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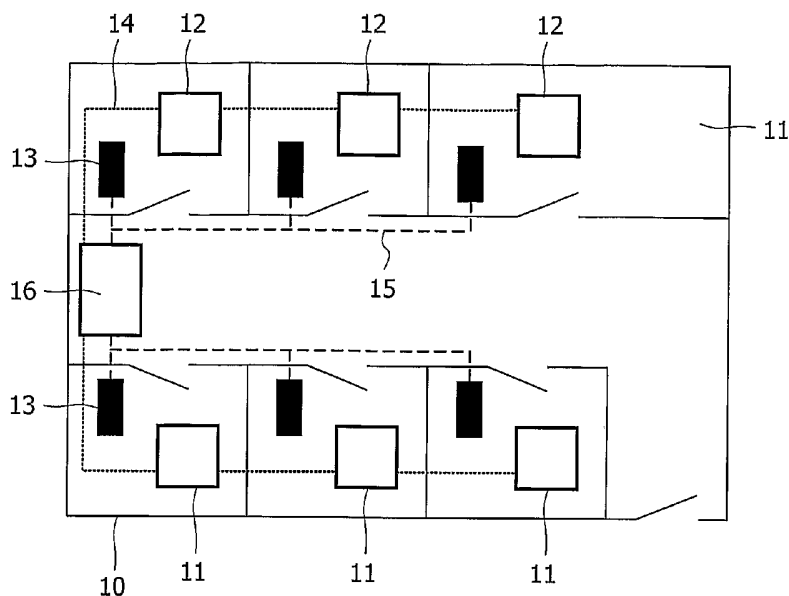
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[Continued on next page]

(54) Title: ELECTRONIC CALENDAR DRIVEN COMMUNICATION SYSTEM



(57) Abstract: The present invention relates to a communication system comprising a set of electronic calendars (12), a calendar being adapted to store information associated with a predetermined user, a set of functional units (13), a functional unit being adapted to perform a predetermined function. The communication system further comprises a control unit (16), which is connected to the set of electronic calendars and to the set of functional units, and which is adapted to read the user information from its associated electronic calendar and to control a functional unit depending on said user information. It finds its application notably in the heating or lighting control of rooms inside a building or in the secured access to buildings.



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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Electronic calendar driven communication system**5 FIELD OF THE INVENTION**

The present invention relates a communication system comprising a set of functional units, a functional unit being adapted to perform a predetermined function, and a control unit adapted to control the functional units.

This invention is, for example, relevant for the heating or lighting control of rooms
10 inside buildings or for the secured access to buildings.

BACKGROUND OF THE INVENTION

The US Patent n° 5,778,256 describes a communication system comprising a personal digital assistant having a separate infrared generating device, i.e. a control unit, connected to
15 its printer port for controlling home appliances, i.e. a set of functional units.

According to the teaching of this document, an infrared generating and transmitting device is attached to or is incorporated into the personal digital assistant. The function of such an infrared generating and transmitting device is to enable the personal digital assistant to be capable of direct remote control of infrared operated devices such as video and audio
20 entertainment systems, home automation systems and other infrared operated systems.

However, such a communication system requires the intervention of a user in order to enable the personal digital assistant to control the different appliances.

SUMMARY OF THE INVENTION

25 That is why it is an object of the invention to provide a more sophisticated way of controlling the functional units of the communication system.

To this end, the communication system in accordance with the invention is characterized in that it comprises:

- a set of electronic calendars, a calendar being adapted to store information associated
30 with a predetermined user,
- a set of functional units, a functional unit being adapted to perform a predetermined function,

- a control unit, which is connected to the set of electronic calendars and to the set of functional units, and which is adapted to read the user information from its associated electronic calendar and to control a functional unit depending on said user information.

As a consequence, the communication system in accordance with the invention is able to provide automatically, i.e. without a direct intervention of a user, output signals for controlling a set of functional units from the read out of input signals in the electronic calendars.

As it will be seen further in more detail, such a communication system can save significant amounts of the energy necessary to the work of the functional units depending on the electronic calendar information.

Such a communication system can also be interactive, the functions to be performed by the functional unit being controlled on the basis of the information that are stored in the electronic calendars and that can be read by the control unit at any moment.

It is also adaptive as said communication system can adapt its behavior from past events derived from the electronic calendar and as such propose or predict future events, settings or actions making use of the electronic calendar information.

The present invention also relates to a method for controlling a set of functional units on the basis of information stored on a set of personal calendars, a calendar being associated with a predetermined user, said control method comprising the steps of:

- reading the user information from its electronic calendar,
- controlling a functional unit depending on said user information.

It relates to a control device implementing such a method.

