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(54) **Berendezés és eljárás elektronikusan vezérelhető készülékek és rendszerek vezérlésére nyilvános és nem nyilvános épületekben**

DEVICE AND METHOD FOR CONTROLLING ELECTRONICALLY CONTROLLABLE DEVICES AND SYSTEMS IN PUBLIC AND PRIVATE BUILDINGS

Description

The present invention relates to an arrangement for controlling electronically controllable devices and systems in public and private buildings according to the preamble of claim 1 and a method for controlling electronically controllable devices and systems in public and private buildings according to the preamble of claim 8.

Such arrangements and methods for home automation are widely known. Using existing home automation arrangements, individual devices can be controlled in a targeted way by means of suitable control commands. US 6 522 346 B1 discloses an arrangement and method according to the preamble of claims 1 and 8. Additionally, there is also the possibility to configure actions in a combined manner, which can then be controlled together as control routines, as known for example from the Tahoma system from the Somfy company. This requires decentralized home technology servers, with associated computer equipment in the house in question. The user then gives this system the desired control commands and combines them under a callable control routine. Here, the user must consider beforehand which control commands they actually wish to be performed in a desired combined control routine. For most users, however, this is not possible, or only in an awkward and uncomfortable way.

It is he object of the present invention to improve such arrangements and methods for home automation so that the user can create combined control routines that meet their requirements, without prior knowledge about the function of the individual control commands. In particular, a home automation system is to be provided which proposes control routines to the user on demand.

This object is achieved by means of an arrangement for controlling electronically controllable devices and systems in public and private buildings according to claim 1 and a method for controlling electronically controllable devices and systems in public and private buildings according to claim 8. Further advantageous developments are defined in the dependent claims.

The inventors have found that said object can be solved in a surprising manner according to the invention, in that performed control commands from the user that are recorded, and the user can assign these recorded control commands to a control routine.

Because they are recorded control commands, and thus control commands that have actually been used for controlling, the user can directly see the success of the control command, and evaluate whether said command is usable for a useful control routine.

The arrangement according to the invention for controlling electronically controllable devices and systems in public and private buildings (home automation arrangement), comprising

- at least one device and/or system associated with the building and
- control devices for issuing commands for controlling the function of the device and/or the system,

wherein the device or system is configured to selectively change its condition as a function of the control commands of the control devices,
and is characterized in that devices for recording the control commands of the control device are provided and association devices are provided, which enable a user to associate one or more of the recorded control commands with a selectable control routine.

The "public and private buildings" also include related land properties. Suitably, display devices are provided for displaying the control commands in a selected time period, in particular an elapsed time period. This enables the user to combine control commands from a desired time period into a control routine in a targeted way, as only those control commands that were relevant for this time period are shown.

In a particularly preferred embodiment, the devices for recording the control commands are configured to only record those control commands that are triggered by the user. Thus, the selection of appropriate control commands is made easier for the user, since, in most cases, controls that were automatically performed by the home automation system, such as for example weather-dependent controls, are not suited for a repeat routine. Recording precisely such commands in a targeted way, however, may be useful in case the user wishes to fine-tune such automatic controls. For instance, a temperature-dependent control for reducing the heating can be combined in a targeted way by the user with turning on an air conditioning unit and/or lowering an awning.

In a further advantageous embodiment, devices for identifying interrelated control commands are provided, which propose to the user to associate these interrelated control commands with the control routine. Thus, it is no longer necessary for the user to keep track of the effects of the control commands, as only those control commands that are interrelated are proposed for a routine.

In a related development, the devices for identifying can be configured to identify control commands as interrelated which are issued within a predetermined time period, wherein the time period is 15 minutes at the most, preferably 10 minutes at the most, in particular 5 minutes at the most. Here, it is assumed that control commands that are issued within a narrow time window are interrelated, and therefore are also called repeatedly.

Alternatively or additionally, it can be arranged that the devices for identifying are configured to identify control commands as interrelated which are issued for systems or devices of a particular space. Here, "space" not only refers to rooms and the like, but also to open spaces, such as gardens etc.

These control commands may likewise be those that are initiated directly by the user themselves, or also those that are initiated automatically home automation system, either because they were already programmed beforehand by the user, or because they were initiated by the system itself.

Particularly advantageously, the devices for recording are con-

figured so that the starting point and/or the end point of the recording is determinable by the user, wherein it is advantageously provided that the devices for association are configured to associate all such recorded control commands with the control routine. Thus, when desired, the user can, in a targeted way, initiate a recording of controls of devices and systems initiated by the user themselves, to try out their effects, and subsequently associate the related control commands with a control routine.

Suitably, the control devices are configured to automatically execute the control routine at a predetermined point in time and/or directly after activation by the user.

In a further advantageous configuration, it is provided that the arrangement is configured to enable the user to remove control commands from an existing control routine or to associate the control commands with the control routine. Thus, control routines can be tested first and then, if necessary, amended.

In a particularly preferred embodiment, it is provided that the programs, data and/or routines used for controlling the arrangement are stored centrally, so, for example, not on a decentralized home server but in a cloud. Thus, remote configuration and remote maintenance can be performed by a trained technician, and, on the other hand, the device can be offered to the user in a much more cost-effective and space-saving way, as a decentralized storage of the programs, data and routines and the redundant provision of storage or control technology leads to substantial added costs. Preference is given to a central storage, which serves to control two or more home automation systems and/or two or more user access instances to a single home automation system, for example by means of a cloud solution with multi-user capabilities.

