Title: PERSONAL ALARM SYSTEM

Abstract: A method and a system for safeguarding the personal security of a particular person, by the use of a cellular phone and a server system (21) with software, capable of CLI detection and with data links to cellular mobile operators (13) to determine the position of the particular cellular phone calling. The server holds additional pre-stored personal data and information, which is added when alarm is automatically forwarded to an alarm central (22), utilising standardized alarm protocols. The response and action from the alarm central is configurable on an individual basis. In addition to or instead of the above alarm central transmission, the alarm message can be sent to a predetermined list of recipients by any type of mobile messaging.
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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.
Personal alarm system

Field of the invention

The present invention relates generally to an alarm system for personal security. In particular, the present invention is a system and method for expediting adopted actions by the connected alarm central and/or if needed also notifying several other persons whenever the personal security of the person is compromised and assistance is required.

Background of the invention

Emergency situations may arise anywhere. The emergency may be compounded by inclement weather, a disabling injury, etc. It is of a major interest to be able to quickly alarm about the situation in order to quickly be found and get assistance.

Generally, a person must dial an emergency number, and attempt to provide landmark or navigational data for the benefit of the authorities. These tasks are difficult when performed under the stress of an emergency situation, and they can be impossible when a person is disabled or has an injury.

Unfortunately, a cellular telephone only provides the communication link. It will not of itself perform the task of communicating. This task is left to the person. Consequently, the person must perform the following tasks:
1. remember the telephone number of the proper authorities; and
2. dial the number; and
3. convey landmark or navigational data to direct the respondents to the site; and
4. Communicate the type of situation and what type of assistance that is needed to the answering operator of the general emergency number.

In an emergency situation it is not always, due to time stress, possible to quickly give all information needed in order to get the proper and accurate assistance.

The time it takes to complete the above described tasks jeopardizes the health and security of the person. This is especially true when the person has no idea of his or her location and cannot provide the requisite navigational data and/or emergency situation information to the authorities. More often, the instructions and information provided are inaccurate, misleading, or misunderstood.
On the market surveillance companies provide alarm centrals on a commercial basis.
To be able to contact these specialised alarm centrals there is a need for a pre-registration and also the use of some kind of special apparatus equipped with the special protocols needed for communication with these alarm centrals. Typical equipment connected to these alarm centres are burglary alarms and elevator alarms using dial up connection.

A few devices with GPS satellite positioning capability and communication capability via cellular networks are also available on the market. These devices are specially designed as portable alarm devices. They are easily triggered by pressing a few buttons and are then predefined to initiate a call to an alarm central using standardized alarm communication protocols. When triggered, these devices send the alarm position and the special alarm identification code of the device, to the alarm centrals.

One drawback with these GPS based devices is the need for line of sight to at least two satellites preferably three for making a positioning. This reduces the use of these devices to outdoor use and then with specific problems in areas with high buildings. Through a method of continuous positioning and timestamp to each position, the last known position is transmitted when trigging the alarm. In areas like subways, garages or large indoor shopping areas this technique has obvious drawbacks. Also the unit should be worn outside of clothing to make best possible chance for an accurate positioning.

This means that an alarm trig with the most current position will be delayed, due to the fact that the person has to hold the device up into the air and wait for a proper positioning before being able to trig the alarm.

Making a phone call and store a phone number is a basic function of a cellular phone. All alarm call devices intended for wireless alarm functions depend upon additional functions to be able to send an alarm. These special alarm call devices need to have data saved and formatted in advance in order to be able to communicate automatically with the alarm central.

Also they depend upon GPS or similar satellite positioning data with earlier described drawbacks. The end users also find the cost for these specially designed or incorporated devices to be too high.

*Summary of the invention*
Current invention eliminates these drawbacks and can be used by all cellular phones as a special service after registration.

5 Personal security demands an automated, yet economical system for summoning an emergency response in accordance with the specific personal needs of the individual. This invention takes use of the available services of positioning within cellular network operators. This positioning service has the feature of being available at all locations where there is coverage of the cellular network. This means that the service normally is available even indoors where many crimes are conducted. The accuracy of the positioning will vary depending on specific areas but the most accurate positioning will be possible in dense areas where most of the alarm calls can be expected.

