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(54) SOCIAL CARE SYSTEM

(57) A social care system which utilises mobile devices as network nodes to extend a range of operation of a social alarm trigger device is described. The social care system 10 comprises a trigger device 100 and mobile electronic device 200. The trigger device 100 is arranged to transmit a first alarm signal 102 at a first, predetermined, radio frequency, and transmit a second alarm signal 104 at a second, different, radio frequency. The mobile electronic device 200 is arranged to monitor and process signals received at the second radio frequency 104, and in response to receiving such the second alarm signal 104, transmit a third alarm signal 202 at a third frequency to an operator of the social care system. Thus, the operator may be alerted to an emergency event without utilising the first alarm signal which is only processable by a hub unit 300 specifically paired with the trigger device 100; e.g. when the trigger device 100 is out of range of the hub unit 300.

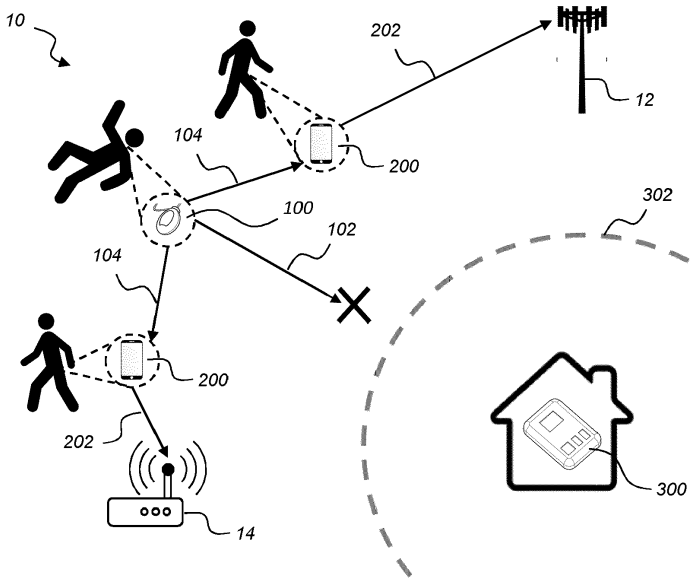

Fig. 2

EP 4 123 611 A1

Description

Field of the Invention

[0001] The present disclosure relates to a social care system, devices within that system and methods of operating that system. In particular the present disclosure is concerned with network range extension for a social alarm trigger of the social care system by distributed mobile nodes.

Background

[0002] Social care systems incorporating wearable devices for signalling emergency or distress are well known. For example, a common system includes a pendant worn around the neck, which communicates with a hub unit installed somewhere centrally in a client's residence. When the alarm device is activated, either manually by the client or by a predetermined trigger event occurring, such as the client falling over, a signal is sent to the hub unit which in turn raises the alarm with an operator of the social care system. The operator might be an on-site carer (e.g. at a dedicated social care facility) but is more commonly situated at a remote call centre. Once the alarm is raised, on-site aid may be dispatched to the client.

[0003] Currently the alarm device worn by the client can only alert the operator of an alarm activation if the device is within range of the hub unit; typically, up to 400m in open air and 50m indoors (through walls). As such the social alarm device is inoperable when the wearer is away from their residence. Consider that the client could be shopping, walking the dog, or away from home for a weekend, etc. In such a situation an alarm raised by the alarm device will not result in appropriate action being taken (e.g. help being dispatched) because the operator will never receive an alarm notification.

[0004] Consider also that many clients managed by the social care system are not technology savvy, and as such may not be able to raise an alarm using alternative means such as by calling the call-centre directly using a phone; particularly in high stress emergency situations when the client might be in significant discomfort and possibly immobile.

[0005] It is therefore highly desirable to develop techniques for raising an alarm in a social care system that overcomes such limitations.

Summary

[0006] The example embodiments have been provided with a view to addressing at least some of the difficulties that are encountered with current social care systems whether those difficulties have been specifically mentioned above or will otherwise be appreciated from the discussion herein. In particular it is an aim to mitigate the range limitation of current trigger devices and minimise the associated inoperable periods.

[0007] The example embodiments build upon recent changes in Android and iOS ecosystems due to "Covid-19 track and trace" development to leverage a distributed network of mobile device users (primarily envisaged as friends and family) to relay social alarms from an alarm trigger device to a call centre when out of range of the central hub.

[0008] The present invention is defined according to the independent claims. Additional features will be appreciated from the dependent claims and the description herein.

[0009] In one aspect of the invention there may be provided a social care system for raising an alarm with an operator. The social care system comprises a trigger device and mobile electronic device. The trigger device is arranged to transmit a first alarm signal at a first, predetermined, radio frequency, and transmit a second alarm signal at a second, different, radio frequency. The mobile electronic device is arranged to monitor and process signals received at the second radio frequency, and in response to receiving the second alarm signal from the trigger device at the second radio frequency, transmit a third alarm signal to the operator at a third frequency.

