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(71) Applicant 000233055
Hitachi Software Engineering Co., Ltd
1-14 Suehiro-cho, Tsurumi-ku, Yokohama-shi, Kanagawa-ken

(74) Agent 100091096
Yusuke Hiraki, patent attorney

(74) Agent 100105463
Mitsuo Sekiya, patent attorney

(74) Agent 100102576
Toshiaki Watanabe, patent attorney

(72) Inventor Hiroaki Ikeda
% Hitachi Software Engineering Co., Ltd.
4-12-7 Higashi Shinagawa, Shinagawa-ku, Tokyo-to

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(54) [Title of the Invention] Welfare Information Provision System

(57) [Abstract]
[Problem] To provide a welfare information provision system capable of collecting disaster victim welfare information quickly and publishing such welfare information without affecting congestion of communication lines immediately after a disaster occurs.
[Solution] A welfare information provision system, comprising a service center which is provided with a signal gathering processing unit which acquires from a mobile telephone carrier communication records between communication base stations and mobile telephone terminals carried by disaster victims and acquires location information of the mobile telephone terminals from the communication records, a terminal information storage unit which stores the acquired mobile telephone terminal location information, and a terminal information provision unit which provides the stored mobile telephone terminal location information, and a welfare information provision server which is provided with a terminal information acquisition unit which acquires the mobile telephone terminal location information from the service center, a welfare information storage unit which stores the acquired mobile telephone terminal location information as welfare

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information, and a welfare information provision unit which provides the stored welfare information.
[Selected Drawing] FIG. 1

[Claims]
[Claim 1]
A welfare information provision system, being a system that provides welfare information on disaster victims during a disaster via wireless base stations for mobile telephone terminals, comprising a service center which is provided with a signal gathering processing unit which acquires from mobile telephone carriers communication records between communication base stations and mobile telephone terminals carried by disaster victims and acquires location information of the mobile telephone terminals from the communication records, a terminal information storage unit which stores the acquired mobile telephone terminal location information, and

a terminal information provision unit which provides the stored mobile telephone terminal location information, and a welfare information provision server which is provided with a terminal information acquisition unit which acquires the mobile telephone terminal location information from the service center, a welfare information storage unit which stores the acquired mobile telephone terminal location information as welfare information, and a welfare information provision unit which provides the stored welfare information.
[Claim 2]
The welfare information provision system as claimed in claim 1, wherein the service center further comprises a means for acquiring and storing mapping information relating to locations of communication base stations from the mobile telephone carrier, and the terminal information provision unit of the service center provides the mapping information in association with the mobile telephone terminal location information.
[Claim 3]
The welfare information provision system as claimed in claim 1 or 2, wherein the welfare information provision server is provided with a disaster information storage unit which stores disaster information by area, and the welfare information provision unit provides the disaster information in association with the welfare information.
[Claim 4]
The welfare information provision system as claimed in any one of claims 1 to 3, wherein the welfare information provision server is provided with a use registration information storage unit which stores at least either a mobile telephone number or a mobile telephone terminal ID as user registration information.
[Claim 5]
The welfare information provision system as claimed in claim 4, wherein the terminal information acquisition unit acquires the mobile telephone terminal location information from the service center based on the mobile telephone number or mobile telephone terminal ID of users registered in the use registration information storage unit.
[Claim 6]
The welfare information provision system as claimed in claim 4 or 5, wherein the welfare information provision unit sends users the welfare information and the disaster information based on the registration information of users stored in the use registration information storage unit.
[Claim 7]

The welfare information provision system as claimed in any one of claims 1 to 6, wherein the welfare information provision server is provided with a means for receiving the welfare information of users affected by a disaster and storing this welfare information in the welfare information storage unit.

[Claim 8]

A system that provides disaster victim location information during a disaster, being a location information provision system having

a signal gathering processing unit which acquires from a mobile telephone carrier communication records between communication base stations and mobile telephone terminals carried by disaster victims and acquires location information of the mobile telephone terminals from the communication records,

a terminal information storage unit which stores the acquired mobile telephone terminal location information, and

a terminal information provision unit which provides the stored mobile telephone terminal location information.

[Claim 9]

The location information provision system as claimed in claim 8, wherein the location information provision system is provided with a means for acquiring and storing mapping information relating to the location of communication base stations from the mobile telephone carrier, and the terminal information provision unit provides the mapping information in association with the mobile telephone terminal location information.

[Claim 10]

A system that provides welfare information on disaster victims during disasters, being a welfare information provision system, having

a signal gathering processing unit which acquires from a mobile telephone carrier communication records between communication base stations and mobile telephone terminals carried by disaster victims and acquires location information of the mobile telephone terminals from the communication records,

a terminal information storage unit which stores the acquired mobile telephone terminal location information,

a disaster information storage unit which stores disaster information by region, and

a welfare information provision unit which provides welfare information of owners of the mobile telephone terminals based on the mobile telephone terminal location information and the disaster information.

[Detailed Description of the Invention]

[Technical Field]

[0001]

The present invention relates to a system that provides information relating to the welfare of preregistered disaster victims during major disasters, and relates more particularly to a welfare information provision system capable of rapidly and accurately providing disaster victim welfare information amid the confusion of information and communication lines immediately after a disaster has occurred.

[Background Art]

[0002]

Regional governments, so-called "lifeline companies" such as power and gas companies, and nonprofit organizations, among others, provide services including provision of disaster

prevention information, disaster assistance, and disaster response with the goal of ensuring the safety of local residents. Today there are disaster prevention portal websites which use the Internet to provide the aforementioned services, providing services which are of great use to their users, i.e., local residents.

[0004]

There is a strong demand for practical implementation of such services due to the fact that when a major disaster such as an earthquake occurs the number of telephone calls placed to check on disaster victims' welfare rapidly increases, congesting communication lines and making it impossible to make those welfare checks, and also due to the fact that it is difficult to easily acquire welfare information about individual disaster victims from information in television and radio broadcasts.

[0005]

The welfare information provision system described in Patent Literature 1 allows local residents to register for use of a server which has been set up on the Internet ahead of time and use mobile terminals or the like to transmit and store their own welfare information on the server if they ever become victims of a major disaster. Moreover, persons other than the disaster victims (e.g., family, friends, and acquaintances of the disaster victims) can access the server to make inquiries about and confirm the welfare information of specific disaster victims.

[0006]

Use registration, welfare check inquiries, and various other types of inquiries can be done with the welfare information provision system using a web browser on a computer terminal or mobile terminal, which is very convenient for users and keeps system setup and running costs low.

[0007]

[Patent Literature 1] JP 2002-342859 A.

[Disclosure of the Invention]

[Problem to Be Solved by the Invention]

[0008]

Incidentally, when a major disaster occurs, many telephone calls are placed in the disaster area immediately thereafter in order to request rescue and fire assistance and to check on the welfare of disaster victims. Therefore, communication lines in and around the affected area frequently become congested.

[0009]

This kind of congestion can happen with any kind of communication line, including land lines and mobile telephone and PHS (Personal Handy-telephone System) networks.

[0010]

Under these circumstances, the problems such as the inability to access the server due to communication line congestion arise when disaster victims attempt to send the server their own welfare information using the foregoing welfare information provision system.

[0011]

Attempts have been made to avoid congestion of communication lines during disasters by introducing redundant lines in the form of satellite communication lines or making line integration devices more robust, but such attempts are difficult to realize due to the high costs of such systems. The current situation is therefore that communication lines frequently become congested for hours or days after a disaster occurs.

[0012]

Accordingly, in reality it is common to settle for a compromise in which many existing welfare information provision systems are deemed sufficient if they're able to collect disaster victim welfare information once a certain amount of time has passed from when the disaster occurred and the communication lines are no longer congested, e.g., three or more days after a disaster.

[0013]

Nevertheless, the families of disaster victims want to find out whatever information is available about the welfare of the disaster victims as quickly as possible, and disaster victims themselves want to notify their families and others of their own safety or injuries as quickly as possible using welfare information systems. Beyond that, personnel involved in disaster recovery need to be able to use such welfare information systems to provide rapid notifications upon discovering persons who had been lost or are injured.

[0014]

In the face of such requirements, the very existence of welfare information systems is brought into question if they are unable to provide notifications or inquiries of disaster victim welfare information for hours or days after a disaster has occurred, which is a problem.

[0015]

Accordingly, the present invention was devised in view of these circumstances and provides a welfare information provision system capable of collecting disaster victim welfare information quickly and publishing said welfare information without affecting communication line congestion immediately after a disaster.

[Means for Solving the Problem]

[0016]

Since it is possible to identify the general location of disaster victims from communication records between the mobile telephone terminals carried by disaster victims and mobile telephone communication base stations when a disaster occurs, the inventors engaged in cutting edge research in view of the problem to be solved and arrived at the concept of acquiring communication records after a disaster and providing welfare information on the basis of the obtained disaster victim location information.

