Australian Government
IP Australia

Innovation Patent Australia

IP-607-Patent Title**: WOMEN SECURITY USING IOT BASED INTELLIGENT ELECTRONIC JEWELRY**

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Complete Specification: **Australian Government.**

FIELD OF THE INVENTION

The invention women security using IOT based intelligent electronic jewelry is relating to relates to the personal safety devices and, more specifically, to a device or in combination of devices for providing an alarm or distress signal upon activation by the user in order to, for example, deter an attack or to summon assistance.

BACKGROUND OF THE INVENTION

Historically the primary responsibility for personal protection has always fallen on the individuals. This is true regardless of the community where one lives. Police agencies have been unable to protect everyone. Today, many innocent people find themselves victims of crime. The nature of the crime varies from minor misdemeanors, such as theft, to violent assault, such as rape or murder. Typically, the victim of a crime is physically unable to prevent or deter an attack.

Application of the personal attack alarm is aimed at persons at risk of being attacked outside their home for instance when individuals for one reason or another are out on the streets at night or live in insecure neighborhoods are suddenly attacked. These people may be the elderly, teenagers or women at risk of being attacked. Living in and around our large metropolitan cities requires that individuals, whether alone or with others, take precautionary measures to protect themselves against personal assaults. Various personal safety devices are available, including firearms, stun guns, chemical sprays, audible alarms and wireless security services.

Personal protection devices such as chemical sprays, for example, pepper sprays, audible personal security alarms, and stun guns, when used properly, all have a deterrent effect on an aggressor without the consequences associated with a firearm. These devices, however, have limitations and can prove to be ineffective depending upon the circumstances. Chemical sprays and audible alarms have their advantages and disadvantages. Chemical sprays generally offer a user the advantage of deterring an assailant at a distance of as much as 10 to 15 feet, as well as giving notice to the assailant that the user is not totally defenseless.

However, a chemical spray is of no use when the assailant covers his eyes with eyeglasses. Audible alarms on the other hand when used as a standalone device have lost their usefulness, since most people in the metropolitan city areas no longer pay attention to such sound generated devices. Moreover, as such, many people have resorted to carrying lethal weapons, such as hand guns. However, in certain jurisdictions, a person is forbidden by law to possess or use a lethal weapon.

Mobile and wireless technology have touched our lives in a multitude of ways ranging from communicating with near and dear ones to managing different aspects of our personal and business functions. Mobile technology is now also making a foray into personal safety management given the broad range of features and functions it possesses

to facilitate things like capturing evidence at the scene of a crime in terms of both sound or visual evidence. It can also help with transmitting various signals for assistance.

The drawback with handheld devices is that users need to visually look at the phone in order to use it. It is very hard to try to use the mobile device in a concealed or hidden way. If the mobile device is in a person's pocket, bag or purse, it makes it that much more difficult to try to access it, look at the device and use it for a particular purpose. And one cannot figure out the current state of the device or operate any of the functions without actually looking at it.

In circumstances where an individual (victim) is being attacked, chances are unlikely that the victim will be able to access their mobile device and reach out for help as the attacker (perpetrator) may seize any known and identifiable deterrents such as the mobile device and escalate the attack leaving the victim with not many options to reach out for help. Having a single mechanism that can be adapted and added to different wearable ornaments to activate the mobile device in a concealed way will make all the difference in the victim's ability at making contact with people that may be able to provide help and assistance. There are some applications currently available that may send out a text message to certain contacts when activated but even to access that functionality, the victim will need to access the mobile device and look at it to activate the application. In essence, this solution also does not really help solve the problem.

Therefore, there is a need for systems and methods that overcome the deficiencies mentioned above that provide a simple, inconspicuous, flexible and easy-to-use means to seek help in the event of a threatening situation and address the above-mentioned drawbacks of traditional systems/approaches.

Technical solutions are known in the art for the design of wearable on the human body, including in the form of a ring or ring, alarm devices made with the function of secretly sending signals about help and about their location to response services or other personalities. The patents also describe the design features of such a device in a simplified scheme using a processor, means for transmitting signals over a distance, and an alarm button.

So, there are known methods and devices for alarm notification, in which the so-called "panic button" is used - a miniature radio transmitter on whose body a control button is installed. The radio transmitter is activated by pressing the control button when there is a danger to human life, health and material values, in particular when there is a threat to an employee of the corresponding power structure. The radio signal (alarm radio signal) emitted by the "panic button" is received at the central security center and, after processing and decryption, is displayed as a panic message indicating the identification signs of the panic button that emitted the panic signal. When an alarm message is indicated in the indicated central protection points, sound and / or light alarm is applied. Various device options for technical implementations of this method are presented, in particular, in the application US L2001 / 0052848, G08B21 / 00 and in the patent US K26310539, G08B23 / 00.

The disadvantages of this technical solution is the small range of the "panic button" and the lack of alarm data on the location of the radio signal source. In addition, in a sudden attack, the user may not have time to use this warning tool.

Also known are such personal safety alarm devices, made in the form of a ring or ring, that is, in the form of a conveniently and constantly worn thing that does not cause the aggressor to have a pre-formed negative attitude or suspicion (US2008182547, H04M 11/04, publ. 31.07 .2008). This decision was made as a prototype for the claimed device.

This patent describes a personal security threat alarm device comprising a housing made in the form of an annular element carried on the user's finger, in the inner cavity of which a power source, a processor unit, a microphone, and a signal transmission unit are mounted via wireless communication to an externally located receiver of this signal - a mobile phone, which in relay mode is connected with a subject that provides security for the user, as well as a button for I initiate the generation of the specified signal, which is an alarm signal about a threat to the personal safety of the user, when a voice message is sent through the microphone to the processor unit.

The peculiarity of the execution of these rings or rings is that the panic button itself is always located on the outside of the product so that it can be pressed either with the finger of the other hand, or by resting on some object. Known analogues and prototype have one serious drawback - the lack of the ability to send an alarm and your location in one short action, for example, in case of limitation of hand movement.

In addition, the architecture of the layout of such a device provides that all elements are mounted on one common board mounted in the housing. In this case, in the event of a breakdown, either completely replace one ring with a new one, or dismantle the board and install a new one in its place. Typically, this architecture is used for disposable products, or for products whose service life is determined by the time before the first breakdown. This is beneficial for the manufacturer, as it increases the turnover and shift of goods, but is disadvantageous for the consumer.