Independent protection is claimed for the method according to the invention for controlling electronically controllable devices and systems in public and private buildings (home automation method), wherein at least one device and/or system associated with the building and control devices for issuing commands for controlling the function of the device and/or the system are provided, wherein the device or system is configured to selectively change

its condition as a function of the control commands of the control devices, wherein the method is characterized in that the control commands of the control device are recorded and a user can associate one or more of the recorded control commands with a selectable control routine.

The described features can readily be combined with each other, unless otherwise specified. In particular, features of the arrangement can be used as features of the method and features of the method can be used as features of the arrangement.

The features and characteristics, as well as other advantages of the present invention, will become apparent in the following description of preferred embodiments in connection with the figures. These show, purely schematically:

Fig. 1 a diagram showing the configuration of the database structure of the arrangement according to the invention,

Fig. 2 a block diagram showing the elements of the arrangement according to the invention of Fig. 1,

Fig. 3a, 3b a display of recorded control commands within a time window with identification of interrelated control commands,

Fig. 4 a scheme for editing created control routines,

Fig. 4 a control panel for manual recording initiated control commands and

Fig. 6 a diagram for carrying out the method according to the invention.

In Fig. 1, the database schema, and thus the configuration of the cloud data structure of an arrangement according to the invention 1 for controlling electronically controllable devices and systems in public and private buildings (home automation arrangement) is shown purely schematically.

The following relationships can be seen: per house 3, there can be one or more users 5. Each house 3 has one or more rooms 7. There can also be multiple devices 9 per room 7. Each device 9 has exactly one type 11. Each device 9 has a list of past states 13. Each control routine ("iHaus actions") 15 can consist of multiple control commands ("action") 17 of one or more devices 9. Each house 3 can then be controlled directly via such a

control routine 15 in a targeted way. Each house 3, user 5, room 7, device 9, type 11, control routine 15, control command 17 and datum 19 has their own identification number ("ID") associated therewith, possibly its own name ("name") and an associated datum ("datum"). Furthermore, a unique password ("password") can be associated with each user 5, a unique address with each house 3 ("address"), a unique image with each room ("image"), a unique position ("position"), a unique state ("state") and a control address ("address") with each device, and a unique logo ("icon") with each type (device type) ("type"), which are used for control and operation. Each device type ("type") has a specific data type ("datum") as its basis. A data type may for example be simply "on/off", or an interval [0;1], as is useful for, among other things, dimming lights and roller blinds, as they have the possibility of intermediate states. Other data types are possible. For example, a television could have a program number as its data type, being the stored stations.

In Fig. 2 a block diagram showing the elements of the arrangement according to the invention 1 from Fig. 1 is shown purely schematically. It can be seen that a client software 21 is provided, which is supplied via the internet from a web server 23 to a tablet 25 or another client. This client 25 communicates with a socket server 27 (for instance a node server), which can establish a standing TCP connection 29 (or any other suitable type of cable or wireless connection) with devices present in a house 31 (for instance a home server 33 with connected electronic entertainment devices in the form of a television 35 and a music installation 37). This socket server 27 waits for messages (for instance status messages) from the devices 33, 35, 37 of the respective house 31, and reports them to the client 25. Upon successful confirmation, the client 25 then causes an entry change in the database 39 of the cloud 41.

A trained technician 43 sets up the software and configures it. A configuration by the user 45 is not desired. A special administration interface 47 is provided for said technician 43. The technician 43 also configures the house devices 33, 35, 37 via the home server 33, and the database 39 via the web server 23.

All user actions and associated control commands are stored

centrally in the database 39 in the cloud 41, so that a decentralized storage per house 31 is not required.

The control routines used according to the invention (iHaus actions) are combined control commands (Action) of one or more devices 33, 35, 37 that take place in a specific time period. Herein, preferably, only control commands executed by the user 45 are considered, as what is envisioned is an evaluation of the user's habits.

In Fig. 3a, 3b, recorded control commands within a time window are shown purely schematically with identification of interrelated control commands, illustrating such user habits related to the control routine "TV news".

As can be seen, several actions that presumably belong together are performed in connection with watching the news on tv: a roller blind of the room where watching tv takes place is closed, a radio in this room is turned off, the tv is turned on, a light in the room is turned off, another light in the same room is dimmed (cf. Fig. 3a). Many of these control commands are again performed in reverse after the news program, but not all. The roller blind, for instance, remains closed (cf. Fig. 3b).

The arrangement 1 according to the invention records all control commands performed through the control interface of the tablet 25 (and preferably only those). Upon opening (cf. Fig. 6) the "Timeline"-view, all previously performed control commands from the current time onwards are shown (cf. Fig. 3a, 3b). Preselected for a combined first control routine 51 are the last performed control commands 53a, 53b, 53c, performed within a certain period (e.g. tolerance value of 5 minutes, corresponding to the width of the highlight 51 of the first control routine 51).

The user 45 now has the option to store these control commands 53a, 53b, 53c as a first control routine 51 under a specific name.