The present invention finally relates to a computer program product comprising program instructions for implementing, when said program is executed by a processor, said control method.

These and other aspects of the invention will be apparent from and will be elucidated with reference to the embodiments described hereinafter.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will now be described in more detail, by way of example, with reference to the accompanying drawings, wherein:

- Fig. 1 is a block diagram of a first embodiment of a communication system in accordance with the invention dedicated to energy saving, and

- Fig. 2 is a block diagram of a second embodiment of a communication system in accordance with the invention dedicated to secure access to buildings.

DETAILED DESCRIPTION OF THE INVENTION

5 The present invention relates, from a general point of view, to a communication system comprising a set of electronic calendars, a calendar being adapted to store information associated with a predetermined user.

10 The electronic calendars of the set are based on Lotus NotesTM, Microsoft OutlookTM or equivalent messaging, calendaring and scheduling software, and are accessible to a user, for example, via a personal computer or personal digital assistant that will be synchronized with the personal computer. The user is responsible for entering information in said calendar, the information being, for example:

- location, e.g. when he will be present or absent of his office, or where he is when he is out of his office,
- 15 - time, e.g. from what time to what time he will be out of his office,
- subject, e.g. for which activity,
- room, number, name and affiliation of attendees, in case of an appointment inside the building of his company, etc.

20 The present invention also comprises a set of functional units, a functional unit being adapted to perform a predetermined function.

 The functional units are, for example, dedicated to heating, cooling, lighting or shading of an environment. As another example, they are dedicated to security or access to an environment, allowing controlled access to the local information infrastructure, or allowing controlled tunnelling to the guest information infrastructure.

25 The present invention also comprises a control unit adapted to read the user information from its associated electronic calendar and to control a functional unit depending on said user information.

 For that purpose, the control unit and the electronic calendar must be interoperable. The electronic calendar contains, for example, predetermined key words that can be
30 identified and recognized by the control unit. As another example, a user can enter information in its own language and the control unit comprises an interpretation unit, which is able to translate the information given by the user into control actions for controlling the set of functional units.

The control unit is a server or an equivalent device and is connected to the set of electronic calendars using a conventional network, which can be a wired network or a wireless network, based on blue tooth for example, according to a principle known to a person skilled in the art. The control unit is also connected to the set of functional units via a
5 wired network or wireless network, such as an infrared network for example, still according to a principle known to a person skilled in the art.

Fig. 1 depicts a first embodiment of the communication system in accordance with the invention. According to this embodiment, the set of functional units is a set of energy sources
10 (13), each source being installed in a predetermined room or office (11) of a given environment (10), for example a house, an office building or a plant, and being able to provide energy to said room or office.

According to a first variant of the invention, the energy sources are heating or cooling apparatuses. According to another variant of the invention, the energy sources are lighting or
15 shading apparatuses.

The communication system in accordance with this embodiment also comprises a set of electronic calendars (12) accessible via a set of personal computers and a control unit (16), which is connected to the set of personal computers using a first network (14). The control unit is also connected to the set of energy sources via a network (15).

20 The control unit is then able to control the energy sources depending on the information registered in the electronic calendars. As an example, if a person is planned to be absent of a given room the energy sources are switched off of said room during his planned absence. As another example, if a meeting is planned in a meeting room from 8 to 10 hours, the energy sources are switched on during this period of time and inversely the energy
25 sources are switched off for people attending to this meeting in their respective offices if said offices are empty.

Such an embodiment can save significant amounts of energy required for heating, cooling, or lighting of an environment.

30 According to another embodiment of the invention, a functional unit is for example a projector located in a meeting room. A predetermined presentation is automatically made available to this projector and is launched at a start time as indicated, for example, in the electronic calendar of the person organizing this meeting.

This results in an automatic and interactive presentation.

Fig. 2 depicts another embodiment of the communication system in accordance with the invention. According to this embodiment, the set of functional units are access units for authorizing users to access to an environment in a secured manner.

5 For example, such a functional unit is a terminal (22) comprising means for reading (23) an identifier unit (26), a name badge for example. Said reading means and identifier units are based, for example, on a magnetic reading principle known to a person skilled in the art. Said terminal also comprises automatic doors (24) for opening or closing (25) the access unit.

10 The control unit (21), which is connected to the terminal via a link (27), is then able to identify the user corresponding to this identifier unit, to read the electronic calendar (29) of this user, via a network (28), in order to determine, for example, if this user is supposed to be present or absent, and to prevent him to enter the building if he was supposed to be absent. Then, the control unit sends an output signal in order to control the opening or closing of the
15 automatic doors depending on the electronic calendar information.

As an improvement, the controlled access to the environment can be limited to a predetermined period of time derived from the electronic calendar of a user.

