

workers having different jobs or posts monitor a large number of apparatuses from many different viewpoints. It is rare that one uniformed monitoring procedure is established. In other words, it is necessary for workers, who are in charge of monitoring and checking a plant, to check items to be monitored from their own standpoints.

With regard to this point, according to the related art disclosed in Japanese Patent Application Laid-open No. 2000-222027, 2003-295975, or 2013-101248, the same speech information is provided irrespective of the job, the post, or interest of a user (worker). Because of this, not only information necessary for an individual user but also much unnecessary information is provided. As a result, a user may not obtain necessary information effectively. In addition, necessary information may be hidden by unnecessary information. As a result, a user may not carry out appropriate measures promptly. The larger the number of apparatuses to be monitored, the larger the adverse effect.

In view of the above-mentioned circumstances, it is desirable to provide a plant monitoring server and a plant monitoring method capable of providing appropriate information depending on users, and monitoring a plant effectively and reliably.

~~(1) According to a first embodiment of the present invention, there is provided a plant monitoring server capable of communicating with a mobile information terminal carried by a user, the plant monitoring server including: a user definition information database configured to store user definition information; an apparatus definition information database configured to~~

~~store identification information on an apparatus to be monitored; a monitor information database configured to store monitor information in association with the apparatus to be monitored; a user definition information obtaining unit configured to obtain user identification information from the mobile information terminal, to search the user definition information database, and to obtain user definition information in association with the user identification information; an apparatus determining unit configured to obtain position information from the mobile information terminal, to search the apparatus definition information database, and to determine the apparatus having a predetermined positional relation with the mobile information terminal; an information extracting unit configured to search the monitor information database, and to extract monitor information on the determined apparatus to be output based on the obtained user definition information; and a speech information generator configured to generate speech information based on the extracted monitor information, the speech information corresponding to speech to be output by the mobile information terminal.~~

According to a first aspect of the present invention, there is provided a plant monitoring server capable of communicating with a mobile information terminal carried by a user, the plant monitoring server comprising: a user definition information database configured to store user definition information; an apparatus definition information database configured to store identification information on an apparatus to be monitored; a monitor information database configured to store monitor information in association with the apparatus to be monitored; a user definition information obtaining unit configured to obtain user identification information from the mobile information terminal, to search the user definition information database, and to obtain user

definition information in association with the user
identification information; an apparatus determining unit
configured to obtain position information from the mobile
information terminal, to search the apparatus definition
information database, and to determine the apparatus
5 having a predetermined positional relation with the
mobile information terminal; an information extracting
unit configured to search the monitor information
database, and to extract monitor information on the
10 determined apparatus to be output based on the obtained
user definition information; and a speech information
generator configured to generate speech information based
on the extracted monitor information, the speech
information corresponding to speech to be output by the
15 mobile information terminal, the speech information
generator including a sentence template database
configured to store a sentence template of speech to be
provided to a user, the speech information generator
being configured to search the sentence template database
20 and to generate sentence information corresponding to the
extracted monitor information; and an importance decision
unit configured to decide importance of the sentence
information based on the user definition information and
the extracted monitor information, wherein the speech
25 generated based on the speech information is to be output
in a mode corresponding to the decided importance.

~~According to the first embodiment of the present
invention, there is further provided a plant monitoring
method executed by a mobile information terminal carried
30 by a user and by a plant monitoring server, the plant
monitoring server including a user definition information
database configured to store user definition information,
an apparatus definition information database configured
to store identification information on an apparatus to be
35 monitored, and a monitor information database configured~~

to store monitor information in association with the apparatus to be monitored, the plant monitoring method including: obtaining user identification information from the mobile information terminal, searching the user definition information database, and obtaining user definition information in association with the user identification information; obtaining position information from the mobile information terminal, searching the apparatus definition information database, and determining the apparatus having a predetermined positional relation with the mobile information terminal; searching the monitor information database, and extracting monitor information on the determined apparatus to be output based on the obtained user definition information; and generating speech information based on the extracted monitor information, the speech information corresponding to speech to be output by the mobile information terminal.

According to the first embodiment of the present invention, the following configurations (2) to (4) may be provided.

(2) The plant monitoring server according to (1), in which the speech information generator includes a sentence template database configured to store a sentence template of speech to be provided to a user, and the speech information generator is configured to search the sentence template database, and to generate sentence information corresponding to the extracted monitor information.

(3) The plant monitoring server according to (1) or (2), further including: an importance decision unit

~~configured to decide importance of the sentence information based on the user definition information and the extracted monitor information, in which the speech generated based on the speech information is to be output in a mode corresponding to the decided importance.~~

~~(4) The plant monitoring server according to any one of (1) to (3), further including~~In an embodiment, the plant monitoring server further comprises: an information analyzer configured to analyze speech information and/or image information sent from the mobile information terminal; and a monitor information updating unit configured to update the monitor information database based on monitor information corresponding to the analyzed speech information and/or image information.

