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(54) **HAPTIC HEALTH FEEDBACK MONITORING**

HAPTISCHE GESUNDHEITS-FEEDBACK-ÜBERWACHUNG

DISPOSITIF DE SURVEILLANCE DE RETOUR D'INFORMATIONS HAPTIQUES SUR LA SANTE

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(73) Proprietor: **Immersion Corporation**
San Jose, CA 95131 (US)

(72) Inventors:
- **RAMSAY, Erin, B.**
  Montreal, Quebec H4A 2V9 (CA)
- **HEUBEL, Robert, W.**
  San Leandro, CA 64577 (US)
- **OLIEN, Neil, Thomas**
  Quebec, H4B 2V3 (CA)

(74) Representative: **Hofstetter, Alfons J.**
Hofstetter, Schurack & Skora
Balanstrasse 57
81541 München (DE)

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Description

[0001] One embodiment of the present invention is directed to a haptic feedback system. More particularly, one embodiment of the present invention is directed to a system that generates haptic feedback based on monitored health parameters.

[0002] In the medical profession today, the advent of high technology has provided a myriad of impressive diagnostic tools. However the focus of this medical technology has been on diagnosis of acute conditions, rather than advanced warnings and preventive advice. Routine "checkups" are the recognized method of monitoring a person's health. Such examinations provide a physician with information relating to the patient's condition. However, unless a patient's checkup is fortuitously scheduled for a time at which symptoms of an ensuing illness are just developing, the checkup may not be effective in helping to detect the onset of an adverse medical condition.

[0003] Portable health monitors have been developed in the past which monitor body/health parameters specific to a particular medical condition. In some cases these monitors record specific parameter data, while in others they provide an output to the patient which is indicative of the physical parameters they sense. Some monitors simply provide an alarm when the parameters reach a pre-set level of particular concern. Others such as portable heart rate monitors provide a digital display of heart rate to the patient. Still others record heart rate over time. Patients use such heart rate monitors to warn them of high heart rates. Athletes use them to ensure that their physical training includes periods of elevated heart rate thought to be sufficient to promote conditioning. Similar monitors also exist for measuring other parameters. US 2007/124027 A discloses a system for providing information as a function of factors which place a workload on the driver when he is driving a motor vehicle. Information is output as a function of the load factors which act objectively on the driver, driver activities and driver-specific driver characteristics which influence the driving of the vehicle. US 2002/120188 A1 discloses an apparatus and a method for sensing at an anatomic body site and mapping or transforming the sensor signal into various forms of virtual image and feedback signals, having particular application in assisting surgeons and other operators during a medical procedure. In one embodiment, a system is provided for controlling manipulation of a medical implement including a sensor positionable at an internal body site for sensing a non-visible field of a body structure at the site and generating a sensor signal indicative of the field, a transformation system for transforming the sensor signal into a feedback signal, and a control system, including a haptic user interface, for manipulating a medical implement at the site, the control system receiving the feedback signal and in response thereto providing a tactile signal at the user interface.

[0004] Known methods of alerting users of health parameters are fairly limited. In many instances, a user needs to be alerted or informed of parameters without having to look at a specific display or listen for a distinctive noise. Based on the foregoing, there is a need for an improved system and method for monitoring and alerting a user of health parameters.

[0005] One embodiment is a haptic health feedback monitor with the features of claim 6 that includes a health parameter monitor that detects a health parameter. A haptic feedback generator receives the health parameter and compares it to a predetermined level. If the health parameter reaches or exceeds the level, a type of haptic feedback to generate is determined. The type of feedback may depend on which predetermined level is reached or exceeded. The haptic feedback generator then generates the determined type of haptic feedback.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] Fig. 1 is a plan view of a health monitoring system in accordance with one embodiment that monitors health parameters of a user.

[0007] Fig. 2 is a block diagram of the health monitoring system in accordance with one embodiment.

[0008] Fig. 3 is a flow diagram of the functionality of the health monitoring system in accordance with one embodiment.

DETAILED DESCRIPTION

[0009] Embodiments of the present invention may include kinesthetic feedback (such as active and resistive force feedback) and/or tactile feedback (such as vibration, texture, and heat), more generally known collectively as "haptic feedback", to provide health parameters to a user. Haptic feedback can provide cues that enhance and simplify the user interface. Specifically, vibration effects, or vibrotactile haptic effects, may be useful in providing cues to users of electronic devices to alert the user to specific events, or provide realistic feedback to create greater sensory immersion within a simulated or virtual environment. One embodiment is a health monitoring system in which haptic feedback is used to alert a user of health parameter levels.

[0010] Fig. 1 is a plan view of a health monitoring system 30 that monitors health parameters of a user. The system includes a health parameter monitor 32 coupled to a haptic feedback generator 34. Health parameter monitor 32 may be any type of device for monitoring health parameters. For example, embodiments that are used for disease management may monitor blood glucose, blood pressure, ambulatory ECG, respiratory, temperature, heart rate, blood salinity, blood electrolytes, hormones, blood iron, blood alcohol, etc. Embodiments that are used for healthy lifestyle management may include monitoring for temperature, heart rate, blood pressure, amount of work or rate of work performed, etc.

