Title: VISUAL INTERFACE UNIT AND METHOD OF OPERATING THE SAME

Abstract: According to an exemplary aspect of the invention, a visual interface unit is provided wherein the visual interface unit comprises a receiver unit and a transmitter unit, wherein the receiver unit is adapted to receive a first control signal from a remote control, and wherein the transmitter unit is adapted to send a second control signal to a remote device based on the first control signal.
FIELD OF THE INVENTION

The present invention relates to the field of visual interface units. The invention further relates to methods of operating visual interface units, in particular for remote controlling of devices. Moreover, the invention relates to a program element. Further, the invention relates to a computer-readable medium.

BACKGROUND OF THE INVENTION

The large number of remote controls for electronic (audio/video) devices in a household is a common source of inconvenience. All-in-one remote control devices combine the functionality of multiple remote controls in one universal device. In these universal devices a trade-off needs to be made between the number of offered remote control commands and the convenience of operation. A device with a complete set of commands may be inconvenient in practical operation, while a simplified set of commands will not include specialized commands for all devices.

In a typical household, usually a couple of remote controls can be found, each for one electronic (audio/video) device. Finding the right remote control, and the right button on it in time, is often a challenge. All-in-one remote control devices try to replace the functionality of multiple remote controls in one universal remote control device. This ranges from the simpler universal remote controls without display, to the more sophisticated ones featuring a touch-sensitive display, or mobile phone devices with the possibility of downloading remote control functionality.

Thus, there may be a need for a single remote control unit adapted to perform the control of plurality of devices and which is easy to handle.

SUMMARY OF THE INVENTION

It is an objective of the invention to provide a visual interface unit enabling controlling of multiple devices in an easy way while having incomplex configuration.

In order to achieve the objective defined above, a visual interface unit, a method of operating a visual interface unit, a program element, and a computer-readable
medium according to the independent claims are provided. Advantageous embodiments of
the present invention are described by the dependent claims.

According to an exemplary aspect of the invention, a visual interface unit is
provided wherein the visual interface unit comprises a receiver unit and a transmitter unit,
wherein the receiver unit is adapted to receive a first control signal from a remote control,
and wherein the transmitter unit is adapted to send a second control signal to a remote device
based on the first control signal.

In particular, the remote control may be remote to the visual interface, i.e. is
arranged in a location distinct to the location of the visual interface unit. For example, the
remote control may be a mobile or handheld remote control unit, like a remote control unit
for a television set or a DVD player. