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**Friedlander et al.**

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(45) **Date of Patent: Mar. 3, 2015**

(54) **DIRECTING A USER TO A MEDICAL RESOURCE**

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(51) **Int. Cl.**

| | |
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| ***G01C 21/20*** | (2006.01) |
| ***G01C 21/36*** | (2006.01) |
| ***A61B 5/11*** | (2006.01) |
| *A61B 5/01* | (2006.01) |
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USPC .... **600/301**; 701/515; 707/705; 707/E17.001; 707/94

(58) **Field of Classification Search**

CPC ..... A61B 5/0022; A61B 5/0024; A61B 5/01; A61B 5/02; G06F 17/30241; G06F 19/3418; G01C 21/3617

USPC ..... 600/301; 701/515; 707/705, E17.001, 707/941, 999.107

See application file for complete search history.

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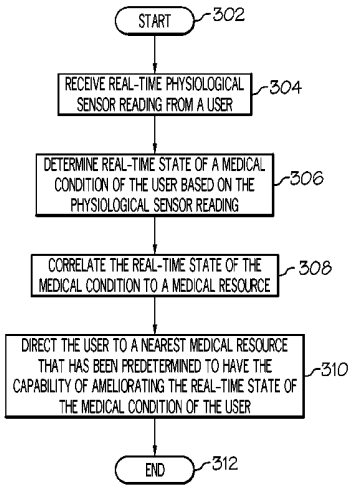
(57) **ABSTRACT**

A processor-implemented method, system, and/or computer program product directs a user using a physiological sensor to a needed medical resource. A real-time state of a medical condition of a user is determined based on readings from a physiological sensor on a user. A processing system correlates the real-time state of the medical condition of the user to a medical resource, which has been predetermined to have a capability of ameliorating the real-time state of the medical condition of the user. Directions are then sent, to the user, for a temporally nearest medical resource that has been predetermined to have the capability of ameliorating the real-time state of the medical condition of the user.

**3 Claims, 3 Drawing Sheets**



(51) **Int. Cl.**

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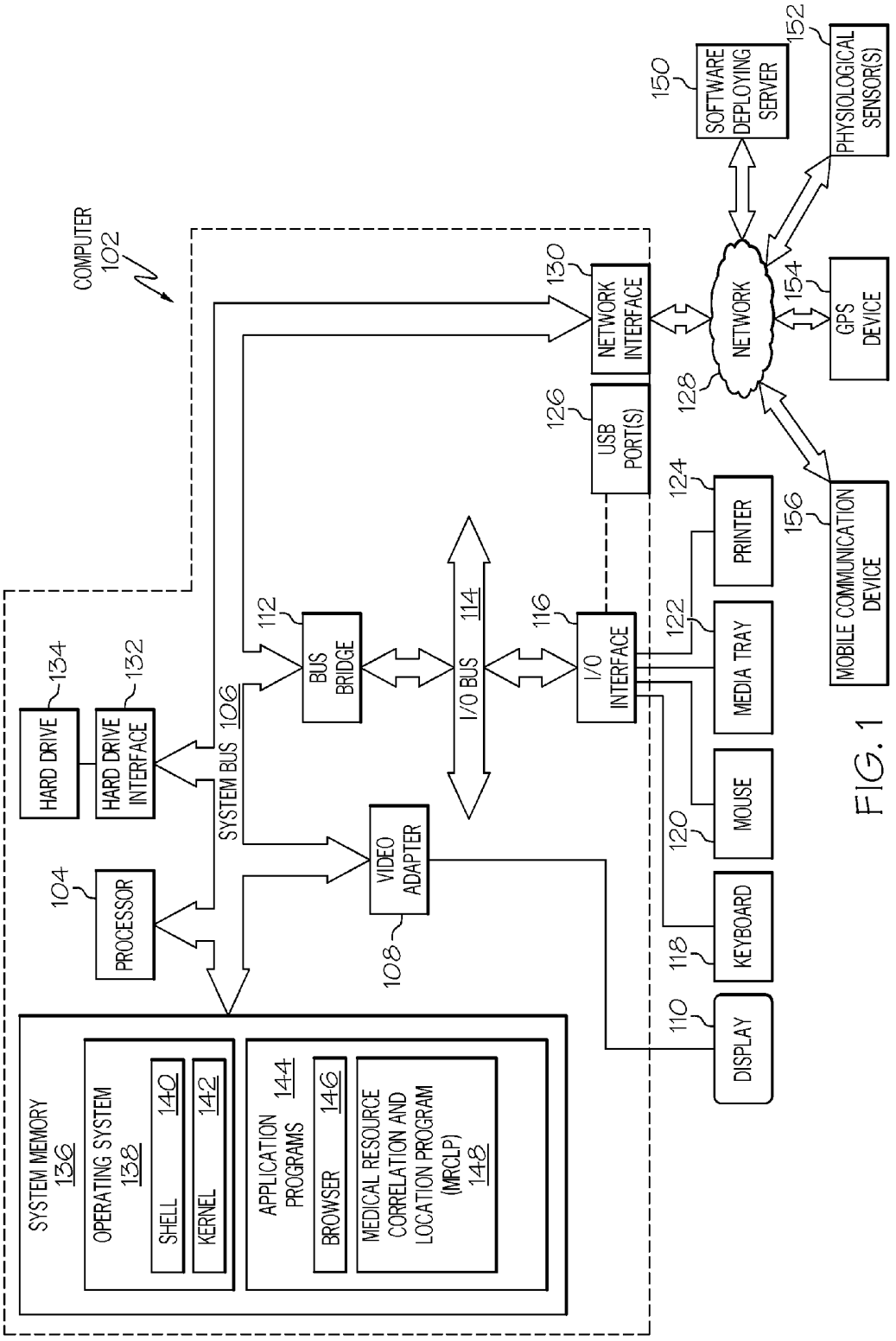
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OPERATING SYSTEM
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SHELL
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BROWSER
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MEDICAL RESOURCE
CORRELATION AND
LOCATION PROGRAM
(MRCLP)
148
PROCESSOR
104
HARD DRIVE
134
HARD DRIVE
INTERFACE
132
SYSTEM BUS
106
BUS
BRIDGE
112
I/O BUS
114
I/O
INTERFACE
116
VIDEO
ADAPTER
108
NETWORK
INTERFACE
130
USB
PORT(S)
126
DISPLAY
110
KEYBOARD
118
MOUSE
120
MEDIA TRAY
122
PRINTER
124
NETWORK
128
SOFTWARE
DEPLOYING
SERVER
150
PHYSIOLOGICAL
SENSOR(S)
152
GPS
DEVICE
154
MOBILE COMMUNICATION
DEVICE
156