By using control elements "forward" and "back", the user 45 can choose to be presented with further proposals for matching control routines 55, wherein again the next control commands 57a, 57b, 57c, 57d, 57e, going back in time, that were performed in sequence within the tolerance value are highlighted 55 (cf. Fig. 3b). These control routines 55, too, can optionally be

stored by the user 45. Thus, for instance, referring to figures 3a and 3b, the corresponding control routines "TV news END" 51 and "TV news BEGIN" 55 can be set and stored.

Furthermore, there is the possibility of making these tolerances, in other words the highlights 51, 57, bigger or smaller by finger swiping, so that more or fewer control commands 53a, 53b, 53c, 57a, 57b, 57c, 57d, 57e are associated with a proposal for a control routine 51, 55. Moreover, there is a possibility of removing devices 33, 35, 37, 59a, 59b, 59c from the selection or adjusting the associated control parameters per entry.

In case the user, immediately or later, by using the control routine 51, 55, finds that a certain control command 53, 57 is not meaningfully used within this control routine 51, 55, the user 45 can, immediately or later, remove this control command 53a, 53b, 53c, 57a, 57b, 57c, 57d, 57e from the control routine 51, 55 or suitably modify it (for instance, dim the light of the other lamp 59b more).

For such removal or modification of specific control commands in a control routine 51, 55, 61, 63, 65, according to the invention, as can be seen in Fig. 4, it is provided that the entire control routine 51, 55, 61, 63, 65 is performed ("perform"), so that removals, additions and/or modifications of certain control commands can immediately be executed in their actions.

Moreover, the possibility exists for a control routine 51, 55, 59, 61, 63 to be executed at a specific time. To this end, a start and end time for the control routine 51, 55, 59, 61, 63 can be entered, and also at which interval the control routine 51, 55, 59, 61, 63 should be executed (for instance once, daily, weekly, monthly).

An alternative or additional possibility to create control routines is shown purely schematically in Fig. 5. More precisely, a control panel 71 for manually recording control commands that are triggered is shown in Fig. 5. As can be seen, the user 45 can trigger a recording 73 of all user-triggered control commands for a specific room (cf. Fig. 6 "rooms") for the home appliances 35, 37, 59a, 59b, 59c while they are carried out. The control commands thus performed ("recorded actions") can then be stored as a new control routine ("store"), which is again editable (cf. Fig. 4).

In Fig. 6, the execution of the method according to the invention 81 is shown once more, purely schematically, in a diagram.

As can be seen, the user 45 logs into the arrangement 1 ("log-in()") and sees a welcome screen on the user's tablet 23 ("home screen"). Using this welcome screen ("home screen") the user can, by tapping ("tab()") in menus, access a status request ("status request") without status change of the individual devices 33, 35, 37, 59a, 59b, 59c, the individual rooms 3, the available control routines 51, 55 ("iHaus actions") and a continuous recording of control commands ("timeline").

At the level of the house 3, device states ("device state") of the devices 33, 35, 37, 59a, 59b, 59c are changed 83 and read 84 and fed 85 to a database ("database") in the cloud 41, and, optionally, simultaneously shown 87 at the device 33, 35, 37, 59a, 59b, 59c. Through the menus, rooms ("rooms") and control routines ("iHaus actions"), the states of the devices 33, 35, 37, 59a, 59b, 59c van be influenced 89, 91 directly and current states can be shown 89, 91.

From the database 39 in the cloud 41, the data are provided upon the status request ("status request"), the continuous recording of control commands ("timeline") and for checking the password of each user 45.

From the above presentation, the numerous advantages of the present invention are clear.

Thus, regularly recurring control commands can be recognized by means of a visual representation and then combined into control routines.

As the control commands are always executed before being added to a control routine, the user 45 does not require any deeper knowledge about the functioning or interaction of different control commands. This also applies to the editing of existing control routines.

By combining the control commands to an abstract, higher control routine, processes around the house can be simplified, as they can be triggered by means of a single command. This offers more comfort and time saving than executing the control commands separately.

In addition, the user is offered a better overview of the control commands made around the house 3. This leads to more efficient utilization of

home automation and thus to energy saving.

As the control routines are explicitly triggered by the user 45, and not automatically preset by the home automation system, the user 45 feels completely in control.

List of reference numbers

1	arrangement for controlling according to the invention
3	house
5	user
7	rooms
9	device
11	device type
13	list of previous states
15	control routine
17	control commands
19	datum
21	client software
23	web server
25	tablet
27	socket server
29	TCP connection
31	house
33	home server
35	tv
37	music installation
39	database
41	cloud
43	technician
45	user
47	admin interface
51	first control routine, highlight
53a, 53b, 53c	control commands
55	control routine
57a, 57b, 57c, 57d,	control commands

57e	
59a, 59b, 59c	devices
61, 63, 65	control routines
71	control panel
73	recording
81	method for controlling according to the invention
83	changing device states
84	reading device states
85	sending device states to database
87	showing device states
89, 91	influencing and showing device states

Berendezés és eljárás elektronikusan vezérelhető készülékek és rendszerek vezérlésére nyilvános és nem nyilvános épületekben

