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(54) MOBILE MONITORING SYSTEM

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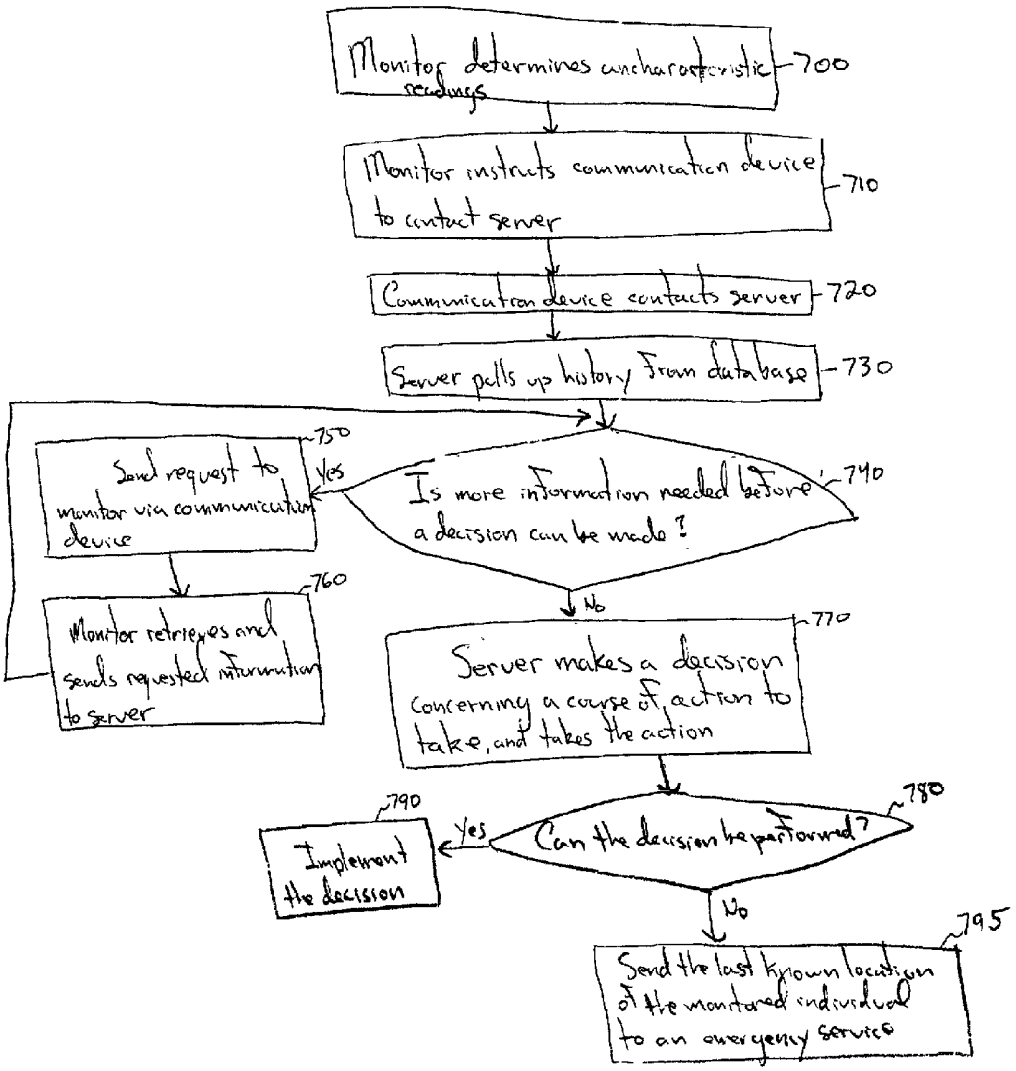
(57) **ABSTRACT**

A system and method for a mobile monitoring system, comprising monitoring an entity with a monitor, recording information based on the monitoring, communicating said information to a wireless communication device when an emergency situation is detected based on the monitoring, forwarding said information from said wireless communication device to a server, determining an action to take based upon said information, and taking said action.