[0011] One embodiment of haptic parameter monitor 32 may be a chest strap, as shown in Fig. 1, that includes

a variety of parametric sensors that can detect health parameters non-invasively. Other embodiments may detect health parameters in a more invasive method such as through sampling of blood or other body fluids. Health parameter monitor 32 may include a processor and memory.

[0012] Haptic feedback generator 34 is any type of device that is capable of communicating with health parameter monitor 32 to receive measured health parameters, and is capable of applying haptic feedback to a user in response to the health parameters. Haptic feedback generator 34 may be worn on the user's wrist, as shown in Fig. 1, or on any other portion of the user's body, including as a glove on a hand, a belt around the waist, a shoe or clothing or accessories such as a shirt, pants, undergarments, sunglasses, ear-pieces, rings, bracelets, necklaces, etc. Haptic feedback generator 34 may also be a device that is not "attached" to the user's body but still is able to apply haptic feedback that can be detected by the user. For example, a cellular telephone that can be slipped in the user's pocket may be used to apply a haptic feedback to the user. Further, haptic feedback generator 34 may be housed in the same physical device as health parameter monitor 32.

[0013] Fig. 2 is a block diagram of health monitoring system 30 . Health parameter monitor 32 is in communications with haptic feedback generator 34 via communication link 36. Communication link may be any type of interface for communicating data, including wired, wireless, radio, infra-red ("IR"), etc. Health parameter monitor 32 and haptic feedback generator 34 include communication modules (not shown) for facilitating data communications via communication link 36.

[0014] Processor 12 can decide what haptic effects are to be played and the order in which the effects are played based on high level parameters which are based on information from the monitor 32 regarding health parameter values falling outside of or reaching predefined levels. In general, the high level parameters that define a particular haptic effect include magnitude, frequency, duration, attack level, attack time, fade level and fade time. These high level parameters can also be dynamically changed. Individual haptic effects can also be grouped together to form more complex haptic effects or timelines.

[0015] Processor 12 outputs the control signals to drive circuit 16 which includes electronic components and circuitry used to supply actuator 18 with the required electrical current and voltage to cause the desired haptic effects. Actuator 18 is a haptic device that generates a vibration on the body of haptic feedback generator 34 or in some other area so that it can be felt by the user. Actuator 18 may be, for example, an electromagnetic actuator such as an Eccentric Rotating Mass ("ERM") in which an eccentric mass is moved by a motor, a Linear Resonant Actuator ("LRA") in which a mass attached to a spring is driven back and forth, or a "smart material" such as piezoelectric, electro-active polymers or shape memory alloys.

[0016] Memory 20 can be any type of storage device, such as random access memory ("RAM") or read-only memory ("ROM"). Memory 20 stores instructions executed by processor 12. Memory 20 may also be located internal to processor 12, or any combination of internal and external memory. Memory 20 further stores data of measured parameters from haptic parameter monitor 32 so that it can be used at a later time.

[0017] Haptic feedback generator 34 can generate multiple types of haptic effects to communicate different information to the user. For example, for vibration based haptic effects, high amplitude, high frequency vibration can communicate one type of information, while low amplitude, low frequency vibration can communicate another type of information. Similarly, for temperature based haptic effects, a cold temperature or hot temperature may communicate two or more types of information. Other examples of possible haptic effects that can be varied to communicate more than one type of information include humidity levels (e.g., wet or dry) or the rigidity of generator 34 (e.g., it can be changed from loose and floppy to tight/constricting and rigid). All permutations and combinations of the various types of haptic feedback can be combined in embodiments to create compelling haptic effects. The use of varying patterns of haptic effects can also be used to communicate different information to the user. A limitless number of haptic patterns could be used to communicate a plethora of health-related information by varying not only the individual haptic effect amplitude, frequency and duration parameters, but by varying the durations between these haptic effects and by combining the same or dissimilar haptic effects into unique patterns for the purpose of this communication. For example, in one embodiment the application of a series of short duration haptic effects repeated at a set interval can communicate one type of information and the application of a series of long duration haptic effects at a different interval can communicate another type of information.

[0018] Many health parameters monitored by health parameter monitor 32 have various levels that may be of interest to a user. For example, for a measured heart rate a user might desire a haptic feedback when the heart rate exceeds a predetermined level (e.g., 180 beats per minute ("bpm")). However, some athletes attempt to get their heart rate within various "zones" such as Zone 1 (50-60% of maximum heart rate); Zone 2 (60-70% of maximum heart rate); Zone 3 (70-80% of maximum heart rate); Zone 4 (80-90% of maximum heart rate); Zone 5 (90-100% of maximum heart rate). For these users, it is beneficial to receive a different type of haptic effect when entering each zone. Similarly, one level of blood glucose may generate one type of haptic effect, while a second level, which may indicate that medication or other steps must be undertaken immediately, may generate another type of haptic effect.