FIG. 1

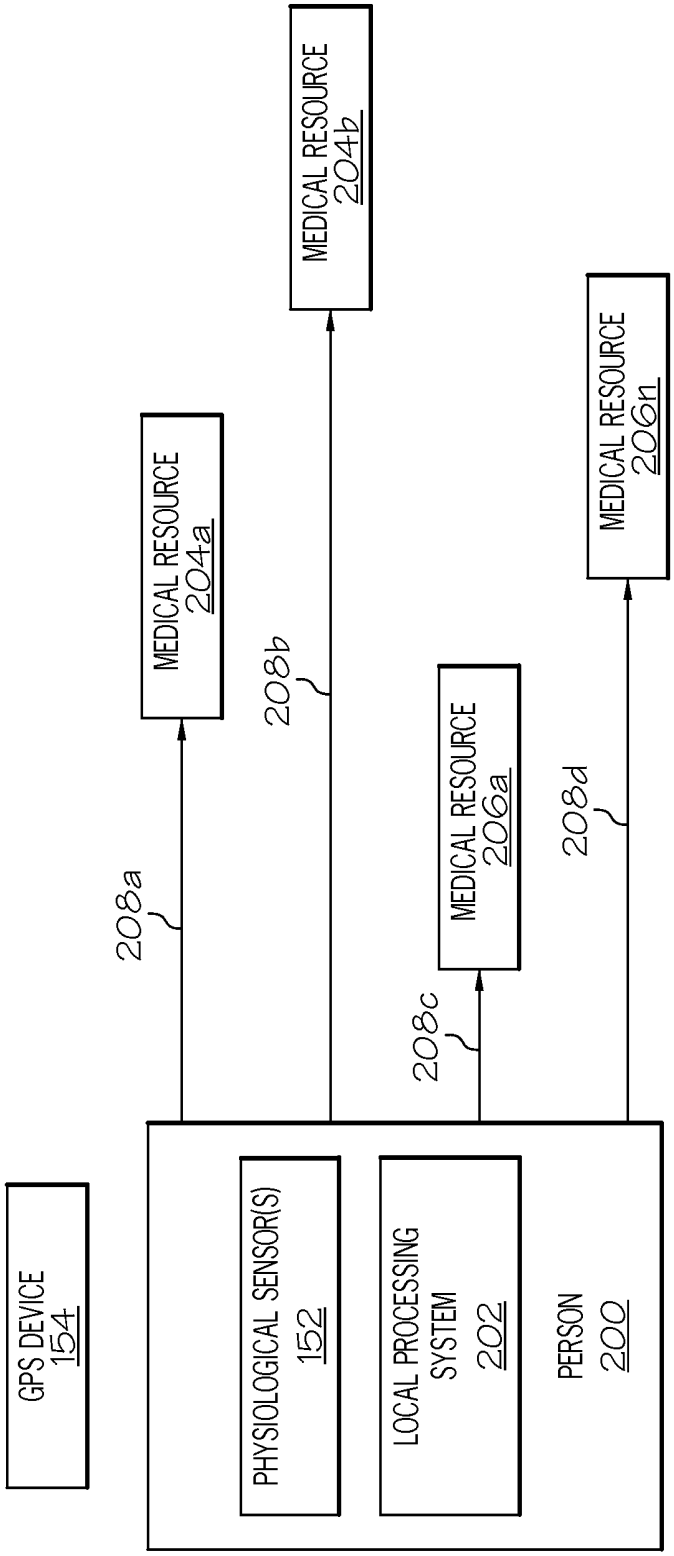
GPS DEVICE 154
PHYSIOLOGICAL SENSOR(S) 152
LOCAL PROCESSING SYSTEM 202
PERSON 200
MOBILE COMMUNICATION DEVICE 156
MEDICAL RESOURCE 204a
MEDICAL RESOURCE 204b
MEDICAL RESOURCE 206a
MEDICAL RESOURCE 206n
208a
208b
208c
208d

FIG. 2

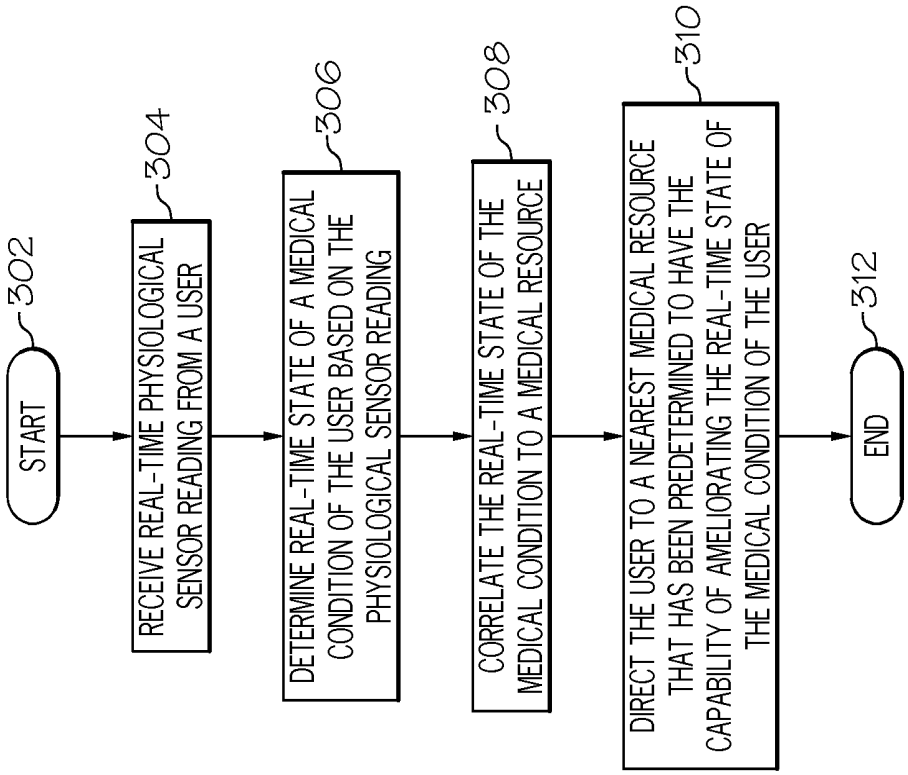
302
START
304
RECEIVE REAL-TIME PHYSIOLOGICAL SENSOR READING FROM A USER
306
DETERMINE REAL-TIME STATE OF A MEDICAL CONDITION OF THE USER BASED ON THE PHYSIOLOGICAL SENSOR READING
308
CORRELATE THE REAL-TIME STATE OF THE MEDICAL CONDITION TO A MEDICAL RESOURCE
310
DIRECT THE USER TO A NEAREST MEDICAL RESOURCE THAT HAS BEEN PREDETERMINED TO HAVE THE CAPABILITY OF AMELIORATING THE REAL-TIME STATE OF THE MEDICAL CONDITION OF THE USER
312
END