Szabadalmi igénypontok

1. Berendezés (1) elektronikusan vezérelhető készülékek (33, 35, 37, 59a, 59b, 59c) és rendszerek vezérlésére nyilvános és nem nyilvános épületekben (3, 31), amely magában foglal legalább egy, az épülethez (3, 31) hozzárendelt készüléket (33, 35, 37, 59a, 59b, 59c) és/vagy rendszert és vezérlőeszközt (23, 25, 27, 41) utasítások (17, 53a, 53b, 53c, 57a, 57b, 57c, 57d, 57e) adására a készülék (33, 35, 37, 59a, 59b, 59c) és/vagy rendszerek funkciójának vezérlésére, ahol a készülék (33, 35, 37, 59a, 59b, 59c) vagy rendszer állapotának a vezérlőeszköz (23, 25, 27, 41) vezérlő utasításainak függvényében történő szelektív megváltoztatására van kiképezve, ahol a vezérlőeszköz (23, 25, 27, 41) vezérlő utasításainak (17, 53a, 53b, 53c, 57a, 57b, 57c, 57d, 57e) rögzítésére szolgáló eszközök találhatók, és hozzárendelő (23, 25, 3) eszközök találhatók, amelyekkel a berendezés (1) felhasználója (45) a feljegyzett vezérlő utasítások (17, 53a, 53b, 53c, 57a, 57b, 57c, 57d, 57e) közül egyet vagy többet egy kiválasztható vezérlő rutinhoz (15, 51, 55) rendelhet hozzá, **azzal jellemezve**, hogy összefüggő vezérlő utasításokat (53a, 53b, 53c, 57a, 57b, 57c, 57d, 57e) azonosító (23, 25) eszközei vannak, amelyek a felhasználó (45) számára javasolják ezen összefüggő vezérlő utasítások (53a, 53b, 53c, 57a, 57b, 57c, 57d, 57e) vezérlő rutinhoz (51, 55) történő hozzárendelését, ahol az azonosító (23, 25) eszközök úgy vannak kialakítva, hogy azon vezérlő utasításokat (53a, 53b, 53c, 57a, 57b, 57c, 57d, 57e) összefüggőként azonosítsák, amelyek adása előre meghatározott időn belül történik, és/vagy amelyek adása egy meghatározott helyiség (7) rendszerei vagy készülékei (33, 35, 37, 59a, 59b, 59c) számára történik.

2. Az 1. igénypont szerinti berendezés (1), **azzal jellemezve**, hogy kijelző eszközei (25) vannak az egy kiválasztott időtartamon, különösen egy eltelt időtartamon belüli vezérlő utasítások (17, 53a, 53b, 53c, 57a, 57b, 57c, 57d, 57e) kijelzésére.

3. Az 1. vagy 2. igénypont szerinti berendezés (1), **azzal jellemezve**, hogy a vezérlő utasításokat (17, 53a, 53b, 53c, 57a, 57b, 57c, 57d, 57e) feljegyző (23, 25, 39) eszközök úgy vannak kialakítva, hogy csak a felhasználó (45) által adott vezérlő utasításokat (17, 53a, 53b, 53c, 57a, 57b, 57c, 57d, 57e) jegyezzék fel.

4. Az előző igénypontok bármelyike szerinti berendezés (1), ***azzal jellemezve***, hogy az előre megadott idő legfeljebb 15 perc, előnyösen legfeljebb 10 perc, különösen legfeljebb 5 perc.

5. Az előző igénypontok bármelyike szerinti berendezés (1), ***azzal jellemezve***, hogy a feljegyzés kezdési időpontja és/vagy befejezési időpontja a felhasználó (45) által meghatározható, ahol előnyös, ha a hozzárendelő (23, 25) eszközök alkalmassá vannak téve az összes így feljegyzett vezérlő utasítás vezérlő rutinhoz való hozzárendelésére.

6. Az előző igénypontok bármelyike szerinti berendezés (1), ***azzal jellemezve***, hogy a vezérlő eszközök (23, 25, 27, 41) alkalmassá vannak téve arra, hogy a vezérlő rutint (15, 51, 55) automatikusan egy előzetesen megadható időpontban és/vagy közvetlenül a felhasználó (45) általi aktiválás után hajtsák végre.

7. Az előző igénypontok bármelyike szerinti berendezés (1), ***azzal jellemezve***, hogy a berendezés (12) alkalmassá van téve arra, hogy a felhasználó (45) egy meglévő vezérlő rutinból (15, 51, 55) vezérlő utasításokat (17, 53a, 53b, 53c, 57a, 57b, 57c, 57d, 57e) távolítson el vagy rendeljen ahhoz hozzá.