15 In a first aspect of the invention, a method for safeguarding the personal security of a particular person is provided comprising the steps of:
   - monitoring a range of incoming phone lines with different incoming phone numbers and detecting incoming Calling Line Identification (CLI) and the dialled number of the incoming trig-call;
   - comparing CLI to personal information pre registered and stored in a server, and determine action depending on stored information; several different sets of actions may be taken, depending of what number that was dialled and the pre-stored information;
   - establishing a data link to the mobile operator matched to the incoming CLI to get a location and position within the network through a positioning service of subscription;
   - formatting and preparing different digital messages aimed for mobile networks message data transmission or other digital message format, for example, but not limited to SMS, EMS, MMS, or E-mail including the retrieved information of the position and the personal data;
   - sending a digital message of confirmation receipt to the triggering cellular phone;
   - choosing to send or not send a digital message to list of known recipients according to personal stored information and dialled number;
   - choosing to send or not send a specially formatted alarm message to an alarm central for further actions according to personal stored information
and dialled number; different suitable and available alarm protocols may be set according to predefinition.

The method may further comprise the step of: sending identification code according to standard alarm transfer protocol and transferring the incoming voice mode call (trig call) from the alarm trig server to the said alarm central to enable a two-way voice communication between the operator of the said alarm centre and the person in need for help.

The method may yet further comprise the step of: the alarm trig server sending answering tones to trigger calling mobile phone to continue predefined dialling sequence with identification code if CLI should not be presented.

The method may still yet further comprise the step of: pre storing an emergency number in a short list in said cellular phone.

The method may further comprise the steps of:
- registering personal information in a system database at subscription of the alarm service;
- storing personal information relating to a particular person in an alarm trig server system, said personal information including a personal identification as well as other information characteristic of said particular person. The information may be shared, linked or transferred to the alarm central software through data interface;

In a second aspect of the invention, an apparatus for receiving incoming alarm trigs is provided, comprising:

an alarm trig system and software for detecting incoming calls and communicate with appropriate alarm central and mobile network operators; the server software holds a database of customer data with remote access to modify and create individual entries; the server software has a remote access so that the alarm central operator can access the individual data in a case of triggered alarm; the server software has the capacity of matching individual customer data to different and updateable modules for protocols for interfacing various positioning servers; the server software has the capacity of matching individual customer data to
different and updateable modules for protocols for interfacing various alarm centrals.

The invention may further be implemented in an alarm system comprising at least:

- a communication device;
- a communication infrastructure;
- an alarm trig server comprising: an alarm trig system and software for detecting incoming calls and communicate with appropriate alarm central and mobile network operators; the server software holds a database of customer data with remote access to modify and create individual entries; the server software has a remote access so that the alarm central operator can access the individual data in a case of triggered alarm; the server software has the capacity of matching individual customer data to different and updateable modules for protocols for interfacing various positioning servers; the server software has the capacity of matching individual customer data to different and updateable modules for protocols for interfacing various alarm centrals.

20  Brief description of the drawings

The above-described and other objects, features, and advantages will become more apparent from the following detailed description of the preferred embodiments and certain modifications there of when taken together with the accompanying drawing in which:

FIG. 1 shows an overview of a personal security system in accordance with the preferred embodiment of the present invention.

30  Detailed description of the preferred embodiment

Referring now to FIG. 1,
A personal security system and method according to the present invention includes a Cellular phone (12), which is transported along with a person (11). The cellular telephone (12) may be any conventional cellular telephone, connected to a public land mobile network PLMN (10), and pre-registered in the database of the alarm service server (21). The PLMN communicates with cellular phone through a network
of several base stations (15). The PLMN network is connected to the Public Switched Telephony Network PSTN (20). Hence, the present invention should not be construed as limited to a cellular telephone, any network with positioning service and interconnection to PSTN (10) is possible to use.

The personal data and phone number of the cellular phone and person is being registered when signing a subscription of the alarm service.

The personal security method also uses an alarm central (22), which is manned by an alarm central operator (23). This type of alarm central with automated registration and verification of incoming alarm calls is commonly available among surveillance companies.

The personal security system also includes an alarm trig server (21) that is a major part of the current invention.

In the preferred embodiment of the alarm trig server (21) the following features and functions are performed:

One or multiple interface and communication links for one or several public land mobile network PLMN (10), example but not limited to GSM, CDMA or any mobile operators providing location services. The communication to such service is often performed using TCP/IP over internet (30) but any conventional data link can be used.

Recognition of incoming calls from PLMN (10) through PSTN (20) by using CLI presentation.

Match CLI with the customer database.

Answer the alarm call by a voice message or use tone signaling to trigger incoming mobile phones to continue a dialing sequence in case of a “Secret CLI” or otherwise non presented CLI has been prompted by PSTN Network. Confirm and propose to hang up or alternatively dial the alarm central on a parallel line, send Identification code according to customer database in an alarm protocol format, example but not limited to P100, then transfer the original incoming call to the alarm central (22).