[0010] In this way an operator of the system may be alerted to an emergency event (via the third alarm signal) without utilising the first alarm signal which can be received and interpreted only by a hub unit which is paired with that trigger device. Beneficially the operator may be alerted to an emergency when a client using the trigger device is outside a normal range of communication of the first alarm signal (i.e. out of range of the associated hub unit, due to e.g. attenuation of the first alarm signal). Suitably the third frequency may be a frequency suitable for transmitting long-range communications, such as a telecommunications network frequency or a Wi-Fi network frequency (for transmission over the internet).

[0011] The third alarm signal preferably includes identifier information on the trigger device (initially transmitted with the second alarm signal) and location data obtained from the mobile device. In this way the operator is provided with useful information on who (i.e. which client) is raising an alarm and where they are located, allowing aid to be dispatched to the area in which the alarm originated.

[0012] The second radio frequency is preferably a Bluetooth low energy frequency. Utilising Bluetooth beneficially allows communication with a broad range of third party mobile devices, has very low power requirements so as to extend an operational lifespan of the trigger device, and is particularly suited for very short range communication meaning that any location data transmitted with the third alarm signal is localised to the area in which the client experiencing an emergency is located.

[0013] In another aspect of the invention there is described a social alarm trigger device for use in the aforementioned system. The trigger device comprises a first radio frequency 'RF' unit configured to transmit at a predetermined radio frequency (e.g. for normal communica-

tion with a hub unit), and a second RF unit configured to transmit in a Bluetooth low energy band. The trigger device also comprises a processor configured to, in response to detecting a trigger event, control the first RF unit to transmit a first alarm signal at the predetermined radio frequency and control the second RF unit to transmit a second alarm signal at a Bluetooth low energy frequency. The second RF unit may be particularly optimised for short range operation at up to ten metres.

[0014] The components of the social alarm trigger device may be suitably configured to only be in operation when required, so as to extend longevity of the trigger device by reducing power consumption. In particular the processor may wake both the first and second RF units from a low power mode in order to transmit the first alarm signal. The second RF unit may optionally be woken from low power mode to transmit the second alarm signal when it is determined that an acknowledgement signal has not been received from a hub unit (e.g. after a suitable time delay).

[0015] In another aspect of the invention there is described a method corresponding to the aforementioned system.

Brief Description of the Drawings

[0016] For a better understanding of the present disclosure reference will now be made to the accompanying drawings, in which:

Fig. 1 shows a prior art social care system;

Fig. 2 shows an improved social care system;

Fig. 3 shows an example trigger device for use in the improved social care system; and

Fig. 4 shows a method of operation of an improved social care system.

Detailed Description

A typical social care system

[0017] Figure 1 shows an example prior art social care system. The system includes a trigger device 1 configured to transmit a radio frequency (RF) alarm signal 2 to a hub unit. The trigger device 1 has a unique identifier which is registered to the hub unit 3, such that the alarm signal 2 may only be interpreted by the specific hub unit 3, and not another hub unit; in essence, the trigger device 1 and hub unit 3 are 'paired' to each other.

[0018] The trigger device 1 is designed to be born on the body of a client 4, such as a pendant, watch, or belt clip. An example trigger device 1 is a fall detector. These devices comprise means to detect that the client 4 has fallen over and in turn trigger the transmission of the alarm signal 2; one example means is an accelerometer. Such devices are well known in the art and are not covered in further detail here.

[0019] The hub unit 3 is configured to contact a remote operator using a public switched telephone network (PSTN) when it receives the alarm signal 2 from the trigger device 1. Speakers on the hub unit 3 may output the operator's voice. A microphone may additionally be provided to allow for the client 4 to talk back to the operator.

[0020] The hub unit 3 is typically installed somewhere central within a client's residence 5, in order to improve the chances of the alarm signal being received by the hub unit 3. In some example systems, the hub unit 3 is configured to transmit an acknowledgement to the trigger device 1 that the alarm signal 2 has been successfully received (using the same frequency as the alarm signal 2).

[0021] The trigger device 1 and hub unit 3 are configured to operate on a radio frequency which is specifically reserved for social alarm systems. This applies whether the system is setup for one-way alarm transmission or two-way, bidirectional, alarm and acknowledgement. That is, signals transmitted between the trigger device 1 and hub unit 3 are all done at the reserved frequency. For most countries, the reserved frequency lies within the frequency band ranging from 312 MHz to 921 MHz (megahertz). By way of example, in the UK the reserved frequency is 869.2125MHz. It will of course be appreciated that other reserved frequencies could be utilised. Only transmission of alarm information is permitted on the reserved social alarm frequency.

[0022] For social alarms operating in the reserved frequency band of 312 to 921 MHz, the typical range of operation is up to around 400 metres in open air and 50 metres indoors (through walls); thus a social alarm trigger event can only successfully be received by the central hub (and then alerted to the operator) if the two units are within that range. As will be readily apparent, clients of the social alarm system can readily fall outside of the maximum range of alarm signal transmission, meaning that their alarms will not be passed on to the call centre and hence appropriate action will not be taken to help them.