8. Eljárás elektronikusan vezérelhető készülékek (33, 35, 37, 59a, 59b, 59c) és rendszerek vezérlésére nyilvános és nem nyilvános épületekben (3, 31), ahol legalább egy, az épülethez (3, 31) hozzárendelt készülék (33, 35, 37, 59a, 59b, 59c) és/vagy rendszer és vezérlő eszköz (23, 25, 27, 41) van utasítások (17, 53a, 53b, 53c, 57a, 57b, 57c, 57d, 57e) adására kialakítva a készülék (33, 35, 37, 59a, 59b, 59c) működésének vezérlésére, és/vagy rendszerek találhatók, ahol a készülék vagy rendszer állapotának a vezérlő eszközök, (23, 25, 27, 41) vezérlő utasításainak (17, 53a, 53b, 53c, 57a, 57b, 57c, 57d, 57e) függvényében történő szelektív megváltoztatására van kialakítva, ahol a vezérlő eszköz (23, 25, 27, 41) vezérlő utasításait (17, 53a, 53b, 53c, 57a, 57b, 57c, 57d, 57e) feljegyezzük és az eljárás egy felhasználója (45) a feljegyzett vezérlő utasítások (17, 53a, 53b, 53c, 57a, 57b, 57c, 57d, 57e) közül egyet vagy többet egy kiválasztott vezérlő rutinhoz (15, 51, 55) hozzárendelhet, **azzal jellemezve**, hogy az összefüggő vezérlő utasításokat (17, 53a, 53b, 53c, 57a, 57b, 57c, 57d, 57e) azonosítjuk (23, 25), és a felhasználó (45) számára javasoljuk ezen összefüggő vezérlő utasítások (17, 53a, 53b, 53c, 57a, 57b, 57c, 57d, 57e) hozzárendelését a vezérlő rutinhoz (51, 55), ahol azokat a vezérlő utasításokat (17, 53a, 53b, 53c, 57a, 57b, 57c, 57d, 57e) azonosítjuk összefüggőként, amelyeket egy előre megadott időtartamon belül és/vagy egy meghatározott helyiség (7) rendszerei vagy készülékei (35, 37, 59a, 59b, 59c) számára bocsátanak ki.

9. A 8. igénypont szerinti eljárás, azzal jellemezve, hogy az 1-7. igénypontok bármelyike szerinti berendezést (1) alkalmazzuk.

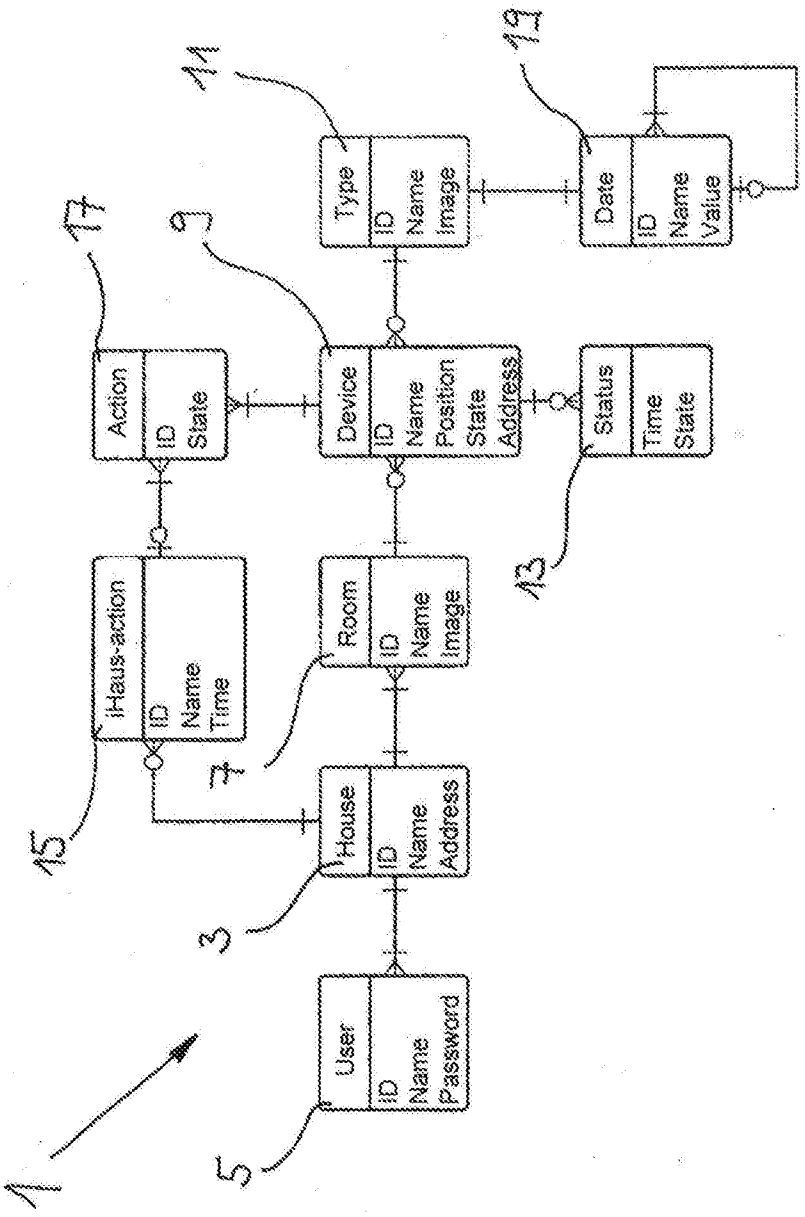
1
3
House
ID
Name
Address
5
User
ID
Name
Password
7
Room
ID
Name
Image
9
Device
ID
Name
Position
State
Address
11
Type
ID
Name
Image
13
Status
Time
State
15
iHaus-action
ID
Name
Time
17
Action
ID
State
19
Date
ID
Name
Value

