and an subject interaction device (300) to increase the interaction of a second human or animal subject with the subject interaction device.

[076] The emotion content control signal (106) is fed into the subject interaction device (300). In addition, a user interface content signal (301) from a different user is fed into the second apparatus. The subject interaction device comprises a receiver (302), a core function (303), a transmitter (304) and creates an output signal (306), which is used to influence the interaction of the second human or animal subject with the subject interaction device.

[077] FIG.7 illustrates an arrangement comprising two emotion signal storage apparatus (100) and an subject interaction device (300) to influence the interaction of at least two human or animal subjects with the subject interaction device. One emotion signal storage apparatus (100) corresponds to a first human or animal subject, one emotion signal storage apparatus (100') corresponds to a further human or animal subject. The emotion content control signal (106) of the first emotion signal storage apparatus (100) and the emotion content control signal (106') of the further emotion content storage apparatus (100') are fed into the subject interaction device (300). In addition, a user interface content signal (301) from the first human or animal subject and a user interface content signal (301') from the further human or animal subject are fed into the subject interaction device (300). The subject interaction device comprises a receiver (302), a core function (303), a transmitter (304) and creates an output signal (306), which is used to influence the interaction of at least two human or animal subjects with the subject interaction device.

[078] FIG.8 illustrates an arrangement comprising one emotion signal storage apparatus (100) and an subject interaction device (300) to influence the interaction of at least two human or animal subjects with the subject interaction device. The emotion signal storage apparatus (100) corresponds to the first and further human and/or animals subjects. The emotion content control signal (106) of the emotion signal storage apparatus (100) is fed into the subject interaction device (300). In addition, a user interface content signal (301) from the first human or animal subject and a user interface content signal (301') from a further human or animal subject are fed into the subject interaction device (300). The subject interaction device comprises a receiver (302), a core function (303), a transmitter (304) and creates an output signal (306), which is used to influence the interaction of at least two human or animal subjects with the subject interaction device.

[079] In a preferred embodiment, the emotion content signals (101) of the first human or animal subject 1 and the emotion content signal (101') of the further human or animal subject are combined to generate the emotion content control signal (106).

[080] The emotion content control signals (106) may be derived from the different signals from the emotion content signal (101) for example by a suitable repetition, selectivity, emotion content. Alternatively or additionally, existing pre-stored emotion content control signals may be used. For example, the emotion content storage apparatus may comprise a large number of pre-stored emotion content signals corresponding to different possible events and reference information characteristics.

[081] In one embodiment, meta-data may thus be extracted from the emotion content signal and used to select a suitable pre-stored emotion content signal. This signal may have characteristics amended to correspond to e.g. the victory of a soccer game.

[082] Thus in some embodiments, the determination of content may be used to determine estimates of the reference content information for a given emotion content signal. For example, if it is determined that the emotion content signal relates to a football match an emotion content control signal comprising e.g. scoring of a goal, or the sensation of a victory may be generated.

[083] In the preferred embodiment, the emotion content storage apparatus is operable to modify the processing parameters and algorithms used for extracting the reference content information and for generating the emotion content control signal depending on the category (e.g. genre) of the emotion content signal. For example, the content that may be enhanced by emotion content signals includes data related to soccer games or concerts.

[084] The emotion content storage apparatus may comprise an input for changing the dynamics of the emotion content control signal. The emotion content storage apparatus may also comprise a switch to choose the emotion content control signal being based on meta-data or signal processing/analysis. The emotion content storage apparatus may also comprise means for determining a user profile reflecting preferred emotion content and dynamics of the emotion content control signals (e.g. rate of switching, emotion preference, etc.). For example, if a user has experienced certain emotional events four times, a different emotion content control signal may be desirable at the fifth event. In that case, the user profile may be stored and used to control the settings of the emotion content control signal.

[085] The emotion content storage apparatus may provide the emotion content control signal selectively. For example, the emotion content control signal may be provided only when predefined events occur. As a specific example, an emotion content storage apparatus may be provided as a consumer emotion content storage apparatus which contains a number of features and control means including for example the following:

- Control input for changing the intensity of the emotion experience.
- Control input for selecting an emotion genre.
- Control input for selecting a content item category
- Control input for changing the dynamics of the emotion content control signal.
- Control input for controlling an emotion contrast.
- Control input or automatic means for selecting and/or storing a user profile.
- Means for entering a self-learning mode (e.g. measuring or determining characteristics of the operations of the emotion content storage apparatus such as the number of emotions, for example succeeding happiness events can be emphasized in time).

- Polarization control means: e.g. for controlling that enhancement occurs only for predefined events.
- A Source selector for selecting source information for the emotion content control signal, such as e.g. which information from the emotion content signal to use (heartbeat, skin conductance, respiratory data, etc.).
- A purpose selector for selecting e.g. a purpose of the emotion experience thereby allowing the emotion content control signal to be selected to most suitably achieve this purpose.
- A mood selector.

[086] The invention can be implemented in any suitable form including hardware, software, firmware or any combination of these. However, preferably, the invention is implemented at least partly as computer software running on one or more data processors and/or digital signal processors. The elements and components of an embodiment of the invention may be physically, functionally and logically implemented in any suitable way. Indeed the functionality may be implemented in a single unit, in a plurality of units or as part of other functional units. As such, the invention may be implemented in a single unit or may be physically and functionally distributed between different units and processors.

[087] Although the present invention has been described in connection with the preferred embodiment, it is not intended to be limited to the specific form set forth herein. Rather, the scope of the present invention is limited only by the accompanying claims. In the claims, the term comprising does not exclude the presence of other elements or steps. Furthermore, although individually listed, a plurality of means, elements or method steps may be implemented by e.g. a single unit or processor. Additionally, although individual features may be included in different claims, these may possibly be advantageously combined, and the inclusion in different claims does not imply that a combination of features is no feasible and/or advantageous. In addition, singular references do not exclude a plurality. Thus references to "a", "an", "first", "second" etc. do not preclude a plurality.