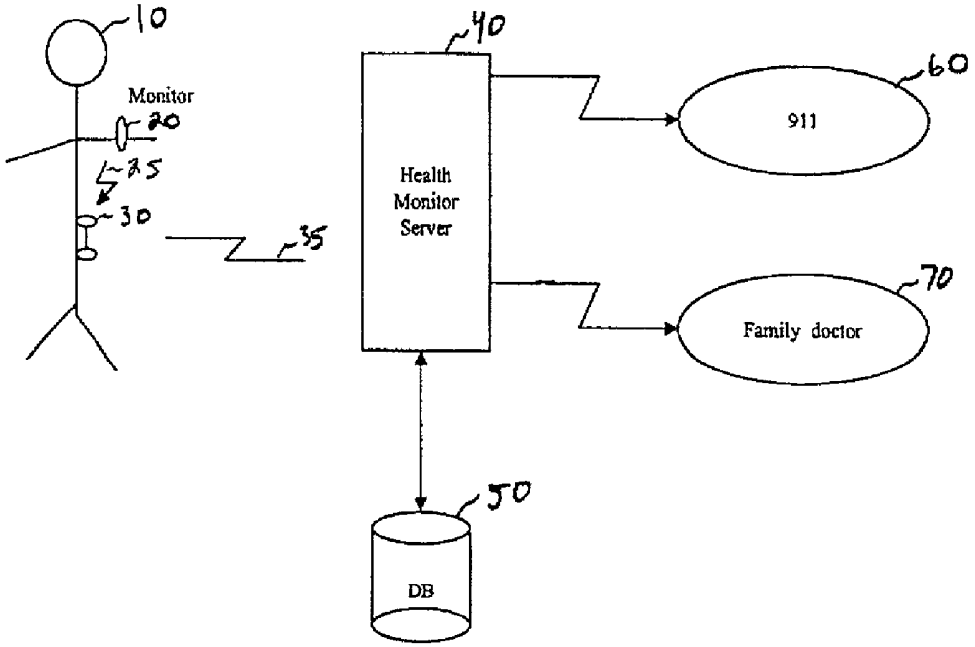

10
Monitor
20
25
30
35
40
Health
Monitor
Server
60
911
70
Family doctor
50
DB

FIG. 1

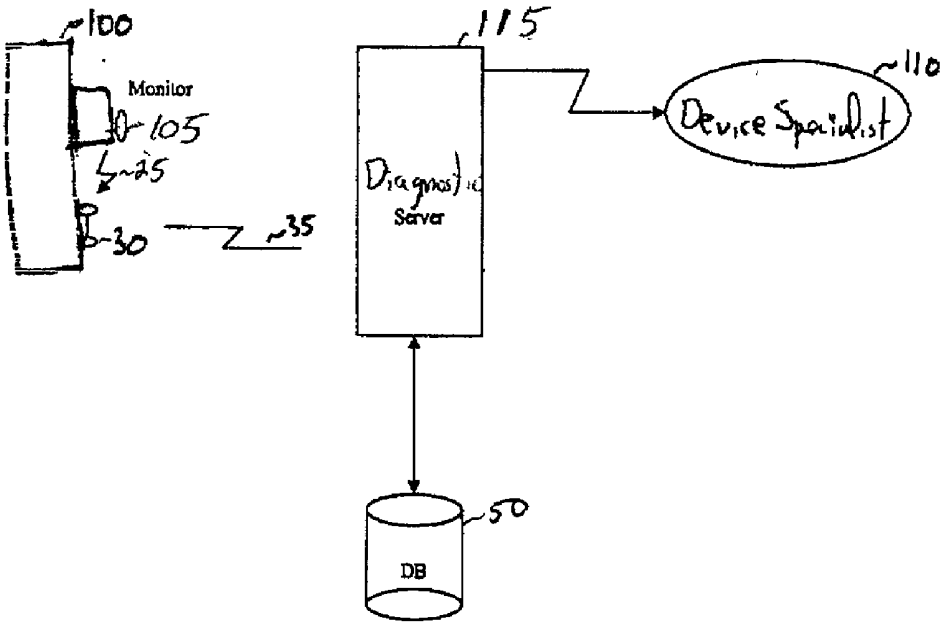

100
Monitor
105
25
30
35
115
Diagnostic
Server
110
Device Specialist
50
DB

FIG. 2

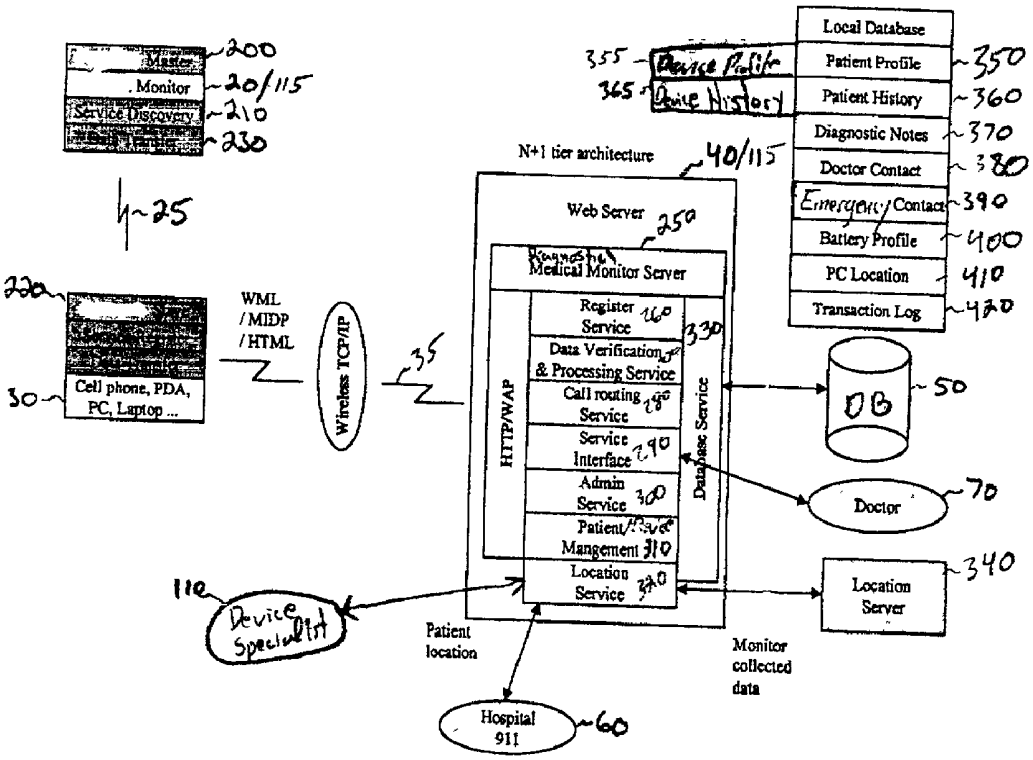

Monitor
Service Discovery
200
20/115
210
230
25
220
Cell phone, PDA, PC, Laptop ...
30
WML /MIDP /HTML
Wireless TCP/IP
35
N+1 tier architecture
40/115
Web Server
250
Medical Monitor Server
Register Service
260
330
Data Verification & Processing Service
Call routing Service
280
Service Interface
290
Admin Service
300
Patient Mangement
310
Location Service
320
HTTP/WAP
Database Service
Local Database
Patient Profile
350
355
Device Profile
Patient History
360
365
Device History
Diagnostic Notes
370
Doctor Contact
380
Emergency Contact
390
Battery Profile
400
PC Location
410
Transaction Log
420
DB
50
Doctor
70
Location Server
340
110
Device Specialist
Patient location
Monitor collected data
Hospital 911
60