~~(5) According to a second embodiment of the present invention, there is provided~~Disclosed herein is a plant monitoring server capable of communicating with a mobile information terminal carried by a user, the plant monitoring server including: a user definition information database configured to store user definition information, the identification information including attribute information on a user; an apparatus definition information database configured to store identification information on an apparatus to be monitored; a monitor information database configured to store monitor information in association with the apparatus to be monitored; a user definition information obtaining unit configured to obtain user identification information from the mobile information terminal, to search the user definition information database, and to obtain user identification information in association with the user identification information; an apparatus determining unit

configured to obtain position information from the mobile information terminal, to search the apparatus definition information database, and to determine an apparatus having a predetermined positional relation with the mobile information terminal; an information extracting unit configured to search the apparatus definition information database, and to extract identification information on the determined apparatus; and a sender configured to provide identification information on the apparatus and the user definition information to the mobile information terminal.

~~According to the second embodiment of the present invention, there is further provided~~ Disclosed herein is a plant monitoring method executed by a mobile information terminal carried by a user and by a plant monitoring server, the plant monitoring server including a user definition information database configured to store user definition information, the identification information including attribute information on a user, an apparatus definition information database configured to store identification information on an apparatus to be monitored, and a monitor information database configured to store monitor information in association with the apparatus to be monitored, the plant monitoring method including: obtaining user identification information from the mobile information terminal, searching the user definition information database, and obtaining user definition information in association with the user identification information; obtaining position information from the mobile information terminal, searching the apparatus definition information database, and determining an

apparatus having a predetermined positional relation with the mobile information terminal; searching the apparatus definition information database, and extracting identification information on the determined apparatus; sending part of the user definition information and identification information on the apparatus, and communicating with an apparatus in association with the identification information; and obtaining monitor information provided by the apparatus, and generating speech information, the speech information being used to output speech corresponding to the monitor information.

~~According to the second embodiment of the present invention, the following configuration (6) may be provided.~~

~~(6)~~ The above plant monitoring server, further including comprising: an information analyzer configured to analyze speech information and/or image information sent from the mobile information terminal; and a monitor information updating unit configured to update the monitor information database based on monitor information corresponding to the analyzed speech information and/or image information.

The mobile information terminal according to the first and second embodiments of the present invention may have the following configurations.

~~(7) A mobile information terminal capable of communicating with the plant monitoring server according to any one of (1) to (4), the~~ The above mobile information terminal including comprising: a speech synthesizer configured to generate speech information based on the sentence information, the speech information being used to output speech corresponding to the sentence information.

~~(8) A mobile information terminal capable of communicating with the plant monitoring server according to (5) or (6), the Disclosed herein is a mobile information terminal including comprising: an apparatus~~
5 communication unit configured to send part of the provided user definition information and the provided identification information on the apparatus, and to communicate with an apparatus in association with the identification information; and a speech synthesizer
10 configured to obtain monitor information provided by the apparatus, and to generate speech information, the speech information being used to output speech corresponding to the monitor information.

According to embodiments of the present invention,
15 monitor information on an apparatus to be monitored is extracted based on user identification information, who operates a mobile information terminal. The monitor information is provided in speech. As a result, appropriate information is provided depending on the job
20 or the post of a user without hindering the user's monitoring task. A plant can be monitored effectively and reliably.

Brief Description of Drawings

Fig. 1 is a system diagram illustrating the outline
25 of the plant monitoring system of Embodiment 1;

Fig. 2 is a block diagram showing the plant monitoring server of Embodiment 1;

Fig. 3 is a block diagram showing the mobile information terminal of Embodiment 1;

30 Fig. 4 shows a structural example of the user definition information database of this embodiment;

Fig. 5 shows a structural example of the apparatus definition information database of this embodiment;

~~What is claimed is:~~ CLAIMS

1. A plant monitoring server capable of communicating with a mobile information terminal carried by a user, the plant monitoring server comprising:

- a user definition information database configured to store user definition information;

- an apparatus definition information database configured to store identification information on an apparatus to be monitored;

- a monitor information database configured to store monitor information in association with the apparatus to be monitored;

- a user definition information obtaining unit configured to obtain user identification information from the mobile information terminal,

- to search the user definition information database, and

- to obtain user definition information in association with the user identification information;

- an apparatus determining unit configured to obtain position information from the mobile information terminal,

- to search the apparatus definition information database, and

- to determine the apparatus having a predetermined positional relation with the mobile information terminal;

- an information extracting unit configured to search the monitor information database, and to extract monitor information on the determined apparatus to be output based on the obtained user definition information; and

- a speech information generator configured to generate speech information based on the extracted monitor information, the speech information corresponding to speech to be output by the mobile information terminal, the speech information

generator including a sentence template database configured to store a sentence template of speech to be provided to a user, the speech information generator being configured to search the sentence template database and to generate sentence information corresponding to the extracted monitor information; and

an importance decision unit configured to decide importance of the sentence information based on the user definition information and the extracted monitor information, wherein

the speech generated based on the speech information is to be output in a mode corresponding to the decided importance.