Fig. 1

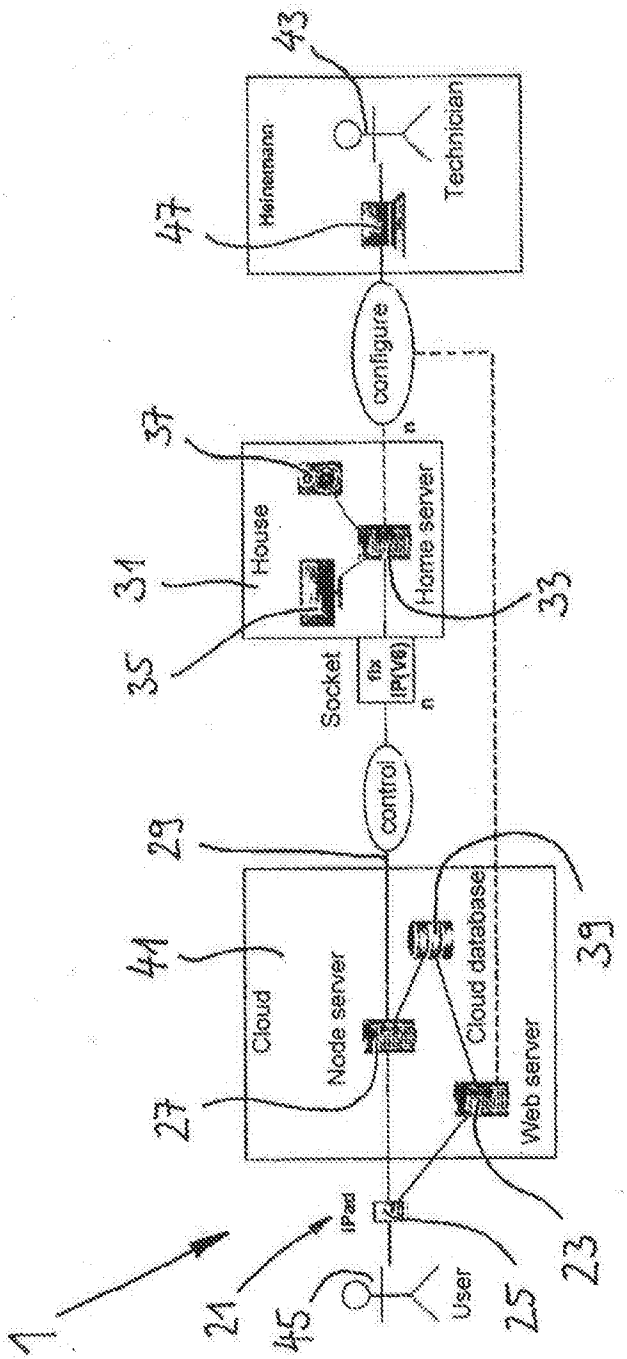
1
24
45
User
25
23
iPad
Cloud
Node server
27
29
Cloud database
Web server
39
44
control
Socket
fb
(IPV6)
n
House
31
35
37
Home server
33
configure
n
Heinemann
47
Technician
43

Fig. 2

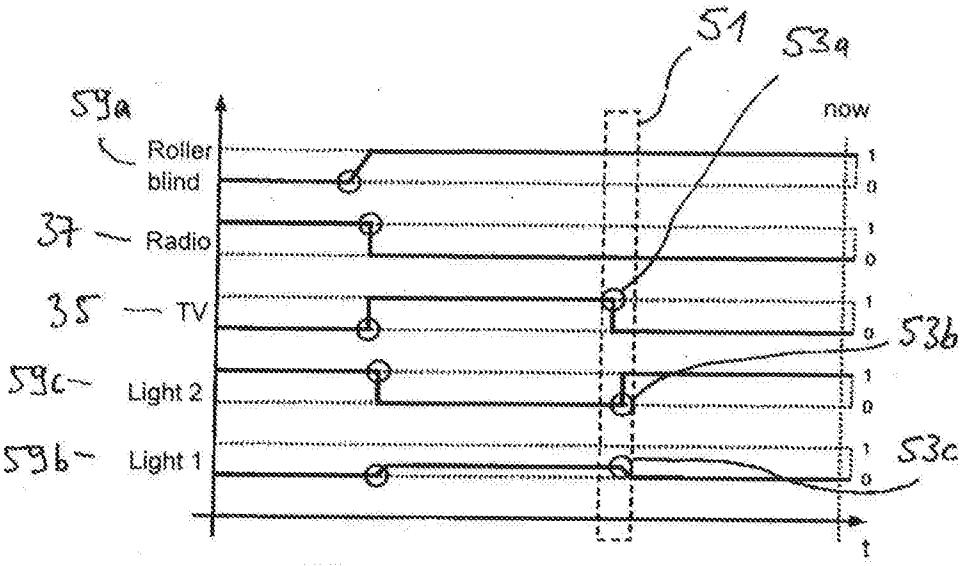
51
53a
59a
Roller blind
now
37
Radio
35
TV
53b
59c
Light 2
59b
Light 1
53c
1
0
t
back
forward