FIG. 3

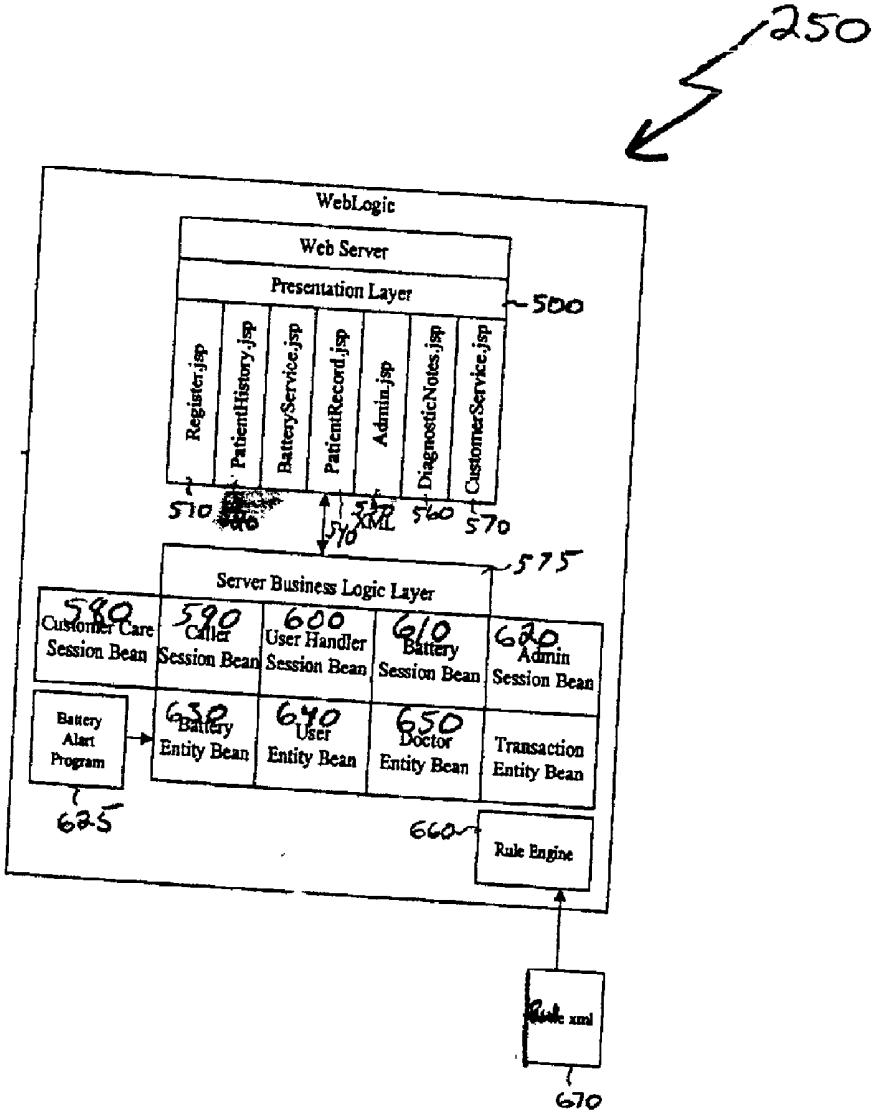

250
WebLogic
Web Server
Presentation Layer
500
Register.jsp
PatientHistory.jsp
BatteryService.jsp
PatientRecord.jsp
Admin.jsp
DiagnosticNotes.jsp
CustomerService.jsp
510
XML
560
570
575
Server Business Logic Layer
580
Customer Care Session Bean
590
Caller Session Bean
600
User Handler Session Bean
610
Battery Session Bean
620
Admin Session Bean
Battery Alart Program
625
630
Battery Entity Bean
640
User Entity Bean
650
Doctor Entity Bean
Transaction Entity Bean
660
Rule Engine
xml
670

FIG. 4

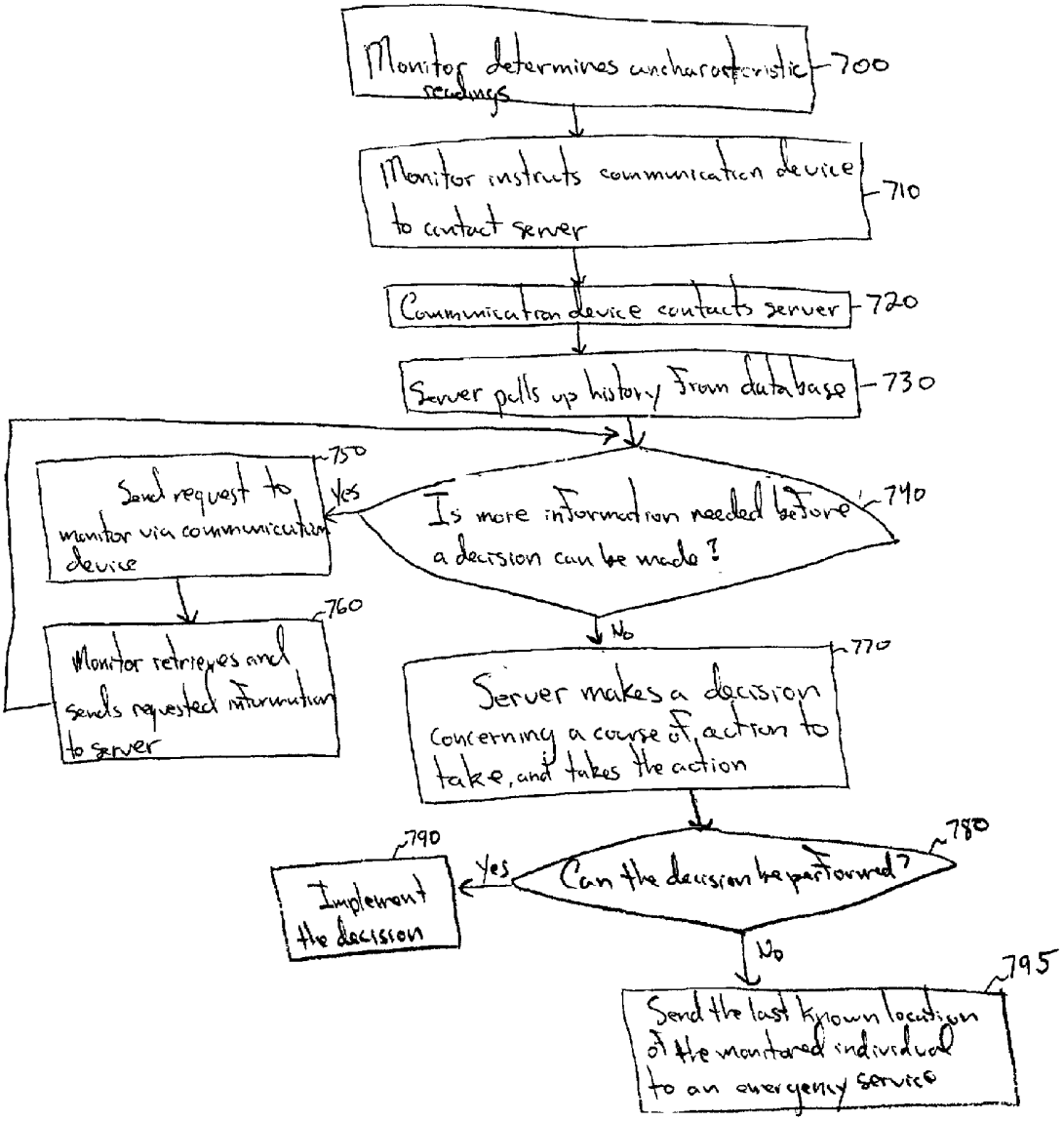

Monitor determines characteristic readings
700
Monitor instructs communication device to contact server
710
Communication device contacts server
720
Server pulls up history from database
730
Is more information needed before a decision can be made?
740
Yes
Send request to monitor via communication device
750
Monitor retrieves and sends requested information to server
760
No
Server makes a decision concerning a course of action to take, and takes the action
770
Can the decision be performed?
780
Yes
Implement the decision
790
No
Send the last known location of the monitored individual to an emergency service
795