[0019] Fig. 3 is a flow diagram of the functionality of health monitoring system 30. The functionality of the flow

diagram of Fig. 3 is implemented by software stored in or loaded into memory and executed by a processor. The functionality can be performed by hardware, or any combination of hardware and software. Further, any of the functionally may be performed by either monitor 32 or generator 34.

[0020] At 102, health parameter monitor 32 detects a health parameter and communicates that data to haptic feedback generator 34.

[0021] At 104, haptic feedback generator 34 compares the health parameter to a predetermined level, such as zone 2 heart rate, mildly high blood glucose level, etc.

[0022] At 106, based on the comparison, generator 34 determines a type of haptic feedback to generate.

[0023] At 108, the haptic feedback parameters are compiled and sent to the haptic device (e.g., actuator drive circuit 16 and vibration actuator 18) to create the haptic feedback. Therefore, the particular haptic feedback that is generated will depend on the type determined at 106. Similarly, different levels at 104 will result in a different type of haptic feedback being generated at 108.

[0024] In addition to generating haptic feedback at 108 to provide an alert to the user, in some embodiments the haptic feedback itself may counteract the health parameter. For example, if the type of haptic feedback is temperature based, a rising temperature can be counteracted by the application of a cold temperature haptic effect. or moisture released in response to the body suffering from arid conditions.

[0025] Further, the haptic feedback alert is generated remotely from health parameter monitor 32 and is applied to a user other than the user wearing health parameter monitor 32. For example, in combat situations, medics could be informed of a soldier's need for medical attention or more generally alerted to the need for medical attention for a group of soldiers based on an average of the group's vital stats readings. Further, those who care for the elderly or the physically disabled can be alerted for the need for medical attention or other type of assistance, or it can be used to remotely monitor children.

[0026] In one embodiment, health parameter monitor 32 further includes a Global Positioning System ("GPS") that generates information regarding the geographic location of the user. In one embodiment, the GPS information can be used after the alert has been triggered to assist in guiding medical or monitoring personal to the person needing attention. In one embodiment, after triggering a haptic health alert and communicating vital health information to the monitoring staff, the system can enter a GPS mode that provides guidance through a series of haptic effects of increasing amplitude, frequency, duration or patterns that assist in pinpointing the location of the person needing attention. Haptic effects, in addition to being generated at a remote user are being used as a two-way communication system in sending one or more haptic effects to the injured person, letting them know a number of relevant facts such as: the alert has been sent; the alert has been received; help is on the way; GPS pinpointing has been activated; or the relative position or distance of medical assistance.

Claims

1. A method of monitoring health comprising:

detecting a first health parameter of a user wearing a health parameter monitor (32);
comparing the first health parameter to a first predetermined level;
determining a first type of haptic feedback to be generated based on the comparison;
generating the determined first type of haptic feedback,
characterized in that
the first type of haptic feedback is generated remotely from the health parameter monitor and is applied to a first user that is different from the user wearing the health parameter monitor (32); and in addition to the first type of haptic feedback being applied to the first user,
sending haptic feedback parameters to a haptic device to create one or more haptic effects to the user wearing the health parameter monitor (32), the one or more haptic effects conveying relevant facts to the user wearing the health parameter monitor (32).

2. The method of claim 1, further comprising
detecting a second health parameter;
comparing the second health parameter to a second predetermined level;
determining a second type of haptic feedback to generate based on the second comparison; and
generating the determined second type of haptic feedback.

3. The method of claim 1, wherein the first type of haptic feedback is vibrotactile, temperature, humidity or rigidity.

4. The method of claim 1, wherein the first health parameter is at least one of heart rate, blood pressure, blood glucose level, respiratory level, temperature, blood alcohol level, blood iron level, blood salinity, blood electrolyte level and hormone level.

5. The method of claim 1, further comprising transmitting a signal that indicates a location of a user that has the first health parameter.

6. A haptic health feedback monitor comprising:

a health parameter monitor (32) that detects a first health parameter of a user wearing the health parameter monitor (32); and

a haptic feedback generator coupled to the monitor (32) that receives the first health parameter and compares to a first predetermined level;
wherein the generator is adapted to determine a first type of haptic feedback to be generated based on the comparison and to generate to the determined first type of haptic feedback,
characterized in that
the first type of haptic feedback is generated remotely from the health parameter monitor and is applied to a first user that is different from the user wearing the health parameter monitor (32); and wherein in addition to the first type of haptic feedback being applied being to the first user,
the generator is adapted to send haptic feedback parameters to a haptic device to create one or more haptic effects to the user wearing the health parameter monitor (32), the one or more haptic effects conveying relevant facts to the user wearing the health parameter monitor (32).

7. The monitor of claim 6, wherein the generator detects a second health parameter, compares the second health parameter to a second predetermined level, determines a second type of haptic feedback to generate based on the second comparison, and generates the determined second type of haptic feedback.

8. The monitor of claim 6, wherein the first type of haptic feedback is vibrotactile, temperature, humidity or rigidity.

9. The monitor of claim 6, wherein the first health parameter is at least one of heart rate, blood pressure, blood glucose level, respiratory level, temperature, blood alcohol level, blood iron level, blood salinity, blood electrolyte level and hormone level.