For the user, the reliability and durability of the product is important, and these parameters are determined not only by the reliability of the installed components, but also by their influence when working on each other. This is especially important when using nodes that are heterogeneous in design and function, for example, a processor and a vibromotor. In this regard, diversity architecture is preferable, since it allows these nodes with features that are heterogeneous in design and function to be spaced apart by a distance at which their mutual influence is eliminated or, at least, reduced.

In the case of a number of emergency situations, a person does not have the opportunity to report that he needs help and where he is. Most people feel anxious for their near and dear ones when they are not nearby. Currently, people rely on mobile phones and active self-defense tools. All currently existing methods of informing that a person needs help have one common and serious drawback - the inability to send an alarm and location in one short action, for example, when restricting hand movement. (In the event of an emergency, it is not always possible to quickly find the telephone and all kinds of key

rings in your bag, pocket or things and use them quickly, and to use the panic button on the watch or bracelet, a second hand is required to perform the action, which in some situations may not be possible).

From the same source (US2008182547) there is a known method for alarming personal security threats, which consists in registering on a mobile computerized means of communication the identification data of a ring or a ring that is worn on a user's finger, equipped with a processor unit, a microphone and a signal transmission unit via wireless communication by pressing a physical button on this ring or ring, and when signs of a threat to personal safety appear, they press a physical button to initiate the processor unit, ofona and signal transmission unit, and then carried out a voice message into the microphone on the ring or rings and transmit it in wireless mode to a mobile computerized communication device, wherein the retransmission mode is performed in signal transmission of the personal security threat subject with the user of the security features. This decision was made as a prototype for the claimed method.

The disadvantage of this method is that both hands of the user are needed to transmit the alarm. In addition, in the event of a false positive, it is not possible to cancel the call. Using a voice message is also problematic, because it is not always possible due to the circumstances of the situation and to work with a microphone you need to bring the ring to your lips, which is sometimes impossible, and when moving away from the lips you need to raise your voice, which is also not always possible.

In addition, the user is not informed that an alarm has been sent or that the device is operating. In a difficult situation of a possible threat, the lack of feedback does not correspond to the psychological state of a person. Disclosure of invention

The present invention is aimed at achieving a technical result, which consists in improving the convenience of use by providing the ability to send an alarm and its location with one finger movement even in conditions of limiting hand movements and without involving voice messages, and the possibility of canceling a fake call.

The specified technical result for the device is achieved by the fact that in the device for alarming personal security threats, comprising a housing in the form of a ring or a ring that is worn on the user's finger with a power source, a processor and a signal transmission unit via wireless communication to an externally located receiver of this signal , as well as a physical button brought out from the housing to initiate the generation of the specified signal, which is a personal alert user safety, characterized in that the physical button is brought outward from the housing to its outer surface in the second and third quadrants in a clockwise direction, the power source is located in the upper part of the housing, above which there is a processor with a signal transmission unit with an antenna, and on the one side of which the vibromotor is placed to issue vibration signals during the time the physical button is held down, and on the other side of which the specified button is placed.

In addition, this device may be further provided with a positioning unit associated with the processor unit for transmitting, in a packet of alarms, a threat to the user's personal

safety and location coordinates. Or it can be additionally equipped with a signal receiving unit from a computerized means for inputting a signal to cancel sending a signal, which is an alarm signal about a threat to the user's personal safety. And as a block transmitting a signal with an antenna, a unit operating via the Bluetooth protocol is used,

In addition, the device can be additionally equipped with at least one LED displayed on the inner surface of the ring or ring splint to visually indicate the operation mode of the device. Also, the device can be additionally equipped with a communication unit with a geolocation system for generating a signal about the location and transmitting it to a signal transmission unit with an antenna.

The disadvantage of the prototype is eliminated by the fact that the claimed device, thanks to the shape of the ring factor (ring) on the finger of the hand and the convenient location of the panic button, allows you to send an alarm and location with one movement of the finger, even when restricting the movement of human hands.

The specified technical result for the method is achieved by the fact that in the method of alarming about a personal security risk, which consists in programming through the use of a mobile computerized means of communication of the user of the processor of the ring or ring worn on the user's finger, equipped with a signal transmission unit via wireless communication by pressing a physical button on it ring or ring, and when signs of a threat to personal safety appear, press a physical button to initiate a the processor and the signal transmission unit for generating a signal, which is an alert signaling a threat to personal safety, and transmitting this signal wirelessly to a remotely accessible mobile computerized communication medium, from which, in relay mode, a personal security threat signal is transmitted to a subject endowed with functions the implementation of user safety, to initiate a processor and a signal transmission unit for generating a signal about a personal safety hazard, press the physical button on the ring or ring and hold it pressed for N seconds, after which the processor unit generates a signal and transfers it to the signal transmission unit for sending to the specified subject, and if the physical button is falsely pressed for a time exceeding N seconds, the user cancels the call by entering the password in the application installed in his mobile communications device.

The present system addresses the issue of providing rapid emergency response following a vehicle crash and the issue of aiding the elderly to live in their own homes while assuring rapid contact with assistance providers in the event such assistance is needed. The present system is concerned with security and safety systems. The wearable transceiver devices of these systems refers to devices which may be worn or carried by a plurality of users in the same family or other group in or near their own dwelling areas or while traveling. The wearable transceiver device may take the form of key fobs, pendants, belt clips, and watches. When the user is at a long distance from his or her dwelling area it is necessary that the user also carry a cell phone allowing the person to be directly connected with a central monitoring station, an emergency response dispatcher, or a caregiver. Technically, a cell phone is a wearable transceiver device. However, in the present description and claims cell phones are expressly excluded from the grouping described by this term. The cell phone contains an assisted GPS chip to allow the determination of the geographical coordinates of the cell phone. The cell phone has the

ability to establish voice-to-voice contact between the wearable transceivers and the central monitoring station.

The wearable transceiver devices may be equipped with two 3-axis G-Force sensors, one programmed to be capable of detecting the event of a crash and the other being programmed to be capable of detecting the event of a perceived fall so that the device is capable of sensing a crash or fall. In the event of a crash or fall, the sensor activates a transmitter carried by the wearable transceiver device. Unless the transmitter is deactivated by the pressing of a communication button carried by the wearable transceiver device within a predetermined time, the device will remotely connect with either a cell phone or a land-line based phone to automatically dial a number connecting the wearable transceiver device with a central monitoring station. The cell phone also sends the geographical coordinates of the device via SMS.