FIG. 3

# DIRECTING A USER TO A MEDICAL RESOURCE

The present application is a continuation-in-part application and claims the benefit of prior nonprovisional U.S. patent application Ser. No. 12/875,261, filed Sep. 3, 2010.

## BACKGROUND

The present disclosure relates to the field of computers and physiological sensors, and specifically to the use of computers and physiological sensors in the field of medicine. Still more particularly, the present disclosure relates to the use of computers and physiological sensors in directing a user to a medical resource based on real-time readings from a physiological sensor that is in use on the user.

Medical resources provide high-tech to low-tech assistance to a person. For example, an operating room with the latest monitoring and surgical tools and personnel provides a high-tech solution to a person having a heart attack, while a park bench provides a low-tech solution to a person whose medical condition simply limits his stamina while walking.

## SUMMARY

A processor-implemented method, system, and/or computer program product directs a user using a physiological sensor to a needed medical resource. A real-time state of a medical condition of a user is determined based on readings from a physiological sensor on a user. A processing system correlates the real-time state of the medical condition of the user to a medical resource, which has been predetermined to have a capability of ameliorating the real-time state of the medical condition of the user. Directions are then sent, to the user, for a temporally nearest medical resource that has been predetermined to have the capability of ameliorating the real-time state of the medical condition of the user.

## BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

FIG. **1** depicts an exemplary computer in which the present disclosure may be implemented;

FIG. **2** depicts a relationship among a person, physiological sensors, and medical resources as contemplated in one embodiment of the present invention; and

FIG. **3** is a high-level flow-chart of one or more actions performed by a processor to direct a user to an appropriate medical resource based on real-time readings of physiological sensor(s) on the user.

## DETAILED DESCRIPTION

As will be appreciated by one skilled in the art, aspects of the present invention may be embodied as a system, method or computer program product. Accordingly, aspects of the present invention may take the form of an entirely hardware embodiment, an entirely software embodiment (including firmware, resident software, micro-code, etc.) or an embodiment combining software and hardware aspects that may all generally be referred to herein as a "circuit," "module" or "system." Furthermore, aspects of the present invention may take the form of a computer program product embodied in one or more computer readable medium(s) having computer readable program code embodied thereon.

Any combination of one or more computer readable medium(s) may be utilized. The computer readable medium may be a computer readable signal medium or a computer readable storage medium. A computer readable storage medium may be, for example, but not limited to, an electronic, magnetic, optical, electromagnetic, infrared, or semiconductor system, apparatus, or device, or any suitable combination of the foregoing. More specific examples (a non-exhaustive list) of the computer readable storage medium would include the following: an electrical connection having one or more wires, a portable computer diskette, a hard disk, a random access memory (RAM), a read-only memory (ROM), an erasable programmable read-only memory (EPROM or Flash memory), an optical fiber, a portable compact disc read-only memory (CD-ROM), an optical storage device, a magnetic storage device, or any suitable combination of the foregoing. In the context of this document, a computer readable storage medium may be any tangible medium that can contain, or store a program for use by or in connection with an instruction execution system, apparatus, or device.

A computer readable signal medium may include a propagated data signal with computer readable program code embodied therein, for example, in baseband or as part of a carrier wave. Such a propagated signal may take any of a variety of forms, including, but not limited to, electro-magnetic, optical, or any suitable combination thereof. A computer readable signal medium may be any computer readable medium that is not a computer readable storage medium and that can communicate, propagate, or transport a program for use by or in connection with an instruction execution system, apparatus, or device.

Program code embodied on a computer readable medium may be transmitted using any appropriate medium, including, but not limited to, wireless, wireline, optical fiber cable, RF, etc., or any suitable combination of the foregoing.

Computer program code for carrying out operations for aspects of the present invention may be written in any combination of one or more programming languages, including an object oriented programming language such as Java, Smalltalk, C++ or the like and conventional procedural programming languages, such as the "C" programming language or similar programming languages. The program code may execute entirely on the user's computer, partly on the user's computer, as a stand-alone software package, partly on the user's computer and partly on a remote computer or entirely on the remote computer or server. In the latter scenario, the remote computer may be connected to the user's computer through any type of network, including a local area network (LAN) or a wide area network (WAN), or the connection may be made to an external computer (for example, through the Internet using an Internet Service Provider).

Aspects of the present invention are described below with reference to flowchart illustrations and/or block diagrams of methods, apparatus (systems) and computer program products according to embodiments of the invention. It will be understood that each block of the flowchart illustrations and/or block diagrams, and combinations of blocks in the flowchart illustrations and/or block diagrams, can be implemented by computer program instructions. These computer program instructions may be provided to a processor of a general purpose computer, special purpose computer, or other programmable data processing apparatus to produce a machine, such that the instructions, which execute via the processor of the computer or other programmable data processing apparatus, create means for implementing the functions/acts specified in the flowchart and/or block diagram block or blocks.

These computer program instructions may also be stored in a computer readable medium that can direct a computer, other

programmable data processing apparatus, or other devices to function in a particular manner, such that the instructions stored in the computer readable medium produce an article of manufacture including instructions which implement the function/act specified in the flowchart and/or block diagram block or blocks.