10. The monitor of claim 6, further comprising a location determiner that determines a location of the health parameter monitor (32).

11. A computer readable medium having instructions stored thereon that, when executed by a processor (12), cause the processor (12) to:

receive a first health parameter of a user wearing a health parameter monitor (32) and compare to a first predetermined level;
determine a first type of haptic feedback to be generated based on the comparison; and
generate the determined first type of haptic feedback,
characterized in that
the first type of haptic feedback is generated remotely from the health parameter monitor and is applied to a first user that is different from a user wearing a health parameter monitor (32); and further cause the processor (12) to in addition to the first type of haptic feedback being applied to the first user,
send haptic feedback parameters to a haptic device to create one or more haptic effects to the user wearing the health parameter monitor (32), the one or more haptic effects conveying relevant facts to the user wearing the health parameter monitor (32).

Patentansprüche

1. Verfahren zum Überwachen der Gesundheit, das umfasst:

Erfassen eines ersten Gesundheitsparameters eines Benutzers, der ein Gesundheitsparameter-Überwachungsgerät (32) trägt;
Vergleichen des ersten Gesundheitsparameters mit einem ersten vorbestimmten Pegel;
Bestimmen eines ersten Typs einer zu erzeugenden haptischen Rückmeldung auf der Basis des Vergleichs;
Erzeugen des bestimmten ersten Typs der haptischen Rückmeldung, **dadurch gekennzeichnet, dass**
der erste Typ von haptischer Rückmeldung entfernt vom Gesundheitsparameter-Überwachungsgerät erzeugt wird und auf einen ersten Benutzer aufgebracht wird, der vom Benutzer, der das Gesundheitsparameter-Überwachungsgerät (32) trägt, verschieden ist; und zusätzlich zum ersten Typ von haptischer Rückmeldung, die auf den ersten Benutzer aufgebracht wird,
Senden von Parametern der haptischen Rückmeldung zu einer haptischen Vorrichtung, um einen oder mehrere haptische Effekte für den Benutzer zu erzeugen, der das Gesundheitsparameter-Überwachungsgerät (32) trägt, wobei der eine oder die mehreren haptischen Effekte relevante Tatsachen an den Benutzer, der das Gesundheitsparameter- Überwachungsgerät (32) trägt, übermitteln.

2. Verfahren nach Anspruch 1, das ferner umfasst
Erfassen eines zweiten Gesundheitsparameters;
Vergleichen des zweiten Gesundheitsparameters mit einem zweiten vorbestimmten Pegel;
Bestimmen eines zweiten Typs einer zu erzeugenden haptischen Rückmeldung auf der Basis des zweiten Vergleichs; und
Erzeugen des bestimmten zweiten Typs von haptischer Rückmeldung.

3. Verfahren nach Anspruch 1, wobei der erste Typ von

haptischer Rückmeldung vibrotaktil, eine Temperatur, eine Feuchtigkeit oder eine Steifigkeit ist.

4. Verfahren nach Anspruch 1, wobei der erste Gesundheitsparameter mindestens einer aus Herzfrequenz, Blutdruck, Blutzuckerspiegel, Atempegel, Temperatur, Blutalkoholspiegel, Bluteisenspiegel, Blutsalzgehalt, Blutelektrolytspiegel und/oder Hormonspiegel ist.

5. Verfahren nach Anspruch 1, das ferner das Übertragen eines Signals umfasst, das einen Ort eines Benutzers angibt, der den ersten Gesundheitsparameter aufweist.

6. Gesundheitsüberwachungsgerät mit haptischer Rückmeldung, das umfasst:

ein Gesundheitsparameter-Überwachungsgerät (32), das einen ersten Gesundheitsparameter eines Benutzers, der das Gesundheitsparameter-Überwachungsgerät (32) trägt, erfasst; und

einen Generator für eine haptische Rückmeldung, der mit dem Überwachungsgerät (32) gekoppelt ist und der den ersten Gesundheitsparameter empfängt und mit einem ersten vorbestimmten Pegel vergleicht;

wobei der Generator dazu ausgelegt ist, einen ersten Typ von zu erzeugender haptischer Rückmeldung auf der Basis des Vergleichs zu bestimmen, und den bestimmten ersten Typ von haptischer Rückmeldung zu erzeugen,

dadurch gekennzeichnet, dass

der erste Typ von haptischer Rückmeldung entfernt vom Gesundheitsparameter-Überwachungsgerät erzeugt wird und auf einen ersten Benutzer aufgebracht wird, der vom Benutzer, der das Gesundheitsparameter-Überwachungsgerät (32) trägt, verschieden ist; und wobei zusätzlich zum ersten Typ von haptischer Rückmeldung, die auf den ersten Benutzer aufgebracht wird,

der Generator dazu ausgelegt ist, Parameter der haptischen Rückmeldung zu einer haptischen Vorrichtung zu senden, um einen oder mehrere haptische Effekte für den Benutzer zu erzeugen, der das Gesundheitsparameter-Überwachungsgerät (32) trägt, wobei der eine oder die mehreren haptischen Effekte relevante Tatsachen an den Benutzer, der das Gesundheitsparameter-Überwachungsgerät (32) trägt, übermitteln.