The wearable transceiver devices may connect with the central monitoring station through either a cell phone or land-line based phone if the user presses the communication button. In connecting to the central monitoring station, the cell phone sends the geographical coordinates as well as the ability to begin voice-to-voice communication. A plurality of persons in the same family or other group may be protected by the same system simultaneously.

PRIOR ART SEARCH

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US20140218537A1 *2013-02-062014-08-07Michael Nepo System and method for disseminating information and implementing medical interventions to facilitate the safe emergence of users from crises.
US20150145727A1 *2010-10-082015-05-28HJ Laboratories, LLCTracking a mobile computer indoors using WI-FI and motion sensor information.
US20150172538A1 *2013-03-142015-06-18Google Inc. Wearable Camera Systems.
US20130078942A1 *2011-09-272013-03-28Rachel Dina Owens Wearable networked alert unit and method for its use.
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US20050259641A1 *2004-05-202005-11-24Sonata Systems Inc. Systems and methods for communication platforms.

US20080129518A1 *2006-12-052008-06-05John Carlton-Foss Method and system for fall detection.

OBJECTIVES OF THE INVENTION

1. The objective of the invention is to a wearable accessory including a detachable/removable circuitry housing, a vibration generation means for producing a vibration, the vibration generation means housed within the housing?
2. The other objective of the invention is to a at least one switch for allowing a user of the wearable accessory to cause activation of the vibration generation means the switch housed within the housing a module for communicating with at least one handheld device using a communication protocol an image capturing device including a microphone for receiving audio and video signals at the wearable accessory.
3. The other objective of the invention is to a USB port for charging the wearable accessory a multiple-bit microprocessor is configured and coupled for controlling functions of the wearable accessory the microprocessor housed within the housing and a storage means for storing data representative of the signals the storage means coupled with the microprocessor?
4. The other objective of the invention is to a safety system comprising a plurality of wearable transceiver devices for operation in independent use with a plurality of a landline-based phone and a cell phone to establish contact between a user of a wearable transceiver device and a central monitoring station.
5. The other objective of the invention is to a wearable transceiver devices sense a crash or a fall and notify a monitor by a landline-based phone or a cell phone of this incident and the assisted GPS determined location of the incident and the information is provided to the monitor a short predetermined time following activation unless the device is deactivated by pressing a communication button.
6. The other objective of the invention is to a device has not been activated by a crash or fall the user may press the communication button to communicate with the monitor to obtain a wide variety of services and a cell phone having reserve batteries, accelerometers, and assisted GPS location capabilities.

SUMMARY OF THE INVENTION

The inventive system and method enhances the process of notifying an emergency situation by allowing a user to send audio (voice based), video, images (pictures) and text based data in addition to the voice based communication by triggering a distress signal using a wearable accessory. Accordingly, one aspect of the present invention relates to a method which enables a user to customize and notify multiple pre-configured members in the user's defined network. In one embodiment, the method follows the steps of (a)

triggering an emergency assistance signal by the user via at least one wearable accessory that includes a circuit enclosed by a casing.

The circuitry (enclosed in the casing) is removable and can be attached to any other wearable accessory, (b) activating at least one handheld device, upon receipt of the triggered emergency assistance signal from the wearable accessory and establishing a communication thereof using a communication protocol, (c) recording all the events including audio and video at the wearable accessory, transmitting this to a handheld device which in turn transmits the same in real-time to a remote server, (d) receiving an acknowledgement signal from the handheld device to the wearable accessory using the communication protocol, wherein the acknowledgement signal includes a vibration to the wearable accessory which provides confirmation to the user that the emergency assistance signal has been triggered successfully and the same has been sent to a list of pre-configured members stored in the handheld device, and (e) sending alert messages with Global Positioning System (GPS)/Indoor Positioning System (IPS) location to the list of pre-configured emergency contacts of the user via social media, email, text messages, voice message, voice call etc.

Another aspect of the present invention provides a wearable accessory, including housing, a vibration generation means for producing a vibration. The vibration generation means housed within the housing has at least one switch for allowing a user of the wearable accessory to cause activation of the vibration generation means. The switch is housed within the housing and there is a module for communicating with at least one handheld device using a communication protocol, an image capturing device including a microphone for receiving audio and video signals at the wearable accessory, a USB port for charging the wearable accessory, a multiple-bit microprocessor configured and coupled for controlling functions of the wearable accessory. The microprocessor is housed within the housing and there is a storage mechanism for storing data representative of the signals, the storage mechanism is coupled with the microprocessor.

These and various other advantages and features of novelty which characterize the invention are pointed out with particularity in the claims annexed hereto and form a part hereof. However, for a better understanding of the invention, its advantages, and the objects obtained by its use, reference should be made to the drawings which form a further part hereof, and to the accompanying descriptive matter, which illustrates and describes specific examples of an apparatus in accordance with the invention.

BRIEF DESCRIPTION OF THE DIAGRAM

FIG. 1 shows a schematic diagram of the personal safety communication network which enables a user to customize and notify multiple pre-configured members in the user's defined network.

FIG. 2 shows a flow chart of a method which enables a user to notify multiple pre-configured members in the user's defined network and receive responses back from the pre-defined network, according to one embodiment of the present invention.

FIG. 3 shows the partially exploded view of the wearable accessory's included components used in accordance with the present invention.

FIG. 4 shows the pendant alarm in two safe zones. It is capable of contacting the cell phone and also the landline-based phone.

FIG. 5 shows two pendants, one being capable of connecting with a cell phone due to the proximity of the pendant and cell phone, and one being capable of connecting with a landline-based phone due to the proximity of the pendant and phone. The outer circle in each instance shows a geo-fence or outer range inside which the pendant can connect with the phone. The inner circle in each instance shows the range which will trigger an alarm should the pendant go outside of that range.

FIG. 6 is an elevated perspective view of a cell phone having conventional batteries and reserve batteries.