In said embodiment the content of the electronic calendar is an additional requirement for the access to the building, thus reinforcing the security in this building. It will be apparent
20 to a person skilled in the art that the above-described principle can be extended to plant as well as to the personal or home environment.

Another embodiment of the invention is based on ambient intelligence. According to this embodiment, the communication system comprises a set of sensors, which are the
25 functional units, a set of electronic calendars and a control unit. The control unit can adapt its behavior from past events and as such proposes or predicts future events, settings and/or actions making use of the electronic calendar information and all other sensory information that are available in the ambient environment. Such an embodiment is particularly adaptive.

30 It is to be noted that the control method in accordance with the invention can be implemented by means of items software or hardware. Said software items can be implemented in several manners, such as by means of an integrated circuit that is suitable programmed. The integrated circuit comprises a set of instructions. Said set of instructions contained, for example, in a memory may cause the integrated circuit to carry out the

different steps of the control method. The set of instructions may be loaded into the memory by reading a data carrier such as, for example, a disk. A service provider can also make the set of instructions available via a communication network such as, for example, the Internet.

- 5 Any reference sign in the following claims should not be construed as limiting the claim. It will be obvious that the use of the verb "to comprise" and its conjugations do not exclude the presence of any other steps or elements besides those defined in any claim. The word "a" or "an" preceding an element or step does not exclude the presence of a plurality of such elements or steps.

CLAIMS

1. A communication system comprising:

- a set of electronic calendars (12;29), a calendar being adapted to store information associated with a predetermined user,
- a set of functional units (13;22), a functional unit being adapted to perform a predetermined function,
- a control unit (16;21), which is connected to the set of electronic calendars and to the set of functional units, and which is adapted to read the user information from its associated electronic calendar and to control a functional unit depending on said user information.

2. A communication system as claimed in claim 1, wherein the functional units are energy sources (13), an energy source being able to provide energy to a room (11) of a building (10), and wherein the control unit (16) is able to control the energy source associated with a room depending on a presence information of a user in said room, said information being derived from the electronic calendar (12) of said user.

3. A communication system as claimed in claim 2, wherein the energy source is a heating or cooling apparatus.

4. A communication system as claimed in claim 2, wherein the energy source is a lighting apparatus.

5. A communication system as claimed in claim 1, wherein the functional unit is an access unit (22) adapted to read an identifier unit (26), and wherein the control unit (21) is able to identify a user from the identifier unit and to authorize access to an environment by opening the access unit depending on an expected presence information derived from the electronic calendar (29) of the user to whom the identifier unit belongs.

6. A communication system as claimed in claim 1, wherein the functional units are sensors, and wherein the control unit is adapted to predict future actions to be taken to control the sensors from past information derived from the set of electronic calendars and from the set of sensors.