[0017]

Specifically, the present invention is a welfare information provision system, being a system that provides welfare information on disaster victims during a disaster via wireless base stations for mobile telephone terminals, comprising a service center which is provided with a signal gathering processing unit which acquires from mobile telephone carriers communication records between a communication base station and mobile telephone terminals carried by disaster victims and acquires location information of the mobile telephone terminals from the communication records, a terminal information storage unit which stores the acquired mobile telephone terminal location information, and a terminal information provision unit which provides the stored mobile telephone terminal location information, and a welfare information provision server which is provided with a terminal information acquisition unit which acquires the mobile telephone terminal location information from the service center, a welfare information storage unit which stores the acquired mobile telephone terminal location information as welfare information, and a welfare information provision unit which provides the stored welfare information.

[0018]

The "communication records" between the mobile telephone terminals and the communication base stations are records of control signals which mobile telephone terminals continuously send to and received from communication base stations in order to announce their own location and establish communication paths.

[0019]

In the welfare information provision system of the present invention, the service center further comprises a means for acquiring and storing mapping information relating to locations of communication base stations from the mobile telephone carrier, and the terminal information provision unit of the service center provides the mapping information in association with the mobile telephone terminal location information.

[0020]

The location information of a mobile telephone terminal can thereby be calculated based on the information of when the mobile telephone terminal communicated with which communication base station, and on the information relating to the location of the communication base station.

[0021]

In the welfare information provision system of the present invention, the welfare information provision server is further provided with a disaster information storage unit which stores disaster information by region, and the welfare information provision unit provides the disaster information in association with the welfare information.

[0022]

A disaster victim's welfare can be provided in greater detail by providing not just the disaster victim's mobile telephone terminal location information, but also disaster information of the specified location as well.

[0023]

In the welfare information provision system of the present invention, the welfare information provision server is provided with a use registration information storage unit which stores at least one of a mobile telephone number or a mobile telephone terminal ID as user registration information.

[0024]

Furthermore, the terminal information acquisition unit acquires the mobile telephone terminal location information from the service center based on the mobile telephone number or mobile telephone terminal ID of users registered in the use registration information storage unit.

[0025]

Furthermore, the welfare information provision unit sends users the welfare information and the disaster information based on the registration information of users stored in the use registration information storage unit.

[0026]

It is thus possible to easily identify the relevant disaster victim's mobile telephone terminal in the extensive communication records held by the service center. It is also possible to easily identify disaster victims using the mobile telephone numbers or mobile telephone terminal IDs and provide disaster victim welfare information.

[0027]

In the welfare information provision system of the present invention, the welfare information provision server is further provided with a means for receiving the welfare

information of users affected by a disaster and storing this welfare information in the welfare information storage unit.

[0028]

This lets disaster victims send the system their own welfare information after confusion has subsided following a disaster due to communication line congestion and the like, which makes it possible to provide even more reliable welfare information.

[0029]

The present invention is a system that provides disaster victim location information during a disaster, being a location information provision system having a signal gathering processing unit which acquires from a mobile telephone carrier communication records between communication base stations and mobile telephone terminals carried by disaster victims and acquires location information of the mobile telephone terminals from the communication records, a terminal information storage unit which stores the acquired mobile telephone terminal location information, and a terminal information provision unit which provides the stored mobile telephone terminal location information.

[0030]

In the location information provision system of the present invention, the location information provision system is provided with a means for acquiring and storing mapping information relating to the location of communication base stations from the mobile telephone carrier, and the terminal information provision unit provides the mapping information in association with the mobile telephone terminal location information.

[0031]

Furthermore, the present invention is system that provides welfare information on disaster victims during disasters, being a welfare information provision system, having a signal gathering processing unit which acquires from a mobile telephone carrier communication records between communication base stations and mobile telephone terminals carried by disaster victims and acquires location information of the mobile telephone terminals from the communication records, a terminal information storage unit which stores the acquired mobile telephone terminal location information, a disaster information storage unit which stores disaster information by region, and a welfare information provision unit which provides welfare information of owners of the mobile telephone terminals based on the mobile telephone terminal location information and the disaster information.

[Effects of the Invention]

[0032]

As described above, with the welfare information provision system according to the present invention is possible to be apprised of the location of a disaster victim's mobile telephone terminal basically in real time by continuously acquiring the communication records between mobile telephone terminals and communication base stations even during the period immediately after a disaster when communication lines are congested. It is also possible to make an inquiry for the welfare information of disaster victims by specifying features of disaster victims such as their mobile telephone numbers, partial names, ages, nicknames, and so on based on preregistered user information.

[0033]

Thus, a disaster victim's acquaintances and relatives can be apprised to a certain extent of the disaster victim's actions before and after the occurrence of a disaster even if they become incommunicado due to communication line congestion, which prevents them from checking on

the welfare of the disaster victim, thereby allowing them to respond calmly. Moreover, since placement of calls to check on welfare immediately after a disaster has occurred will be minimized, communication line congestion can be avoided.

[0034]

Furthermore, even if the disaster victim him or herself is unable to notify anyone of his or her welfare due to communication line congestion, the disaster victim's current location can be calculated from the mobile telephone terminal he or she is carrying. If the disaster victim knows that this location will be sent to friends and family, this eliminates any need for pointless worry, and enables the disaster victim to await the end of the disaster calmly.

[0035]

Regional governments and the like operating the welfare information provision system according to the present invention are able to stay on top of the impact of a disaster on local residents accurately and quickly, allowing effective rescue operations. For example, the welfare information provision system according to the present invention makes it possible to calculate the estimated number of people affected by a disaster based on the penetration rate of mobile telephones. Furthermore, movement of mobile telephone terminals during a disaster can be used to propose new evacuation plans after a disaster and formulate disaster prevention policies.

[Best Mode for Implementing the Invention]

[0036]

The best mode for implementing a welfare information provision system according to the present invention is described in detail below with reference to the attached drawings.

[0037]

FIGs. 1 to 12 are illustrations of embodiments of the present invention. Parts having the same reference numerals are the same and have basically the same configuration and operation.

[0038]

[1] General configuration of the welfare information provision system

FIG. 1 is a schematic view showing a general configuration of a welfare information provision system according to one embodiment of the present invention.

[0039]

In FIG. 1, a welfare information provision system according to the present embodiment includes welfare information provision servers 101, 102,..., a mobile terminal information service center 110, mobile telephone carrier companies 121, 122,..., communication base stations 131, 132, 133,... belonging to the mobile telephone carrier companies, a mobile telephone terminal 141 belonging to a disaster victim, and a PC terminal 151 and a mobile telephone terminal 152 for accessing the welfare information provision servers.

[0040]

The mobile telephone terminal 141 belonging to the disaster victim continuously communicates its own location to the communication base stations when within the communication range of any of the communication base stations 131, 132, 133,....

[0041]

The communication base stations 131, 132, 133,... accumulate logs of communications with mobile telephone terminals transmitting and present within their communication range and send these communication logs to the mobile telephone carrier company 121. The communication base stations 131, 132, 133,... may also transmit to the mobile telephone carrier company 121 the reception signal strength measured during communication with the mobile telephone terminal 141 together with the communication logs.

[0042]

The mobile telephone carrier companies 121, 122,... save the communication logs with mobile telephone terminals received from the various communication base stations on their own server devices or the like (this also includes information relating to the aforementioned reception signal strength; thus hereafter).

[0043]

Ordinarily, the communication logs are replaced with new ones after a certain amount of time has passed. Note that the mobile telephone carrier companies 121, 122... save at least mobile telephone terminal identification information, identification information of communication base stations performing communication, and communication time in the communication logs. It is thus possible to use the communication logs to establish that a specific mobile telephone terminal communicated with a specific communication base station at a specific time, making it possible to establish the location information of the mobile telephone terminal at that time.

[0044]

Furthermore, the mobile telephone carrier companies 121, 122,... calculate the location of a mobile telephone terminal using the locations of the antenna and the communication base station with which the mobile telephone terminal has communicated and may also save this together with the communication logs.

[0045]

The mobile telephone information service center 110 continuously acquires the communication logs saved at that time from the mobile telephone carrier companies 121, 122,.... Alternately, the mobile terminal information service center 110 may also acquire only the latest communication logs saved at that time (known as a snapshot dump). During ordinary operation, the mobile terminal information service center 110 also replaces communication logs with new ones after a certain amount of time has passed.

[0046]

The mobile terminal information service center 110 tabulates the acquired communication logs and saves them for a specific amount of time as location information of mobile telephone terminals. Alternately, if the mobile telephone carrier companies 121, 122,... calculate and save the locations of mobile terminals, the mobile terminal information service center 110 may also acquire this information together with the communication logs and save it for a specific amount of time as location information of the mobile telephone terminals.

[0047]

The welfare information provision servers 101, 102,... may, as needed (e.g., during a disaster), acquire location information of mobile telephone terminals from the mobile terminal information service center 110 and detect which mobile telephone terminals are registered in the present welfare information provision system, thereby acquiring the location information of those mobile telephone terminals.

[0048]

An inquiry of location information of the mobile telephone terminals acquired by the welfare information provision servers 101, 102,... can be made using a management terminal 101a, and a PC terminal 151 and a mobile telephone terminal 152 can also access the welfare information provision servers 101, 102 via communication line networks to allow inquiries for the location information of the mobile telephone terminals.

[0049]

Note that the mobile telephone carrier companies 121, 122,... and the communication base stations 131, 132, 133,... naturally are also provided with ordinary functionality for providing services such as telephone calls and email to other mobile telephone terminals, aside from the aforementioned functions.