7. Überwachungsgerät nach Anspruch 6, wobei der Generator einen zweiten Gesundheitsparameter erfasst, den zweiten Gesundheitsparameter mit einem zweiten vorbestimmten Pegel vergleicht, einen zweiten Typ von zu erzeugender haptischer Rückmeldung auf der Basis des zweiten Vergleichs bestimmt, und den bestimmten zweiten Typ von haptischer Rückmeldung erzeugt.

8. Überwachungsgerät nach Anspruch 6, wobei der erste Typ von haptischer Rückmeldung vibrotaktil, eine Temperatur, eine Feuchtigkeit oder eine Steifigkeit ist.

9. Überwachungsgerät nach Anspruch 6, wobei der erste Gesundheitsparameter mindestens einer aus Herzfrequenz, Blutdruck, Blutzuckerspiegel, Atempegel, Temperatur, Blutalkoholspiegel, Bluteisenspiegel, Blutsalzgehalt, Blutelektrolytspiegel und/oder Hormonspiegel ist.

10. Überwachungsgerät nach Anspruch 6, das ferner eine Ortsbestimmungsvorrichtung umfasst, die einen Ort des Gesundheitsparameter-Überwachungsgeräts (32) bestimmt.

11. Computerlesbares Medium, auf dem Befehle gespeichert sind, die, wenn sie von einem Prozessor (12) ausgeführt werden, bewirken, dass der Prozessor (12):

einen ersten Gesundheitsparameter eines Benutzers, der ein Gesundheitsparameter-Überwachungsgerät (32) trägt, empfängt und mit einem ersten vorbestimmten Pegel vergleicht;

einen ersten Typ von zu erzeugender haptischer Rückmeldung auf der Basis des Vergleichs bestimmt; und

den bestimmten ersten Typ von haptischer Rückmeldung erzeugt, **dadurch gekennzeichnet, dass**

der erste Typ von haptischer Rückmeldung entfernt vom Gesundheitsparameter-Überwachungsgerät erzeugt wird und auf einen ersten Benutzer aufgebracht wird, der von einem Benutzer, der das Gesundheitsparameter-Überwachungsgerät (32) trägt, verschieden ist; und ferner bewirkt, dass der Prozessor (12) zusätzlich zum ersten Typ von haptischer Rückmeldung, die auf den ersten Benutzer aufgebracht wird, Parameter der haptischen Rückmeldung zu einer haptischen Vorrichtung sendet, um einen oder mehrere haptische Effekte für den Benutzer zu erzeugen, der das Gesundheitsparameter-Überwachungsgerät (32) trägt, wobei der eine oder die mehreren haptischen Effekte relevante Tatsachen an den Benutzer, der das Gesundheitsparameter-Überwachungsgerät (32) trägt, übermitteln.

Revendications

1. Procédé de surveillance de la santé, comprenant les étapes consistant à :

détecter un premier paramètre de santé d'un utilisateur qui porte un moniteur des paramètres de santé (32) ;
comparer le premier paramètre de santé à un premier niveau prédéterminé ;
déterminer un premier type de réaction haptique, à générer sur la base de la comparaison ;
générer le premier type de réaction haptique déterminé,
caractérisé en ce que
le premier type de réaction haptique est généré à distance du moniteur des paramètres de santé et est appliqué à un premier utilisateur qui est différent de l'utilisateur qui porte le moniteur des paramètres de santé (32) et, en plus, au premier type de réaction haptique, appliqué au premier utilisateur,
envoyer les paramètres de réaction haptique à un dispositif haptique, pour créer un ou plusieurs effets haptiques pour l'utilisateur qui porte le moniteur des paramètres de santé (32), le un ou plusieurs effets haptiques transmettant les faits pertinents à l'utilisateur qui porte le moniteur des paramètres de santé (32).

2. Procédé selon la revendication 1, comprenant en outre les étapes consistant à détecter un deuxième paramètre de santé ;
comparer le deuxième paramètre de santé à un deuxième niveau prédéterminé ;
déterminer un deuxième type de réaction haptique à générer sur la base de la deuxième comparaison et générer le deuxième type déterminé de réaction haptique.

3. Procédé selon la revendication 1, dans lequel le premier type de réaction haptique est vibrotactile, la température, l'humidité ou la rigidité.

4. Procédé selon la revendication 1, dans lequel le premier paramètre de santé est au moins un paramètre parmi la fréquence cardiaque, la pression artérielle, le niveau de glycémie, le niveau respiratoire, la température, l'alcoolémie, le niveau de fer dans le sang, la salinité du sang, le niveau d'électrolytes dans le sang et le niveau d'hormones.

5. Procédé selon la revendication 1, comprenant en outre l'étape consistant à émettre un signal, qui indique l'emplacement d'un utilisateur qui a le premier paramètre de santé.