Format and send network specific digital messages to list of predefined recipients (14) according to individual match in customer database.
Format and send network specific digital message based alarm trig to Alarm central (22) including object code and position according to individual match in customer database.

External data interface for customer database create, update and read.

The alarm trig server (21) is controlled by database software to control and manage the above functions. The database will hold personal information to help and guide the alarm central operator (23) in an alarm situation. The information may consist of (as an example of but is not limited to) weight, length, hair color, eye color, frequently used addresses, eventual medicine prescription, known medical problems, a list of cellular phone numbers to friends (14) capable of receiving alarm notification, current PLMN operator, action list to perform upon alarm. This software may perform alone or in conjunction with existing alarm handling software at alarm central (22) where data can be separated or shared in any combination according to set up.

The software to enable external data interface to the alarm central operator (23) in order to access above information and features of repositioning, confirming and resetting alarm status during an alarm call situation.

In general operation, the client (11) carry the cellular phone (12) and, due to a variety of personal security conditions, manually triggers the dialling sequence (e.g. by choosing a pre stored emergency number from a short list in the cellular phone) to initiate a normal phone call to the Alarm trig server (21). The Alarm trig server will determine the CLI of the incoming call, compare this with the database of registered clients and establish a data link to corresponding mobile operator (13) with a predefined communication protocol. The service of positioning (13) is maintained on a subscription basis by the mobile operator. Individual subscription of this service is set up at first registration of each client in the alarm service. Positions can be obtained in two various formats, either the Latitude/Longitude format or a predefined description of the area corresponding to the current position. Both formats are asked for during the data link communication with the mobile cellular operator (13). Once the position is obtained several individually formatted digital messages will be initiated, one is formatted according to protocol used for transmitting alarm messages to the central alarm station (22) and one is
formatted for transmission to the individual list predefined known recipients (14). One is used to a reply back to initiating cellular phone (12) to confirm the trig. Above messages are set out as example and any number of messages may be used.

Once the alarm call is transferred, to the alarm centre (22) the information is conveniently displayed to the alarm central operator (23) through the use of common alarm protocols. In parallel the pre-stored personal data file is made accessible to the operator by the information stored in the alarm database of the alarm central.

It is the use of CLI or dialling sequence, combined with network positioning, and pre-stored personal information, that enables common cellular phones to communicate with the alarm central (22). The assistance from the alarm central operator (23) will be available even without the need of any additional manual information or action from the person in need (11) and actions can be launched according to predefinition and location provided. Should two-way speech communication additionally be possible the assistance may be adopted and focused accordingly. This allows the operator (23) to dispatch the proper responding agents. The response will be more efficient, more accurate and based on stored information. The alarm central operator (23) may also immediately contact the proper authorities depending on situation. The operator (23) can also provide supplementary information such as special health conditions of the person in need (for instance, diabetes, heart problems, etc.) and continuously monitor the position of the person through provided data links.

A method for safeguarding the personal security of a particular person according to the present invention, comprising the steps of:

- registering personal information in a system database at subscription of the alarm service;
- storing personal information relating to a particular person in an alarm trig server system, said personal information including a personal identification as well as other information characteristic of said particular person. The information may be shared, linked or transferred to the alarm central software through data interface;
monitoring a range of incoming phone lines with different incoming phone numbers and detecting incoming Calling Line Identification (CLI) and the dialled number of the incoming trig-call;

- comparing CLI to personal information and determine action depending on stored information. Several different sets of actions may be taken, depending of what number that was dialled and the pre-stored information;
- establishing a data link to the mobile operator matched to the incoming CLI to get a location and position within the network through the positioning service of subscription;

- formatting and preparing different digital messages aimed for mobile networks message data transmission or other digital message format, example but not limited to SMS, EMS MMS or E-mail including the retrieved information of the position and the personal data;
- Sending a digital message of confirmation receipt to the triggering cellular phone;
- sending or not sending digital message to list of known recipients according to personal stored information and dialled number;
- sending or not sending a specially formatted alarm message to an alarm central (22) for further actions according to personal stored information and dialled number. Different suitable and available alarm protocols may be set according to predefinition.

The method further comprises the step of, sending identification code according to standard alarm transfer protocol and transferring the incoming voice mode call (trig call) from the alarm trig server (21) to the said alarm central (22) to enable a two-way voice communication between the operator of the said alarm centre (23) and the person in need for help (11).

The method further comprises the step of the alarm trig server sending answering tones to trigger calling mobile phone to continue predefined dialling sequence with identification code if CLI should not be presented.