Fig. 3a

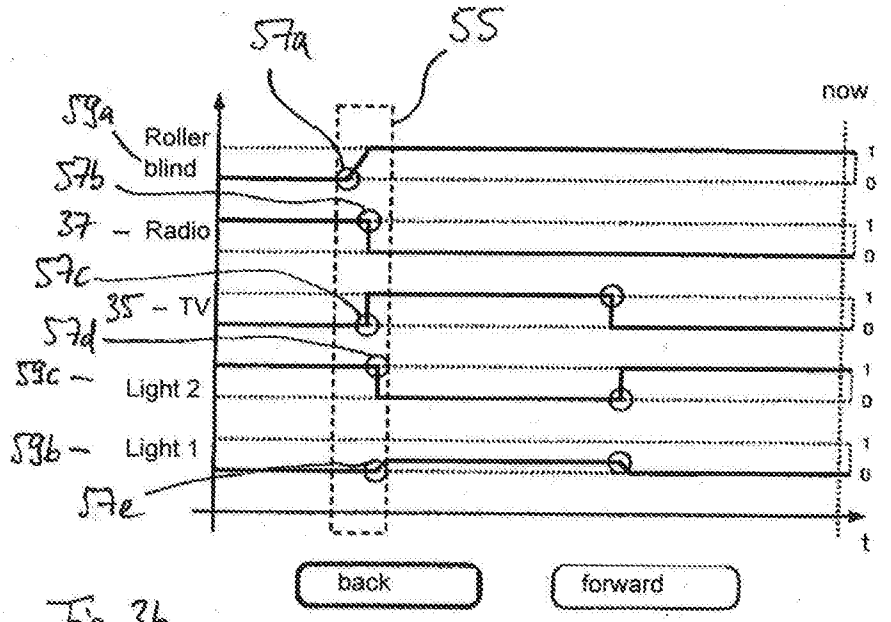
57a
55
now
59a
Roller blind
57b
37
Radio
57c
35
TV
57d
59c
Light 2
59b
Light 1
57e
1
0
t
back
forward

Fig. 3b

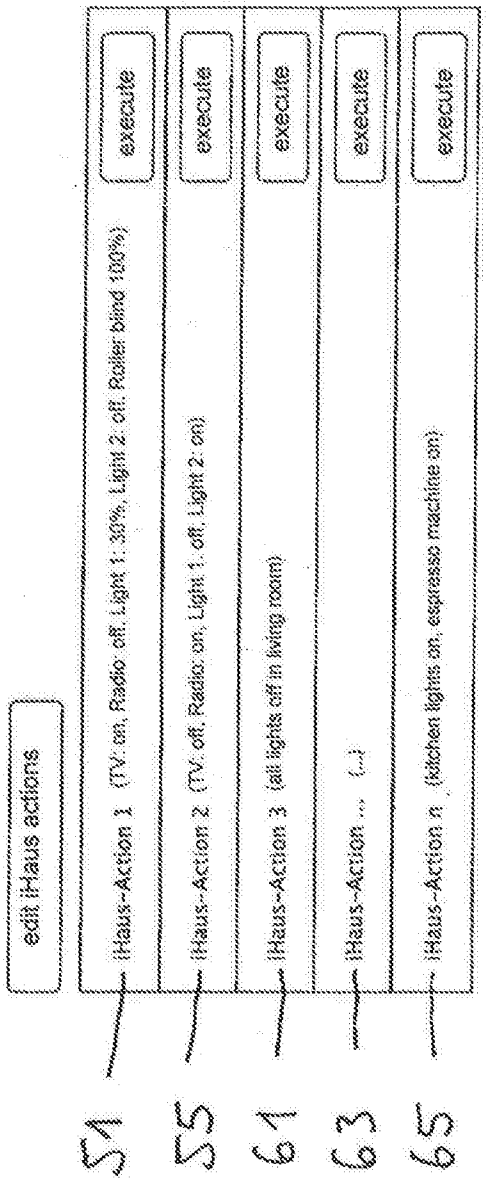
edit iHaus actions
iHaus-Action 1 (TV: on, Radio: off, Light 1: 30%, Light 2: off, Roller blind 100%)
execute
iHaus-Action 2 (TV: off, Radio: on, Light 1: off, Light 2: on)
execute
iHaus-Action 3 (all lights off in living room)
execute
iHaus-Action ... (...)
execute
iHaus-Action n (kitchen lights on, espresso machine on)
execute
51
55
61
63
65