6. Moniteur àréactionen matière de santé haptique, comprenant :

un moniteur de paramètres de santé (32), qui détecte un premier paramètre de santé d'un utilisateur qui porte le moniteur de paramètres de santé (32) et
un générateur de réaction haptique, couplé au moniteur (32), qui reçoit le premier paramètre de santé et le compare à un premier niveau prédéterminé ;
dans lequel le générateur est adapté pour déterminer un premier type de réaction haptique à générer en fonction de la comparaison et pour générer le premier type déterminé de réaction haptique,
caractérisé en ce que
le premier type de réaction haptique est généré à distance du moniteur de paramètres de santé et est appliqué à un premier utilisateur qui est différent de l'utilisateur qui porte le moniteur de paramètres de santé (32) et dans lequel, outre le premier type de réaction haptique, appliqué au premier utilisateur,
le générateur est adapté pour envoyer des paramètres de réaction haptique à un dispositif haptique, pour créer un ou plusieurs effets haptiques pour l'utilisateur qui porte le moniteur des paramètres de santé (32), le un ou plusieurs effets haptiques transmettant les faits pertinents à l'utilisateur qui porte le moniteur des paramètres de santé (32).

7. Moniteur selon la revendication 6, dans lequel le générateur détecte un deuxième paramètre de santé, compare le deuxième paramètre de santé à un deuxième niveau prédéterminé, détermine un deuxième type de réaction haptique à générer en fonction de la deuxième comparaison et génère le deuxième type déterminé de réaction haptique.

8. Moniteur selon la revendication 6, dans lequel le premier type de réaction haptique est vibrotactile, la température, l'humidité ou la rigidité.

9. Moniteur selon la revendication 6, dans lequel le premier paramètre de santé est au moins un paramètre parmi la fréquence cardiaque, la pression artérielle, le niveau de glycémie, le niveau respiratoire, la température, l'alcoolémie, le niveau de fer dans le sang, la salinité du sang, le niveau d'électrolytes dans le sang et le niveau d'hormones.

10. Moniteur selon la revendication 6, comprenant en outre un déterminant d'emplacement, qui détermine l'emplacement du moniteur de paramètres de santé (32).

11. Support, lisible par ordinateur, ayant des instructions

qui y sont stockées qui, quand elles sont exécutées par un processeur (12), amènent le processeur (12) à :

recevoir un premier paramètre de santé d'un utilisateur qui porte un moniteur de paramètres de santé (32) et à le comparer à un premier niveau prédéterminé ;
déterminer un premier type de réaction haptique à générer en fonction de la comparaison et
générer le premier type déterminé de réaction haptique,
caractérisé en ce que
le premier type de réaction haptique est généré à distance du moniteur de paramètres de santé et est appliqué à un premier utilisateur qui est différent de l'utilisateur qui porte un moniteur de paramètres de santé (32) et amènent en outre le processeur (12), en plus du premier type de réaction haptique, appliqué au premier utilisateur,
à envoyer les paramètres de réaction haptique à un dispositif haptique, pour créer un ou plusieurs effets haptiques pour l'utilisateur qui porte le moniteur des paramètres de santé (32), le un ou plusieurs effets haptiques transmettant les faits pertinents à l'utilisateur qui porte le moniteur des paramètres de santé (32).