NUMBER LISTING

(100) = emotion content storage apparatus

(101) = emotion content signal, comprised of more than one emotion content signals

(101-1) = emotion content signal

(101-2) = emotion content signal

(101-n) = emotion content signal

(102) = receiver

(103) = processor

(104) = storage device

(105) = transmitter

(106) = emotion content control signal

(110) = graphical representation of the cross-correlation

(200) = subject interaction device

(201) =

(202) = receiver

(203) = core function, being a storage device, processors, data generator

(204) = transmitter

(206) = output signal

(300) = another second apparatus

(301) = user interface content signal

(302) = receiver

(303) = core function, being a storage device, processors, data generator

(304) = transmitter

(306) = output signal

Conclusies

1. Een emotie controle systeem voor het converteren van emotie signalen van mensen of dieren in emotie stuursignalen voor feedback interactie, waarbij het systeem ten minste het volgende omvat:

- Een eerste apparaat ingericht voor het waarnemen van emotie signalen van ten minste een eerste en een tweede type, van een eerste mens of dier, het verwerken en het omzetten van desbetreffende emotie signalen van een eerste en tweede type, in een eerste emotie stuursignaal en het aanbieden van desbetreffende eerste emotie stuursignaal;

Een interactie apparaat ingericht voor het ontvangen van een eerste emotie stuursignaal, uitgestuurd door genoemde eerste apparaat, en voor het uitvoeren van de feedback interactie met een eerste mens of dier op basis van een ontvangen eerste emotie stuursignaal, met het kenmerk, dat het eerste en/of verdere apparaat omvat:

- Ontvangstmiddelen voor het ontvangen van genoemde emotie signalen van het ten minste eerste en tweede type;
- Verwerkingsmiddelen voor het verwerken van emotie signalen van het ten minste eerste en tweede type, tot het genoemde emotie stuursignaal via kruiscorrelaties op basis van parametrische representaties en frequentieanalyse van de emotie signalen van het ten minste eerste en tweede type; en
- Overdrachtsmiddelen voor het uitsturen van het emotie stuursignaal.

2. Systeem volgens conclusie 1, verder omvattend:

- Ten minste een tweede apparaat ingericht voor het waarnemen van emotie signalen van ten minste een eerste en een tweede type van ten minste een tweede mens of dier, het verwerken en het omzetten van de verdere emotie signalen van het eerste en tweede type in een tweede emotie stuursignaal en het verzenden van desbetreffende gegenereerde tweede emotie stuursignaal naar een interactie apparaat ingericht voor het uitvoeren van feedback interactie met een andere mens of dier op basis van de inhoud van het ontvangen tweede emotie stuursignaal.

3. Systeem volgens conclusie 1, waarbij:

- Genoemde eerste apparaat is ingericht voor het waarnemen van emotie signalen van ten minste een eerste en een tweede type van ten minste twee of meer mensen en/of dieren, het verwerken en het omzetten van de emotie signalen van een eerste en tweede type van de genoemde eerste en genoemde ten minste tweede mens of dier in een gecombineerd emotie stuursignaal en het verzenden van genoemde gegenereerde gecombineerde emotie stuursignaal naar het interactie apparaat voor het uitvoeren van

de feedback interactie met de eerste en de ten minste tweede mens of dier gebaseerd op het genoemde gegenereerde en ontvangen gecombineerde emotie stuursignaal.

4. Systeem volgens conclusie 1, waarbij het eerste en/of verdere apparaat omvat:

- Opslagmiddelen voor het opslaan van de emotie signalen van het ten minste eerste en tweede type, en het emotie stuursignaal.

5. Systeem volgens conclusie 1 of 4, waarbij:

- De genoemde verwerkingsmiddelen van het eerste en/of verdere apparaat referentie informatie uit de ontvangen emotie signalen van het ten minste eerste en tweede type van een eerste of ten minste tweede mens of dier extraheert; of
- De genoemde verwerkingsmiddelen van het eerste en/of verdere apparaat referentie informatie uit de in de opslagmiddelen opgeslagen emotie signalen en emotie control signalen extraheert; en
- De genoemde referentie informatie door middel van tijd en frequentie-analyse van de genoemde emotie signalen van het ten minste eerste en tweede type genereert; en
- De genoemde referentie informatie via een zelflerend en/of patroonherkenning algoritme wordt gegenereerd; en
- De genoemde referentie informatie in de opslagmiddelen wordt opgeslagen.

6. Systeem volgens conclusie 5, waarbij de genoemde verwerkingsmiddelen van het eerste en de / of volgende apparaten het emotie stuursignaal gebaseerd op een vooraf gedefinieerde en geselecteerde gebeurtenis genereert.

7. Systeem volgens een of meer der voorgaande conclusies, waarbij het interactie apparaat is ingericht voor het ontvangen van feedback signalen van de eerste en / of verdere mens of dier.

8. Systeem volgens conclusie 7, waarbij het systeem verder omvat:

- Tenminste één hulpinrichting welke door de feedback interactie van het interactie apparaat wordt aangestuurd.

9. Systeem volgens conclusie 8, waarbij de hulpinrichting ten minste één van de lijst omvat:

- Een geluid voortbrengende module;
- Een licht-emitterende module;
- Een beeldscherm;
- Een data-projecterende module;
- Een tactiele actuator;
- Een trilling actuator;
- Een warmte uitstralende actuator;

10. Systeem volgens één of meer der voorgaande conclusies, waarbij genoemde typen emotie signalen ten minste twee van de volgende signalen omvat:

- Hartslag;
- Bloeddruk;
- Gezichtsuitdrukking;
- Body oppervlaktetemperatuur;
- Lichaamsoppervlak geleidbaarheid;
- Neurotransmitter of hormoon profielinformatie;
- Vocale speech kenmerken;
- Body gebaren of houding.

11. Apparaat voor toepassing in een systeem volgens een of meer der voorgaande conclusies, omvattende:

- Ontvangstmiddelen voor het ontvangen van genoemde emotie signalen van het ten minste eerste en tweede type;
- Verwerkingsmiddelen voor het verwerken van emotie signalen van het ten minste eerste en tweede type, tot het genoemde emotie stuursignaal via kruiscorrelaties op basis van parametrische representaties en frequentieanalyse van de emotie signalen van het ten minste eerste en tweede type; en
- Overdrachtsmiddelen voor het uitsturen van het emotie stuursignaal.

12. Gebruikersinteractie systeem voor toepassing in een systeem volgens een of meer der voorgaande conclusies.

13. Werkwijze voor het verbeteren van de interactie met een eerste en/of volgende mens of dier, waarbij de werkwijze de stappen omvat van:

A. Blootstellen van een eerste en/of volgende mens en dier aan een interactieve omgeving;
B. Ontvangen van de emotie signalen van een eerste en tweede type van de genoemde eerste en/of volgende mens of dier, waarbij genoemde emotie signalen door blootstelling aan de genoemde interactieve omgeving door genoemde eerste en volgende mens of dier worden gegenereerd;
C. Verwerken van de emotie signalen van de ten minste eerste en tweede type tot enkelvoudige en/of samengestelde emotie stuursignalen via kruiscorrelaties op basis van parametrische representaties en frequentieanalyse van de emotie signalen van het ten minste eerste en tweede type;
D. Opslag van de genoemde emotie signalen van de ten minste eerste en tweede type en de genoemde enkelvoudige en/of samengestelde emotie stuursignalen;

E. Het overbrengen van de genoemde enkelvoudige en/of samengestelde emotie stuursignalen op een interactie apparaat, welke is uitgerust met middelen voor het ontvangen van de enkelvoudige en/of samengestelde emotie stuursignalen;

F. Het geven van feedback interactie door genoemde interactie apparaat aan een eerste en/of volgende mens of dier welke is blootgesteld aan de interactieve omgeving.