[0050]

Furthermore, in the above, the disaster victim's mobile telephone terminal 141 and the mobile telephone terminal 152 for accessing the welfare information provision server include any terminal capable of communicating with any other mobile telephone terminal such as car telephone terminals, PHS terminals, satellite telephone terminals, and mobile information terminals.

[0051]

[2] Configuration of the mobile terminal information service center

FIG. 2 is a functional block diagram schematically showing the internal configuration of a mobile telephone information service center 110.

[0052]

In FIG. 2, the mobile terminal information service center 110 includes a signal gathering processing unit 230 which gathers and processes communication logs of mobile telephone terminals acquired from the mobile telephone carrier companies 121, 122,..., a mobile terminal information storage unit 210 which stores the gathered communication logs, a mapping information storage unit 220 which stores location information of base stations for each of the mobile telephone carrier companies 121, 122,..., and an extraction processing unit 240 which extracts information stored in the mobile terminal information storage unit 210 and the mapping information storage unit 220 using specific conditions.

[0053]

FIG. 3 is a schematic view showing a data structure stored in the mobile terminal information storage unit 210 of the mobile terminal information service center 110. In FIG. 3, the mobile terminal information storage unit 210 stores signal data 310 and signal data 320.

[0054]

The signal data 310 is the communication logs of the mobile telephone terminals gathered and processed by the signal gathering processing unit 230 of the mobile terminal information service center 110 stored in association with signal IDs. The records in the signal data 310 are made up of a signal ID 311, a reception date and time 312, a mobile telephone carrier company 313, and a communication log file body 314.

[0055]

The communication log file body 314 includes at least the data items included in the signal data 310 described below, even if the format is different for each of the mobile telephone carrier companies 121, 122,... which are the acquisition sources. In the example in FIG. 3, the file body 314 is a text file, and it is preferable for the signal gathering processing unit 230 of the mobile terminal information service center 110 to convert the communication logs in different formats for each of the mobile telephone carrier companies 121, 122,... into text files and then store them in the mobile telephone information storage unit 210.

[0056]

Note that the mobile terminal information service center 110 continuously acquires communication logs from the mobile telephone carrier companies 121, 122,..., so the signal data 310 is continuously updated by the latest communication logs during ordinary operation.

[0057]

The signal data 320 is the communication records between mobile telephone terminals and communication base stations acquired from the communication log file bodies 314 included in the records of the signal data 310 which have been gathered and processed. In the example in FIG. 3, the records in the signal data 320 are made up of a record time and date 321 for each communication, communication base station identification information 322, mobile telephone terminal identification information 323, and a mobile telephone terminal telephone number 324, but besides this, information relating to the communication record file body 314 at the data acquisition source, location information of mobile telephone terminals provided by the mobile telephone carrier companies, reception signal strength measured by the communication base stations, and so on may also be included for example. The signal data 320 can be used with the records sorted according to any data item.

[0058]

With this signal data 320 it can be established that, in the example in FIG. 3, communication base station A0001 communicated with a mobile telephone terminal having telephone number 0901**122**at 11:01 AM on 2002/07/15. In other words, the location information can be obtained for that mobile telephone terminal at that time.

[0059]

Note that the location information of the communication base stations can be obtained from base station area information 420 and base station location information 410 in the mapping information storage unit 220 described below using the base station ID as a reference key.

[0060]

FIG. 4 is a schematic view showing the data structure stored in the mapping information storage unit 220 of the mobile terminal information service center 110. In FIG. 4, the mapping information storage unit 220 stores the base station location information 410 and the base station area information 420.

[0061]

The base station location information 410 includes a base station ID 411, an address 412 thereof, and a postal code 413 thereof as information relating to the locations of the communication base stations of the mobile telephone carrier companies 121, 122,.... The base station location information 410 may also include other information indicating the locations of the communication base stations, such as the geographic coordinates.

[0062]

The base station area information 420 includes a base station ID 421, large area information 422, medium area information 423, and small area information 424 as area information which is set for the communication base stations of the mobile telephone carrier companies 121, 122,.... This area information indicates communication areas covered by each communication base station and is sent to the mobile terminal information service center 110 by the mobile telephone carrier companies 121, 122,....

[0063]

Accordingly, specifying the base station ID of the specific communication base station in the mapping information storage unit 220 allows acquisition of the address and communication area thereof.

[0064]

Returning to FIG. 2, the extraction processing unit 240 can extract location information for a mobile telephone terminal using specific conditions from information stored in the mobile terminal information storage unit 210 and the mapping information storage unit 220.

[0065]

The extraction process carried out by the extraction processing unit 240 includes a terminal extraction process 241 which extracts the location of a mobile telephone terminal by specifying the telephone number and terminal ID thereof, an area extraction process 242 which extracts the telephone numbers and terminal IDs of mobile telephone terminals present within a specific area, and a time range extraction process 243 which extracts the telephone number and terminal ID of mobile telephone terminals which have communicated with any of the communication base stations within a specific time range, etc. A combination of these processes can also be carried out.

[0066]

Alternately, besides an extraction process combining the extraction processes 241 to 243 above, any extraction process which can be used with the data structures in the mobile terminal information storage unit 210 and the mapping information storage unit 220 may be carried out.

[0067]

Note that ordinarily the extraction processing unit 240 carries out extraction processes in response to requests from the welfare information provision server 101, and the results are sent back to the welfare information provision server 101, but the present invention is not limited to this operation.

[0068]

As described above, in the welfare information provision system according to the present embodiment, the mobile terminal information service center 110 references the mobile telephone terminal communication logs acquired from the mobile telephone carrier companies 121, 122,... to provide location information of those mobile telephone terminals using the location information of the communication base stations with which the mobile telephone terminals have communicated, but it is also possible for the welfare information provision system according to the present embodiment to be provided with a means for providing more detailed location information of mobile telephone terminals.

[0069]

For example, it is also possible for the mobile terminal information service center 110 to be provided with a means for acquiring reception signal strength measured when a communication base station communicates with a mobile telephone terminal together with the communication logs to triangulate the location of the mobile telephone terminal using the reception signal strength and antenna location of the communication base station.

[0070]

[3] Configuration of the welfare information provision server

FIG. 5 is a functional block diagram schematically showing the internal configuration of the welfare information provision server 110. Note that the other welfare information provision servers 102,... have the same configuration.

[0071]

In FIG. 5, the welfare information provision server 101 includes a disaster victim location information acquisition unit 510 which acquires the location information of a disaster victim from the mobile terminal information service center, a management function unit 510 which manages operation of the server, a welfare information provision unit 530 which provides welfare information, etc., to the PC terminal 151 and the mobile telephone terminal 152 over communication line networks, a use registration information storage unit 540 which stores user registration information of the present system, a welfare information storage unit 550 which

stores welfare information of disaster victims, and a disaster information storage unit 560 which stores disaster-related information, etc.

[0072]

FIG. 6 is a schematic view illustrating a data structure stored in the use registration information storage unit 540 of the welfare information provision server 101. In FIG. 6, the use registration information storage unit 540 stores use registration information 610, information 620 relating to welfare information inquiries, and information 630 relating to welfare information notification destinations.

[0073]

The use registration information 610 is the user information stored in the system, specifically including a user ID 6 11, a password 612, a name 613, a sex 614, a date of birth 615, an email address 616, a publishing restriction 617, a mobile telephone number 618, a mobile telephone terminal ID 619, etc., for each user.

[0074]

Besides this, information useful for identifying individual users may also be included. Registered users are users who can make an inquiry for disaster victim welfare information in the system during a disaster and persons subject to provision of welfare information when affected by a disaster.

[0075]

The publishing restriction 617 included in the use registration information 610 is a setting relating to whether or not other users are permitted to make an inquiry for that user's welfare information. In the example shown in FIG. 6, the publishing restriction 617 for Taro XYZ having user ID id0000001 is set to "publish," meaning that any user registered in the system may view his welfare information. On the other hand, the publishing restriction 617 for Hanako Suzuki having user ID id0000002 is set to "only registered requesters, meaning that only persons who XYZ Suzuki has registered ahead of time can view her welfare information. Besides this, appropriate settings can be made in the present system relating to publishing restrictions of user welfare information.

[0076]

The information 620 relating to welfare information inquiries includes settings when settings restricting persons able to view welfare information are made in the publishing restriction 617. Specifically, the information 620 relating to welfare information inquiries includes a user ID 621 and a password 622 for persons able to set the publishing restriction for welfare information, and a user ID 623 for persons permitted to view the welfare information.

[0077]

In the information 620 relating to welfare information inquiries, user id0000002 allows user id9000003 to view his welfare information using password entry is a condition. Furthermore, since user id0000002 has not set a password, he permits user id9000005,... to view his welfare information unconditionally.

[0078]

The information 630 relating to welfare information notification destinations is information relating to the notification destination of a disaster victim's welfare information, specifically including a user ID 631 and notification destination email address 632. Besides this, information such as the timing and content of welfare information notifications may also be included. The notification destination is not limited to an email address and allows setting of any conceivable communication means.

[0079]

Typically, it is the user him or herself who registers the use registration information 610, the information 620 relating to welfare information inquiries, and the information 630 relating to welfare information notification destinations, but the administrator or the like of the welfare information provision server 101 may enter it instead using the management terminal 101a, for example. Utility is increased even more by adding functionality for group registration which registers multiple users, e.g., families, as a group.