DESCRIPTION OF THE INVENTION

In the following description, for purpose of explanation, specific details are set forth in order to provide an understanding of the invention. It will be apparent, however, to one skilled in the art that the invention may be practiced without these details. One skilled in the art will recognize that embodiments of the present invention, some of which are described below, may be incorporated into a number of enterprise resource planning systems. Structures and devices shown in the figures are illustrative of exemplary embodiments of the invention and are meant to avoid obscuring the invention. Furthermore, connections between components and/or modules within the figures are not intended to be limited to direct connections. Rather, data between these components and modules may be modified, re-formatted or otherwise changed by intermediary components and modules.

References in the specification to “one embodiment” or “an embodiment” means that a particular feature, structure, characteristic, or function described in connection with the embodiment is included in at least one embodiment of the invention. The appearances of the phrase “in one embodiment” in various places in the specification are not necessarily all referring to the same embodiment.

FIG. 1 is a schematic of a personal safety communications network where a user notifies an emergency assistance signal to a plurality of entities i.e. responders which are in the user's defined network. The network includes a handheld device e.g. handheld device 102 which is located on or near the user 100; the user 100 has a wearable accessory. The wearable accessory includes a circuitry enclosed in a casing. Although embedded, the circuitry (enclosed in a casing) has the flexibility of being removed and can be attached to any other wearable accessory. The wearable accessory may be or may include, but is not limited to, a wearable ornament, bracelet, watch, chain, shoe, ear rings, necklace, spectacles, ring etc. having the electronic circuit embedded. The handheld device 102 houses the mobile application that enables the user to customize and pre-configure a list of emergency contacts which can be ordered on a preferential basis. The

application provides the user with a means to add, edit, register, save and store personal information (name, sex, DOB, blood type etc.) and also configure the information of the user's emergency contacts. Once Bluetooth connectivity is established with the wearable accessory using secure credentials, it opens the application automatically without any user intervention to perform the set of activities to send out alert messages to the pre-configured list. The handheld device application provides a mechanism to continually sync up with the server and store information/updates on a real-time basis.

The handheld device 102 contains standard or non-standard communication system/protocol which allows the usage of global positioning and data transmission. The application provides near real-time updates on the user's whereabouts to a list of emergency contacts by updating the GPS/IPS information at a pre-determined interval (in secs). The GPS/IPS location is converted into an actual address from the latitude and longitude of the coordinates and can be accessible via google maps. The network 104 provides the back-bone for the communication path and data transmission capabilities. The handheld device 102 is connected to the network 104. The network typically can consist of be a satellite communication system, one or more cellular phone tower, a wireless communication node, or any combination thereof. The personal safety communications network depicted in FIG. 1 allows for multi-directional (i.e., two-way, and three-way) communications. That is, a third-party response provider can receive and transmit data from/to the handheld device 102, and to the user 100 with wearable accessory via the network 104.

As discussed above, the emergency or distress signal can be a data signal which includes position data. The emergency signal can also include audio data, so that once the signal is activated on the handheld device 102 with the help of the wearable accessory 100, a microphone on the wearable accessory 100 can capture and transmit any audible sounds from the user's environment to the handheld device 102 and then to the third-party response provider in real-time. In yet another embodiment, a camera on the wearable accessory 100 can automatically be activated once the emergency signal is activated. The audio and video data along with other user information and location can be stored on in memory on the handheld device 102 and on a secure server 112.

The various pre-configured contacts in the user's list may include third-party response providers, such as Emergency responders 106, monitoring service 108, and a user's personal friends/family network 110. All these response providers are all part of the network 104. The circuitry in the wearable accessory, the handheld device application, the network and the secure server are in constant communication using the underlying communication protocol to provide real-time updates on the user's location to the list of emergency contacts.

The list of emergency responders 106 includes but is not limited to, police departments, campus security, 911 emergency centers, volunteer organizations, emergency medical service (EMS) providers, rescue departments, volunteers, employees, national security organizations including federal agencies, task forces and non-governmental agencies.

The monitoring service 108 can offer a subscription-based service that monitors the handheld device 102 when triggered by the user's wearable accessory 100. The user's personal friends/family network 110 can include a prioritized pre-determined list of contacts to whom a distress signal is automatically transmitted. The contacts can receive communication in the form of text messages, multi-media messages (MMS), email, a phone call, face time alert with a recorded emergency message. In addition, the emergency contacts can receive distress signals in the form of live audio/videos from the user's handheld device, a social network notification to any of the social networking sites Facebook, LinkedIn etc., an instant messenger notification, or any combination thereof.

In FIG. 1 of the personal safety communications network diagram, the wearable accessory is worn by the user 100, such as on the hand (i.e. bracelet, jewelry), on the finger (i.e. ring), on the head (i.e. hair clip or ornament), around the user's neck (i.e., necklace), on the ankle (i.e., anklet or ankle bracelet), or as a wristband (i.e., watch strap, watch). In this embodiment the wearable accessory serves as a multi-function device that includes signal reception and transmission capabilities. The wearable accessory triggers communication with the handheld device 102 using a communication protocol. The communication protocol may include but is not limited to Bluetooth, Bluetooth low energy, RFID etc. The distress signal can also be directly triggered from the mobile application which enables the user 100 to communicate with a remote location.

The handheld device may be an off-the-shelf smart phone or device, such as an iPhone, iPod, iPad, Blackberry, Android, or other similar system which can be loaded with applications or software. Users will have the capability of downloading an application from the internet, Android Marketplace, and/or the Apple Apps Store. The application may include features that facilitate communication between the user with wearable accessory 100 and the handheld device 102 by means of triggering the distress signal from the user's wearable accessory as described below. In an embodiment, the user can download and use the applications on the handheld device 102 for free while paying for the user's wearable accessory 100. Alternatively, the user may or may not pay for both the application and the wearable accessory.

In another embodiment the present invention provides a method 200 for operating the system. The method 200 is explained with reference to FIG. 2. At step 201, an emergency assistance signal is triggered from the wearable accessory having an electronic circuit embedded therein. At step 202, the triggered signal is transmitted to a handheld device thereby activating the device to establish a communication between the device and the wearable accessory using any communication protocol, the communication protocol may include but is not limited to Bluetooth, Bluetooth Low Energy or RFID etc. At step 203, the handheld device automatically starts the application which is a pre-installed application once it receives a command from the circuit through the communication protocol. At step 204, the circuit continuously checks, whether the user has cancelled the emergency assistance signal in order to clarify whether the emergency signal has been wrongly initiated or not. If yes, at step 205, the circuit waits for a predetermined time interval and cancels the activation of the emergency assistance signal, and the wearable accessory and the handheld device return backs to its normal mode. The wearable accessory records all the events including audio or a video or both with the help of the electronic circuit therein

and receives a vibration confirming cancellation. At step 206, the triggered signal received at the handheld device generates a distress signal by way of sending alert messages and GPS/IPS location to pre-configured emergency contacts of the user by social media, email, text messages and pre-configured voice messages. In an embodiment of the present invention, the location of the user is determined by Indoor Positioning System (IPS) which is based on magnetic sensor data from the handheld device which is used to wirelessly locate the user inside a building.