14. Werkwijze volgens conclusie 13, verder omvattende de stap van het herhalen van de stappen B-C-D-E-F.

15. Werkwijze volgens conclusie 13, verder de stappen omvattend:

- Het opslaan van de emotie signalen van het ten minste eerste en tweede type en het genoemde emotie stuursignaal;
- Stap F van terugkoppeling met verdere stappen van:
    - F1 het verstrekken van tactiele terugkoppeling;
    - F2 het verstrekken van akoestische terugkoppeling;
    - F3 het verstrekken van visuele terugkoppeling;
    - F4 het verstrekken van emitterende terugkoppeling;
    - F5 het verstrekken van warmte terugkoppeling;
    - F5 het verstrekken van mechanische terugkoppeling;

16. Een computer geïmplementeerde werkwijze die wordt uitgevoerd in de opslagmiddelen van de eerste of verdere apparaten of in de opslagmiddelen van het interactie apparaat, bestaande uit uitvoerbare code compatibel met besturingsprogramma's van de genoemde opslagmiddelen, volgens een werkwijze beschreven in conclusie 13.

17. Computerprogramma opgeslagen op een niet-vluchtig registratiedrager, het computerprogramma bevat instructiecodes uitgevoerd in een omvattend computerprogramma volgens conclusie 16.