The computer program instructions may also be loaded onto a computer, other programmable data processing apparatus, or other devices to cause a series of operational steps to be performed on the computer, other programmable apparatus or other devices to produce a computer implemented process such that the instructions which execute on the computer or other programmable apparatus provide processes for implementing the functions/acts specified in the flowchart and/or block diagram block or blocks.

With reference now to the figures, and in particular to FIG. **1**, there is depicted a block diagram of an exemplary computer **102**, which may be utilized by the present invention. Note that some or all of the exemplary architecture, including both depicted hardware and software, shown for and within computer **102** may be utilized by software deploying server **150**, physiological sensor(s) **152**, a Global Positioning System (GPS) device **154**, and/or mobile communication device **156** shown in FIG. **1**, and/or local processing system **202** shown in FIG. **2**.

Computer **102** includes a processing unit **104** that is coupled to a system bus **106**. Processing unit **104** may utilize one or more processors, each of which has one or more processor cores. A video adapter **108**, which drives/supports a display **110**, is also coupled to system bus **106**. System bus **106** is coupled via a bus bridge **112** to an input/output (I/O) bus **114**. An I/O interface **116** is coupled to I/O bus **114**. I/O interface **116** affords communication with various I/O devices, including a keyboard **118**, a mouse **120**, a media tray **122** (which may include storage devices such as CD-ROM drives, multi-media interfaces, etc.), a printer **124**, and external USB port(s) **126**. While the format of the ports connected to I/O interface **116** may be any known to those skilled in the art of computer architecture, in one embodiment some or all of these ports are universal serial bus (USB) ports.

As depicted, computer **102** is able to communicate with a software deploying server **150** using a network interface **130**. Network **128** may be an external network such as the Internet, or an internal network such as an Ethernet or a virtual private network (VPN).

A hard drive interface **132** is also coupled to system bus **106**. Hard drive interface **132** interfaces with a hard drive **134**. In one embodiment, hard drive **134** populates a system memory **136**, which is also coupled to system bus **106**. System memory is defined as a lowest level of volatile memory in computer **102**. This volatile memory includes additional higher levels of volatile memory (not shown), including, but not limited to, cache memory, registers and buffers. Data that populates system memory **136** includes computer **102**'s operating system (OS) **138** and application programs **144**.

OS **138** includes a shell **140**, for providing transparent user access to resources such as application programs **144**. Generally, shell **140** is a program that provides an interpreter and an interface between the user and the operating system. More specifically, shell **140** executes commands that are entered into a command line user interface or from a file. Thus, shell **140**, also called a command processor, is generally the highest level of the operating system software hierarchy and serves as a command interpreter. The shell provides a system prompt, interprets commands entered by keyboard, mouse, or other user input media, and sends the interpreted command(s) to the appropriate lower levels of the operating system (e.g., a kernel **142**) for processing. Note that while shell **140** is a text-based, line-oriented user interface, the present invention will equally well support other user interface modes, such as graphical, voice, gestural, etc.

As depicted, OS **138** also includes kernel **142**, which includes lower levels of functionality for OS **138**, including providing essential services required by other parts of OS **138** and application programs **144**, including memory management, process and task management, disk management, and mouse and keyboard management.

Application programs **144** include a renderer, shown in exemplary manner as a browser **146**. Browser **146** includes program modules and instructions enabling a world wide web (WWW) client (i.e., computer **102**) to send and receive network messages to the Internet using hypertext transfer protocol (HTTP) messaging, thus enabling communication with software deploying server **150** and other computer systems.

Application programs **144** in computer **102**'s system memory (and, in one embodiment, software deploying server **150**'s system memory) also include a medical resource correlation and location program (MRCLP) **148**. MRCLP **148** includes code for implementing the processes described below, including those described in FIGS. **2-3**. In one embodiment, computer **102** is able to download MRCLP **148** from software deploying server **150**, including in an on-demand basis, wherein the code in MRCLP **148** is not downloaded until needed for execution. Note further that, in one embodiment of the present invention, software deploying server **150** performs all of the functions associated with the present invention (including execution of MRCLP **148**), thus freeing computer **102** from having to use its own internal computing resources to execute MRCLP **148**.

The hardware elements depicted in computer **102** are not intended to be exhaustive, but rather are representative to highlight essential components required by the present invention. For instance, computer **102** may include alternate memory storage devices such as magnetic cassettes, digital versatile disks (DVDs), Bernoulli cartridges, and the like. These and other variations are intended to be within the spirit and scope of the present invention.

With reference now to FIG. **2**, consider a user depicted as person **200**, on whom are one or more physiological sensors **152**. These one or more physiological sensors **152** are inside of, carried by, strapped to, or otherwise proximate to the person **200**. For example, an oxygen saturation monitor is attached to a fingertip of the person **200**; a portable electrocardiogram (ECG/EKG) machine, with leads attached to the person **200**, is worn by the person **200** in a carry-pack; a continuous glucose monitoring device, having sensors attached to or under a patient's skin, is carried by person **200**; a therapeutic drug monitoring device can be surgically implanted to remain inside the person **200**; etc. Thus, the physiological sensors **152** are sensors that monitor physiological/pharmaceutical/medical/etc. conditions of person **200** to which the physiological sensors **152** are attached/worn/implanted/carried/etc.

In accordance with one embodiment of the present invention, the person **200** also carries (or otherwise has mobile access to) a GPS device **154** and/or a mobile communication device **156**, which may be combined into a single device. That is, a mobile communication device **156** (e.g., a "smart" phone that is capable of connecting to the Internet, a cellular network, etc.) may be GPS-enabled, such that the real-time location of person **200** can always be determined. The GPS-enabled device utilizes signals from Global Positioning System (GPS) satellites to determine the real-time physical location (longitude, latitude, and altitude) of the person **200**.

As described herein, when one or more of the physiological sensor(s) **152** detects a real-time state of a medical condition (of person **200**) that warrants a medical resource, directions to the nearest appropriate medical resource are sent to the mobile communication device **156**, based on information from the GPS device. For example, assume that person **200** is a diabetic who has taken too much insulin, or is chronically hypoglycemic. When readings from the physiological sensor (s) **152** indicate that person **200** is currently experiencing an excessively low blood glucose level, a processor (e.g., part of local processing system **202** or part of a remote system such as computer **102** shown in FIG. **1**) correlates that condition with what type of medical resource is needed. In this example, the medical resource may be any type of vendor from which the person **200** can obtain a soft drink that, upon ingestion, will immediately bring the blood glucose level back up to healthy levels.