By using the IPS, one can find the exact location of the user within the building, where the GPS fails to establish the exact indoor locations. Further, the circuitry of the wearable accessory communicates to a remote server with the help of the handheld device or communication device. Upon receiving at the server, in response, at step 207, an acknowledgement signal is received at the wearable accessory via the handheld device. The acknowledgement signal includes a vibration to the wearable accessory in order to provide a confirmation to the user that the emergency assistance signal has been triggered successfully and the same has been sent to the list of pre-configured emergency contacts on the handheld device. The distress signal is transmitted by the handheld device to other location using a network for e.g. a victim's network. It is also possible that the distress signal can be sent simultaneously to all other available networks which are in sync with the electronic circuit of the wearable accessory. In Step 208 of the present invention, at least one person from the user's personal network responds to the emergency notification they received via Step 206. The response might be in the form of text, SMS, MMS, Social Media alert such as Facebook, etc.

An acknowledgement signal is then received at the wearable accessory via the handheld device. The acknowledgement signal includes a vibration to the wearable accessory in order to provide a confirmation to the user that help is on the way. In another aspect of the present invention, the user's personal network is sent a message periodically with user's updated location where law enforcement can track user on a web-based application, as step 209.

Once help reaches user, the user can cancel the alert via wearable accessory or via the handheld device, as step 210. Upon doing that, the user receives cancellation vibration on wearable accessory and also user's network is informed that the user has cancelled emergency, as in step 211. Further, the emergency log with full event information is created and stored on server and handheld device, as in step 211.

FIG. 3 shows the partially exploded view of the wearable accessory included components used in accordance with the present invention. As shown in the block diagram, the wearable accessory having a housing 300 and includes an electronic circuit embedded thereof which will be worn by a user. The electronic circuit although embedded has the flexibility of being removable and can be attached to any other wearable accessory. The circuit further includes, at least two switches 301 and 302, a first switch 301 for triggering the signal and a second switch 302 for deactivating the signal, a Bluetooth/Bluetooth low energy module 303, a vibration generation means or a vibration motor 304, a plurality of resistors 305, a plurality of capacitors 306, a plurality of transistors 307, a processor including a memory 308, an amplifier 309, a supply source

i.e. re-chargeable battery 310, a micro-phone 311, a plurality of color LEDs 312 and 313 and a USB port for charging in 313.

In an example embodiment of the invention, the user has to press the switch 301 on the wearable accessory 300 in order to trigger or to activate an emergency assistance signal to a plurality of responders in the network. Upon triggering the switch, the wearable accessory 300 including the processor 308 activate to establish a communication between the wearable accessory 300 and the handheld device using the Bluetooth/Bluetooth low energy module 303. The communication between the wearable accessory and the handheld device may be unidirectional, bi-directional or both. Upon setting a communication between the wearable accessory and the handheld device, the wearable accessory receives an acknowledgement signal as vibration using the vibration motor 304 from the handheld device in order to provide a confirmation to the user that the emergency assistance signal has been successfully processed. The vibration motor consists of vibrations that may be long and short in order to convey different messages to the user.

The plurality of resistors 305 used to balance the flow of current in the circuit and the plurality of capacitors 306 used to store the electric charge as necessary. The plurality of transistors 307 are to amplify and switch the electric current as needed. The processor including a memory, 308, represents the SD card which can store user data, such as audio, when the emergency is triggered using the processor. The amplifier 309 to amplify the sounds received by the microphone 311 so that the audio stored and transmitted is clearly audible. The power supply or re-chargeable battery 310 powers the entire circuit of the wearable accessory. The microphone 311 which helps in collecting audio information and then the same sound gets amplified (309) and sent using Bluetooth. The accessory may include a camera (not shown in figure) for capturing the video signals or live videos. The LEDs 312 and 313 are different colored LED lights representing various signals to the users including battery health and may indicate whether an emergency has been triggered. The port 314 represents the USB charger which when plugged into a USB port can be used to re-charge the battery.

The processor coupled with the switches are capable of monitoring the activation on the first switch for a predetermined period of time to determine if the user still intends to activate an emergency. If the user does not want to activate or accidentally activated the emergency over the said predetermined period of time, the emergency signal can be deactivated using the second switch. If the user does not deactivate the emergency over the pre-determined period of time, the emergency signal gets activated. The processor is coupled and configured with the vibration generation means for testing the power level of the stored energy supply, the logic of the processor is coupled with the stored energy supply and further coupled with the display on the wearable accessory indicating a signal representative of the power level of the stored energy supply (i.e. battery) using LED lights.

In an advantageous aspect, the present solution does not require the potential victim to reach for their phone and manually enable an application, thereby saving valuable time for distress. The responses can be felt by the potential victim in the form of vibrations

instead of needing any visual confirmation. The visual confirmation by the potential victim if seen by the assailant might warn the assailant and could lead to further harm to the potential victim. The electronic circuit (enclosed in a casing), within the wearable accessory, although embedded has the flexibility of being removable and can be attached to any other wearable accessory. This makes it difficult for the perpetrator to identify, locate and possibly get rid of the wearable accessory on the victim.

Further, the present invention could relate to safety of women, children and senior citizens and extend to any individual needing emergency assistance. It could help support law enforcement agencies to act quickly to any distress signals. Overall, this could increase personal safety. The present invention saves time; it is affordable, practical and increases safety for one 'n' all. It saves time, which is of the essence and is devoted to a social cause so people can act quickly in case of distress.