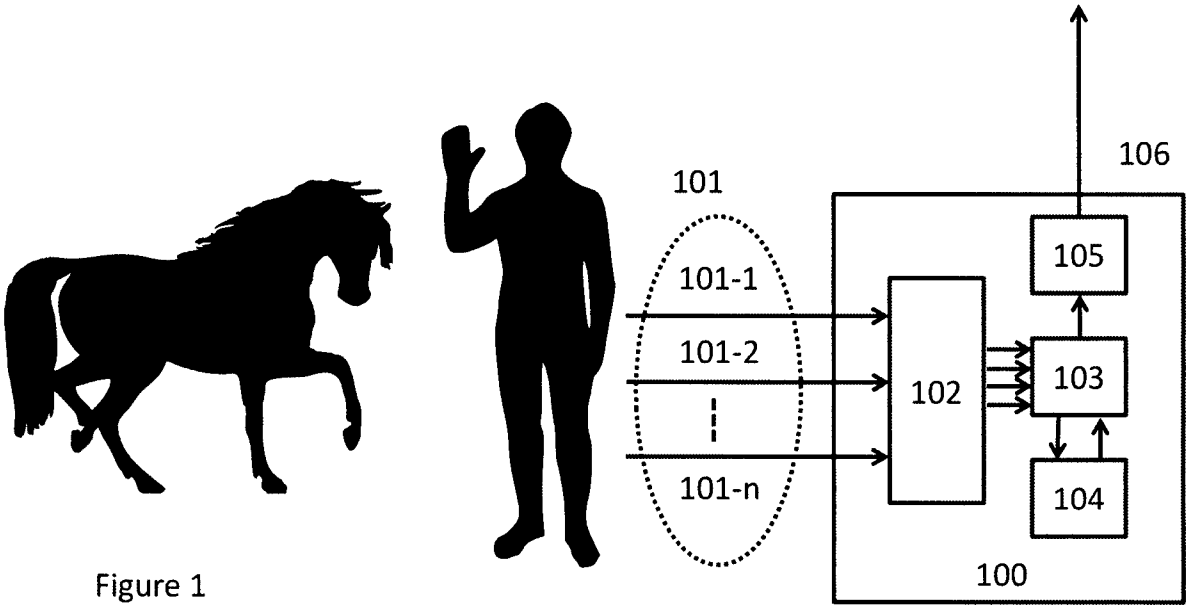


Figure 1

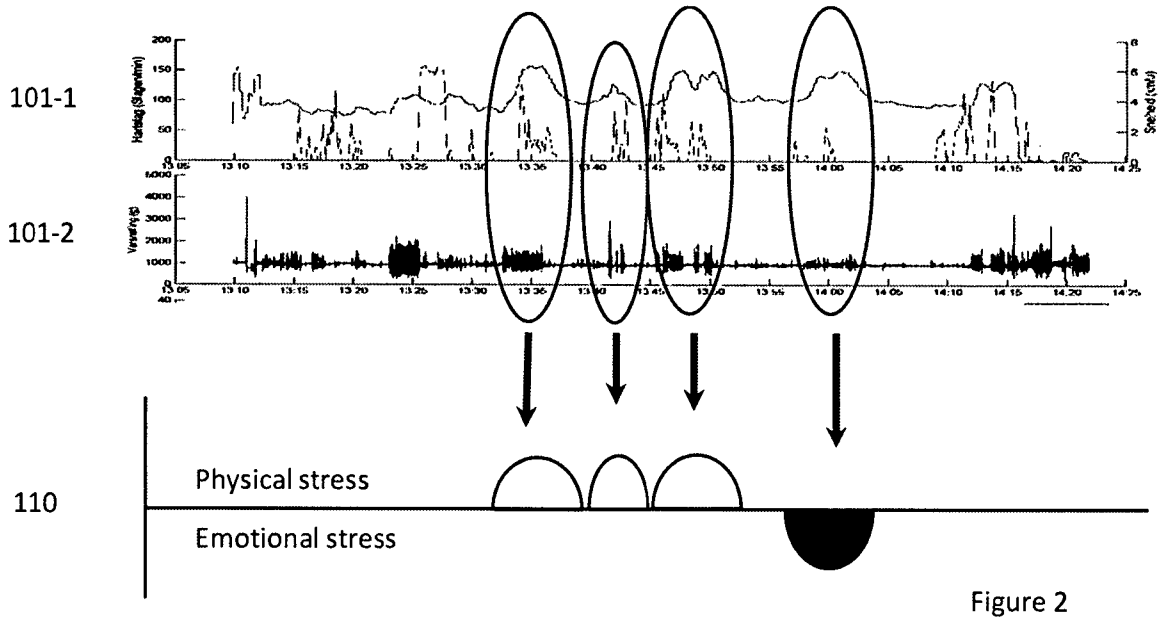


Figure 2

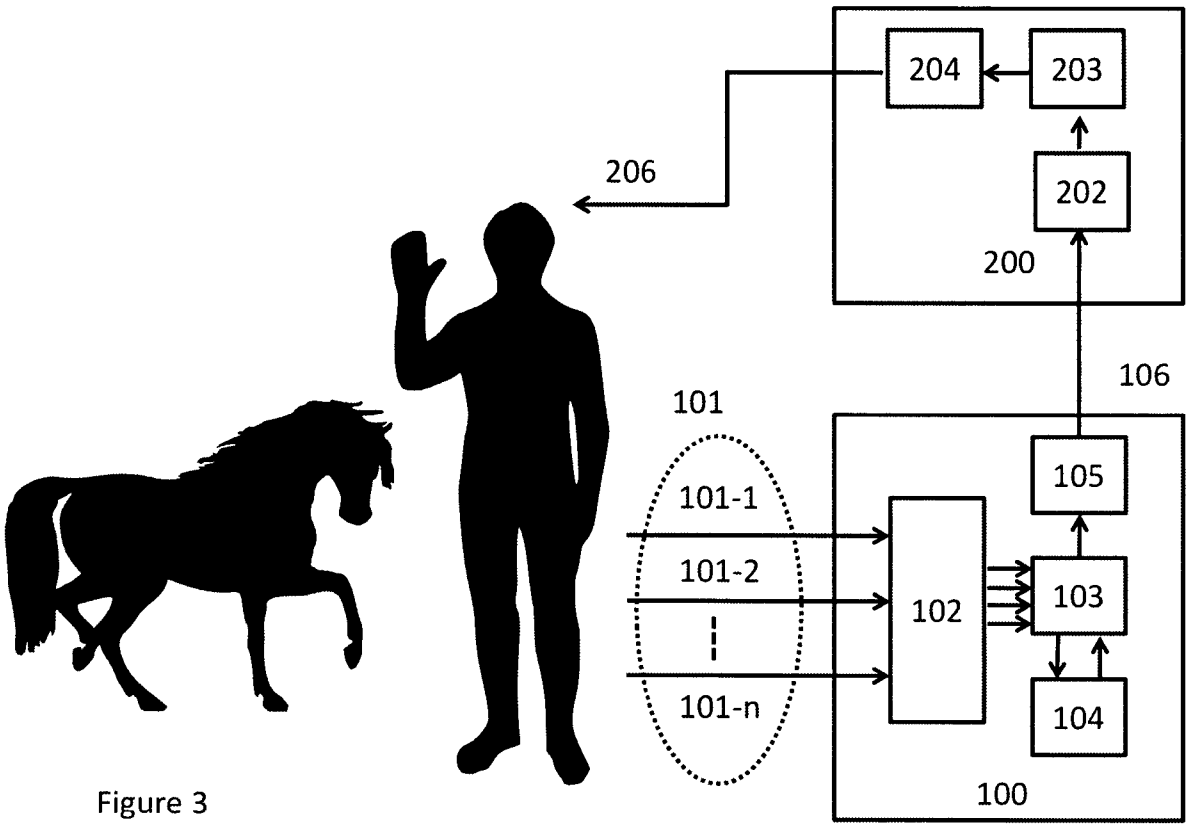


Figure 3

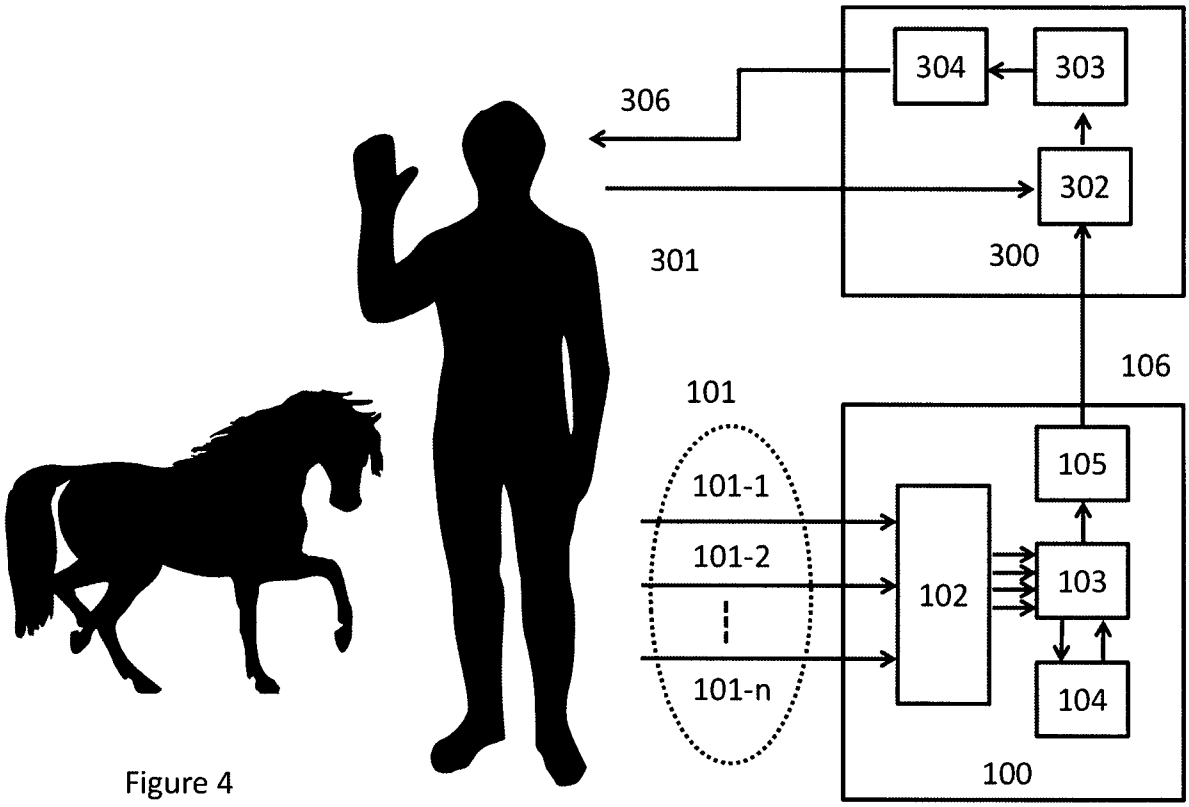

304
303
306
302
301
300
106
101
105
101-1
101-2
102
103
101-n
104
100

Figure 4

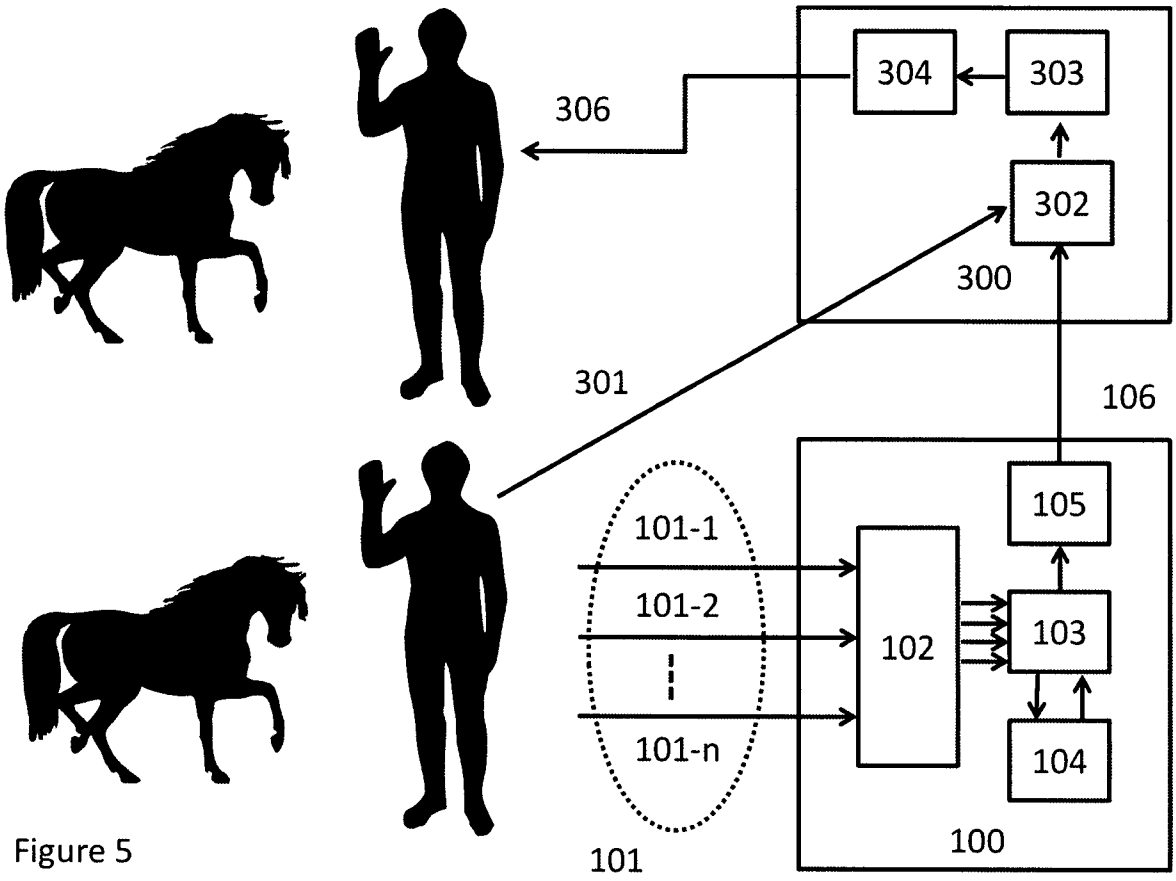

306
304
303
302
300
301
106
105
101-1
101-2
101-n
102
103
104
100
101

Figure 5

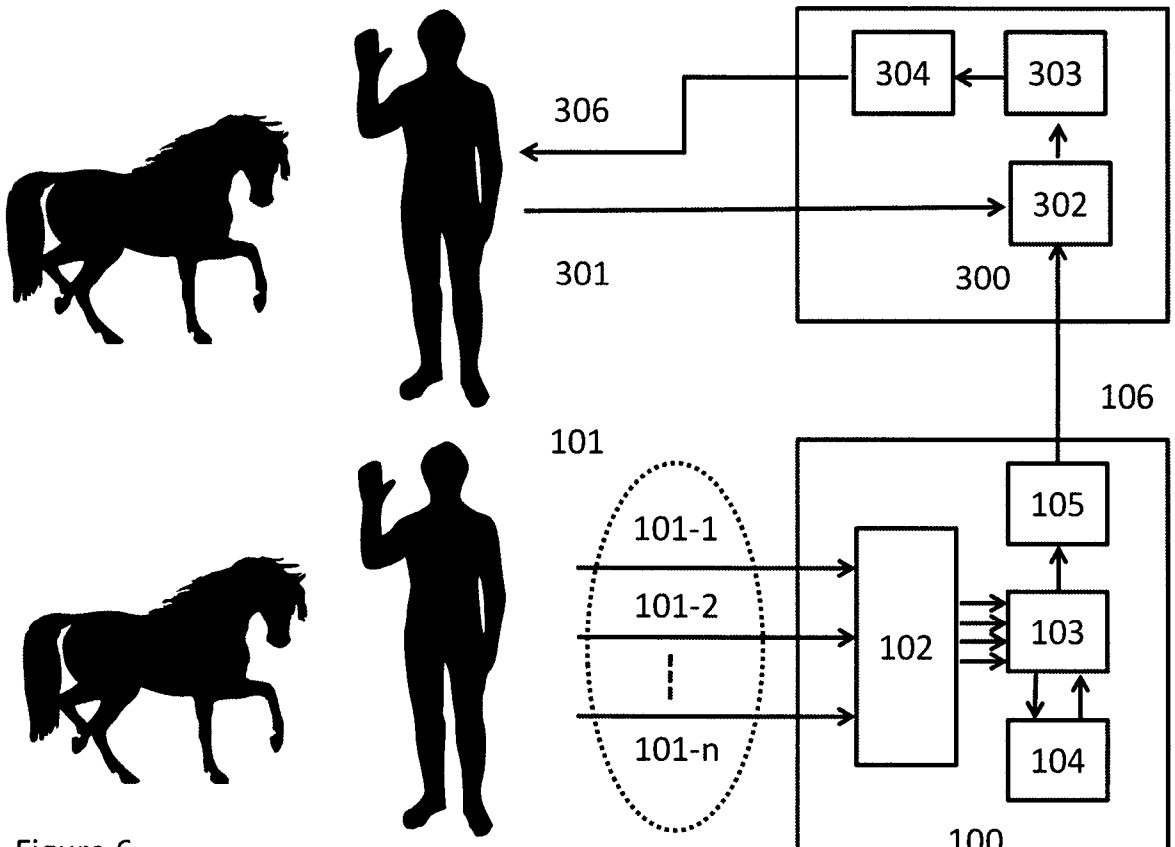

304
303
306
302
301
300
106
101
105
101-1
101-2
102
103
101-n
104
100

Figure 6

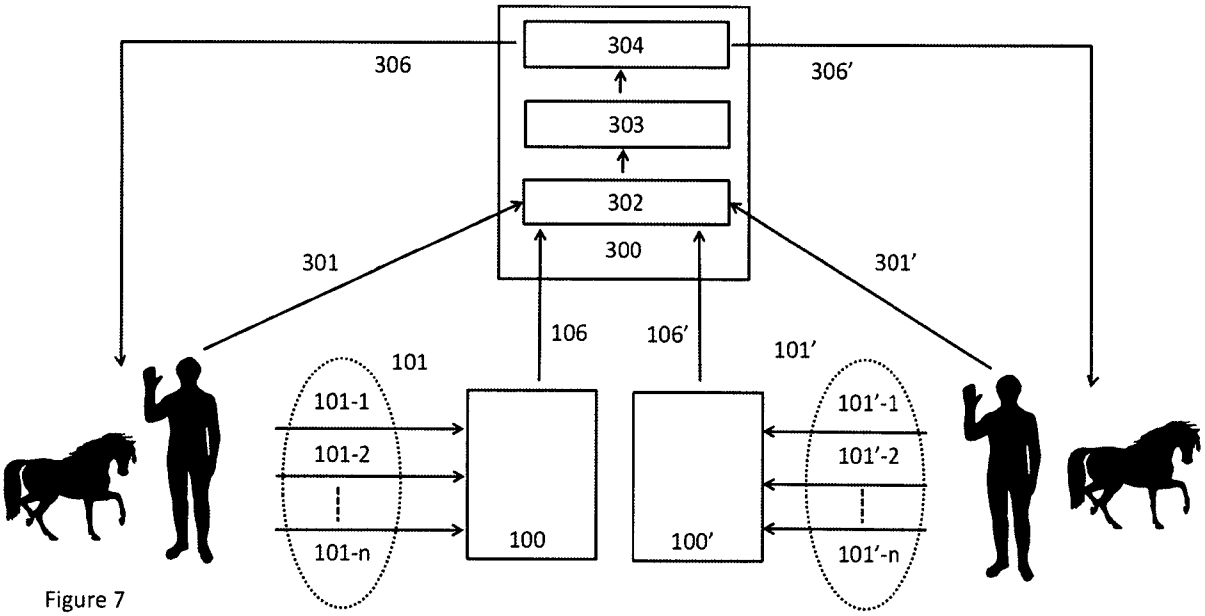