Extending the operating range of a social care system

[0023] Figure 2 shows an improved social care system 10 with extended operating range. In particular, the social care system 10 facilitates raising of an alarm with an operator of the system when the client is outside an operating range of the social alarm signal (i.e. a range at which the alarm signal may be successfully received by a hub unit 300).

[0024] The system 10 comprises a social alarm trigger device 100. The trigger device 100 is arranged to transmit a first alarm signal 102 in response to a trigger event. The exact mechanism of event detection may be varied according to a particular use case of the trigger device 100, as will be familiar to those in the art; one example

is fall detecting. The alarm signal 102 is transmitted at a first radio frequency, which is preferably a frequency within the reserved social alarm frequency band. Other predetermined frequencies reserved for communication with the hub unit 300 may also be employed by the trigger device 100. When the trigger device is within a communication range 302 of the hub unit 300 (which will vary according to environment), an alarm may be raised with an operator of the system by the hub unit 300 (for example via PSTN, Voice over Internet Protocol 'VoIP', and/or a telecommunications network).

[0025] The trigger device 100 is also arranged to transmit a second alarm signal 104. The second alarm signal is transmitted at a second, different, radio frequency to the first frequency; in this way cross talk between the two frequency signals may be minimised, and also the second frequency may be tailored for reception by devices other than the hub unit 300. For example, the second frequency may be in the 2.4 GHz (gigahertz) radio frequency (RF) band ranging from 2400 to 2500 Mhz. Like the first alarm signal 102, the second alarm signal 104 may also include data which identifies the alerting trigger device 100.

[0026] In a preferred example the second radio frequency is within the Bluetooth low energy (BLE) band; that is, a frequency of 2.402 to 2.480 MHz and operating on one of 37 data channels (spaced apart by 2 MHz) within that band, as dictated by Bluetooth version 5.2 (and other compatible versions). Suitably the second alarm signal in this example is formatted for transmission (and subsequent receipt) by Bluetooth communication protocols.

[0027] Advantageously BLE provides an ultra-low power protocol for data transmission and receipt via radio frequency communication. As such, utilising Bluetooth provides the trigger device 100 with excellent longevity compared with other radio frequency communications. In a typical use case, it is expected that the trigger device should be operable for at least 5 years without requiring a battery change (indeed many social alarm trigger devices have unchangeable batteries, requiring replacement of the whole unit when the battery dies).

[0028] Moreover, Bluetooth 5.2 is the current Bluetooth standard for modern devices, particularly smart phones, and is also backwards compatible to at least Bluetooth version 4; thus, a BLE enabled trigger device 100 may readily communicate with a wide range of third party devices (which are also configured to utilise Bluetooth). It will therefore be appreciated that the second alarm signal may be received and interpreted by any device running BLE within range of the trigger device 100. The theoretical maximum range of BLE is 100 metres, however most BLE devices, including the trigger device 100, are configured to communicate at ranges up to around ten metres. BLE components are also readily available and commonplace in electronic devices, making it easier to source components and manufacture into the trigger device 100.

[0029] The social care system care also comprises a mobile electronic device 200. The mobile device 200 is suitably configured to monitor and process signals received at the second radio frequency. In the example whereby the trigger device 100 utilises BLE for the second alarm signal, the mobile device 200 may be suitably arranged to also communicate using BLE. Moreover, the mobile device 200 is suitably arranged to have its Bluetooth functionality in operation, so as to be ready to receive and transmit signals, though may not currently be in active operation (i.e. Bluetooth is running as a background process on the device 200, but is not actively being used to send or receive data). When the mobile device 200 receives an RF transmission from the trigger device 100, the signal is suitably analysed to identify the second alarm signal 104 within the transmission.

[0030] In response, the mobile device 200 is arranged to generate a third alarm signal 202 and transmit this alarm signal 202 to the operator of the social care system. The third alarm signal is transmitted at a third frequency which is different to the first frequency (e.g. is not the reserved social alarm frequency) and may also be different to the second frequency (though might otherwise be within the same frequency band, e.g. the 2.4 GHz band). The third frequency is suitably chosen for transmission of the third alarm signal 202 to the operator over a suitable network.

[0031] Preferably, the third frequency is a frequency which allows the third alarm signal to be transmitted using suitable telecommunication infrastructure 12. For example, the third frequency may be selected from one of 2G (including 900 MHz and 1800 MHz band), 3G (including 900 MHz and 2100 MHz bands), 4G (including 800 MHz, 1400 MHz, 1800 MHz, 2100 MHz, 2300 MHz, and 2600 MHz bands), or 5G (including 3400 MHz, 3600-4000 MHz bands). This list is non-limiting and other telecommunication frequencies could also be used.

[0032] Suitably the third frequency is variable based on whatever communications frequency the mobile device 200 is currently communicating on. For example, even though the mobile device 200 may be capable of transmitting at 5G frequencies, the third alarm signal may be transmitted at 4G frequencies if the mobile device 200 is not within range of its 5G service. When using mobile communication, a range of formats for the alarm signal may be appropriate. In one example, the third alarm signal 202 may be transmitted as an SMS to a specific operator number. In another example the third alarm signal 202 may be transmitted using mobile internet as a data packet direct to an IP address associated with the operator.