~~2. The plant monitoring server according to claim 1, wherein~~

~~the speech information generator includes a sentence template database configured to store a sentence template of speech to be provided to a user, and~~

~~the speech information generator is configured~~

~~to search the sentence template database, and~~

~~to generate sentence information corresponding to the extracted monitor information.~~

~~3. The plant monitoring server according to claim 1 or 2, further comprising:~~

~~an importance decision unit configured to decide importance of the sentence information based on the user definition information and the extracted monitor information, wherein~~

~~the speech generated based on the speech information is to be output in a mode corresponding to the decided importance.~~

42. The plant monitoring server according to any one of claims 1 to 3, further comprising:

an information analyzer configured to analyze speech information and/or image information sent from the mobile information terminal; and

a monitor information updating unit configured to update the monitor information database based on monitor information corresponding to the analyzed speech information and/or image information.

~~5. A plant monitoring server capable of communicating with a mobile information terminal carried by a user, the plant monitoring server comprising:~~

~~— a user definition information database configured to store user definition information, the identification information including attribute information on a user;~~

~~— an apparatus definition information database configured to store identification information on an apparatus to be monitored;~~

~~— a monitor information database configured to store monitor information in association with the apparatus to be monitored;~~

~~— a user definition information obtaining unit configured to obtain user identification information from the mobile information terminal,~~

~~— to search the user definition information database, and~~

~~— to obtain user definition information in association with the user identification information;~~

~~— an apparatus determining unit configured~~

~~— to obtain position information from the mobile information terminal,~~

~~— to search the apparatus definition information database, and~~

~~— to determine an apparatus having a predetermined~~

~~positional relation with the mobile information terminal;
— an information extracting unit configured
— to search the apparatus definition information
database, and
— to extract identification information on the
determined apparatus; and
— a sender configured to provide identification
information on the apparatus and the user definition
information to the mobile information terminal.~~

~~6. The plant monitoring server according to claim 5,
further comprising:~~

~~— an information analyzer configured to analyze speech
information and/or image information sent from the mobile
information terminal; and
— a monitor information updating unit configured to update
the monitor information database based on monitor information
corresponding to the analyzed speech information and/or image
information.~~

~~7. A mobile information terminal capable of communicating
with the plant monitoring server according to any one of
claims 1 to 4, the mobile information terminal comprising:~~

~~— a speech synthesizer configured to generate speech
information based on the sentence information, the speech
information being used to output speech corresponding to the
sentence information.~~

~~8. A mobile information terminal capable of communicating
with the plant monitoring server according to claim 5 or 6,
the mobile information terminal comprising:~~

~~— an apparatus communication unit configured
— to send part of the provided user definition
information and the provided identification information
on the apparatus, and~~

~~to communicate with an apparatus in association with the identification information, and~~
~~a speech synthesizer configured~~
~~to obtain monitor information provided by the apparatus, and~~
~~to generate speech information, the speech information being used to output speech corresponding to the monitor information.~~

93. A plant monitoring method executed by a mobile information terminal carried by a user and by a plant monitoring server,

the plant monitoring server including

a user definition information database configured to store user definition information,

an apparatus definition information database configured to store identification information on an apparatus to be monitored, and

a monitor information database configured to store monitor information in association with the apparatus to be monitored, and

a sentence template database configured to store a sentence template of speech to be provided to a user,

the plant monitoring method comprising:

obtaining user identification information from the mobile information terminal, searching the user definition information database, and obtaining user definition information in association with the user identification information;

obtaining position information from the mobile information terminal, searching the apparatus definition information database, and determining the apparatus having a predetermined positional relation with the mobile information terminal;

searching the monitor information database, and

extracting monitor information on the determined apparatus to be output based on the obtained user definition information; and

generating speech information based on the extracted monitor information, the speech information corresponding to speech to be output by the mobile information terminal, the step including searching the sentence template database and generating sentence information corresponding to the extracted monitor information; and

deciding importance of the sentence information based on the user definition information and the extracted monitor information, wherein

the speech generated based on the speech information is to be output in a mode corresponding to the decided importance.

~~10. A plant monitoring method executed by a mobile information terminal carried by a user and by a plant monitoring server,~~

~~the plant monitoring server including~~

~~a user definition information database configured to store user definition information, the identification information including attribute information on a user,~~

~~an apparatus definition information database configured to store identification information on an apparatus to be monitored, and~~

~~a monitor information database configured to store monitor information in association with the apparatus to be monitored,~~

~~the plant monitoring method comprising:~~

~~obtaining user identification information from the mobile information terminal, searching the user definition information database, and obtaining user definition information in association with the user identification information;~~

~~obtaining position information from the mobile information terminal, searching the apparatus definition information database, and determining an apparatus having a predetermined positional relation with the mobile information terminal;~~

~~searching the apparatus definition information database, and extracting identification information on the determined apparatus;~~

~~sending part of the user definition information and identification information on the apparatus, and communicating with an apparatus in association with the identification information; and~~

~~obtaining monitor information provided by the apparatus, and generating speech information, the speech information being used to output speech corresponding to the monitor information.~~