[0080]

FIG. 7 is a schematic view illustrating a data structure stored in the welfare information storage unit 550 of the welfare information provision server 101. In FIG. 7, the welfare information storage unit 550 stores user location information 710 and self welfare information 720.

[0081]

The user location information 710 is obtained as the location information of the mobile telephone terminal in the possession of each user and includes a user ID 711, a registration date and time 712, an area 713, and a disaster impact status 714. The area 713 stores location information of the user obtained from the mobile terminal information service center by the disaster victim location information acquisition unit 510, and the record time and date 712 is the time and date communications between the user's mobile telephone terminal and the communication base stations took place, or the time and date the disaster victim location information acquisition unit 510 acquired the location information. The disaster impact status 714 is the disaster impact status of the area indicated by the area 713, the disaster impact status of each area being determined based on data in a disaster impact information storage unit 560 discussed below.

[0082]

In the example in FIG. 7, it can be seen that user id0000001 was in an area with a high disaster impact level between 11:05 AM and 12:05 PM on 2002/07/15 after the occurrence of a disaster, and thereafter moved to an area with a low disaster impact level at 1:02 PM. Moreover, it can be established that user id0000002 was not in an affected area as of 1:02 PM on 2002/07/15.

[0083]

The self welfare information 720 stores welfare information transmitted by the user him or herself and includes a user ID 721, a record time and date 722, status 723, and notes 724. Besides this, data indicating welfare information of the user may also be included. When a disaster occurs, the user can transmit to the welfare information provision server 101 his or her own welfare information using the email function of his or her mobile telephone terminal, etc. The status 723 and the notes 724 are very reliable information provided by the user him or herself.

[0084]

Furthermore, the self welfare information 720 may also be entered by a person other than the user. In this case, it is preferable to record whether the information was entered by the user him or herself or a substitute party.

[0085]

FIG. 8 is a schematic view illustrating a data structure stored in the disaster information storage unit 560 of the welfare information provision server 101. In FIG. 8, the disaster information storage unit 560 stores disaster information 810.

[0086]

The disaster information 810 is information which continuously records factors such as the type and scale of a disaster which is occurred and area-bi-area disaster impact status, etc., and includes a disaster occurrence time and date 811, a disaster area 812, a disaster category 813, and a disaster level 814.

[0087]

The disaster information 810 is input by the administrator or the like of the welfare information provision server 101 using the management terminal 101a during the requisite period immediately after the occurrence of a disaster. Alternately, the disaster information 810 may be received automatically and entered from a relevant body (the fire department, a regional government, the central government, or civilian bodies).

[0088]

Returning to FIG. 5, the disaster victim location information acquisition unit 510 of the welfare information provision server 101 requests the location information of disaster victims at predetermined time intervals from the mobile terminal information service center 110 when a disaster has occurred.

[0089]

The disaster victim location information request is made using the mobile telephone number or mobile telephone terminal ID of the user stored in the use registration information storage unit 540, or, depending on the processing functionality provided to the extraction processing unit 240 of the mobile terminal information service center 110, the disaster victim location information request may request the terminal extraction process 241 which extracts the location information of a specific user (mobile telephone terminal), the area extraction process 242 which extracts a user (mobile telephone terminal) present in a specific area, or the time range extraction process 243 which extracts a user (mobile telephone terminal) which has communicated with a communication base station in the disaster area within a specific time range, etc. Alternately, the request may be for a combination of these extraction processes.

[0090]

The management function unit 520 continuously updates the disaster impact status of each area stored in the disaster information storage unit 560 either automatically or by an instruction by the administrator, etc., using the management terminal 101a when a disaster has occurred. The management function unit 520 manages other functions of the welfare information provision server 101 as needed.

[0091]

The welfare information provision unit 530 provides services including a use registration process 531, a welfare information distribution process 532, a welfare information inquiry process 533, and a welfare information reception process 534 to the mobile telephone terminals 141, 152 and PC terminal 151 belonging to users of the present system over communication line networks.

[0092]

The use registration process 531 accepts new user registrations as well as additions, changes, and deletions of registration information, and Causes This Information to Be Reflected in the Use Registration Information Storage Unit 540.

[0093]

When a disaster occurs, the welfare information distribution process 532 distributes welfare information of users obtained from the welfare information storage unit 550 and the

disaster information storage unit 560 by email, etc., to the welfare information notification destinations which are preset in the use registration information storage unit 540. Distribution of the welfare information is done continuously, for example once an hour immediately after a disaster has occurred. The frequency of distribution may also be set by the user ahead of time in the use registration information storage unit 540.

[0094]

The welfare information inquiry process 533 allows users accessing the system to make an inquiry for the welfare information of specific users. Inquiries for the welfare information of users are done by specifying the user through a combination of his or her user ID, name, sex, date of birth, email address, and mobile telephone number, for example, thereby acquiring the welfare information for the user from the welfare information storage unit 550 and the disaster information storage unit 560.

[0095]

The welfare information reception process 534 receives provision of an impacted user's own welfare information when a disaster occurs in stores this well for information in the welfare information storage unit 550. Impacted users can enter their own welfare information by accessing the system over a network using the mobile telephone terminal 141 or by sending an email with their welfare information to the system.

[0096]

Furthermore, the welfare information provision unit 530 is provided with basic functionality including user access authentication and so on, as needed.

[0097]

FIGs. 9 and 10 show a pattern A and a pattern B for inquiry data and response data which are exchanged when the welfare information provision server 101 requests a disaster victim's location information from the mobile terminal information service center 110.

[0098]

In FIG. 9, pattern A inquiry data 910 indicates a record time and date range and mobile telephone number as inquiry conditions in the mobile terminal information service center 110, indicating the mobile telephone number, record time and date, and small area as the requisite information. In response, pattern A response data 920 includes all records to which the inquiry conditions apply, one record being the combination of mobile telephone number, record time and date, and small area.

[0099]

In this example, the inquiry involves information of small areas where mobile telephone terminals having the mobile telephone numbers 0901**122** and 0902**244**were present in the record time and date range of 12 PM on 2002/07/15 to 1:00 PM on 2002/07/15. In response, it is established that the mobile telephone terminal having mobile telephone number 0901**122** was present in area Z111 at 12:05 PM on 2002/07/15, and that the mobile telephone terminal having the mobile telephone number 0902**244**was present in area Q10 at 12:01 PM on 2002/07/15 and in area Q11 at 12:23 PM on 2002/07/15.

[0100]

In other words, the pattern A inquiry makes it possible to obtain information on the location where a specific user (mobile telephone terminal) was present during a specific time range.

[0101]

In FIG. 10, pattern B inquiry data 1010 specifies a record time and date range and small area as the inquiry conditions for the mobile terminal information service center 110, and indicates the mobile telephone number and record time and date as the requisite information. In response, the pattern B response data 1020 includes all relevant records applicable to these inquiry conditions, with one record being a combination of the mobile telephone number and record time and date.

[0102]

In this example, an inquiry is made of information of mobile telephone terminals present in area Z111 during the record time and date range from 12:00 PM on 2002/07/15 to 1:00 PM on 2002/07/15, and in response to this inquiry it is established that the mobile telephone terminal having mobile telephone number 0901**122** was present in area Z111 at 12:05 Pm on 2002/07/15 and the mobile telephone terminal having mobile telephone number 0902**233** was present in area Z111 at 12:15 PM on 2002/07/15 and at 12:35 PM on 2002/07/15.

[0103]

In other words, with the pattern B inquiry, information can be obtained of users (mobile telephone terminals) present in specific areas during specific time ranges.

[0104]

Note that inquiries from the welfare information provision server 101 to the mobile terminal information service center 110 are not limited to these two examples and can be done in various patterns depending on the information stored in the mobile terminal information service center 110. Moreover, the parameters and returned values used in the queries and responses may be written in SQL or the like, for example.

[0105]

[4] Operation of the welfare information provision system

Operation of the welfare information provision system according to the present invention is described next, with reference to FIGs. 11 and 12.

[0106]

FIG. 11 is a sequence diagram showing ordinary operation of the welfare information provision system according to the present embodiment.

[0107]

In FIG. 11, the communication base stations 131, 132,... regularly communicate with mobile telephone terminals in their area and send information on those mobile telephone terminals to the mobile telephone carrier companies 121, 122.... The mobile telephone carrier companies 121, 122,... save the mobile telephone terminal information acquired from the communication base stations 131, 132,... as communication logs for a certain amount of time.

[0108]

The mobile terminal information service center 110 periodically accesses the mobile telephone carrier companies 121, 122,... And acquires the mobile telephone terminal communication logs. Thereafter, a signal gathering process is carried out by the signal gathering processing unit 230, and the necessary information is extracted from the acquired communication logs and stored in the mobile terminal information storage unit 210. The mobile terminal information service center 110 acquires from the mobile telephone carrier companies 121, 122 information on the locations and communication areas of the communication base stations and store this information in the mapping information storage unit 220.

[0109]

On the other hand, the welfare information provision server 101 accepts operations for registering users and making various settings. The welfare information provision unit 530 carries out the use registration process and the like and stores the result in the use registration information storage unit 540.