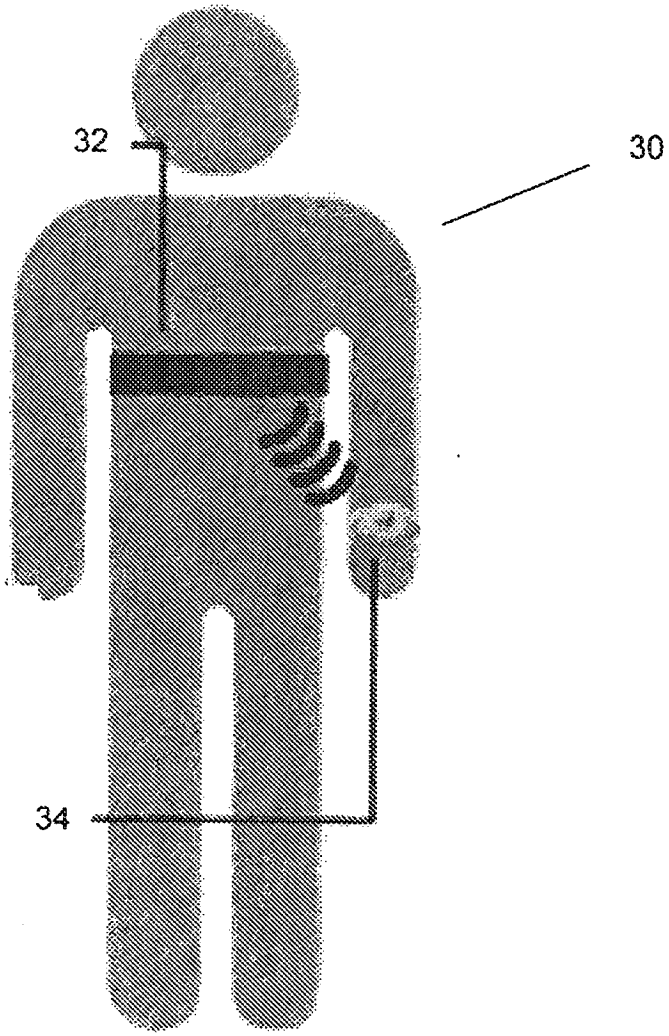

Fig. 1

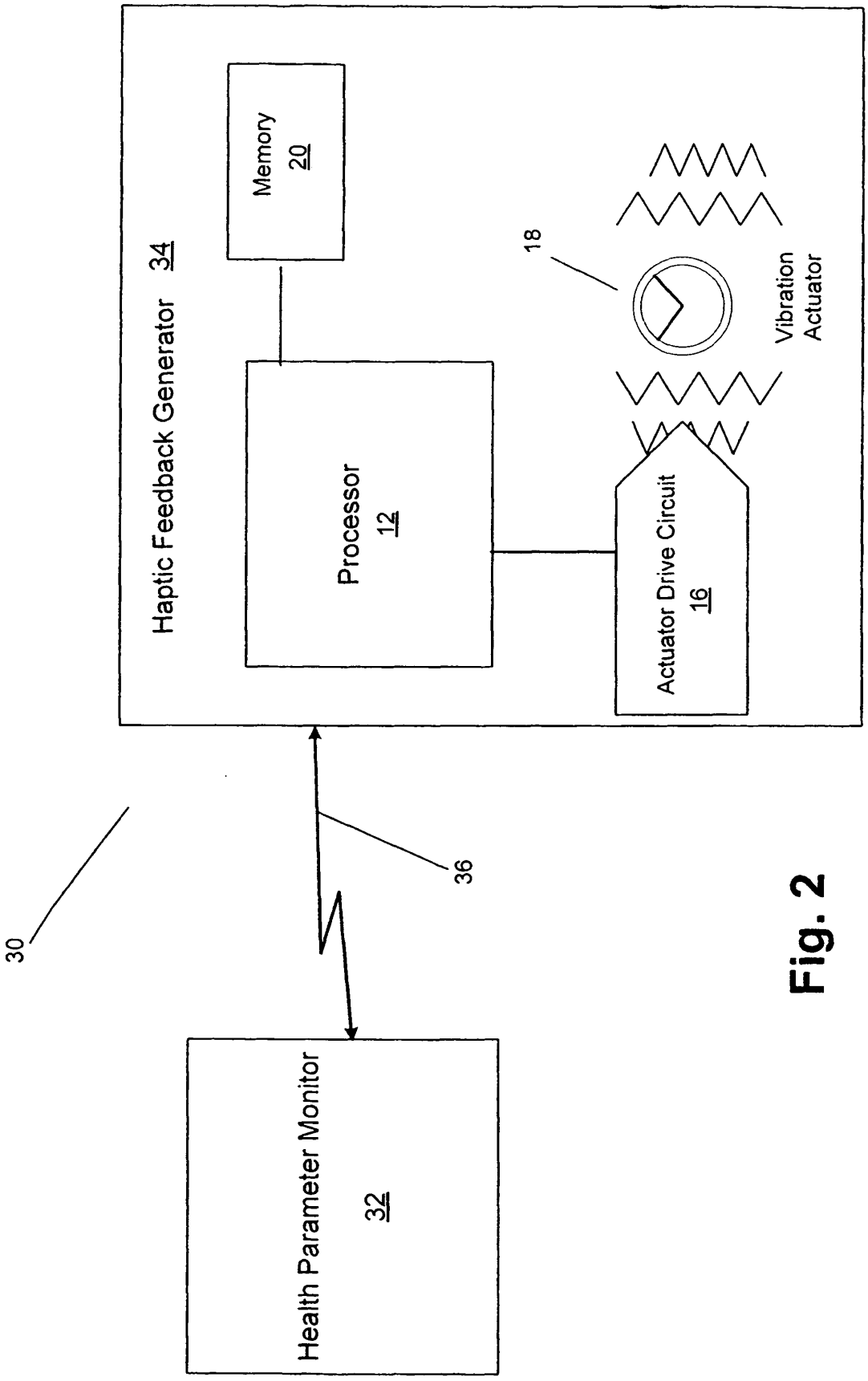
Haptic Feedback Generator 34
Memory 20
Processor 12
Actuator Drive Circuit 16
18
Vibration Actuator
30
36
Health Parameter Monitor 32