FIG. 5

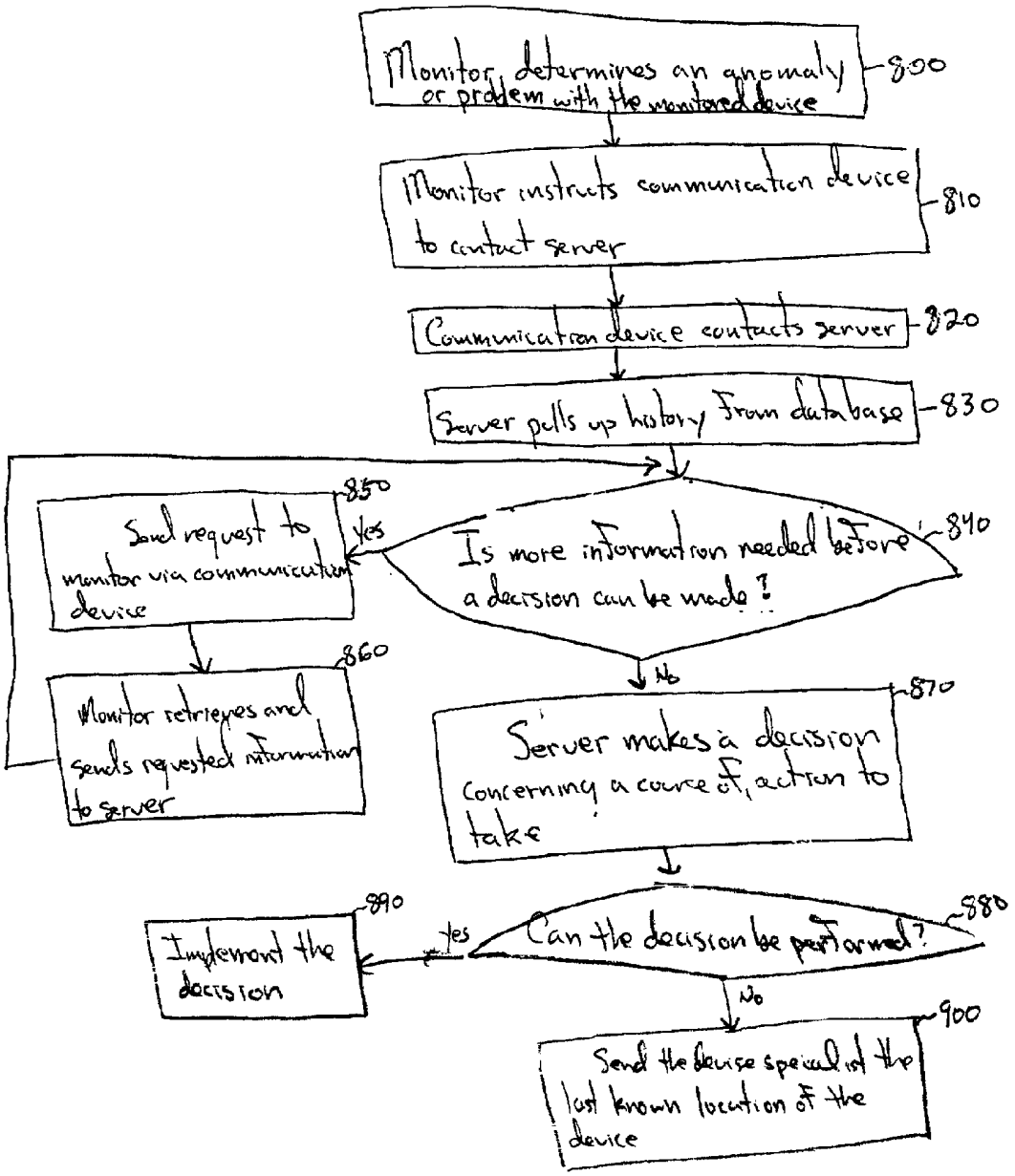

Monitor determines an anomaly or problem with the monitored device
800
Monitor instructs communication device to contact server
810
Communication device contacts server
820
Server pulls up history from database
830
Is more information needed before a decision can be made?
840
Yes
Send request to monitor via communication device
850
Monitor retrieves and sends requested information to server
860
No
Server makes a decision concerning a course of action to take
870
Can the decision be performed?
880
Yes
Implement the decision
890
No
Send the device specialist the last known location of the device
900

FIG. 6

MOBILE MONITORING SYSTEM

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention relates to monitoring systems. More specifically, the invention relates to a mobile monitoring system that monitors the health of individuals, recognizes anomalies based on the monitoring, diagnoses the cause of the anomalies, and takes corrective action based on the diagnosis. Additionally, the invention is able to monitor the state of electrical and/or mechanical devices, recognize anomalous states of the devices based on the monitoring, diagnose the cause of the anomalous states, and take corrective action based on the diagnosis.

[0003] 2. Description of the Related Art

[0004] The ability to determine whether individuals out of reach of immediate medical assistance, such as hospital out-patients or military personnel deployed in hostile territory, are in need of medical assistance has been a top priority for both hospitals and militaries alike. To support this priority, the prior art has attempted to produce effective medical monitoring systems to remotely monitor the well-being of patients and personnel. Of these attempts, the prior art generally consists of two types of medical monitoring systems.

[0005] The first type of medical monitoring system typically includes a monitoring unit, affixed to a patient, that is in constant communication with a base station. In this type of monitoring system, the base station must be in close proximity to the patient. This is due to the short range communication system used between the monitoring unit and base station—which creates a small communication zone within which the patient must remain.

[0006] Problems exist with this first type of medical monitoring system. One problem is limited mobility, as the patient must remain within the communication zone or else the patient will no longer be monitored by the base station. Furthermore, the constant communication between the monitor and base station causes continuous communication traffic and interference and a continuous drain of the monitoring unit's power supply, whether or not the patient has a medical problem that needs to be analyzed or interpreted by the base station.