[0110]

FIG. 12 is a sequence diagram showing operation of the welfare information provision system according to the present embodiment when a disaster has occurred.

[0111]

When a disaster occurs, occurrence of the disaster is registered in the welfare information provision server 101. When this happens, details about the disaster are stored in the disaster information storage unit 560 and sent to the mobile terminal information service center 110. It is preferable to temporarily increase the storage capacity for the communication logs which are periodically acquired from the mobile telephone carrier companies 121, 122,... in the mobile terminal information service center 110 upon receiving the details of the disaster. For example, all communication logs can be held for a period of three days until the confusion following the disaster has settled, for example.

[0112]

After a disaster occurs, the welfare information provision server 101 can use the disaster victim location information acquisition unit 510 to make a batch request of registered user location information from the mobile terminal information service center 110. Upon receiving this request, the mobile terminal information service center 110 uses the extraction processing unit 242 extract location information of certain mobile telephone terminals from the mobile terminal information storage unit 210, etc., and sends the result to the welfare information provision server 101. The welfare information provision server 101 stores this information in the welfare information storage unit 550.

[0113]

When the batch acquisition process of the registered user location information is complete, the welfare information provision server 101 can use the welfare information distribution processing unit 532 to distribute the welfare information to preregistered mobile telephone terminals. It is preferable to periodically repeat this automatic distribution of welfare information after a disaster has occurred as well as to distributed if there are any changes in the status of the disaster.

[0114]

On the other hand, users of the system can make an inquiry for the welfare information of other users by accessing the welfare information provision server 101 after a disaster has occurred. Upon receiving a request to make an inquiry for welfare information, the welfare information inquiry processing unit 533 of the welfare information provision server 101 acquires the welfare information of users subject to the inquiry from the welfare information storage unit 550 and allows provision thereof to the welfare requester. Alternately, the welfare information inquiry processing unit 533 can use the disaster victim location information acquisition unit 510 to request the location information of users subject to the inquiry from the mobile terminal information service center 110 and provide the welfare requester with the obtained location information as the welfare information.

[0115]

Users impacted by the disaster can use their mobile telephone terminals or the like to transmit their own welfare information to the welfare information provision server 101. The

welfare information reception processing unit 534 of the welfare information provision server 101 receives this self welfare information and stores it in the welfare information storage unit 550.

[0116]

A specific embodiment of the welfare information provision system according to the present invention has been described above, but the present in body meant is not limited to this. Persons skilled in the art can make various modification and improvements to the configuration and functionality of the foregoing embodiments or the invention according to other embodiments without departing from the gist of the invention.

[0117]

In particular, various methods can be used to acquire mobile telephone terminal location information from each mobile telephone carrier company. Besides the method for calculating the location of a mobile telephone terminal based on the communication area of the communication base stations described above, it is also possible to use the geographic coordinates of a terminal as the location information for mobile telephone terminals provided with GPS functionality, for example.

[Industrial Applicability]

[0118]

The welfare information provision system according to the present invention is a system which provides information relating to the welfare of preregistered disaster victims when a major disaster has occurred, and is applicable in particular as a welfare information provision system capable of providing disaster victim welfare information and the like rapidly and accurately amid the confusion of information and communication lines immediately after a disaster has occurred.

[Brief Description of the Drawings]

[0119]

FIG. 1 is a schematic view showing a general configuration of a welfare information provision system according to one embodiment of the present invention.

FIG. 2 is a functional block diagram schematically showing the internal configuration of a mobile terminal information service center 110 shown in FIG. 1.

FIG. 3 is a schematic view illustrating a data structure stored in a mobile terminal information storage unit 210 of the mobile terminal information service center 110 shown in FIG. 2.

FIG. 4 is a schematic view illustrating a data structure stored in a mapping information storage unit 210 in the mobile terminal information service center 110 shown in FIG. 2.

FIG. 5 is a functional block diagram schematically showing the internal configuration of a welfare information provision server 102 shown in FIG. 1. The other welfare information provision servers 102,... have the same configuration.

FIG. 6 is a schematic view illustrating a data structure stored in a use registration information storage unit 540 of the welfare information provision server 101 shown in FIG. 5.

FIG. 7 is a schematic view illustrating a data structure stored in a welfare information storage unit 550 of the welfare information provision server 101 shown in FIG. 5.

FIG. 8 is a schematic view illustrating a data structure stored in a disaster information storage unit 560 of the welfare information provision server 101 shown in FIG. 5.

FIG. 9 is a view showing the content of inquiry data and response data transmitted to and received from the mobile terminal information service center 110 when the welfare information provision server 101 requests disaster victim location information.

FIG. 10 is a view showing the content of inquiry data and response data transmitted to and received from the mobile terminal information service center 110 when the welfare information provision server 101 requests disaster victim location information.
FIG. 11 is a sequence diagram showing ordinary operation of the welfare provision information provision system according to the present invention.
FIG. 12 is a schematic view showing operation of the welfare information provision system according to the present invention when a disaster occurs.
[Explanation of the Reference Numerals]
[0120]
101, 102,... Welfare information provision servers
101a Management terminal
110 Mobile terminal information service center
121, 122,... Mobile telephone carrier companies
131, 132, 133,... Communication base station
141 Mobile telephone terminal
151 PC terminal
152 Mobile telephone terminal
210 Mobile terminal information storage unit
220 Mapping information storage unit
230 Signal gathering processing unit
240 Extraction processing unit
241 Terminal extraction process
242 Area extraction process
243 Time range extraction process
310 Signal data
311 Signal ID
312 Reception time and date
313 Mobile telephone carrier company
314 File body
320 Signal data
321 Record time and date
322 Base station ID
323 Mobile telephone terminal ID
324 Telephone number
410 Base station location information
411 Base station ID
412 Address
413 Postal code
420 Base station area information
422 Large-area information
423 Medium area information
424 Small area information
510 Disaster victim location information acquisition unit
520 Management function unit
530 Welfare information provision unit
531 Use registration process

532 Welfare information distribution process
533 Welfare information inquiry process
534 Welfare information reception process
540 Use registration information storage unit
550 Welfare information storage unit
560 Disaster information storage unit
610 Use registration information
611 User ID
612 Password
613 Name
614 Sex
615 Date of birth
616 Email address
617 Publishing restriction
618 Mobile telephone number
619 Mobile telephone terminal ID
620 Welfare information inquiry information
621 User ID
622 Password
623 User ID allowed to make inquiries
630 Welfare information notification destination information
631 User ID
632 Notification destination email address
710 User location information
711 User ID
712 Record time and date
713 Area
714 Disaster impact status
720 Self welfare information
721 User ID
722 Recording date and time
723 Status
724 Notes
810 Disaster information
811 Occurrence date and time
812 Disaster area
813 Disaster category
814 Disaster level
910 Pattern A inquiry data
920 Pattern A response data
1010 Pattern B inquiry data
1020 Pattern B response data