Fig. 2

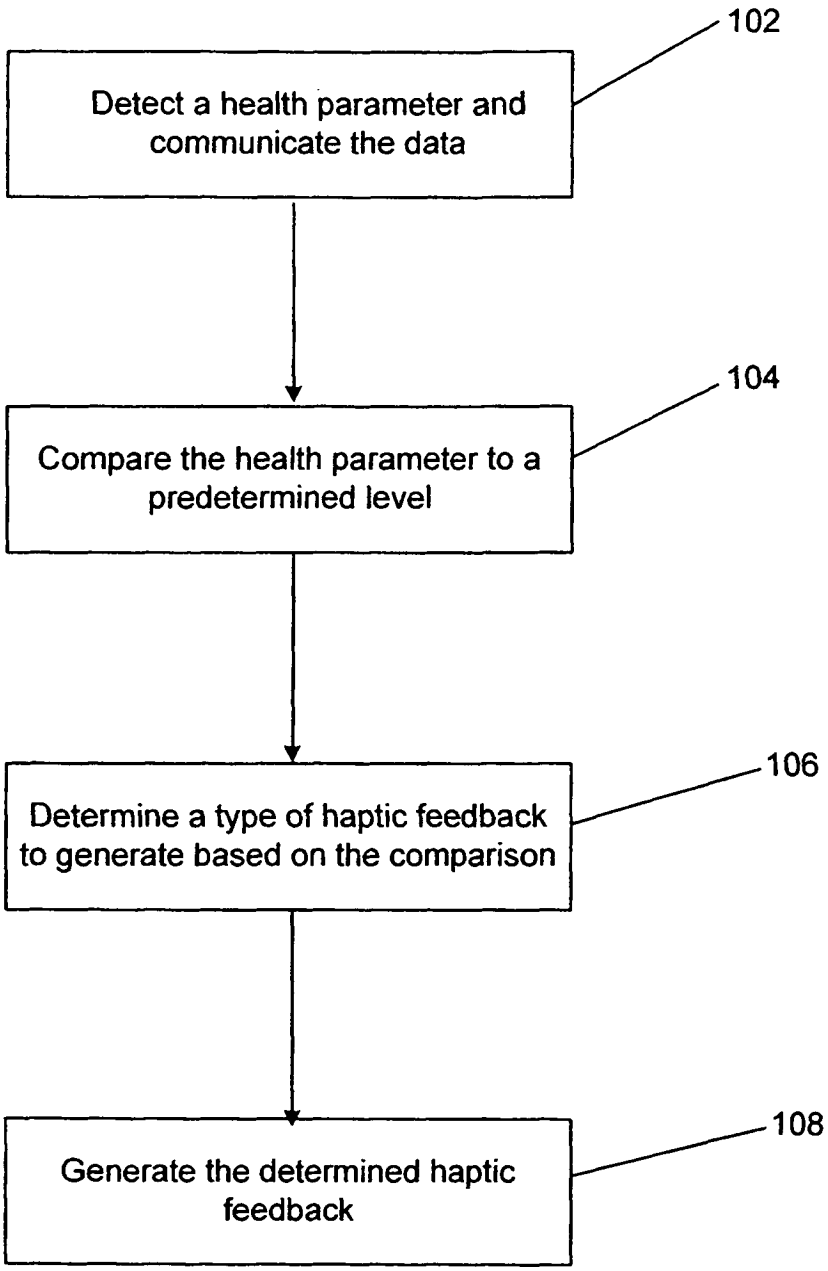
102
Detect a health parameter and communicate the data
104
Compare the health parameter to a predetermined level
106
Determine a type of haptic feedback to generate based on the comparison
108
Generate the determined haptic feedback

Fig. 3

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 2007124027 A **[0003]**
- US 2002120188 A1 **[0003]**

专利名称(译)	触觉健康反馈监测		
公开(公告)号	EP2155050B1	公开(公告)日	2012-01-25
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[标]申请(专利权)人(译)	伊梅森公司		
申请(专利权)人(译)	Immersion公司		
当前申请(专利权)人(译)	Immersion公司		
[标]发明人	RAMSAY ERIN B HEUBEL ROBERT W OLIEN NEIL THOMAS		
发明人	RAMSAY, ERIN, B. HEUBEL, ROBERT, W. OLIEN, NEIL, THOMAS		
IPC分类号	A61B5/00 A61B19/00		
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优先权	11/766452 2007-06-21 US		
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外部链接	Espacenet		

摘要(译)

触觉健康反馈监视器包括检测健康参数的健康参数监视器。触觉反馈生成器接收健康参数并将其与预定级别进行比较。如果健康参数达到或超过该级别，则确定要生成的触觉反馈的类型。反馈的类型可以取决于达到或超过哪个预定水平。然后，触觉反馈生成器生成所确定的触觉反馈类型。

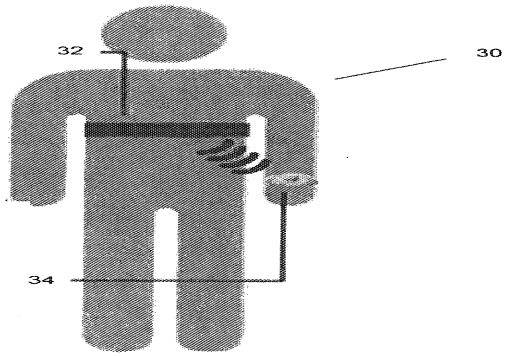

Fig. 1