[0033] In another example the third frequency is a Wi-Fi frequency within the 2.4 GHz band, which allows the mobile device 200 to communicate with a nearby Wi-Fi router 14. That is, the third alarm signal 202 may be transmitted using the internet via a Wi-Fi network to which the mobile device 200 is authenticated. The selection of Wi-Fi or mobile telecommunication frequency for transmis-

sion of the third alarm signal 202 is not exclusive. For example, Wi-Fi might be utilised if no telecommunications service is available to the mobile device 200. Moreover, both Wi-Fi and telecommunications frequencies may be utilised to send copies of the third alarm signal 202, thereby providing redundancy and improving reliability of the system. In other words, multiple third frequency alarm signals 202 may be transmitted at different frequencies.

[0034] In this manner the third alarm signal 202 may be transmitted to the operator regardless of the distance of the client 4 to the hub unit 300; in particular, when the client 4 is outside an operating range 302 of the hub unit 300 (that is, a range outside which the alarm signal 102 becomes too attenuated to be received correctly by the hub unit 300). To identify the client 4, the third alarm signal 202 includes identifier information which has been extracted from the second alarm signal 104, and is therefore associated with the trigger device 100, and the owner (client) 4 of that trigger device 100. The alarm third alarm signal 202 also includes location information, such as GNSS data, so that the operator may provide suitable location data to those dispatched to provide aid to the client 4.

Social alarm networking via 'smart' devices

[0035] The mobile device 200 may be suitably realised by a range of modern electronic devices, in particular so called 'smart' devices such as, but not limited to, smart phones. That is, devices which comprise means for: receiving and transmitting RF signals (e.g. one or more antennas), particularly Bluetooth; storing, processing, and manipulating those RF signals and for storing and executing programs to do so (e.g. a memory, processors, etc), and; performing long range communication (e.g. using the internet, cellular telecommunication connections).

[0036] As such, the mobile device 200 may be controlled by a suitable application installed onto the mobile device 200; i.e. stored on the device memory and executed by the device processor. The second alarm signal 104 may be formatted to initiate a push notification to the application via BLE. Push notifications may be processed in real time, and therefore the application may respond quickly, in real time, to initiate the onward alarm signalling procedures (i.e. the third alarm signal 202). In response to receiving the push notification, the application may extract the identity of the trigger device 100 from the BLE data packet of the second alarm signal 104, and also obtains location data of the mobile device 200. The application then uses the trigger identity and mobile location data to generate the third alarm signal 202, and controls the mobile device 200 to forward the third alarm signal 202 using an appropriate network and communication protocol (which may vary based on current network coverage).

[0037] Previously, such functionality would not have been possible due to the inability of non-operating system applications (non-native apps) to utilise Bluetooth in real-time while running in the background of a smart device; at least on Android and iOS devices. Historically, applications which were not running in the foreground of a smart device could not be serviced by Bluetooth, or in the rare occasions they were, would only be serviced infrequently. It will be appreciated that infrequent servicing (i.e. intermittent, non-real time, Bluetooth notifications) are inappropriate for raising alerts during an emergency situation. Recent changes to these operating systems in the wake of the Covid-19 crisis now allows non-native applications to receive real-time Bluetooth notifications while those apps are running in the background, and this functionality may be leveraged for raising social alarms as outlined above.

[0038] Thus the operating range of the social care system may be increased by, in essence, extended the social alarm network to include third party smart devices which are running a social alarm application (and advantageously the application need only run as a background process). That is, the range of the social alarm system is extended beyond what can be achieved with direct communication between the hub unit 300 and trigger device 100. Put another way, a distributed network, akin to a mesh, of radio receiving/transmitting equipment (network nodes) is utilised to operate in much wider way than would be possible via the hub unit 300 alone.

[0039] In particular, it is envisaged that network extension will be primarily achieved by family, friends, and carers installing and running the app in the background of their smart phone. Of course, the wearers own smart phone could also be utilised, however it is not yet common for the typical demographic of clients in social care environments to own, or understand how to operate, smart devices. As such, reliance on a client owned smart device is not preferred. Rather, it is preferable to have many devices operating simultaneously to transmit alarm signals to the operator. Multiple simultaneous (third) alarm signals may be readily resolved at the operator end owing to the trigger device identifier included in the alarm signal.

[0040] As the number of people who install the application increase (e.g. because they have loved ones in a social care environment operating the system 10), so the number of network nodes increases, and the total network coverage of the social care system 10 increases. Thus the need for the client to be within a small range of the hub unit 300 is lessened, and periods of inoperability of the social alarm system are reduced. In this way the client 4 may be more confident of an emergency alarm being raised even should they go to the shops for a pint of milk, walk the dog, or be away from home for the weekend, etc.

Example Trigger Device

[0041] Figure 3 shows an example trigger device 100

for use in the system 10 in greater detail. That is, a social alarm trigger device 100 for raising an emergency alarm with an operator of the social care system 10.