FIG. 1

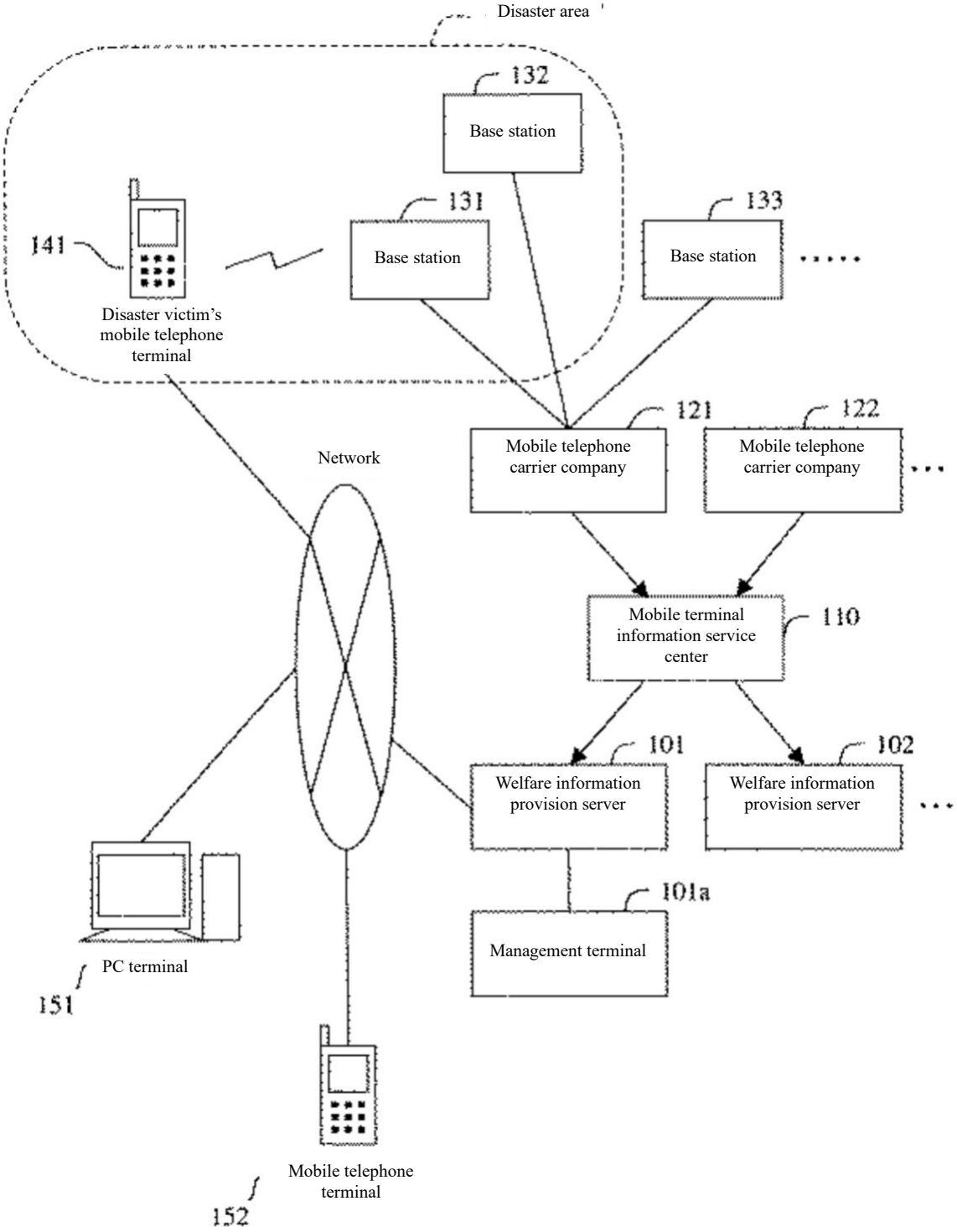

Disaster area
132
Base station
131
Base station
133
Base station
141
Disaster victim's mobile telephone terminal
121
Mobile telephone carrier company
122
Mobile telephone carrier company
Network
Mobile terminal information service center
110
101
Welfare information provision server
102
Welfare information provision server
101a
Management terminal
PC terminal
151
Mobile telephone terminal
152

FIG. 2

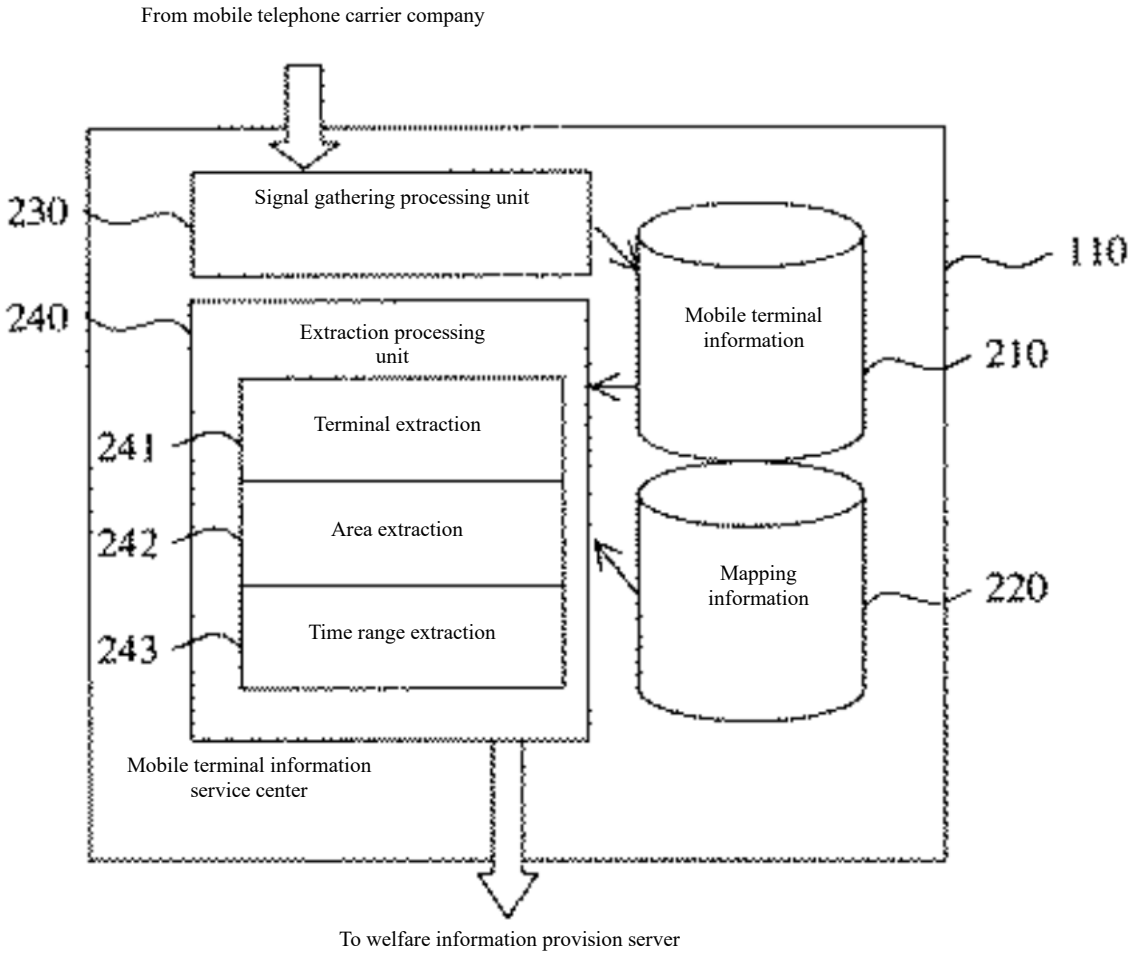
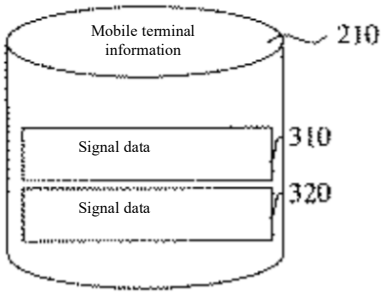

From mobile telephone carrier company
230
Signal gathering processing unit
110
240
Extraction processing unit
Mobile terminal information
210
241
Terminal extraction
242
Area extraction
Mapping information
220
243
Time range extraction
Mobile terminal information service center
To welfare information provision server

FIG. 3



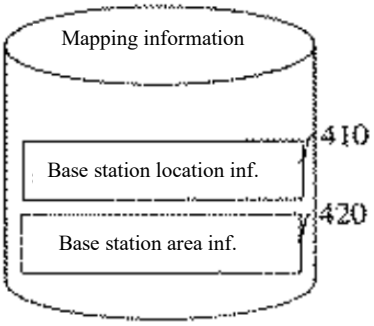
Signal data

Signal ID (311)	Reception time and date (312)	Mobile telephone carrier company (313)	File body (314)
00001	2002/07/15 13:01	Mobile telephone company A	aaaaaaa.txt
00002	2002/07/15 13:05	Mobile telephone company B	bbbbbb.txt
00003	2002/07/15 13:02	Mobile telephone company C	ccccccc.txt
⋮	⋮	⋮	⋮

Signal data

Record time and date (321)	Base station ID (322)	Mobile telephone terminal ID (323)	Telephone number (324)
2002/07/15 11:01	Base station A0001	**********	0901**122**
2002/07/15 12:05	Base station A0002	**********	0901**122**
2002/07/15 13:01	Base station A0003	**********	0901**122**
2002/07/15 12:01	Base station E0002	aaaaaaaaaaaaaaaaa	0902**222**
2002/07/15 13:01	Base station E0002	aaaaaaaaaaaaaaaaa	0902**222**
2002/07/15 12:05	Base station B0001	bbbbbbbbbbbbbbb	0903**322**
2002/07/15 13:01	Base station B0001	ccccccccccccccccc	0904**422**
⋮	⋮	⋮	⋮

FIG. 4



Base station location inf.

411 Base station ID	412 Address	413 Postal code
A0001	District A, City A, Pref. A	111-1111
A0002	District B, City A, Pref. A	111-1112
⋮	⋮	⋮

Base station area inf.