The geo-fence 24 will be discussed with reference to FIGS. 4 and 5. The user 4 may establish a geo-fence 24 in a conventional manner. If a user 4 having a wearable transceiver device 8 moves outside the range of the cell phone 12 or the landline-based phone 10 an alarm event will be triggered. If the user 4 having a wearable transceiver device 8 but not having a cell phone 12 starts to go from inside to outside the alarm boundary 26 which is set a predetermined distance, e.g., 75 yards inside of the perimeter of the geo-fence 24, the device 8 starts to beep for 15 seconds, warning the user 4 that the user 4 will not be protected outside of the geo-fence 24. If the user 4 having a wearable transceiver device 8 but no cell phone 12 moves outside the geo-fence 24 the human monitor 18 would automatically be notified. In this way a user 4 with dementia can be alerted that he or she should not continue to stray from a pre-defined area. Also, the GPS function of the cell phone 12 can be used to locate the user 4 in the event the user 4 carrying a cell phone 12 happens to get lost.

In at least one embodiment, a plurality of users 4 may carry and operate a plurality of wearable transceiver devices 8 associated with the same home-based land-line phone 10 or cell phone 12. The cell phone 12 and the land-line based phone 10 can work either independently or in conjunction with each other; however, if an emergency event is triggered either phone 10 12 can independently call the central monitoring station 6. Thus, if there are two users 4 living together and they both require a wearable transceiver device 8 they would both be protected by the same home-based landline phone 10 or cell phone 12.

The wearable transceiver devices 8 contain small transceivers which send and receive radio signals via the Zigbee system. These devices 8 communicate directly with the home-based landline phone 10 or cell phone 12. The home-based phone 10 and cell phone 12 have RF receivers and transmitters which allow them to use the Zigbee radio system to communicate with the wearable transceiver device 8 and with cell phone towers 14 using radio signals. The cell phone towers 14 can communicate with the satellite 16 of the GPS system using radio signals and with the cell phones 12 or home-based phones 10 using the Zigbee system radio system. Each of the cell phone 12 and the landline-based phone 10 contains a memory which allows it to store phone numbers the user 4 might wish to contact, including that of the central monitoring station 6.

A single user 4 or several users 4 may utilize the same system 2 at any given time. Each user 4 can be identified because the wearable transceiver device 8 has an RFID signature that allows the central monitoring station 6 to know which wearable transceiver device 8, and therefore which user 4, is making a call. For instance, if several users 4 are in a retirement home they can all be protected on the landline-based phone 10 and if for some reason two users 4 send alarms to the central monitoring station 6 at the same time, the central monitoring station 6 would search for the cellular system 2 protecting more than one person 4 at the same time. The RFID identifies a particular user 4 and the central monitoring station 6 has medical information such as allergies, medical history, present medical condition, and present medications on file. Thus, in notifying an emergency response team, useful information concerning the patient 4 may be known by the team before they reach the patient 4, saving valuable time.

Example 1

Person One 4 leaves the house with his wearable transceiver device 8 and cell phone 12 and goes outside the geo-fence 24 but still within range of the wearable transceiver device 8 of Person Two 4. Because of the cell phone 12, he is protected as long as the cell phone 12 can contact the central monitoring station 6. Person Two 4, who is at home, slips and falls while wearing a wearable transceiver device 8 and person One 4 is unaware of this. However, the fall sensor in the wearable transceiver device 8 detects a fall and contacts the central monitoring station 6 via the landline-based phone 10.

Even if the landline-based phone 10 became unavailable because of cut or downed wires the cell phone 12 would still be available to contact the central monitoring station 6.

Example 2

In at least one embodiment, one of the wearable transceiver devices 8 is a key fob. One particular embodiment of a key fob is set forth below.

Size: 2.50 inches by 1.96 inches by 0.78 of an inch thick

LCD screen size is 1.02″ (L)×0.92″ (W)

Cold/Warm/Hot start time; 42/38/1 second

Sensitivity −159 dBm tracking

Battery Solution: Lithium with AAA backup power from Techtium BackuPower TEC103+TEC2020−

Optional Batteries—With reference to FIG. 6, the key fob device uses lithium for the primary battery and can use a variety of AAA batteries for backup charging the primary batteries up to 3-hour talk time in the same manner as provided for the cell phone of FIG. 6. Nickel cadmium batteries (NI—NH) which allow the device to keep 85% of its charge for over 3 years if the device is not activated or alkaline batteries can give up to 10-year shelf life. The battery will be fully charged prior to shipping the product. This allows the device to be stored and used as needed without losing any power.

Optional 4 MB flash memory for data logging and/or mapping for different regions

Built-in high-performance speaker microphone (speaker phone)

LED Flashlight

Ultra-low-power consumption Atmel AVR32UC3B processor

Stand by time 30 days

Mini USB port for charging and data exchanging

duction charging plate that allows the user to simply place the device on the charging plate for re-charge (no need for charging cable)
GSM 850/900/1800/1900 (default tri-bands)
Polyphonic for ring tones
Vibration engine
Low-battery power alarm
Way-back feature
Firmware upgrade remotely (update phone book remotely)
Voice communication: GSM/GPRS simultaneously
SIM 10 code setting
SMS Protocol to reduce bandwidth
GPRS class 10, 10 cp/udp
Easy-to-read large white-on-black display
Emergency SOS Panic Button
Extra Loud +100 dB Ringer
Red LED to indicate out of range
A second button activates a 95-decibel panic alarm
3-axis G-force sensor accelerometer from Bosch BMA150. Crash data are calculated in the delta velocity (Delta V)
Certified to Military Standard 810 F for dust, shock, vibration, temperature extremes, low pressure, and solar radiation. It performs in extreme outdoor environments and stands up to dusty environments, drops, exposure to vibration from heavy machinery use, and hot/cold climates.
Certified to Military Standard 810 F for rain, humidity, and salt fog. It is designed to withstand exposure to rain, sleet, and snow. It has rubber casing, interior linings and connections against water trusion.

Speaker: 50 mm, high-power 105 dB output powerful speaker with 3-W output. It has crystal clear sound quality and DSP noise-filtering flat-speaker technology (only 6 mm thin in speaker area). Its full duplex speakers emit high-quality sound, plus it has noise- and echo-cancellation technologies that let callers hear the user better as well. Microphone: With built-in noise canceller extension. To operate the microphone, the user has only to push on the microphone shaft to pop it out. The user presses and releases the microphone shaft and it protrudes 4 cm outside of the device, thus switching it on. Conversely, the user switches it off as the user presses it and pushes it inside. This makes switching on/off extremely easy and comfortable. Moreover, in this way the distance between the microphone and the loudspeaker is beneficially increased.
Text-to-Speech technology announces incoming caller's name or Caller ID, device, call status and setup instructions.