304
303
302
300
306
306'
301
301'
106
106'
101
101'
101-1
101-2
101-n
101'-1
101'-2
101'-n
100
100'

Figure 7

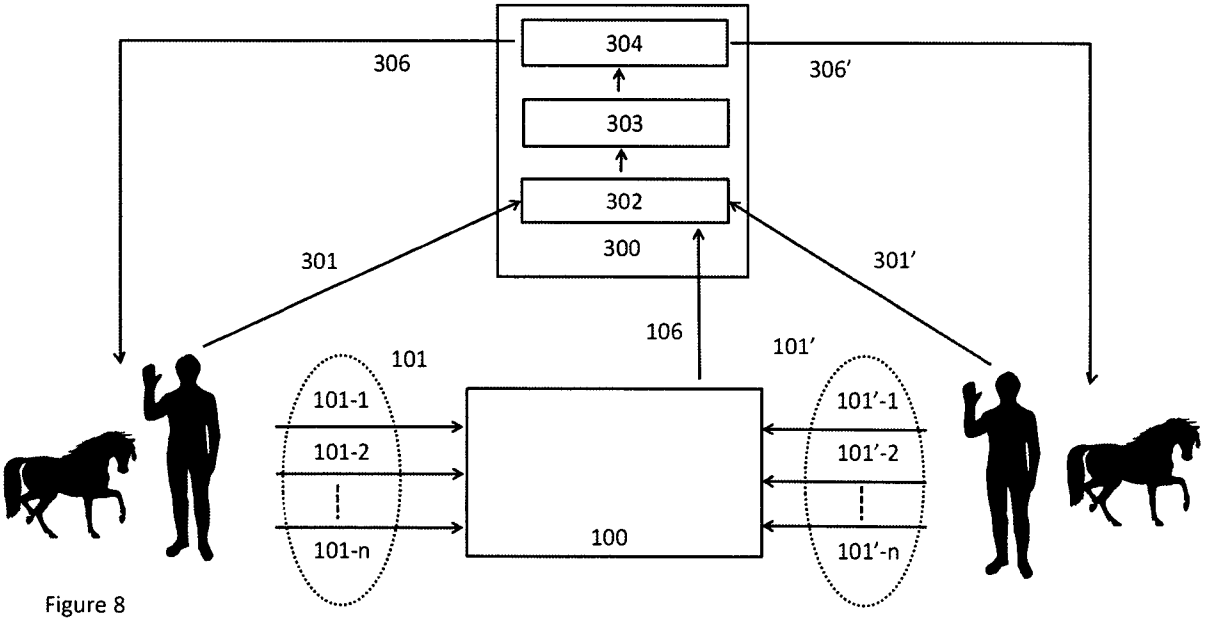

304
303
302
300
306
306'
301
301'
106
101
101'
101-1
101-2
101-n
101'-1
101'-2
101'-n
100

Figure 8

SUMMARY

An emotion content control system for converting emotion content signals from a human or animal subject into emotion content control signals for feedback interaction, said system comprising at least:

- a first apparatus arranged for sensing from at least a first human or animal subject first subject emotion content signals of at least a first and a second type, processing and converting said first and second type subject emotion content signals into a first emotion content control signal and transmitting said converted first emotion content control signal;
- a subject interaction device arranged in receiving said first emotion content control signal being transmitted by said first apparatus and in performing feedback interaction with said first human or animal subject based on said first emotion content control signal being received.