[0042] The trigger device 100 comprises a first RF unit 110. The first RF unit 110 is configured to transmit the first alarm signal 102 at the first (predetermined) frequency, which is preferably the reserved social alarm frequency. Suitably the first RF unit comprises an antenna 112 configured to transmit at the first frequency, and may be implemented in one example as a transmitter only. In another example the antenna 112 is configured to receive an acknowledgement from the hub unit 300 at the first frequency, and so may be implemented as a transceiver.

[0043] The first alarm signal 102 is generated by a processor 106 in response to a sensor 108 indicating that a trigger event has occurred. Suitably the sensor 108 comprises means for detecting an emergency event. For example, the sensor 108 may include a means for detecting a fall, and may include an accelerometer, and a trigger event may be determined as occurring when the accelerometer measures an acceleration above a certain threshold. The first alarm signal 102 may also be generated in response to a manual input from the client 4; e.g. by actuation of a button. The first alarm signal 102 may also include a unique identifier (ID) which identifies the particular trigger device 100 transmitting the first alarm signal 102.

[0044] The first RF unit 110 is preferably inactive, or at least in a low power consumption state (e.g. a sleep mode), until such time as the trigger event is detected by the sensor 108, after which the first RF unit 110 may be powered on (i.e. woken from low power mode) and instructed by the processor 106 to transmit the first alarm signal 102.

[0045] The trigger device 100 also comprises a second RF unit 114. The second RF unit 114 is configured to transmit the second alarm signal 104 at the second frequency. The second alarm signal 104 also includes the unique identifier (ID) which identifies the particular trigger device 100. The second RF unit 114 is preferably inactive, or at least in a low power consumption state (e.g. a sleep mode), until such time as the trigger event is detected, after which the second RF unit 14 may be powered on (i.e. woken from low power mode) ready for transmission.

[0046] In one example, the second alarm signal 104 may be generated by the processor 106 in response to the sensor 108 indicating that the trigger event has occurred (as for the first alarm signal 102). In such a system the first alarm signal 102 and second alarm signal 104 are transmitted substantially concurrently. Thus, the system is beneficially provided with redundancy.

[0047] In another example, the second alarm signal 104 is generated after a time delay. The time delay may be set to correspond to a maximum time in which an acknowledgement signal is expected to be received from the hub unit 300 at the first frequency (taking into account signal transmission and processing time by both devices). If an acknowledgement signal is received from the hub unit 300 within the time delay window, then normal alarm signalling via the hub unit 300 has been successful and the second RF unit 114 may not be powered up (as there is no need to transmit the second alarm 104). Conversely, if no acknowledgement is received, then the processor 106 may generate the second alarm signal 104 and power up the second RF unit 114 to transmit the second alarm signal 104. In this way the second RF unit 114 is only powered when required, thereby improving overall power consumption of the trigger device 100.

[0048] Preferably the second frequency is within the Bluetooth low energy band. Suitably the second RF unit 114 may comprise an antenna 116 configured to transmit at BLE frequencies. Advantageously BLE has extremely low power requirements and is particularly suited for short range communication. Thus the antenna 116 may be optimised for good signal strength at ranges of up to ten metres while maintaining low power consumption (it will be appreciated that the power consumption of an antenna is related to its operating range - more range equals greater power consumption). Ten metres has been determined to provide a good compromise between power consumption and likelihood of being in communication range of suitable mobile device 200.

[0049] Moreover, not just the first RF unit 110 and second RF unit 114 are placed into a low power state when inactive. As much of the trigger device 100 as possible is placed into a low power mode when not in operation, provided that alarm functionality is not compromised. This is because a battery 118 of the device 100 will not usually be replaceable, owing to design parameters for the trigger device 100 which include ruggedness, lightness of weight, and International Protection Code (IP) 67/68 compliance (i.e. totally protected against dust ingress and protected from continuous liquid immersion at around 1 to 3 metre depth). Furthermore, the social care industry typically expects around 5 years of operation of a trigger device before the battery/device needs replacing. Thus it is advantageous for the device 100 to consume as little power as possible.

Method of Operation

[0050] Figure 4 summarises a method of raising an alarm in a social care system which incorporates network extension via one or more mobile electronic devices (e.g. smart phones).

[0051] At step 401, a first alarm signal is broadcast from the trigger device. The first alarm signal is broadcast at a first (predetermined) frequency receivable by a hub unit which is paired with that trigger device. The alarm signal is transmitted in response to actuation of the trigger device by either manual operation or a sensed event. Preferably the alarm signal is broadcast at a radio frequency specifically reserved for social alarm use.

[0052] At step 402, a second alarm signal is broadcast from the trigger device. The second alarm signal is broad-

cast at a second frequency, different to the first frequency, which is receivable by a mobile electronic device.

[0053] Steps 401 and 402 may occur substantially at the same time, or step 402 may be delayed with respect to step 401 to allow time for an acknowledgement signal to be received from the hub unit.

[0054] At step 403, a mobile device which has received the broadcast second alarm signal alerts an operator of the system by transmitting a third alarm signal at a third frequency. Suitably, the third alarm is transmitted over a network capable of long-range communication, such as a cellular telecommunications network or the internet (via a Wi-Fi connection).