[0007] The second type of monitoring system typically incorporates a mobile phone into the monitor itself, which is worn by the patient being monitored, and which is in communication with a central monitoring device via a wireless communication network.

[0008] There are several disadvantages of using the second type of monitoring system, the first of which is wasted/uneven power consumption due to the combination cell phone/monitor relying on the same power supply. This means, for instance, that the single power supply may be unduly drained by cell phone calls, leaving little power remaining for the actual monitoring of the patient.

[0009] Another disadvantage of the prior art is that the communication between the monitor and server is a one-way only continuous communication. This continuous communication results in a waste of resources in the communication network. Moreover, the cell phone inside the monitor is restricted in use for monitoring purposes, and may not be used for any other purpose.

[0010] Therefore, a need exists for a base station independent, unlimited mobility mobile monitoring system with reduced power consumption, reduced network utilization, and a plurality of accessible communication channels.

SUMMARY OF THE INVENTION

[0011] An aspect of the present invention is to provide a mobile monitoring system that monitors the health of individuals while allowing the monitored individuals to travel anywhere in the world at any time.

[0012] Another aspect of the present invention is to provide a mobile monitoring system that monitors the health of patients with a monitor and is able to make a decision whether to call 911 and/or notify doctors based on the collected data from the monitor and the patient's profile.

[0013] A further aspect of the present invention is to monitor the health of an individual with a monitor and make the location of the individual along with the collected health information from the monitor immediately available to an emergency service personnel in an auditory and/or electronic format.

[0014] Yet another aspect of the present invention is to monitor the vital signs of an individual with a monitor, recognize anomalous vital sign readings, and instruct the monitor and/or individual how to correct the anomalous readings.

[0015] Another aspect of the present invention is to provide a mobile monitoring system that is able to monitor, diagnose, and correct problems in electrical and/or mechanical devices.

[0016] The above aspects may be attained by a system and method that monitors an entity with a monitor, records information based on the monitoring, communicates the information to a wireless communication device, forwards the information from the wireless communication device to a server, determines an action to take based upon said information, and takes the determined action.

[0017] The above aspects may also be attained by a system and method that gathers entity information from an entity with a monitor, determines anomalous entity readings from the gathered entity information, determines curative instructions to correct a cause of the anomalous entity readings, and sends the curative instructions to the monitor,

[0018] These together with other aspects and advantages which will be subsequently apparent, reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019] These and other objects and advantages of the present invention will become more apparent and more readily appreciated from the following description of the

preferred embodiments, taken in conjunction with the accompanying drawings of which:

[0020] **FIG. 1** depicts a mobile patient/individual monitoring system according to an embodiment of the present invention.

[0021] **FIG. 2** depicts a mobile mechanical/electrical device monitoring system according to an embodiment of the present invention.

[0022] **FIG. 3** provides a more detailed view of system elements depicted in **FIGS. 1 and 2**.

[0023] **FIG. 4** depicts a reference implementation of server **250** depicted in **FIG. 3** according to an embodiment of the present invention.

[0024] **FIG. 5** depicts a mobile monitoring system flow according to an embodiment of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0025] Reference will now be made in detail to the preferred embodiments of the present invention, examples of which are illustrated in the accompanying drawings, wherein like reference numerals refer to like elements throughout.

[0026] **FIG. 1** depicts a mobile patient/individual monitoring system according to an embodiment of the present invention. The mobile patient/individual monitoring system provides a unique solution to patients who are in need constant health monitoring, and the system automatically calls for medical help for such patients in the event that they suffer from a detected critical medical condition or other type of detected medical condition.

[0027] Medical monitor **20**, wearable by patient **10**, is used to monitor the vital signs of patient **10**. Medical monitor **20** is capable of monitoring a multitude of medical parameters, including but not limited to heart rate, temperature, and blood pressure. Medical monitor **20** stores monitored data over time and detects abnormalities in the monitored data gathered from patient **10**. Medical monitor **20** works in cooperation with communication device **30** which may be a personal digital assistant (PDA), cell phone, computer with a modem communicating through a landline phone, or any other type of communication device. Medical monitor **20** communicates with communication device **30** via communication link **25** using wireless Bluetooth technology or any other type of communication technology. Advantageously, medical monitor **20** only communicates with communication device **30** when monitor **20** detects an anomaly in the monitor readings of patient **10**, thereby reducing network traffic and conserving the battery life of monitor **20** and communication device **30**.

[0028] After receiving a signal containing monitoring data from medical monitor **20** via communication link **25**, communication device **30** determines the location of patient **10**, using, for example, a location server, an attached GPS locator module, or any other type of individual tracking device. Communication device **30** next establishes a connection with health monitor server **40** via communication link **35**. The connection between communication device **30** and health monitor server **40** may be a wireless or wired connection over the Internet utilizing TCP/IP, or over any other type of network.

[0029] Health monitor server **40** analyzes the data gathered by medical monitor **20** in conjunction with a patient profile of patent **10**, which is stored in database **50**. Health monitor server **40** determines if patient **10** has certain specified conditions, including but not limited to a heart attack or dangerous blood pressure levels. If health monitor server **40** determines that the monitoring data indicates that patient **10** requires immediate medical attention, then health monitor server **40** contacts appropriate emergency medical personnel **60** by, for example, calling 911 and informing 911 of the location of patient **10** using a pre-recorded message, voice synthesis, e-mail, and/or an SMS message. In addition, the collected data from patient **10** and/or an initial diagnostic decision made by health monitor server **40** may also be conveyed to 911 through voice synthesis, fax, e-mail, or by any other electronic means, so that emergency service personnel **60** may be better prepared to treat patient **10**. If, on the other hand, health monitor server **40** determines that the monitoring data does not indicate an emergency, but instead determines that the medical doctor or family doctor of patient **10** should be contacted for any reason, then health monitor server **40** contacts doctor **70** and informs doctor **70** about the current condition of patient **10** using, for example, text to speech voice synthesis, e-mail, and/or an SMS message. Moreover, the doctor may request and receive additional patient information from health monitor server **40**. Health monitor server **40** may receive the doctor's request by utilizing voice-recognition technology, or it may, for example, parse an e-mail or SMS message sent in by the doctor. Doctor **70** and emergency medical personnel **60** may also request and retrieve information from health monitor server **40** via the Internet.