Rijksdienst voor Ondernemend Nederland

RAPPORT BETREFFENDE HET ONDERZOEK NAAR DE STAND VAN DE TECHNIEK

Octrooiaanvrage 1042207

Classificatie van het onderwerp[1]: A61B 5/00; A61B 5/16	Onderzochte gebieden van de techniek[2]: A61B
Computerbestanden: EPODOC, WPI	Omvang van het onderzoek: Volledig
Datum van de onderzochte conclusies: 18 januari 2017	Niet onderzochte conclusies: –

Van belang zijnde literatuur

Categorie[2]	Vermelding van literatuur met aanduiding, voor zover nodig, van speciaal van belang zijnde tekstgedeelten of figuren.	Van belang voor conclusie(s)
X	WO 2006/090371 A (SOFTWARE SOLUTIONS LTD) 31 augustus 2006 * samenvatting; figuren 1 – 3, 7; blz. 2, regel 18 – blz. 3, regel 18; blz. 14, regel 11 – blz. 16, regel 20; blz. 23, regel 5 – blz. 25, regel 26 *	1 – 18
	– – –	
X	US 2014/0234815 A (KOREA ELECTRONICS TELECOMM) 21 augustus 2014 * samenvatting; figuren 1 – 3; alinea's [0027], [0023] – [0043], [0050], [0051] *	1 – 18
	– – –	
A	US 2011/0124977 A (WINARSKI TYSON YORK) 26 mei 2011 * samenvatting; figuren *	1
	– – –	
A	US 2009/0002178 A (MICROSOFT CORP) 1 januari 2009 * samenvatting; figuren *	1
	– – – – –	

Datum waarop het onderzoek werd voltooid: 11 juli 2017	De bevoegde ambtenaar: M. van der Vlugt **Octrooicentrum Nederland,** **onderdeel van Rijksdienst voor Ondernemend Nederland**

1 Gedefinieerd volgens International Patent Classification (IPC).
2 Verklaring van de categorie-aanduiding: zie apart blad.

Categorie van de vermelde literatuur:

X: op zichzelf van bijzonder belang zijnde stand van de techniek

Y: in samenhang met andere geciteerde literatuur van bijzonder belang zijnde stand van de techniek

A: niet tot de categorie X of Y behorende van belang zijnde stand van de techniek

O: verwijzend naar niet op schrift gestelde stand van de techniek

P: literatuur gepubliceerd tussen voorrangs- en indieningsdatum

T: niet tijdig gepubliceerde literatuur over theorie of principe ten grondslag liggend aan de uitvinding

E: octrooiliteratuur gepubliceerd op of na de indieningsdatum van de onderhavige aanvrage en waarvan de indieningsdatum of de voorrangsdatum ligt voor de indieningsdatum van de onderhavige aanvrage

D: in de aanvrage genoemd

L: om andere redenen vermelde literatuur

&: lid van dezelfde octrooifamilie; corresponderende literatuur

Rijksdienst voor Ondernemend Nederland

AANHANGSEL

Behorende bij het Rapport betreffende het Onderzoek naar de Stand van de Techniek, Octrooiaanvrage 1042207

Het aanhangsel bevat een opgave van elders gepubliceerde octrooiaanvragen of octrooien (zogenaamde leden van dezelfde octrooifamilie), die overeenkomen met octrooigeschriften genoemd in het rapport. De opgave is samengesteld aan de hand van gegevens uit het computerbestand van het Europees Octrooibureau per 11 juli 2017. De juistheid en volledigheid van deze opgave wordt noch door het Europees Octrooibureau, noch door Octrooicentrum Nederland gegarandeerd; de gegevens worden verstrekt voor informatiedoeleinden.

In het rapport genoemd octrooigeschrift		**Datum van publicatie**	**Overeenkomende octrooigeschriften**		**Datum van publicatie**
WO 2006090371	A2	31-08-2006	US 2008214903	A1	04-09-2008
			JP 2008532587	A	21-08-2008
			EP 1871219	A2	02-01-2008
			CN 101198277	A	11-06-2008
			CA 2599148	A1	31-08-2006
			AU 2006217448	A1	31-08-2006
US 2014234815	A1	21-08-2014	KR 20140104537	A	29-08-2014
US 2011124977	A1	26-05-2011	US 8666672	B2	04-03-2014
US 2009002178	A1	01-01-2009	(geen)		

Rijksdienst voor Ondernemend Nederland

SCHRIFTELIJKE OPINIE

Octrooiaanvrage 1042207

Indieningsdatum: 1 januari 2017	Voorrangsdatum:
Classificatie van het onderwerp[1]: A61B 5/00; A61B 5/16	Aanvrager: Mentech Innovation B.V.

Deze schriftelijke opinie bevat een toelichting op de volgende onderdelen:

☒ Onderdeel I	Basis van de schriftelijke opinie
☐ Onderdeel II	Voorrang
☐ Onderdeel III	Vaststelling nieuwheid, inventiviteit en industriële toepasbaarheid niet mogelijk
☐ Onderdeel IV	De aanvraag heeft betrekking op meer dan één uitvinding
☒ Onderdeel V	Gemotiveerde verklaring ten aanzien van nieuwheid, inventiviteit en industriële toepasbaarheid
☐ Onderdeel VI	Andere geciteerde documenten
☐ Onderdeel VII	Overige gebreken
☐ Onderdeel VIII	Overige opmerkingen

De bevoegde ambtenaar:
M. van der Vlugt

Octrooicentrum Nederland,
onderdeel van Rijksdienst voor Ondernemend Nederland

1 Gedefinieerd volgens International Patent Classification (IPC).

Schriftelijke Opinie

Octrooiaanvrage 1042207

Onderdeel I Basis van de schriftelijke opinie

Deze schriftelijke opinie is opgesteld op basis van de op 18 januari 2017 ingediende conclusies.

Onderdeel V Gemotiveerde verklaring ten aanzien van nieuwheid, inventiviteit en industriële toepasbaarheid

1. Verklaring

Nieuwheid	Ja: Conclusie(s)	
	Nee: Conclusie(s)	1 – 18
Inventiviteit	Ja: Conclusie(s)	
	Nee: Conclusie(s)	
Industriële toepasbaarheid	Ja: Conclusie(s)	1 – 18
	Nee: Conclusie(s)	

2. Literatuur en toelichting

In het rapport betreffende het onderzoek naar de stand van de techniek worden de volgende publicaties genoemd:

D1: WO 2006/090371 A (SOFTWARE SOLUTIONS LTD) 31 augustus 2006
D2: US 2014/0234815 A (KOREA ELECTRONICS TELECOMM)21 augustus 2014
D3: US 2011/0124977 A (WINARSKI TYSON YORK) 26 mei 2011
D4: US 2009/0002178 A (MICROSOFT CORP) 1 januari 2009

D1

D1 openbaart een emotie controle systeem ('physiological monitoring system 10') voor het converteren van emotie signalen van mensen in emotie stuursignalen voor feedback interactie (zie figuur 1; blz. 2, regel 18 – blz. 3, regel 18).

Het systeem (10) omvat een eerste apparaat ('sensor module 310') ingericht voor

- het waarnemen van emotie signalen van ten minste een eerste en een tweede type van een eerste mens, waarbij de genoemde typen de hartslag (ECG); bloeddruk; temperatuur, huidtemperatuur, weerstand van de huid ('EDA') kunnen omvatten;
- het verwerken en het omzetten van desbetreffende emotie signalen, in een eerste emotie stuursignaal;
- het aanbieden van het eerste emotie stuursignaal (zie samenvatting; figuren 1 – 3; blz. 14, regel 11 – blz. 16, regel 7).