Fig. 4

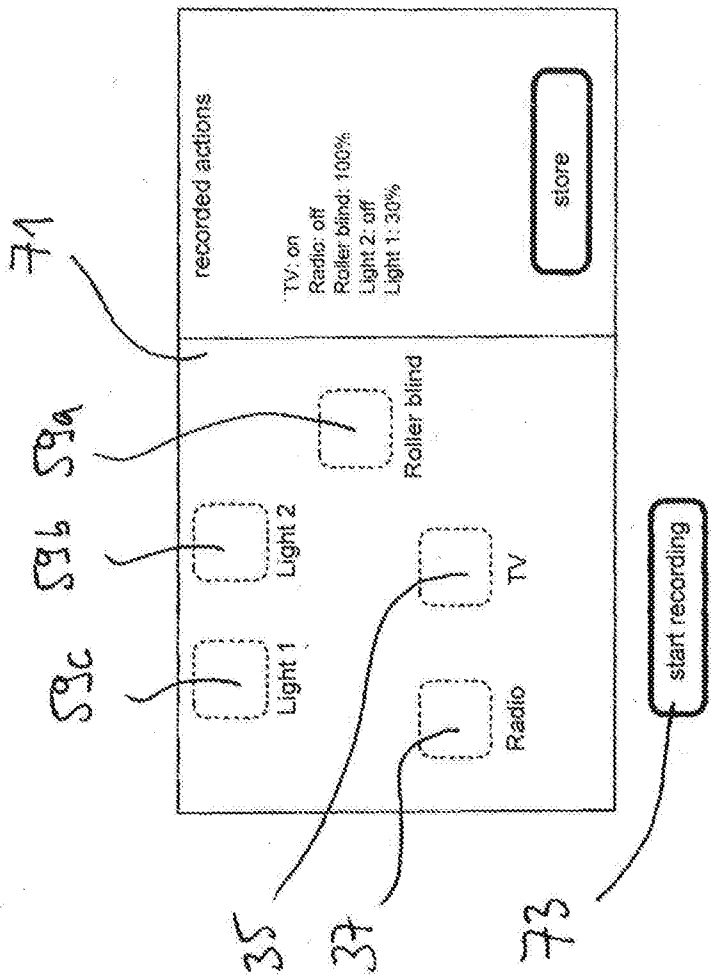
recorded actions
TV: on
Radio: off
Roller blind: 100%
Light 2: off
Light 1: 30%
store
Roller blind
Light 2
Light 1
TV
Radio
start recording
71
93a
93b
93c
35
37
73

Fig. 5

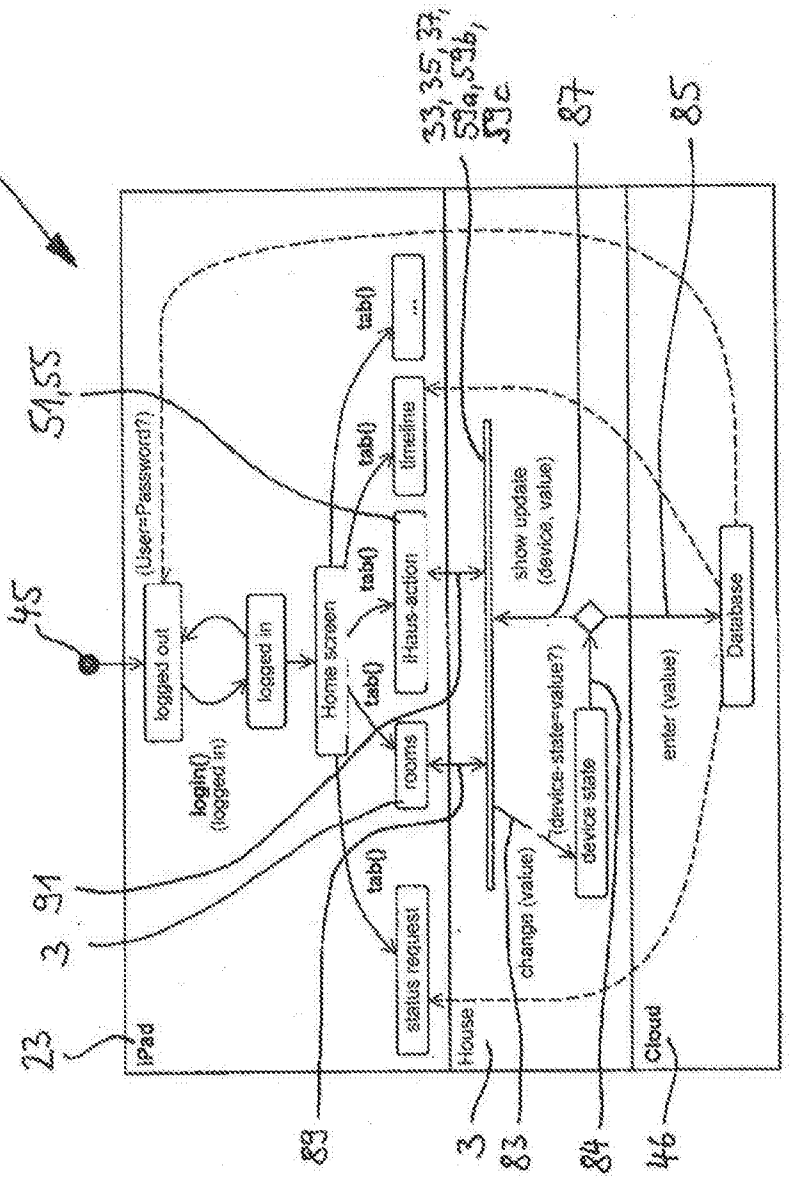
81
33, 35, 37, 53a, 53b, 53c
87
85
51, 55
45
91
3
23
iPad
logged out
(User=Password?)
logged in
login()
(logged in)
Home screen
tab()
...
timeline
Haus-action
rooms
status request
House
change (value)
show update (device, value)
(device-state=value?)
device state
enter (value)
Database
Cloud
83
3
83
84
46

Fig. 6