A server for receiving incoming alarm trigs according to the present invention, comprising:

- an alarm trig system and software for detecting incoming calls and communicate with appropriate alarm central and mobile network operators; the server software also holds a database of customer data with remote access to modify and create
individual entries; the server software has a remote access so that the alarm
central operator can access the individual data in a case of triggered alarm; the
server software has the capacity of matching individual customer data to different
and updateable modules for protocols for interfacing various positioning servers;
the server software has the capacity of matching individual customer data to
different and updateable modules for protocols for interfacing various alarm
centrals.

The invention may be implemented in software code in its entirety in a server or in
parts divided into one or several devices.

The invention may be implemented in an alarm system, comprising at least:
   – a communication device (12);
   – a communication infrastructure (15);
   – an alarm trig server (21) according to claim 6.

It should be noted that the word “comprising” does not exclude the presence of
other elements or steps than those listed and the words “a” or “an” preceding an
element do not exclude the presence of a plurality of such elements. It should
further be noted that any reference signs do not limit the scope of the claims, that
the invention may be implemented by means of both hardware and software, and
that several ”means” may be represented by the same item of hardware.

Having now fully set forth the preferred embodiments and certain modifications of
the concept underlying the present invention, various other embodiments as well as
certain variations and modifications of the embodiments herein described will
obviously occur to those skilled in the art upon becoming familiar with said
underlying concept. It is to be understood, therefore, that within the scope of the
appended claims, the invention may be practiced other than as specifically set forth
in the disclosure.
Claims

1. A method for safeguarding the personal security of a person, comprising the steps of:
   - monitoring a range of incoming phone lines with different incoming phone numbers and detecting incoming Calling Line Identification (CLI) and the dialled number of the incoming trig-call;
   - comparing CLI to personal information pre registered and stored in a database, and determining action depending on stored information; several different sets of actions may be taken, depending of what number that was dialled and the pre-stored information;
   - establishing a data link to the mobile operator matched to the incoming CLI to get a location and position within the network through a positioning service of subscription;
   - formatting and preparing different digital messages aimed for mobile networks message data transmission or other digital message format, for example, but not limited to SMS, EMS, MMS, or E-mail including the retrieved information of the position and the personal data;
   - sending a digital message of confirmation receipt to the triggering cellular phone;
   - choosing to send or not send a digital message to list of known recipients according to personal stored information and dialled number;
   - choosing to send or not send a specially formatted alarm message to an alarm central (22) for further actions according to personal stored information and dialled number; different suitable and available alarm protocols may be set according to predefinition.

2. The method according to claim 1, further comprising the step of, sending an identification code according to a standard alarm transfer protocol and transferring said incoming voice mode call (trig call) from an alarm trig server (21) to said alarm central (22) to enable a two-way voice communication between an operator of said alarm central (23) and the person in need of help (11).

3. The method according to claim 1 or 2, further comprising the step of an alarm trig server sending answering tones to trigger calling mobile phone to continue predefined dialling sequence with identification code if CLI should not be presented.
4. The method according to claim 1, further comprising the step of pre-storing an emergency number in a short list in said cellular phone.

5. The method according to claim 1, further comprising the steps of:
   - registering personal information in a system database at subscription of the alarm service;
   - storing personal information relating to a particular person in an alarm trig server system, said personal information including a personal identification as well as other information characteristic of said particular person. The information may be shared, linked or transferred to the alarm central software through data interface;

6. A server (21) for receiving incoming alarm trigs comprising:
   an alarm trig system and software for detecting incoming calls and communicate with appropriate alarm central and mobile network operators; the server software holds a database of customer data with remote access to modify and create individual entries; the server software has a remote access so that the alarm central operator can access the individual data in a case of triggered alarm; the server software has the capacity of matching individual customer data to different and updateable modules for protocols for interfacing various positioning servers; the server software has the capacity of matching individual customer data to different and updateable modules for protocols for interfacing various alarm centrals.

7. An alarm system comprising at least:
   - a communication device (12);
   - a communication infrastructure (15);
   - an alarm trig server (21) according to claim 6.
A. CLASSIFICATION OF SUBJECT MATTER

**IPC7: G08B 21/02, H04M 11/04**
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

**IPC7: G08B, H04M**

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

**SE, DK, FI, NO classes as above**

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

**EPO-INTERNAL, WPI, PAJ, INSPEC**

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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[X] Further documents are listed in the continuation of Box C.  
[X] See patent family annex.

* Special categories of cited documents

**A** document defining the general state of the art which is not considered to be of particular relevance

**E** earlier application or patent but published on or after the international filing data

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