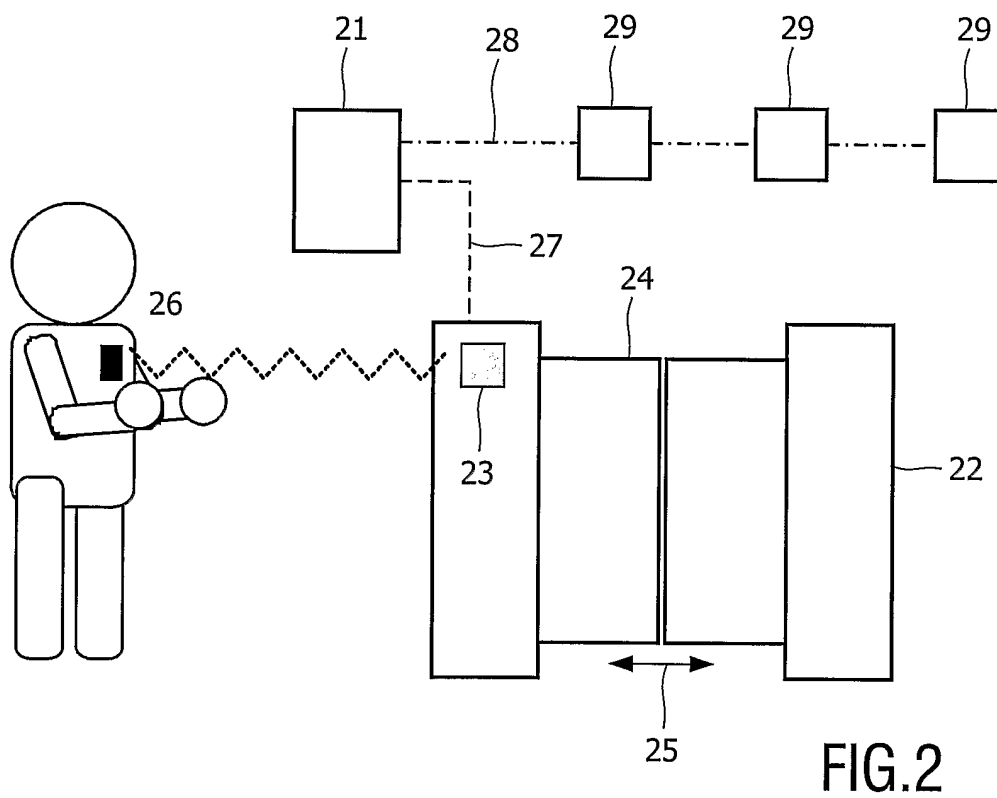
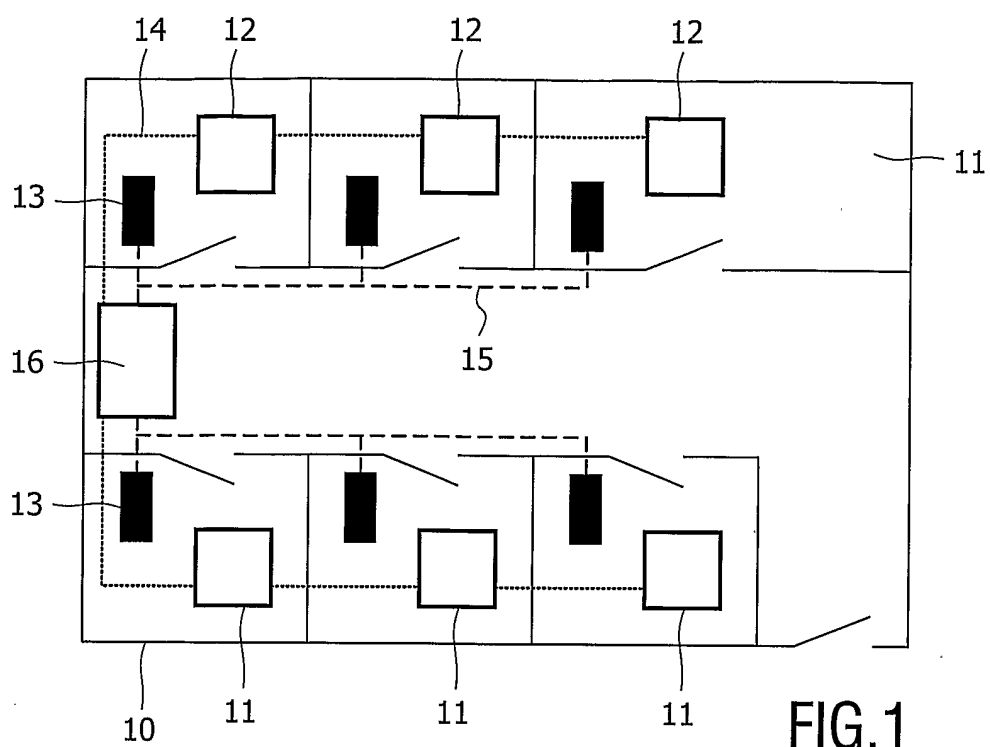
7. A device (16;21) for controlling a set of functional units (13;22) on the basis of information stored on a set of personal calendars (12;29), a calendar being associated with a predetermined user, said control device comprising:

- means for reading the user information from its electronic calendar,
- 5 - means for controlling a functional unit depending on said user information.

8. A method for controlling a set of functional units on the basis of information stored on a set of personal calendars, a calendar being associated with a predetermined user, said control method comprising the steps of:

- 10 - reading the user information from its electronic calendar,
- controlling a functional unit depending on said user information.

9. A computer program product comprising program instructions for implementing, when said program is executed by a processor, a control method as claimed in
15 claim 8.



INTERNATIONAL SEARCH REPORT

International Application No

PCT/IB2004/002500

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G08C23/04

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G08C

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

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

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2002/149467 A1 (OLSON JOHN A ET AL) 17 October 2002 (2002-10-17) paragraph '0038! - paragraph '0051! -----	1,5-9
X	US 2002/154652 A1 (TOKIZANE TOSHIKI ET AL) 24 October 2002 (2002-10-24) paragraph '0034! - paragraph '0051! paragraph '0084! -----	1-4,7-9
X	US 2001/049275 A1 (ROUNDTREE BRIAN ET AL) 6 December 2001 (2001-12-06) paragraph '0049! paragraph '0057! -----	1,7-9
A	US 6 401 059 B1 (CHENG JOSEPHINE MIU ET AL) 4 June 2002 (2002-06-04) the whole document -----	1,7-9

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

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P document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

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INTERNATIONAL SEARCH REPORT

Information on patent family members

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