421 Base station ID	422 Large area	423 Medium area	424 Small area
A0001	Area Z	Area Z1	Area Z112
A0002	Area Z	Area Z1	Area Z112
⋮	⋮	⋮	⋮

FIG. 5

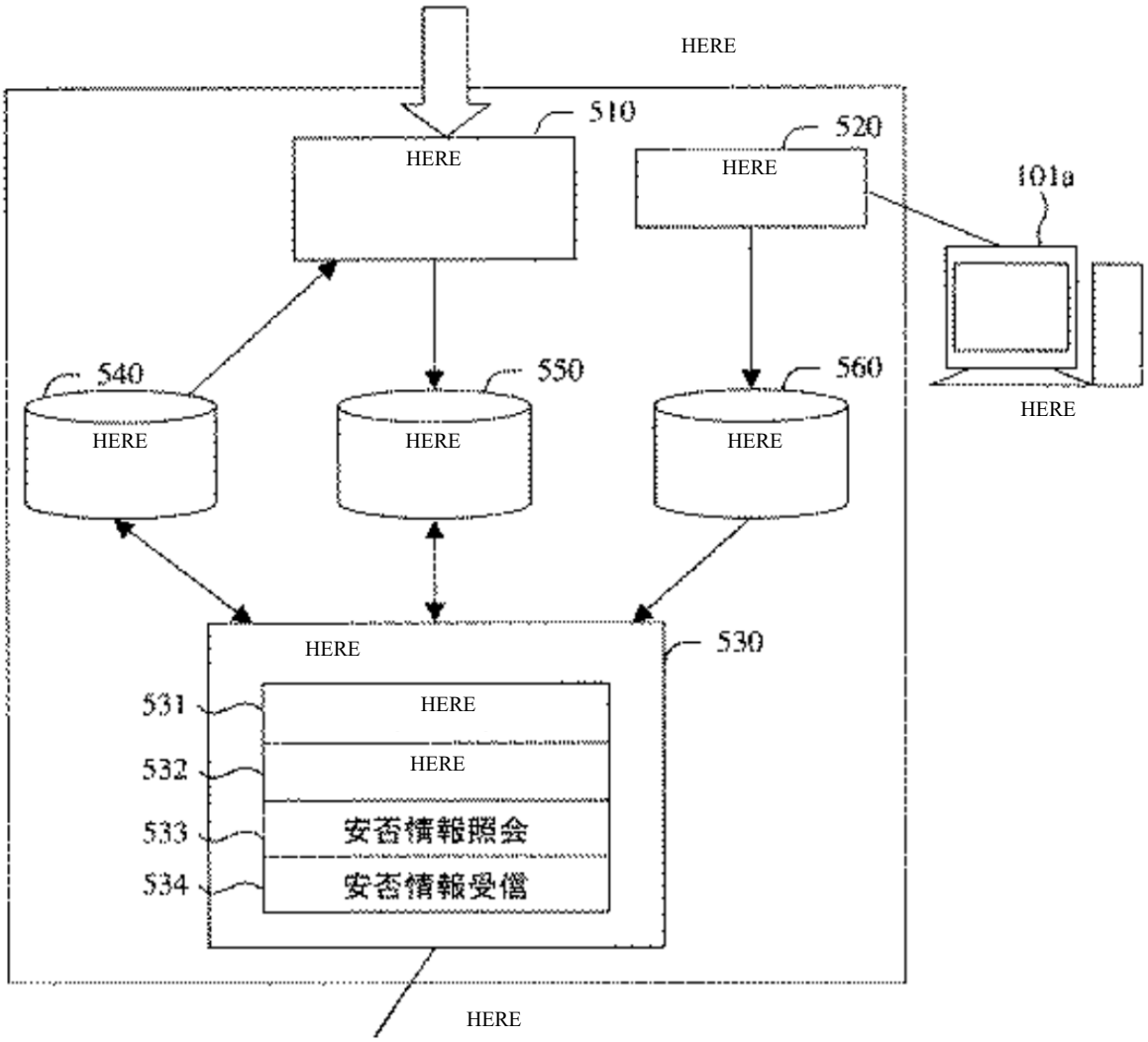
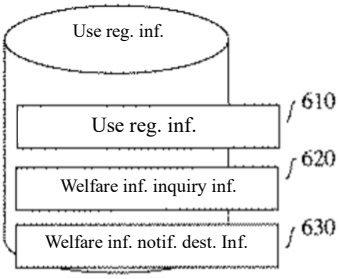

HERE
510
HERE
520
HERE
101a
HERE
540
HERE
550
HERE
560
HERE
530
HERE
531
HERE
532
HERE
533
安否情報照会
534
安否情報受信
HERE

FIG. 6



Use reg. inf.

User ID (611)	Password (612)	Name (613)	Sex (614)	DOB (615)	Email (616)	Publ. restr. (617)	Mobile tel. no. (618)	Mobile tel. term. ID (619)
id0000001	******	Taro Y.	Male	1973/01/01	Yam@**.ne.jp	Publish	0901**122**	aaaaaaaaaaaaaaaa
id0000002	******	Hanako S.	Female	1975/02/02	Suz@**.com	Only reg. req.	0904**422**	bbbbbbbbbbbbbbb
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮

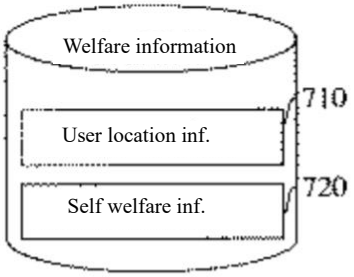
Welfare inf. inquiry inf.

User ID (621)	Password (622)	User ID allowed inquiry (623)
id0000002	******	id9000003
id0000003	null	id9000005,·····
⋮	⋮	⋮

Welfare inf. notif. dest. inf.

User ID (631)	Email (632)
id0000001	Yam001@**.ne.jp
id0000002	Yam002@**.ne.jp
⋮	⋮

FIG. 7



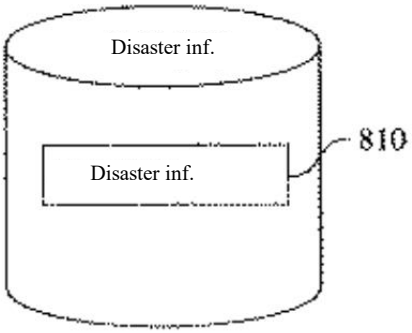
User location inf.

711 User ID	712 Record time and date	713 Area	714 Area determination
id0000001	2002/07/15 11:05	Area Z112	Earthquake, disaster level high
id0000001	2002/07/15 12:05	Area Z111	Earthquake, disaster level high
id0000001	2002/07/15 13:02	Area Z113	Earthquake, disaster level low
id0000002	2002/07/15 13:02	Area Q10	Outside disaster area
⋮	⋮	⋮	⋮

Self welfare inf.

721 User ID	722 Record time and date	723 Status	724 Notes
id0000001	2002/08/17 11:50	Minor injury	Evacuated to XYZ gym
id0000001	2002/08/17 19:10	Minor injury	Minor injury to right leg treated
⋮	⋮	⋮	⋮

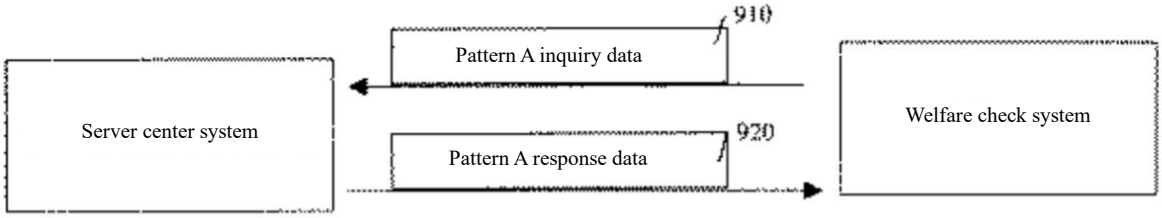
FIG. 8



Disaster inf.

811 Date and time of occurrence	812 Disaster area	813 Disaster category	814 Disaster level
2002/07/15 12:30	Area Z111	Earthquake	High
2002/07/15 12:30	Area Z112	Earthquake	High
2002/07/15 12:30	Area Z113	Earthquake	Low
⋮	⋮	⋮	⋮

FIG. 9



Pattern A inquiry data

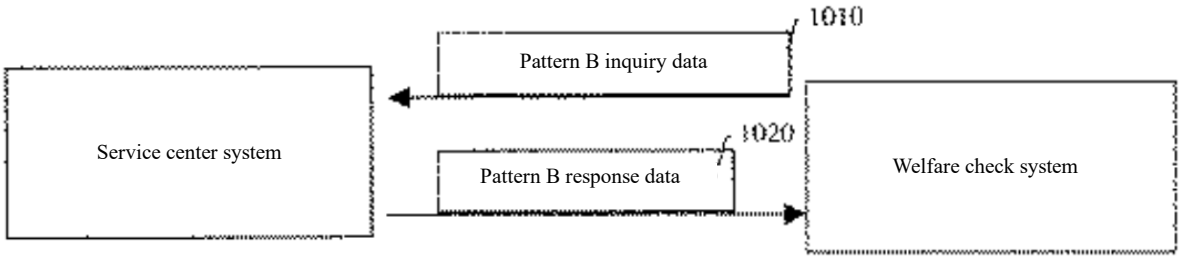
Inquiry cond.	Record time range	2002/07/15 12:00	2002/07/15 13:00
	Mobile tel. no.	0901**122**	0902**244**

Req. inf.	Mobile tel. no	Record time and date	Small area

Pattern A response data

Mobile tel. no.	Record time and date	Small area
0901**122**	2002/07/15 12:05	Area Z111
0902**244**	2002/07/15 12:01	Area Q10
0902**244**	2002/07/15 12:23	Area Q11

FIG. 10



Pattern B inquiry data

Inquiry cond.	Record time range	2002/07/15 12:00	2002/07/15 13:00
	Small area	Area Z111	
Req. inf.	Mobile tel. no.	Record time and date	

Pattern B response data

Mobile tel. no.	Record time and date
0901**122**	2002/07/15 12:05
0902**233**	2002/07/15 12:15
0902**233**	2002/07/15 12:35
.....	.....