Voorts omvat het systeem (10) een interactie apparaat ('mobile monitor 120') ingericht voor het ontvangen van een eerste emotie stuursignaal uitgestuurd door het eerste apparaat (310), en het uitvoeren van de feedback interactie met de eerste mens, via een beeldscherm ('display 122'), speaker ('speaker 126') en toetsenbord ('keypad 124'), op basis van het ontvangen eerste emotie stuursignaal.

Conclusies 1, 8 – 11 zijn niet nieuw.

De set van maatregelen volgens conclusie 2 betreffende een tweede apparaat zijn eveneens bekend uit D1 (zie blz. 16, regels 8 – 10).
Conclusie 2 is niet nieuw.

Het systeem volgens D1 openbaart dat het eerste apparaat (310) verschillende sensoren kan omvatten die simultaan verschillende mensen kunnen monitoren waarbij de sensoren met een interactie apparaat (120) communiceren (zie blz. 16, regels 8 – 12). De maatregelen volgens conclusie 3 zijn hiermee geopenbaard.
Conclusie 3 is niet nieuw.

Het eerste apparaat (310) volgens D1 omvat, ontvangstmiddelen ('sensors') voor het ontvangen van genoemde emotie signalen; verwerkingsmiddelen ('processor 340') voor het verwerken van emotie signalen tot het emotie stuursignaal via kruiscorrelaties op basis van parametrische representaties en frequentieanalyse van de emotie signalen; overdrachtsmiddelen ('communication module 350') voor het uitsturen van het emotie stuursignaal en opslagmiddelen ('memory 342') voor het opslaan van de emotie signalen en het emotie stuursignaal (zie blz. 14, regel 11 – blz. 16, regel 7; blz. 23, regel 24 – blz. 25, regel 2).
Conclusies 4 en 5 zijn derhalve niet nieuw.

D1 openbaart eveneens dat de verwerkingsmiddelen (340) van het eerste apparaat (310) referentie informatie uit de ontvangen emotie signalen van de eerste mens extraheert; dat de genoemde verwerkingsmiddelen de referentie informatie door middel van tijd en frequentie-analyse van de genoemde emotie signalen genereert via een patroonherkenning algoritme en dat de referentie informatie in de opslagmiddelen (342) wordt opgeslagen (zie blz. 23, regel 5 – blz. 25, regel 26).
Conclusies 6 en 7 zijn derhalve niet nieuw.

De maatregelen volgens conclusies 12 en 13 voegen niets toe en zijn derhalve niet nieuw.

De werkwijze volgens conclusie 14 betreft het normaal gebruik van het systeem volgens conclusie 1. Conclusie 1 is niet nieuw derhalve is conclusie 14 evenmin nieuw.

Het herhalen van de stappen van de werkwijze volgens conclusie 14 dringt zich op.
Conclusie 15 is derhalve niet nieuw.

D1 openbaart een mobiele telefoon als interactie apparaat. Met de huidige stand van de techniek van mobiele telefoons is de werkwijze volgens conclusie 16 inherent bekend.
Conclusie 16 is niet nieuw.

Conclusies 17 en 18 zijn bekend uit D1 (zie bijvoorbeeld samenvatting; figuren 1, 3, 7; blz. 16, regels 13 – 20).
Conclusies 17 en 18 zijn niet nieuw.

Schriftelijke Opinie

Octrooiaanvrage 1042207

D2

D2 openbaart een emotie controle systeem ('emotion signal communication system') voor het converteren van emotie signalen van mensen in emotie stuursignalen voor feedback interactie (zie samenvatting; figuur 1; alinea's [0023] – [0035]). Het systeem (10) omvat een eerste apparaat ('emotion signal detecting apparatus 100-1 … 100-2') ingericht voor:

- het waarnemen van emotie signalen met ontvangstmiddelen ('sensor unit 110') van ten minste een eerste en een tweede type van een eerste mens, waarbij de genoemde typen de hartslag (ECG); bloeddruk; temperatuur, Galvanic Skin Response (SGR), body temperatuur, geluidssensor kunnen omvatten;
- het verwerken en het omzetten met verwerkingsmiddelen ('signal processing unit 120') van desbetreffende emotie signalen in een eerste emotie stuursignaal;
- het aanbieden van het eerste emotie stuursignaal met overdrachtsmiddelen ('emotion signal communicating unit 150');
- het opslaan van de emotie signalen en het emotie stuur signaal met opslagmiddelen ('storage unit 160').

Het systeem omvat voorts een interactie apparaat ('emotion service providing apparatus 200'), zoals een mobiele telefoon, of een personal computer, ingericht voor het ontvangen van een eerste emotie stuursignaal uitgestuurd door het eerste apparaat (100), en het uitvoeren van de feedback interactie met de eerste mens, via een beeldscherm ('display unit 230') op basis van het ontvangen eerste emotie stuursignaal (zie figuur 1; alinea's [0036 – [0038]).
De verwerkingsmiddelen van het eerste apparaat ('control unit 130') extraheert referentie informatie uit de ontvangen emotie signalen van de eerste mens via een patroonherkenning algoritme en slaat deze op in de opslagmiddelen (160) (zie figuren 1 – 3; alinea's [0035], [0040] – [0043]).
Conclusies 1, 4 – 13 zijn niet nieuw.

Het emotie controle systeem volgens D1 openbaart dat de verwerkingsmiddelen (130) van het eerste apparaat (100) volgens conclusie 1 tevens ontvangstmiddelen ('receiver 132') omvat ingericht voor het waarnemen van emotie signalen van een extra tweede gebruiker komend van een 'tweede' eerste apparaat ('emotion signal detecting apparatus') waarmee de eerste gebruiker kan worden geïnformeerd over de emotionele toestand van de tweede gebruiker (zie figuren 1, 3; alinea's [0050], [0051]).
Conclusies 2 en 3 zijn derhalve niet nieuw.

De werkwijze volgens conclusie 14 betreft het normaal gebruik van het systeem volgens conclusie 1.
Conclusie 1 is niet nieuw derhalve is conclusie 14 evenmin nieuw.

Het herhalen van de stappen van de werkwijze volgens conclusie 14 dringt zich op.
Conclusie 15 is derhalve niet nieuw.

De werkwijzen volgens conclusies 16 – 18 worden impliciet geopenbaard door D2 (zie alinea [0027]).
Conclusies 16 – 18 zijn niet nieuw.

Schriftelijke Opinie

D3 en D4 openbaren een verderaf gelegen stand van de techniek (zie figuren en samenvatting).