In the example shown in FIG. **2**, the processor, based on information from a local or remote database and current real-time coordinates generated by the GPS device **154**, identifies four medical resources, identified as medical resource **204***a* and medical resource **204**b (where "b" is an integer), and medical resources **206***a*-n (where "n" is an integer). As indicated by distance arrow **208***c*, medical resource **206***a* is the closest medical resource to the person **200**. However, medical resource **206***a* is not the right type of medical resource for a hypoglycemic patient. That is, soft drinks or similar substances are not available from medical resource **206***a*, which may be a clothing store. Thus, the processor ignores medical resource **206***a*. However, the processor identifies medical resource **204***a* and medical resource **204***b* as resources (e.g., convenience stores) where glucose-rich beverages are available. As represented by the length of distance arrow **208***a* compared to the length of distance arrow **208***b*, medical resource **204***a* is the closest medical resource that is able to ameliorate the current state of the medical condition (e.g., hypoglycemia) of the person **200**. Note that medical resource **206***n* is not considered to be a viable medical resource candidate since 1) it is not the needed type of medical resource (i.e., does not sell soft drinks) and 2) it is farther away than medical resource **204***a*.

Once the processor has identified the temporally closest medical resource, directions to that medical resource are sent to the mobile communication device **156**, allowing the person **200** to go directly to that needed medical resource. Note that the selected medical resource is temporally closest. Ordinarily, the temporally closest medical resource is the medical resource that is physically the closest. However, in some embodiments, a physically closest medical resource may actually take longer to get to than a more distant medical resource, and thus is not temporally closest. For example, street blockage, traffic accidents, lack of walkways/roadways, etc. may make is faster to get to a medical resource that is physically farther away from the person **200** than another medical resource. Note also that the person **200** may be a pedestrian, or may be a passenger in a vehicle, either private or public.

Consider now FIG. **3**, which presents a high-level flow chart of one or more actions performed by a processor to direct a user to a temporally nearest medical resource based on real-time readings from physiological sensor(s) on the user. After initiator block **302**, real-time physiological sensor readings are received from one or more physiological sensors on a user (block **304**). The physiological sensor(s) may be worn by, attached to, implanted within, carried by, or otherwise positioned proximately to the user, thus enabling the taking of physiological measurements. These physiological measurements may be oxygen saturation levels in blood; glucose levels in blood; pharmaceutical levels in blood, urine, or exhaled breath; respiration levels (how many times a minute the person takes a breath); EKG readings, to include anomalies such as irregular heartbeats, both chronic and acute (including life-threatening); electroencephalogram (EEG) readings (i.e., from a portable EEG cap/monitor system); body temperature (e.g., from a skin sensor thermometer; an ingested "pill" thermometer to measure body core temperature; etc.); blood pressure readings; etc. Note that some or all of these physiological measurements may be of medical conditions that are imperceptible to the user. For example, a person may have a life-threatening anomaly in his heart rhythm, but will not "feel" anything unusual. An EKG sensor, however, will detect this anomaly, thus setting off the directions to the requisite medical resource, whether that be a simple bench to sit upon (thus allowing the heart to be under less stress) or a hospital (to provide emergency surgery, pharmaceuticals, etc.). Note that this imperceptible medical condition may be transient (i.e., exists in real-time for less than some predetermined length of time). Nonetheless, even though the event passes, the person may still need medical treatment. Without the real-time mobile monitoring however, the event would be ignored or never detected, since it may or may not re-manifest itself.

As described in block **306**, based on the physiological sensor reading(s) received, the processor determines what the real-time state of the medical condition of the user is. For example, if the processor receives a sensor reading indicating low blood glucose, then the real-time state of the medical condition is hypoglycemia. If the processor receives a sensor reading indicating an irregular heartbeat, then the real-time state of the medical condition may be tachycardia. If the processor receives a sensor reading indicating an elevated body core temperature, then the real-time state of the medical condition may be heat exhaustion. If the processor receives a sensor reading indicating rapid shallow breathing, then the real-time state of the medical condition may be hyperventilation and/or hyperventilation-induced blood alkalosis. These examples are representative of the concept of how a real-time state of a medical condition of the user is determined based on readings from the physiological sensors on the user, and are not intended to limit the scope of the present invention.

As described in block **308**, the real-time state of the medical condition (determined in block **306**) is then correlated to a medical resource that has been predetermined to have the capability of ameliorating the real-time state of the medical condition of the user. This medical resource may be from a predetermined list of medical resources, which have been pre-qualified according to their capabilities/resources. For example, assume that a physiological sensor (e.g., an EKG, a respiration monitor, a thermometer, etc.) generates a reading that leads to the real-time state of the medical condition that the user is overexerting, based on some predefined "safe" parameters for that person. That is, if that person's heart rate goes over 160 beats per minute, or his respiration rate goes over 20 breaths per minute, or his core body temperature goes over 102° F., any or all of these have been predetermined as being unsafe for that person, and thus he is overexerted. In order to address this real-time state of his medical condition, certain types of medical resources have been predetermined as appropriate for ameliorating the real-time state of this medical condition. For example, a bench or similar seat has been predetermined as being adequate for ameliorating the real-time state of simply being overexerted. A nearest air-conditioned public building has been predetermined as being

adequate for cooling down an overheated person. Professional medical care from a medical facility has been predetermined as being adequate for providing needed high-level medical treatment. A closest nutrition vendor has been predetermined as being appropriate for providing/selling fruit juice, soft drinks, energy bars, etc. needed by a person who is suffering from hypoglycemia. Whatever the real-time state of the medical condition, an appropriate predetermined type of medical resource, which may also be pre-approved and/or pre-selected according to specific locations of medical resources that match the requisite type of medical resource, is then correlated to that real-time state of the medical condition as being the appropriate type of medical resource for ameliorating the real-time state of the medical condition, whether that real-time state of the medical condition is perceptible or imperceptible to the user being monitored.