FIG. 11

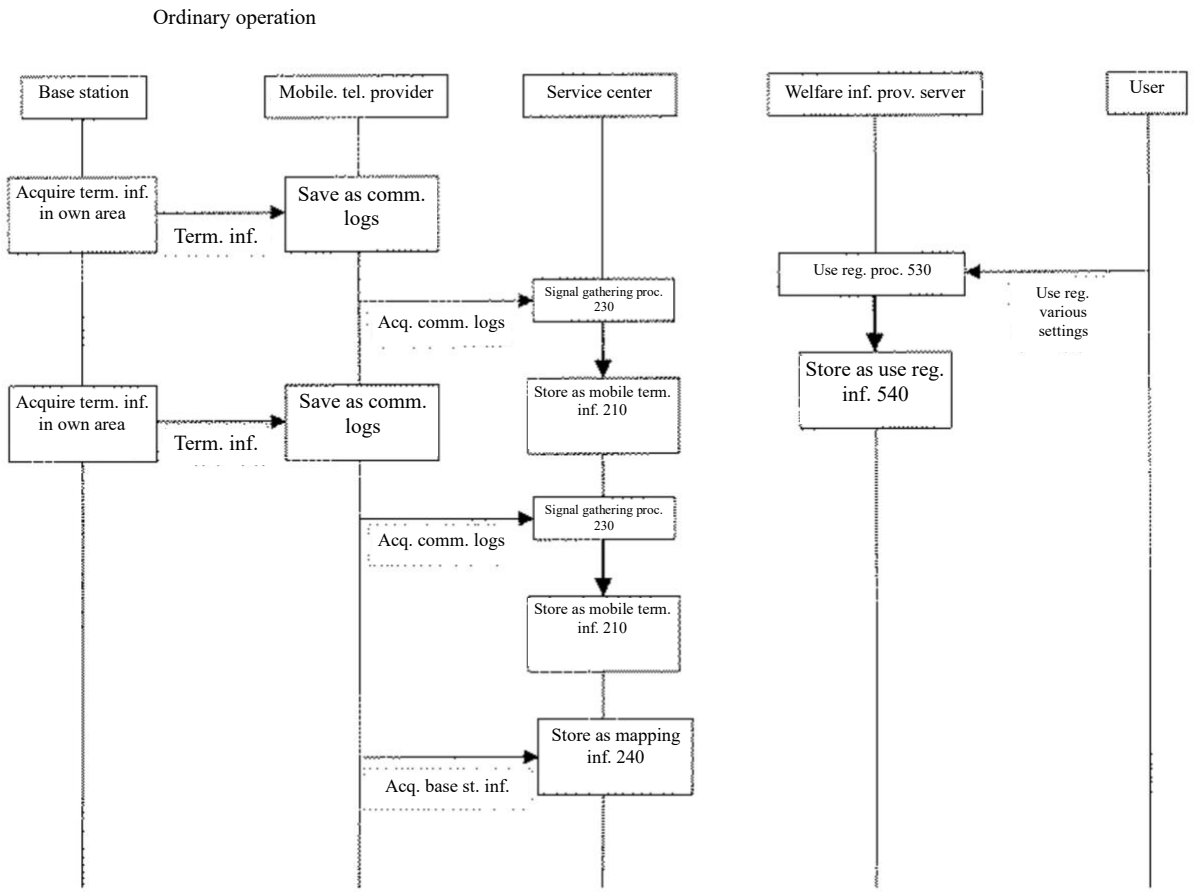
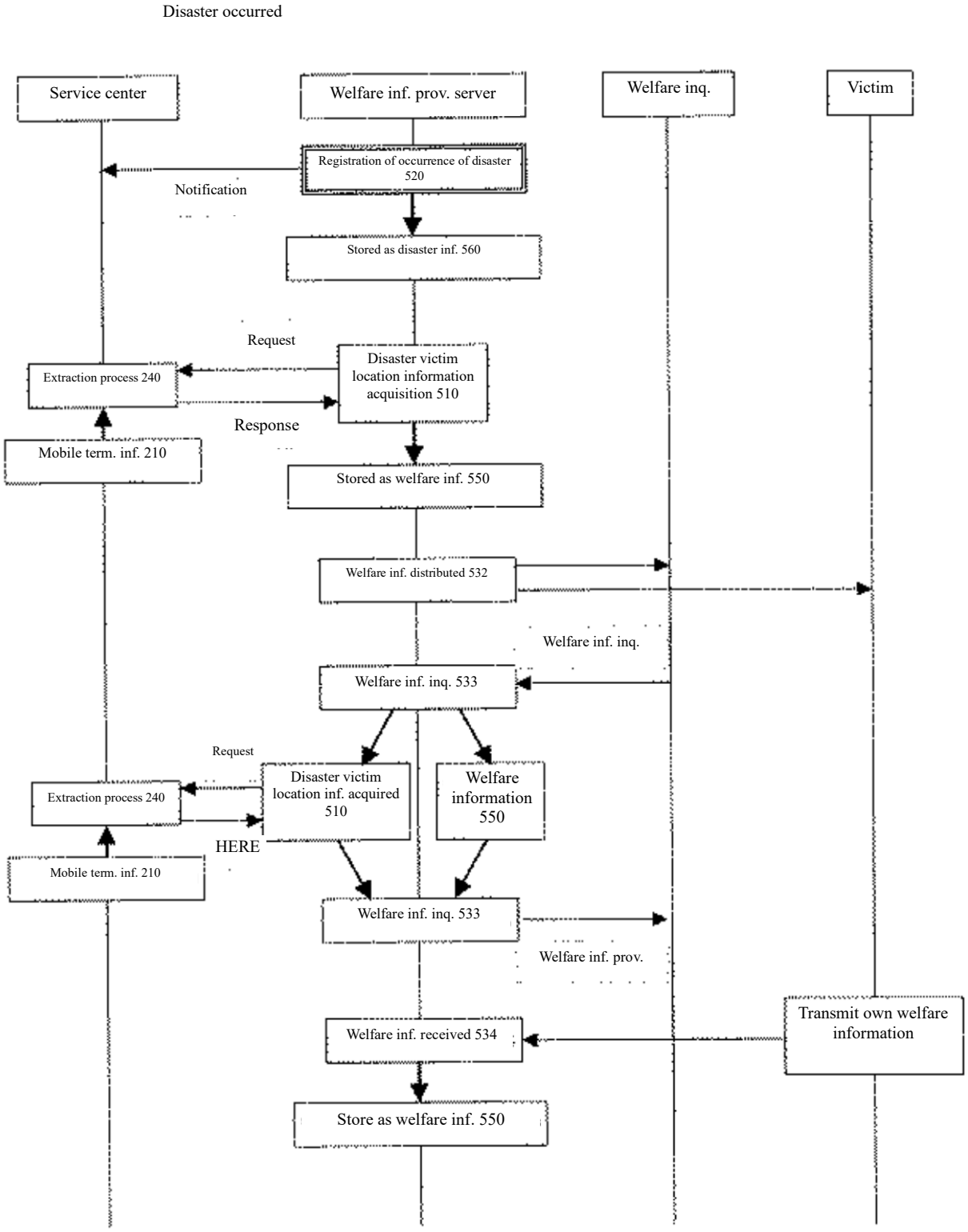

Ordinary operation
Base station
Mobile. tel. provider
Service center
Welfare inf. prov. server
User
Acquire term. inf. in own area
Term. inf.
Save as comm. logs
Signal gathering proc. 230
Acq. comm. logs
Use reg. proc. 530
Use reg. various settings
Store as use reg. inf. 540
Acquire term. inf. in own area
Term. inf.
Save as comm. logs
Store as mobile term. inf. 210
Signal gathering proc. 230
Acq. comm. logs
Store as mobile term. inf. 210
Store as mapping inf. 240
Acq. base st. inf.

FIG. 12


Disaster occurred
Service center
Welfare inf. prov. server
Welfare inq.
Victim
Registration of occurrence of disaster 520
Notification
Stored as disaster inf. 560
Request
Extraction process 240
Disaster victim location information acquisition 510
Response
Mobile term. inf. 210
Stored as welfare inf. 550
Welfare inf. distributed 532
Welfare inf. inq.
Welfare inf. inq. 533
Request
Extraction process 240
Disaster victim location inf. acquired 510
Welfare information 550
HERE
Mobile term. inf. 210
Welfare inf. inq. 533
Welfare inf. prov.
Transmit own welfare information
Welfare inf. received 534
Store as welfare inf. 550

(51) Int.Cl.[7]	FI	Theme codes (reference)
H04M 3/42	H04M 3/42	
H04M 11/00	H04M 11/00	
F-terms (reference)	5C086 AA13 CA25 CB27 DA14 DA40 EA11	
	5C087 AA02 AA03 AA04 AA08 AA19 BB12 BB46 BB65 BB75 DD02	
	DD03 DD49 EE05 EE06 EE08 FF01 FF02 GG19 GG21 GG35	
	GG66	
	5K015 AB01 AE05	
	5K024 AA71 CC11 GG01 GG05 GG10 GG13	
	5K101 KK12 LL11 MM07 NN18 NN21 PP03	

December 11, 2023

Certification of Translation Accuracy

I, Marc Adler, a translator fluent in the English and Japanese languages, on behalf of Lango, do solemnly and sincerely declare that the following is, to the best of my knowledge and belief, a true and correct translation of the documents listed below in a form that reflects the intention and meaning of the original text.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

The documents are designated as:

JP2005080211A

JP2003186980A

Date: Dec 12, 2023

Marc Adler