[0030] Alternatively, in the event of a non-emergency, health monitor server **40** may send recommendations, such as a proposed diet, to patient **10** based upon an analysis of the medical monitoring data via communication link **35** and communication device **30**.

[0031] According to another embodiment of the present invention, patient **10** wears several monitor devices in communication with each other to form an Ad-hoc network, using, for example, Bluetooth technology to form said network, although any other type of networking technology may be employed. This network of monitors communicates with health monitor server **40** via communication device **30**.

[0032] **FIG. 2** depicts a mobile mechanical/electrical device monitoring system according to an embodiment of the present invention. Device monitor **105**, incorporating a data storage means, is affixed to device **100**. It is to be understood that monitor **105** may be a single monitor, or multiple monitors networked together, affixed to or located approximate to device **100**. Device **100** may be a mechanical device, an electrical device, or any other type of device which has parameters which may be monitored for correctness. Device monitor **105** may be battery powered, or, alternately, it may draw power from device **100**. Device monitor **105** monitors and the status of device **100**. Device monitor **105** includes a user-configurable threshold alarm setting that determines when device **100** is malfunctioning, and wireless communications with an associated communication channel for communicating the malfunction to communication device **30** via communication link **25**. Communication device **30** may be a personal digital assistant (PDA), cell phone, computer with a modem communicating through

a landline phone, or any other type of communication device. Communication device **30** may be affixed to device **100**, or, alternately, it may be situated apart from device **100**. When communication device **30** receives monitoring data from device monitor **105**, communication device **30** transmits the data received to diagnostic server **115** via communication link **35** where it is processed and stored. Moreover, after receiving a signal containing monitoring data from device monitor **105** via communication link **25**, communication device **30** determines the location of device **100**, using, for example, a GPS locator module affixed to device **100**, or any other type of tracking device.

[**0033**] Communication link **35** may be a radio connection to a base station (not shown) which accesses standard communication channels to convey the collected monitoring data from device **100** to diagnostic server **115**. Alternatively, communication link **35** may be a direct radio or landline connection which transmits the monitoring data directly to diagnostic server **115**.

[**0034**] Diagnostic server **115** analyzes the data gathered by device monitor/monitors **105** in conjunction with a device profile of device **100**, which is stored in database **50**. Diagnostic server **115** determines if device **100** is outside the range of normal operating parameters. If diagnostic server **115** determines that the monitoring data indicates that device **100** requires immediate attention, then diagnostic server **115** contacts appropriate emergency device specialists **110** by, for example, automatically calling device specialist **110** and informing device specialist **110** of the location and problems with device **100** using a pre-recorded message and/or voice synthesis. In addition, the collected data from device **100** and/or an initial diagnostic decision made by diagnostic server **115** may also be conveyed to device specialist **110** through voice synthesis, fax, e-mail, or by any other electronic means, so that device specialist **110** may be better able to fix device **100**.

[**0035**] **FIG. 3** provides a more detailed view of system elements depicted in **FIGS. 1 and 2**. Master **200** is used to register patient **10** or device **100**. When a patient or device owner purchases monitor **20** or **105**, respectively, a registration service may be used to register the monitor. In the event of the system of **FIG. 1, a** patient profile record is generated in database **50** and the monitor life start date time and the battery life span are also recorded in database **50**. In the event of the system of **FIG. 2, a** device profile record is generated in database **50** and the monitor life start date time and the battery life span are also recorded in database **50**.

[**0036**] A monitor may also be de-registered when a patient or device owner discontinues the monitoring service. The patient/device profile and history may then be deleted, or achieved for later retrieval.

[**0037**] Service discovery **210** automatically finds a slave device, such as slave **220**, which previously registered with master **200**. Master **200** checks if slave **220** has the capability to transfer data to a server such as health monitor server **40** or diagnostic server **115**. If such a slave device can not be found or is in incapable of transferring data, then a beep or a vibration signal is triggered to notify patient **10** or a device **100** user to turn on or find such a slave device.

[**0038**] Monitor **20** detects, collects, and stores the medical data from patient **10** such as time and heart beat rate, blood pressure, temperature, psychological, and environment conditions. Monitor **115** detects, collects, and stores diagnostic data from device **100** including but not limited to internal/external operating temperature, internal pressure, voltage levels, input/output data, and/or environmental conditions. Monitors **20** and **115** store data in an internal memory and make decisions as to when the condition of the entity being monitored becomes critical. At this critical time, master **200** triggers a program on slave **220** using data transfer **230** that passes the data to health monitor server **40** in the event that a patient or individual is being monitored as in **FIG. 1**, or to diagnostic server **115** in the event that a device is being monitored as in **FIG. 2**.

[**0039**] Data transfer **230** organizes the monitoring data in a format that is suitable for the selected slave device. The data format depends on whether communication device **30** is a PDA, a cell phone, a laptop, PC, or other type of communication device.

[**0040**] In the event that communication device **30** is a wireless phone and is currently being used or is in voice mode, then monitors **20** and **115** are able to interrupt the call and switch slave **220** to data mode, as is known in the art (see, for example. U.S. Pat. No. 5,815,503), so that the monitoring data may be sent out immediately.

[**0041**] In the event that communication device **30** is a landline phone, there are at least two methods for transferring data through a land phone. One method utilizes a modem installed in a computer, where the computer has a wireless communication with the monitor through the modem. In this case, the computer is enabled to interrupt the voice call and do autodialing for the user, by using, for example, TAPI software.

[**0042**] Another method for transferring data through a landline phone is used when there is no computer present. When there is no computer involved, there is typically a wireless communication channel open between the phone and the monitor. In this situation, software controls the communication channel open between the phone and monitor, and can interrupt the land phone. Alternately, a multi-channel modem may be used to communicate with a back-end server using a data channel to transfer data. In an alternative embodiment, a voice board may be used to provide s/w capability to detect an inbound signal, and to switch the voice channel to a data channel when such an inbound signal is detected. In yet another embodiment, a multi-channel modem may be used to simultaneously transmit voice and data communications to a remote site (see, for example, U.S. Pat. Nos. 5,452,289 and 5,535,204).

[**0043**] Web servers **40** and **115** may be any computer servers, such as Apache, IIS, or Enterprise Server, used as a front end for diagnostic/medical monitor server **250**. Web servers **40** and **115** accept HTTP requests from cell phones, PDAs, PCs, laptops, or any Bluetooth or other enabled device that communicates with a registered monitor, such as monitors **20** and **105**. Alternately, web servers **40** and **115** may be a part of middleware including but not limited to WebLogic.