As described in block **310**, directions are then issued (e.g., sent to a user's "smart" phone) to the user, directing him to a temporally closest medical resource that has been predetermined to have the capability of ameliorating the real-time state of the medical condition of the user. Note that in one embodiment, the temporally closest medical resource and the physically closest medical resource are the same. However, in another embodiment, the temporally closest medical resource may be physically farther away from the user than another medical resource. That is, descriptions of current travel conditions (i.e., blocked roads or traffic jams if the user is in a vehicle, blocked walkways or dangerously iced walkways if the user is a pedestrian, etc.) may be received by the processor that is correlating the real-time state of the medical condition to the medical resource. Thus, the current travel conditions may result in a different, perhaps farther away, medical resource being identified as being the temporally closest to the user, or alternatively may be the safest for the user to reach.

The flowchart and block diagrams in the figures illustrate the architecture, functionality, and operation of possible implementations of systems, methods and computer program products according to various embodiments of the present disclosure. In this regard, each block in the flowchart or block diagrams may represent a module, segment, or portion of code, which comprises one or more executable instructions for implementing the specified logical function(s). It should also be noted that, in some alternative implementations, the functions noted in the block may occur out of the order noted in the figures. For example, two blocks shown in succession may, in fact, be executed substantially concurrently, or the blocks may sometimes be executed in the reverse order, depending upon the functionality involved. It will also be noted that each block of the block diagrams and/or flowchart illustration, and combinations of blocks in the block diagrams and/or flowchart illustration, can be implemented by special purpose hardware-based systems that perform the specified functions or acts, or combinations of special purpose hardware and computer instructions.

The terminology used herein is for the purpose of describing particular embodiments only and is not intended to be limiting of the invention. As used herein, the singular forms "a", "an" and "the" are intended to include the plural forms as well, unless the context clearly indicates otherwise. It will be further understood that the terms "comprises" and/or "comprising," when used in this specification, specify the presence of stated features, integers, steps, operations, elements, and/or components, but do not preclude the presence or addition of one or more other features, integers, steps, operations, elements, components, and/or groups thereof.

The corresponding structures, materials, acts, and equivalents of all means or step plus function elements in the claims below are intended to include any structure, material, or act for performing the function in combination with other claimed elements as specifically claimed. The description of various embodiments of the present invention has been presented for purposes of illustration and description, but is not intended to be exhaustive or limited to the invention in the form disclosed. Many modifications and variations will be apparent to those of ordinary skill in the art without departing from the scope and spirit of the invention. The embodiment was chosen and described in order to best explain the principles of the invention and the practical application, and to enable others of ordinary skill in the art to understand the invention for various embodiments with various modifications as are suited to the particular use contemplated.

Note further that any methods described in the present disclosure may be implemented through the use of a VHDL (VHSIC Hardware Description Language) program and a VHDL chip. VHDL is an exemplary design-entry language for Field Programmable Gate Arrays (FPGAs), Application Specific Integrated Circuits (ASICs), and other similar electronic devices. Thus, any software-implemented method described herein may be emulated by a hardware-based VHDL program, which is then applied to a VHDL chip, such as a FPGA.

Having thus described embodiments of the invention of the present application in detail and by reference to illustrative embodiments thereof, it will be apparent that modifications and variations are possible without departing from the scope of the invention defined in the appended claims.

What is claimed is:

**1**. A computer program product for directing a user to a medical resource, the computer program product comprising a non-transitory computer readable storage medium having program code embodied therewith, wherein the program code, when read and executed by a processor, performs a method comprising:

determining a real-time state of a medical condition of a user based on readings from one or more physiological sensors on the user;

correlating the real-time state of the medical condition of the user to a medical resource by:

identifying multiple medical resources as identified multiple medical resources;

determining what type of medical product is provided by each of the identified medical resources;

rejecting any of the identified multiple medical resources that do not provide a medical product that has been predetermined to have the capability of ameliorating the real-time state of the medical condition of the user;

identifying any of the identified multiple medical resources, which do provide the medical product that has been predetermined to have the capability of ameliorating the real-time state of the medical condition of the user, as candidate medical resources for ameliorating the real-time state of the medical condition of the user;

issuing, to the user, directions to a temporally closest candidate medical resource that has been identified and predetermined to have the capability of ameliorating the real-time state of the medical condition of the user by providing the medical product that has been predetermined to have the capability of ameliorating the real-time state of the medical condition of the user;

predetermining that a park bench has a capability of ameliorating an overexertion of the user, wherein the overexertion of the user is identified by the processor as a heartrate of the user exceeding a first predefined limit, a respiration rate of the user exceeding a second predefined limit, and a core body temperature of the user exceeding a third predefined limit;

in response to receiving a reading from the one or more physiological sensors indicating that the user is being overexerted, directing the user to a nearest park bench to ameliorate the overexertion of the user;

predetermining that any medical facility from a predetermined list of medical facilities has resources that are capable of ameliorating a first acute medical condition of the user;

in response to receiving a reading from the one or more physiological sensors indicating that the user is currently suffering from the first acute medical condition, directing the user to a temporally nearest medical facility from the predetermined list of medical facilities;

predetermining that a climate controlled room provides an environment that is capable of ameliorating a second acute medical condition of the user;

in response to receiving a reading from the one or more physiological sensors indicating that the user is currently suffering from the second acute medical condition, directing the user to a nearest climate controlled room;

predetermining that a nutrition vendor has resources capable of ameliorating a third acute medical condition of the user;

in response to receiving a reading from the one or more physiological sensors indicating that the user is currently suffering from the third acute medical condition, directing the user to a nearest nutrition vendor;

receiving a description of current travel conditions at a current location of the user;

identifying the temporally closest candidate medical resource based on travel time adjustments caused by the current travel conditions at the current location of the user;

receiving, from the one or more physiological sensors, a real-time state of an imperceptible medical condition of the user, wherein the imperceptible medical condition is detected by the one or more physiological sensors but is imperceptible to the user, wherein the imperceptible medical condition is a transient medical condition that exists in the user in real-time for less than predetermined length of time, wherein the user requires medical treatment related to the transient medical condition after the transient medical condition ceases, wherein the transient medical condition is a singular event that does not recur, and wherein detection of the singular event is a sole evidence of the transient medical condition;

correlating the real-time state of the imperceptible medical condition of the user to the medical resource, wherein the medical resource has been predetermined to have a capability of treating a cause of the real-time state of the imperceptible medical condition of the user;

defining a first limit for a heartrate of the user, a second limit for a respiration rate of the user, and a third limit for a core body temperature of the user, wherein the first limit, the second limit, and the third limit define safe parameters that are specific for the user;