[0055] Thus the operator may be alerted to an emergency event (i.e. one which triggered the alarm device) when the trigger device is outside the normal operating range of its associated hub unit.

[0056] In summary, exemplary embodiments of an improved social care system which implements wireless alerting of an operator via smart devices, in parallel with the existing social alarm method, has been described. In particular, the exemplary embodiments allow for increased range of operation of the social care system, wherein smart devices near the social alarm trigger device act as network nodes in the system.

[0057] The system and its components may be manufactured industrially. An industrial application of the example embodiments will be clear from the discussion herein.

[0058] Although preferred embodiment(s) of the present invention have been shown and described, it will be appreciated by those skilled in the art that changes may be made without departing from the scope of the invention as defined in the claims.

Claims

1. A social care system for raising an alarm with an operator of the system, comprising:

   a trigger device arranged to transmit a first alarm signal at a first, predetermined, radio frequency, and transmit a second alarm signal at a second, different, radio frequency; and
   a mobile electronic device arranged to monitor and process signals received at the second radio frequency, and in response to receiving the second alarm signal from the trigger device at the second radio frequency, transmit a third alarm signal to the operator at a third frequency.

2. The social care system of claim 1, wherein the second radio frequency is a Bluetooth low energy frequency.

3. The social care system of claims 1 or 2, wherein the second alarm signal includes identifier information of the trigger device.

4. The social care system of claim 3, wherein the third alarm signal includes identifier information of the trigger device.

5. The social care system of any preceding claim, wherein the third alarm signal includes location information.

6. The social care system of any preceding claim, wherein the third frequency is a frequency of communication with telecommunication infrastructure.

7. The social care system of claim 6, wherein the third frequency is variable based on current network coverage.

8. The social care system of any of claims 1 to 5, wherein the third frequency is a Wi-Fi frequency.

9. A social alarm trigger device for raising an alarm with an operator of a social care system, comprising:

   a first radio frequency 'RF' unit configured to transmit at a predetermined radio frequency,
   a second RF unit configured to transmit in a Bluetooth low energy band, and
   a processor configured to, in response to detecting a trigger event:

      control the first RF unit to transmit a first alarm signal at the predetermined radio frequency, and
      control the second RF unit to transmit a second alarm signal, at a Bluetooth low energy frequency.

10. The social alarm trigger device of claim 9, wherein the processor wakes the first RF unit from a low power mode in order to transmit the first alarm signal.

11. The social alarm trigger device of claim 9 or 10, wherein the second alarm signal includes a unique identifier of the trigger device.

12. The social alarm trigger device of any of claims 9 to 11, wherein the processor wakes the second RF unit from a low power mode in response to the trigger event.

13. The social alarm trigger device of any of claims 9 to 12, wherein the second alarm signal is transmitted in response to the processor determining that an acknowledgement signal has not been received from a hub unit via the first RF unit during a set time period.

14. The social alarm trigger device of any of claims 9 to

13, wherein the second RF unit is optimised for operation at ranges of up to ten metres.

15. A method for raising an alarm in a social care system, the method comprising:

transmitting, by a trigger device, a first alarm signal at a first, predetermined, radio frequency, the first alarm signal being identifiable by a social care hub unit,
transmitting, by the trigger device, a second alarm signal at a second radio frequency different to the first radio frequency,
receiving, by a mobile electronic device, the second alarm signal at the second radio frequency from the trigger device and, in response, transmitting a third alarm signal at a third frequency to an operator of the social care system.