[**0044**] The different components of diagnostic/medical monitor server **250** will now be described. Register Service **260** creates and stores patient and device profiles and other relevant data into database **50**. Data Verification and Data

Processing Service **270** verifies incoming data and analyses the collected data and makes a decision on what to do. The decision is based on a set of rules built into server **250**. For instance, if the data indicates an emergency, server **250** calls 911 for the patient along with the location of the patient. If data indicates that the patient needs to take a certain action by him/herself then server **20** sends an alarm message to the patient along with medical or curative instructions. Each individual's case and medical domain knowledge may be used in determining these rules. Call Routing Service **280** makes calls, sends data or formatted graphs to a determined location, such as emergency rooms, doctors, or device specialists. Service Interface **290** provides a gateway to external systems such as legacy systems and preparatory systems. Database Service **330** provides utilities to insert, delete and modify data in database **50**. Admin Service **300** provides a user interface for the administrator system status. Patient/Device management **310** includes tools and utilities to allow customer service to update customer records. Location Service **320** finds the location of a patient or device at calling time. There are multiple methods to find the location which depends upon the device used. For instance, if the call is from a cell phone or PDA then location server **340** will provide the location to location service **320**, or if the call is from a PC then location service **320** service will look up the registered location of the PC.

[**0045**] The different data fields of database **50** will now be described. Patient Profile **350** the patient profile which is created when a customer or patient first uses a monitor. Patient Profile **350** contains such data fields as name of patient or individual, phone number, address, and the conditions to be monitored. Device Profile **355** contains such data fields as name, phone number, address, and the systems/parameters of device **100** to be monitored. Patient History **360** is the data collected from monitoring the patient **10** or other individuals. Patient History **360** contains, but is not limited to containing, such information as heart beat rate and the date and time that the data is collected. Device History **365** is the data collected from monitoring device **100**. Diagnostic Notes **370** contains a doctor's or device specialist's comments on each patient or device. Doctor Contact **380** contains the family doctor's name, address, telephone number and data transfer SPI details of each patient **10**. Emergency contact **390** stores the emergency phone numbers of emergency contacts such as doctors **70**, emergency medical personnel **60**, or device specialists **110**. Monitor Battery Profile **400** contains identification number of monitor **20** and the battery expired date. PC Location **410** stores the location of the PC, if a PC is being used as communication device **30**. Transaction Log **420** stores each connection from communication device **30**.

[**0046**] **FIG. 4** depicts a reference implementation of server **250** depicted in **FIG. 3** according to an embodiment of the present invention. This particular embodiment is based on J2EE and WebLogic. However, it is to be understood that there are alternative approaches and embodiments for the implementation of server **250** including, but not limited to, ASP and CGI.

[**0047**] Presentation layer **500** provides a GUI interface to different users, such as administrators and service people, to perform a set of tasks. Register.jsp **510** is a GUI interface which allows users to enter registration information. Register.jsp **510** communicates with User Handler Session Bean **600** to store registration information into database **50**. PatientHistory.jsp **520** is a GUI interface for allowing a user to view patient/device history information. PatientHistory.jsp **520** communicates with User Handler Session Bean **600** to store and retrieve patient history information from patient history **360**. BatteryService.jsp **530** is a GUI that allows users to insert and update monitor battery information such as the life expectancy and expire date of the battery or batteries used in monitor **20** and monitor **105**. PatientRecord.jsp **540** is a GUI which allows users to view patient records. PatientRecord.jsp **540** communicates with User Handler Session Bean **600** to retrieve data from patient history **360**. Admin.jsp **550** is a utility to allow an administrative user to maintain and trouble-shoot diagnostic/medical monitor server **250**. Admin.jsp **550** communicates with Admin Session Bean **620** to store and retrieve information from transaction log **420**. DiagnosticNote.jsp **560** is a GUI that allows a doctor or device specialist to insert and update diagnostic information stored in database **50** through Doctor Entity Bean **650**. CustomerService.jsp **570** is a GUI which allows a user to solve problems encountered by customers by communicating with Customer Care Session Bean **580**. Business Logic Layer **575** provides business logic related to the health/diagnostic service. Caller Session Bean **590** calls User Handler Session Bean **600** to write data into transaction log **420** for a particular call from communication device **30**. User Handler Session Bean **600** creates and writes data in patient profile **350**, device profile **355**, doctor contact **380**, and battery profile **400** using User Entity Bean **640** and Doctor Entity Bean **650**. Battery Session Bean **610** calls Battery Entity Bean **630** to update battery profile **400**.

[**0048**] Rule Engine **660** at system start time, or dynamically upon command, loads and parses rule file **670**. Rule Engine **600** then translates rule file **670** into algorithms for use by User Handler Session Bean **600** and Doctor Entity Bean **650**. Rule file **670** stores all of the rules for the decision algorithms. Rule file **670** is user-configurable. Typically, but not necessarily, doctors, medical experts, and/or device specialists generate the rules stored within rule file **670**.

[**0049**] Battery Alert Program **625** provides alert signals to communication device **30**.

[**0050**] **FIG. 5** depicts a mobile monitoring system flow according to an embodiment of the present invention. At operation **700**, monitor **20** carried by patient **10** determines that one or more anomalies or health problems exist in patient **10** based upon monitoring data generated by the monitoring of patient **10**. At operation **710**, monitor **20** instructs communication device **30** to communicate with health monitor server **40** and forwards the monitoring data to communication device **30**. A operation **720**, communication device **30** contacts health monitor server **40** and sends the monitoring data to health monitor server **40**. At operation **730**, health monitor server retrieves the patient profile and patient history of patient **10**, runs an analysis of the monitoring data, and, at operation **740**, determines if more monitoring information is needed from monitor **20** before a decision as to a course of action may be made. If more monitoring information is needed, then health monitor server **40** sends a request to monitor **20** via communication device **30**. At operation **760**, monitor **20** receives the server's request and sends the requested information to health monitor server **40** via communication device **30**, and processing loops back to operation **740**.

[0051] If, on the other hand, more monitoring information is not needed, then processing proceeds to operation **770** and health monitor server **40** makes a decision as to a course of action to take, such as contacting a doctor, calling 911, sending instructions to patient **10**, or sending instruction to monitor **20** to, for instance, increase the dosage of a drug to patient **10**. This decision is based upon the monitoring data, the patient's profile and history, and any additional monitoring data received by monitor **20** if operations **750** and **760** are implemented.