Voice answer—answer calls with the user's voice command
Digital signal processor for noise and echo cancellation
Digital Volume Control
Supports voice dial activation, redial and call reject
Flashlight 1-W white LED, America LUMILED or Cree’s high-power LED.

Example 3

The description of an embodiment of the pendant wearable transceiver device 8 is set forth below.
Ultra-low-power consumption voice stream through the ZigBee platform. It has a 5-year battery-life.
Voice-enabled single chip (MG2450 or 2455) made available by Zigbee for voice-enabled applications such as transceiver operations.
Speaker: 50 mm, high-power 105 dB output powerful speaker with 3-W output. It has crystal clear sound quality and DSP noise-filtering flat-speaker technology (only 6 mm thin in speaker area). Its full duplex speakers emit high-quality sound, plus it has noise- and echo-cancellation technologies that let callers hear the user better as well.

Microphone: With built-in noise canceller extension. To operate the microphone, the user has only to push on the microphone shaft to pop it out. The user presses and releases the microphone shaft and it protrudes 4 cm outside of the device, thus switching it on. Conversely, the user switches it off as the user presses it and pushes it inside. This makes switching on/off extremely easy and comfortable. Moreover, in this way the distance between the microphone and the loudspeaker is beneficially increased.
Text-to-Speech technology announces incoming caller's name or Caller ID, device, call status and setup instructions.

Voice answer—answer calls with the user's voice command
Digital signal processor for noise and echo cancellation
Digital Volume Control
Supports voice dial activation, redial and call reject
Flashlight 1-W white LED, America LUMILED or Crees high-power LED.
Polyphonic ring tones
Vibration engine
Low-battery power alarm
Way-back feature
Firmware upgrade remotely (update phone book remotely)
Voice communication: GSM/GPRS simultaneously
SIM 10 code setting
Easy-to-read large white-on-black display
Emergency SOS panic button
Extra Loud +100 dB Ringer
Vibration alarm
250 name and number phone book
Hearing Aid Compatible with integrated induction coil (M3/T3-Rating)
Red LED to indicate out of range
A second button activates a 95-decibel panic alarm.

Cell phones, such as cell phone 12 described above, are expressly excluded from the definition of wearable transceiver devices 8. However, cell phone 12 may have some of the same features found in these wearable transceiver devices 8 plus additional features. As can be appreciated from Example 4, the cell phone 12 contains main batteries and reserve batteries. The cell phone 12 contains an assisted GPS chip which allows it to be

geographically located. The cell phone 12 has an accelerometer which allows it to detect a crash.
The cell phone 12 has an audible countdown timer to alert the user 4 that a crash has been detected and the existence of this event will be sent directly to the central monitoring station 6 unless the timer is inactivated within a preset time. The cellular phone 12 contains a communication button which, when pressed, directly connects the phone 12 with the central monitoring station 6. The cell phone 12 has the features of normal cell phones in that its numeric display can be used to contact other phones.

Example 4
A description of at least one embodiment of a cell phone 12 is set forth below:
Cold/Warm/Hot start time; 42/38/1 second
Sensitivity −159 dBm tracking
Battery Solution:
Lithium with AAA backup power from Techtium BackuPower TEC 103+TEC 2020 Standard battery: 1800 mAh Li-Ion High Capacity battery for 60 days of standby time.

Optional Batteries
With reference to FIG. 6, the device uses lithium for the primary battery and can use a variety of AAA batteries for backup charging the primary batteries up to 3-hour talk time. Nickel cadmium batteries (NI—NH) which allows the device to keep 85% of its charge for over 3 years if the device is not activated or Alkaline can give up to 10-year shelf life. The battery will be fully charged prior to shipping the product. This allows the device to be stored and used as needed, without losing any power.

Screen
The external display window measures 1.5 inches diagonally (26×26 mm) 128×128 pixels, monochrome with orange backlighting.

Memory
Optional 4 MB flash memory for data logging and/or mapping for different regions.
Microphone
Built-in high performance speaker microphone.
Flashlight ED Flashlight Processor
Ultra low power consumption Atmel AVR32UC3B processor
Standby and Talk Time
Standby time of 40 days and talk time of 16 hours. This time is less if GPS tracking is activated.

USB Port
Mini USB port for charging and data exchanging
Battery Charging
Optional induction charging plate that allows the user to simply place the cell phone on the charging plate for re-charge (no need for charging cable)

AGPS

Built-in AGPS (Navizon)/GPS/GSM/SMS modem can send the GPS coordinates via SMS or binary code which allows the cell phone to travel inside buildings and still be tracked.
Accelerometer
Crash detection is by a 3-axis G force sensor accelerometer from BOSCH BMA 150. Crash data is measured in the delta velocity.

Rugged Construction

The cell phone is certified to Military Standard 810 F for dust, shock, vibration, temperature extremes, low pressure, and solar radiation. It performs in extreme outdoor environments and stands up to dusty environments, drops, exposure to vibration from heavy machinery use, and hot/cold climates.

Rain Resistance:

The cell phone is certified to Military Standard 810 F for rain, humidity, and salt fog. It is designed to withstand exposure to rain, sleet, and snow. It has rubber casing, interior linings and connections against water intrusion.

Text-to-Speech

(TTS) Technology—announces incoming callers' name or Caller ID, device, call status

GPS Chip:

GPRS to integrate the data to the server.

Additional Features

Polyphonic ring tones, Vibration engine, Low battery power alarm, Way back feature, Firmware upgrade remotely (update phone book remotely), GSM/GPRS simultaneously, SIM 10 code setting, Easy to read large white on black display, Emergency SOS Panic Button, Extra Loud +100 dB Ringer, Large easy-to-read numbers, Vibration Alarm, 250 name and number phone book, Hearing Aid Compatibility with integrated Induction Coil (Rating: M3/T3), Red LED to indicate out of range, ability to answer calls with the user's voice command, digital signal processor for echo and noise cancellation, digital volume control, support for voice dial, and an 80 lumen LED flashlight.