detecting, based on readings from the one or more physiological sensors on the user, that the heartrate of the user is currently exceeding the first predefined limit, the respiration rate of the user is currently exceeding the second predefined limit, and the core body temperature of the user is currently exceeding the third predefined limit;

issuing, to the user, directions to a temporally closest candidate medical resource that has been identified and predetermined to have the capability of reducing the heartrate of the user below the first predefined limit, reducing the respiration rate of the user below the second predefined limit, and reducing the core body temperature of the user below the third predefined limit;

determining that the medical condition of the user is a transient medical condition, wherein the transient medical condition ceases within a predetermined length of time without medical treatment, wherein the transient medical condition is an irregular cardiac condition of the user, wherein the transient medical condition is imperceptible to the user, and wherein a bench is a medical resource that has been predetermined to have the capability of ameliorating the transient medical condition of the user;

issuing, to the user, directions to a temporally closest bench on which the user can sit during the transient medical condition;

identifying a first medical resource and a second medical resource as having the capability of ameliorating the real-time state of the medical condition of the user, wherein the first medical resource is physically farther from the user than the second medical resource;

determining that there is a lack of walkways between the user and the second medical resource;

determining that the first medical resource is the temporally closest medical resource based on the lack of walkways between the user and the second medical resource;

identifying the first medical resource and the second medical resource as having the capability of ameliorating the real-time state of the medical condition of the user, wherein the first medical resource is physically farther from the user than the second medical resource;

determining that walkways between the user and the second medical resource are currently iced over; and

determining that the first medical resource is the temporally closest medical resource based on the iced over condition of walkways between the user and the second medical resource.

**2**. A method for directing a user to a medical resource, the method comprising:

determining, by one or more processors, a real-time state of a medical condition of a user based on readings from one or more physiological sensors on the user;

correlating, by the one or more processors, the real-time state of the medical condition of the user to a medical resource by:

identifying multiple medical resources as identified multiple medical resources;

determining what type of medical product is provided by each of the identified medical resources;

rejecting any of the identified multiple medical resources that do not provide a medical product that has been predetermined to have the capability of ameliorating the real-time state of the medical condition of the user;

identifying any of the identified multiple medical resources, which do provide the medical product that has been predetermined to have the capability of ameliorating the real-time state of the medical condition

of the user, as candidate medical resources for ameliorating the real-time state of the medical condition of the user;

issuing, by the one or more processors and to the user, directions to a temporally closest candidate medical resource that has been identified and predetermined to have the capability of ameliorating the real-time state of the medical condition of the user by providing the medical product that has been predetermined to have the capability of ameliorating the real-time state of the medical condition of the user;

predetermining, by the one or more processors, that a park bench has a capability of ameliorating an overexertion of the user, wherein the overexertion of the user is identified by the one or more physiological sensors on the user as a heartrate of the user exceeding a first predefined limit, a respiration rate of the user exceeding a second predefined limit, and a core body temperature of the user exceeding a third predefined limit;

in response to receiving a reading from the one or more physiological sensors indicating that the user is being overexerted, directing, by the one or more processors, the user to a nearest park bench to ameliorate the overexertion of the user;

predetermining, by the one or more processors, that any medical facility from a predetermined list of medical facilities has resources that are capable of ameliorating a first acute medical condition of the user;

in response to receiving a reading from the one or more physiological sensors indicating that the user is currently suffering from the first acute medical condition, directing, by the one or more processors, the user to a temporally nearest medical facility from the predetermined list of medical facilities;

predetermining, by the one or more processors, that a climate controlled room provides an environment that is capable of ameliorating a second acute medical condition of the user;

in response to receiving a reading from the one or more physiological sensors indicating that the user is currently suffering from the second acute medical condition, directing, by the one or more processors, the user to a nearest climate controlled room;

predetermining, by the one or more processors, that a nutrition vendor has resources capable of ameliorating a third acute medical condition of the user;

in response to receiving a reading from the one or more physiological sensors indicating that the user is currently suffering from the third acute medical condition, directing, by the one or more processors, the user to a nearest nutrition vendor;

receiving, by the one or more processors, a description of current travel conditions at a current location of the user;

identifying, by the one or more processors, the temporally closest candidate medical resource based on travel time adjustments caused by the current travel conditions at the current location of the user;

receiving, by the one or more processors and from the one or more physiological sensors, a real-time state of an imperceptible medical condition of the user, wherein the imperceptible medical condition is detected by the one or more physiological sensors but is imperceptible to the user, wherein the imperceptible medical condition is a transient medical condition that exists in the user in real-time for less than predetermined length of time, wherein the user requires medical treatment related to the transient medical condition after the transient medical condition ceases, wherein the transient medical condition is a singular event that does not recur, and wherein detection of the singular event is a sole evidence of the transient medical condition;

correlating, by the one or more processors, the real-time state of the imperceptible medical condition of the user to the medical resource, wherein the medical resource has been predetermined to have a capability of treating a cause of the real-time state of the imperceptible medical condition of the user;

defining, by the one or more processors, a first limit for a heartrate of the user, a second limit for a respiration rate of the user, and a third limit for a core body temperature of the user, wherein the first limit, the second limit, and the third limit define safe parameters that are specific for the user;

detecting, by the one or more processors and based on readings from the one or more physiological sensors on the user, that the heartrate of the user is currently exceeding the first predefined limit, the respiration rate of the user is currently exceeding the second predefined limit, and the core body temperature of the user is currently exceeding the third predefined limit;

issuing, by the one or more processors and to the user, directions to a temporally closest candidate medical resource that has been identified and predetermined to have the capability of reducing the heartrate of the user below the first predefined limit, reducing the respiration rate of the user below the second predefined limit, and reducing the core body temperature of the user below the third predefined limit;

determining, by the one or more processors and based on readings from the one or more physiological sensors, that the medical condition of the user is a transient medical condition, wherein the transient medical condition ceases within a predetermined length of time without medical treatment, wherein the transient medical condition is an irregular cardiac condition of the user, wherein the transient medical condition is imperceptible to the user, and wherein a bench is a medical resource that has been predetermined to have the capability of ameliorating the transient medical condition of the user;

issuing, by the one or more processors and to the user, directions to a temporally closest bench on which the user can sit during the transient medical condition;

identifying, by the one or more processors, a first medical resource and a second medical resource as having the capability of ameliorating the real-time state of the medical condition of the user, wherein the first medical resource is physically farther from the user than the second medical resource;

determining, by the one or more processors, that there is a lack of walkways between the user and the second medical resource;

determining, by the one or more processors, that the first medical resource is the temporally closest medical resource based on the lack of walkways between the user and the second medical resource;

identifying, by the one or more processors, the first medical resource and the second medical resource as having the capability of ameliorating the real-time state of the medical condition of the user, wherein the first medical resource is physically farther from the user than the second medical resource;

determining, by the one or more processors, that walkways between the user and the second medical resource are currently iced over; and

determining, by the one or more processors, that the first medical resource is the temporally closest medical resource based on the iced over condition of walkways between the user and the second medical resource.