[0052] At operation **780**, health monitor server **40** determines if the determined action can be taken. If so, then processing proceeds to operation **790** where the decision is implemented. If, on the other hand, the decision can not be performed for any reason, including communication problems, then processing proceeds to operation **795** at which point the last known location of patient **10** is sent to emergency medical personnel **60** so that patient **10** may be found and treated by said emergency medical personnel as quickly as possible.

[0053] **FIG. 6** depicts a mobile monitoring system flow according to an embodiment of the present invention. At operation **800**, monitor **105** affixed to device **100** determines that one or more anomalies or problems exist in device **100** based upon monitoring data generated by the monitoring of device **100**. At operation **810**, monitor **105** instructs communication device **30** to communicate with diagnostic server **115** and forwards the monitoring data to communication device **30**. A operation **820**, communication device **30** contacts diagnostic server **115** and sends the monitoring data to diagnostic server **115**. At operation **830**, server **115** retrieves the device profile and device history of device **100**, runs an analysis of the monitoring data, and, at operation **840**, determines if more monitoring information is needed from monitor **105** before a decision as to a course of action may be made. If more monitoring information is needed, then diagnostic server **115** sends a request to monitor **105** via communication device **30**. At operation **860**, monitor **105** receives the server's request and sends the requested information to diagnostic server **115** via communication device **30**, and processing then loops back to operation **840**.

[0054] If, on the other hand, more monitoring information is not needed, then processing proceeds to operation **870**, and diagnostic server **115** makes a decision as to a course of action to take, such as contacting a diagnostic specialist for instructions, or instructing monitor **105** to repair device **100** by, for example, sending electronic pulses and/or providing needed fluid to specific parts of device **100**. This decision is based upon the monitoring data, the device's profile and history, and any additional monitoring data received by monitor **105** if operations **850** and **860** are implemented.

[0055] At operation **880**, diagnostic server **115** determines if the determined action can be taken. If so, then processing proceeds to operation **890** where the decision is implemented. If, on the other hand, the decision can not be performed for any reason, such as a communication problems, then processing proceeds to operation **900** at which point the last known location of device **100** is sent to an emergency service number so that a device specialist may be contacted to find device **100** and make any necessary repairs.

[0056] Although preferred embodiments of the present invention have been shown and described, it will be appreciated by those skilled in the art that changes may be made in these embodiments without departing from the principle and spirit of the invention, the scope of which is defined in the appended claims and their equivalents.

What is claimed is:

1. A system, comprising:

a monitor for monitoring an entity;

a server for storing entity information; and

a communication device situated apart from said monitor for communicating with said monitor and/or server.

2. The system of claim 1, wherein the entity is a patient, and the entity information comprises a patient profile.

3. The system of claim 1, wherein the entity is a living being.

4. The system of claim 3, wherein the living being is a person.

5. The system of claim 1, wherein the entity is a mechanical device.

6. The system of claim 1, wherein the entity is an electrical device.

7. The system of claim 1, wherein communication device is a wireless phone.

8. The system of claim 1, wherein the communication device is a portable computer.

9. The system of claim 1, wherein the communication device is a PDA.

10. A method, comprising:

monitoring an entity with a monitor;

recording information based on the monitoring;

communicating said information to a wireless communication device;

forwarding said information from said wireless communication device to a server;

determining an action to take based upon said information; and

taking said action.

11. A method, comprising:

monitoring an entity with a monitor;

determining anomaly information based on the monitoring;

communicating said anomaly information to a wireless communication device;

forwarding said anomaly information from said wireless communication device to a computer;

retrieving entity information from a database;

determining an action to take based upon said anomaly information and/or said entity information; and

taking said action.

12. The method of claim 11, wherein said determined action comprises requesting additional information from said monitor.

13. The method of claim 11, wherein said determined action comprises forwarding said anomaly information and/or said entity information to a medical professional.

14. The method of claim 11, wherein said determined action comprises forwarding an emergency message and/or said entity information to an emergency medical service.

15. The method of claim 11, wherein said determined action comprises calling **911**.

16. The method of claim 11, further comprising:

diagnosing a medical problem.

17. The method of claim 11, further comprising:

diagnosing a mechanical problem.

18. The method of claim 11, further comprising:

diagnosing an electrical problem.

19. The method of claim 13, further comprising:

determining location information for said entity; and

forwarding said location information to said medical professional.

20. The method of claim 14, further comprising:

determining location information for said entity; and

forwarding said location information to said emergency medical service.

21. The method of claim 11, wherein said entity is a patient and said entity information comprises a patient profile.

22. The method of claim 11, wherein said determined action comprises sending commands to said monitor.

23. The method of claim 11, wherein said determined action comprises sending instructions and/or an alarm message to said entity.

24. A method, comprising:

gathering entity information from an entity with a monitor;

determining anomalous entity readings from said gathered entity information;

determining curative instructions to correct a cause of said anomalous entity readings; and

sending said curative instructions to said monitor.

25. The method of claim 24, further comprising:

communicating said anomalous entity readings to a wireless communication device; and

forwarding said anomalous entity readings from said wireless communication device to a server.

26. The method of claim 24, wherein said curative instructions comprise instructing said monitor to increase a dosage of a medication.

27. The method of claim 24, wherein said curative instructions comprise instructing said monitor to send a electrical impulse to the entity.

28. The method of claim 24, wherein said curative instructions comprise increasing or decreasing the heart rate of said entity.

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专利名称(译)	移动监控系统		
公开(公告)号	US20020169584A1	公开(公告)日	2002-11-14
申请号	US09/853873	申请日	2001-05-14
[标]申请(专利权)人(译)	傅中苏 罗海萍		
申请(专利权)人(译)	傅中苏 罗海平		
当前申请(专利权)人(译)	傅中苏 罗海平		
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发明人	FU, ZHONGSU LUO, HAIPING		
IPC分类号	A61B5/00 A61B5/021 A61B5/024 A61B5/16 G06F19/00 G06F11/00		
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外部链接	Espacenet USPTO		

摘要(译)

一种用于移动监视系统的系统和方法，包括利用监视器监视实体，基于监视记录信息，当基于监视检测到紧急情况时将所述信息传送到无线通信设备，从所述无线转发所述信息通信设备到服务器，根据所述信息确定要采取的动作，并采取所述动作。