The wearable transceiver devices 8 may be used in conjunction with other safety devices such as smoke detectors or similar safety devices. If a smoke detector is activated, the wearable transceiver devices 8 will be activated. If not deactivated within 15 seconds or some similar arbitrary predetermined time, the activated wearable transceiver device 8 will call the landline-based phone 10 or cell phone 12 to be connected to the central monitoring station 6, and, if connected to the monitoring station 6 by the cell phone 12, sending the AGPS-determined location via SMS and a signal informing the monitor of alarm activation.

It will be recognized that the wearable transceiver devices 8 may contain features in addition to those described above. The wearable transceiver device 8 preferably uses reserve or backup battery power using AAA batteries as shown in FIG. 6 to charge the main batteries. Thus, if the main batteries of the cell wearable transceiver device 8 are dead and the user 4 pushes the emergency button the reserve battery would charge the main batteries. Therefore, if the user 4 happens to leave the wearable transceiver device 8 in a drawer or glove box without using the device 8 and it loses its charge it has a

reserve battery that will charge the primary battery in emergency situations extending the dormant shelf life of the product for several years versus several months.

The wearable transceiver device 8 may contain a second button which is a GOOG 411 hot button for directory assistance. The wearable transceiver device 8 may provide turn-by-turn navigation through voice-guided directions or text providing written directions. The wearable transceiver device 8 may provide convenience services regarding products, services, or retail establishments, e.g., restaurants, ATMs, or hotels in the user's 4 area.

A lost cell phone 12 may be located by contacting a monitor 18 who can use AGPS technology to pinpoint the location of the cell phone 12 and who will then advise the user 4 of the phone's 12 location. The wearable transceiver device 8 may be programmed to remind a user's 4 caregiver or pharmacy to provide scheduled medication for the user 4. The wearable transceiver device 8 may display a notification of low battery life.
A virtual fence 24 may be placed around the device 8 and the user 4 may be notified by email, SMS, or a phone call from the monitor 18 if the fence 24 is breached.

The wearable transceiver device 8 may contain an additional button, which controls the way-back feature. The additional button may be pushed upon departing the vehicle. In the event the user 4 cannot find his or her vehicle in a parking lot, the way-back button may be pushed and an arrow directs the user 4 to the vehicle and the distance is displayed. The wearable transceiver device 8 may have the feature of induction charging allowing the battery of the device 8 to be recharged simply by laying the device 8 on a recharging pad rather than plugging the device 8 into an electrical outlet.

WE CLAIMS

1. Our invention "WOMEN SECURITY is a wearable accessory including a detachable/removable circuitry housing, a vibration generation means for producing a vibration, the vibration generation means housed within the housing. The invention is at least one switch for allowing a user of the wearable accessory to cause activation of the vibration generation means the switch housed within the housing a module for communicating with at least one handheld device using a communication protocol an image capturing device including a microphone for receiving audio and video signals at the wearable accessory. The invented technology is also a USB port for charging the wearable accessory a multiple-bit microprocessor is configured and coupled for controlling functions of the wearable accessory the microprocessor housed within the housing and a storage means for storing data representative of the signals the storage means coupled with the microprocessor. The invention is a safety system comprising a plurality of wearable transceiver devices for operation in independent use with a plurality of a landline-based phone and a cell phone to establish contact between a user of a wearable transceiver device and a central monitoring station. The invention is to the wearable transceiver devices sense a crash or a fall and notify a monitor by a landline-based phone or a cell phone of this incident and the assisted GPS determined location of the incident and the information is provided to the monitor a short predetermined time following activation unless the device is deactivated by pressing a communication button. The invention is to a device has not been activated by a crash or fall the user may press the communication button to communicate with the monitor to obtain a wide variety of services and a cell phone having reserve batteries, accelerometers, and assisted GPS location capabilities.
2. According to claim1# the invention is to a wearable accessory including a detachable/removable circuitry housing, a vibration generation means for producing a vibration, the vibration generation means housed within the housing?
3. According to claim1,2# the invention is to a at least one switch for allowing a user of the wearable accessory to cause activation of the vibration generation means the switch housed within the housing a module for communicating with at least one handheld device using a communication protocol an image capturing device including a microphone for receiving audio and video signals at the wearable accessory.
4. According to claim1,2,3# the invention is to a USB port for charging the wearable accessory a multiple-bit microprocessor is configured and coupled for controlling functions of the wearable accessory the microprocessor housed within the housing and a storage means for storing data representative of the signals the storage means coupled with the microprocessor?

5. According to claim1,2,3# the invention is to a safety system comprising a plurality of wearable transceiver devices for operation in independent use with a plurality of a landline-based phone and a cell phone to establish contact between a user of a wearable transceiver device and a central monitoring station.
6. According to claim1,2,4# the invention is to a wearable transceiver devices sense a crash or a fall and notify a monitor by a landline-based phone or a cell phone of this incident and the assisted GPS determined location of the incident and the information is provided to the monitor a short predetermined time following activation unless the device is deactivated by pressing a communication button.
7. According to claim1,2,4,5# the invention is to a device has not been activated by a crash or fall the user may press the communication button to communicate with the monitor to obtain a wide variety of services and a cell phone having reserve batteries, accelerometers, and assisted GPS location capabilities.

   Date: 12/1/21

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ABSTRACT

Our invention **"WOMEN SECURITY is** a wearable accessory including a detachable/removable circuitry housing, a vibration generation means for producing a vibration, the vibration generation means housed within the housing. The invention is at least one switch for allowing a user of the wearable accessory to cause activation of the vibration generation means the switch housed within the housing a module for communicating with at least one handheld device using a communication protocol an image capturing device including a microphone for receiving audio and video signals at the wearable accessory. The invented technology is also a USB port for charging the wearable accessory a multiple-bit microprocessor is configured and coupled for controlling functions of the wearable accessory the microprocessor housed within the housing and a storage means for storing data representative of the signals the storage means coupled with the microprocessor. The invention is a safety system comprising a plurality of wearable transceiver devices for operation in independent use with a plurality of a landline-based phone and a cell phone to establish contact between a user of a wearable transceiver device and a central monitoring station. The invention is to the wearable transceiver devices sense a crash or a fall and notify a monitor by a landline-based phone or a cell phone of this incident and the assisted GPS determined location of the incident and the information is provided to the monitor a short predetermined time following activation unless the device is deactivated by pressing a communication button. The invention is to a device has not been activated by a crash or fall the user may press the communication button to communicate with the monitor to obtain a wide variety of services and a cell phone having reserve batteries, accelerometers, and assisted GPS location capabilities.