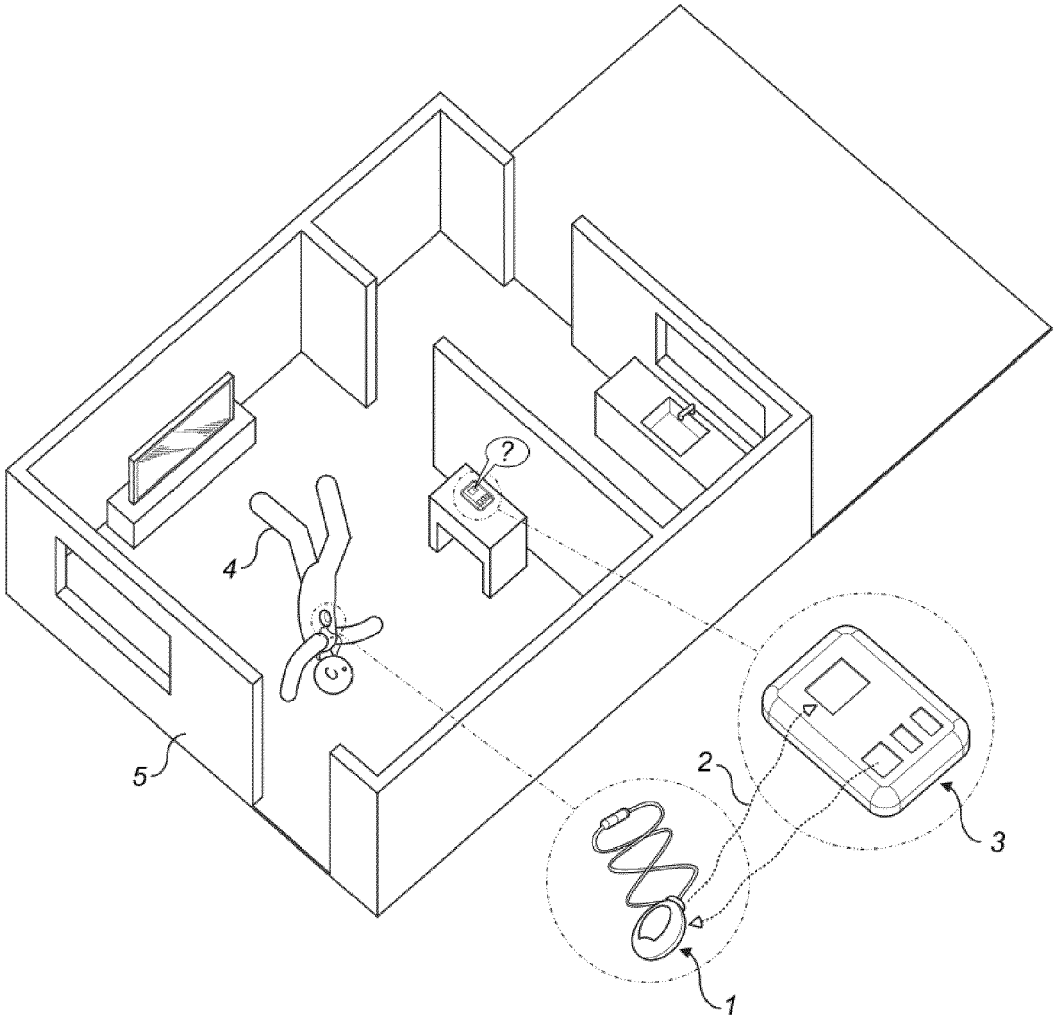

Fig. 1

- - PRIOR ART - -

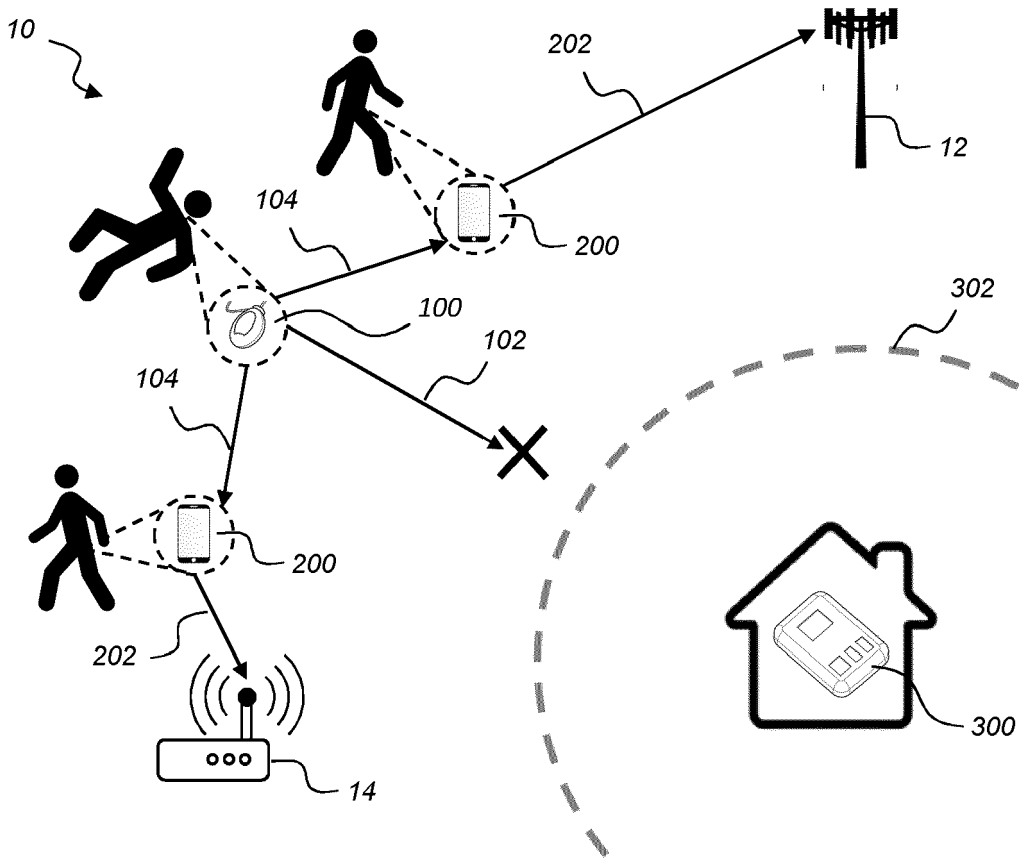

Fig. 2

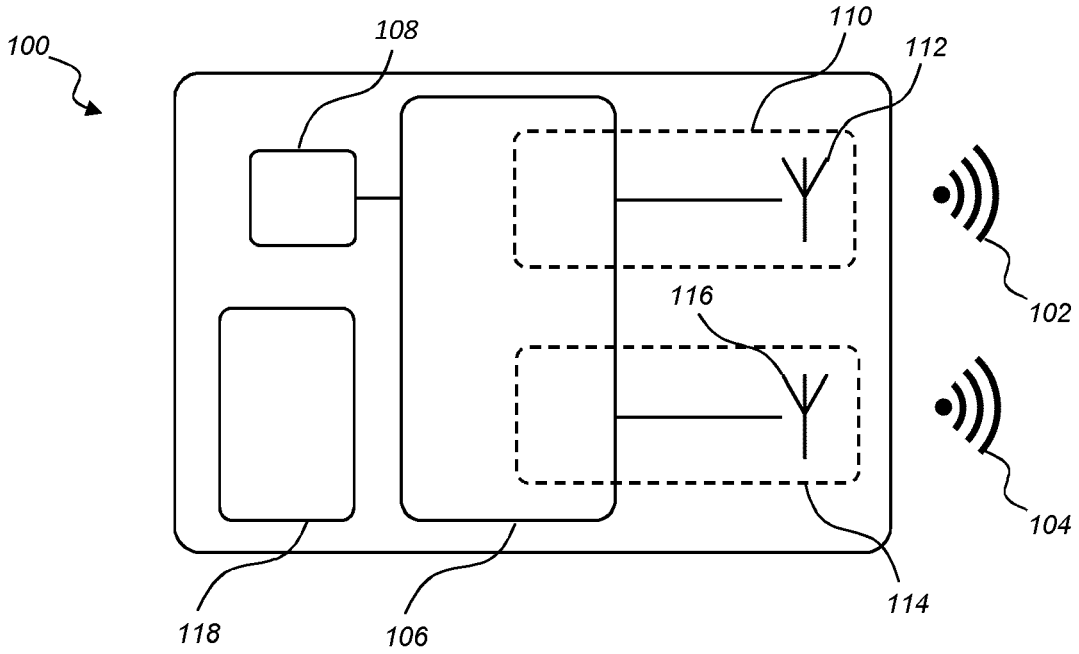

Fig. 3

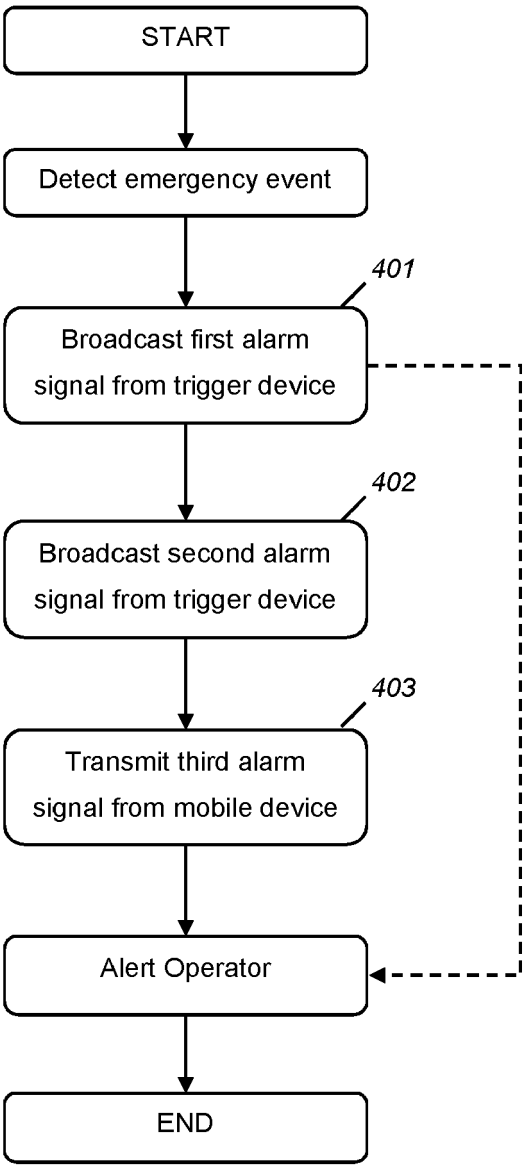
START
Detect emergency event
401
Broadcast first alarm signal from trigger device
402
Broadcast second alarm signal from trigger device
403
Transmit third alarm signal from mobile device
Alert Operator
END

Fig. 4

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EUROPEAN SEARCH REPORT

Application Number
EP 21 18 6788

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Y	* paragraph [0003] * * paragraphs [0005], [0006] * * paragraph [0008] * * paragraph [0013] * * paragraphs [0018], [0019] * * paragraphs [0031] - [0036] * * paragraph [0038] * * paragraph [0040] * * paragraphs [0042] - [0044] * * paragraph [0055] * * figures 1,2,3,4,6,7 *	10,12	
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	20 December 2021	Meister, Mark

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