3. A computer system comprising:

a processor, a computer readable memory, and a non-transitory computer readable storage media, wherein the non-transitory computer readable storage medium has program code embodied therewith, and wherein the program code, when read and executed by the processor, performs a method comprising:

determining a real-time state of a medical condition of a user based on readings from one or more physiological sensors on the user;

correlating the real-time state of the medical condition of the user to a medical resource by:

identifying multiple medical resources as identified multiple medical resources;

determining what type of medical product is provided by each of the identified medical resources;

rejecting any of the identified multiple medical resources that do not provide a medical product that has been predetermined to have the capability of ameliorating the real-time state of the medical condition of the user;

identifying any of the identified multiple medical resources, which do provide the medical product that has been predetermined to have the capability of ameliorating the real-time state of the medical condition of the user, as candidate medical resources for ameliorating the real-time state of the medical condition of the user;

issuing, to the user, directions to a temporally closest candidate medical resource that has been identified and predetermined to have the capability of ameliorating the real-time state of the medical condition of the user by providing the medical product that has been predetermined to have the capability of ameliorating the real-time state of the medical condition of the user;

predetermining that a park bench has a capability of ameliorating an overexertion of the user, wherein the overexertion of the user is identified by the one or more physiological sensors on the user as a heartrate of the user exceeding a first predefined limit, a respiration rate of the user exceeding a second predefined limit, and a core body temperature of the user exceeding a third predefined limit;

in response to receiving a reading from the one or more physiological sensors indicating that the user is being overexerted, directing the user to a nearest park bench to ameliorate the overexertion of the user;

predetermining that any medical facility from a predetermined list of medical facilities has resources that are capable of ameliorating a first acute medical condition of the user;

in response to receiving a reading from the one or more physiological sensors indicating that the user is currently suffering from the first acute medical condition, directing the user to a temporally nearest medical facility from the predetermined list of medical facilities;

predetermining that a climate controlled room provides an environment that is capable of ameliorating a second acute medical condition of the user;

in response to receiving a reading from the one or more physiological sensors indicating that the user is currently suffering from the second acute medical condition, directing the user to a nearest climate controlled room;

predetermining that a nutrition vendor has resources capable of ameliorating a third acute medical condition of the user;

in response to receiving a reading from the one or more physiological sensors indicating that the user is currently suffering from the third acute medical condition, directing the user to a nearest nutrition vendor;

receiving a description of current travel conditions at a current location of the user;

identifying the temporally closest candidate medical resource based on travel time adjustments caused by the current travel conditions at the current location of the user;

receiving, from the one or more physiological sensors, a real-time state of an imperceptible medical condition of the user, wherein the imperceptible medical condition is detected by the one or more physiological sensors but is imperceptible to the user, wherein the imperceptible medical condition is a transient medical condition that exists in the user in real-time for less than predetermined length of time, wherein the user requires medical treatment related to the transient medical condition after the transient medical condition ceases, wherein the transient medical condition is a singular event that does not recur, and wherein detection of the singular event is a sole evidence of the transient medical condition;

correlating the real-time state of the imperceptible medical condition of the user to the medical resource, wherein the medical resource has been predetermined to have a capability of treating a cause of the real-time state of the imperceptible medical condition of the user;

defining a first limit for a heartrate of the user, a second limit for a respiration rate of the user, and a third limit for a core body temperature of the user, wherein the first limit, the second limit, and the third limit define safe parameters that are specific for the user;

detecting, based on readings from the one or more physiological sensors on the user, that the heartrate of the user is currently exceeding the first predefined limit, the respiration rate of the user is currently exceeding the second predefined limit, and the core body temperature of the user is currently exceeding the third predefined limit;

issuing, to the user, directions to a temporally closest candidate medical resource that has been identified and predetermined to have the capability of reducing the heartrate of the user below the first predefined limit, reducing the respiration rate of the user below the second predefined limit, and reducing the core body temperature of the user below the third predefined limit;

determining, based on readings from the one or more physiological sensors, that the medical condition of the user is a transient medical condition, wherein the transient medical condition ceases within a predetermined length of time without medical treatment, wherein the transient medical condition is an irregular cardiac condition of the user, wherein the transient medical condition is imperceptible to the user, and wherein a bench is a medical resource that has been predetermined to have the capability of ameliorating the transient medical condition of the user;

issuing, to the user, directions to a temporally closest bench on which the user can sit during the transient medical condition;

identifying a first medical resource and a second medical resource as having the capability of ameliorating the real-time state of the medical condition of the user, wherein the first medical resource is physically farther from the user than the second medical resource;

determining that there is a lack of walkways between the user and the second medical resource;

determining that the first medical resource is the temporally closest medical resource based on the lack of walkways between the user and the second medical resource;

identifying the first medical resource and the second medical resource as having the capability of ameliorating the real-time state of the medical condition of the user, wherein the first medical resource is physically farther from the user than the second medical resource;

determining that walkways between the user and the second medical resource are currently iced over; and

determining that the first medical resource is the temporally closest medical resource based on the iced over condition of walkways between the user and the second medical resource.

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摘要(译)

处理器实现的方法，系统和/或计算机程序产品使用生理传感器将用户指引到所需的医疗资源。基于来自用户的生理传感器的读数来确定用户的医疗状况的实时状态。处理系统将用户的医疗状况的实时状态与医疗资源相关联，医疗资源已被预定为具有改善用户的医疗状况的实时状态的能力。然后，向用户发送方向，用于暂时最近的医疗资源，该医疗资源已被预定为具有改善用户的医疗状况的实时状态的能力。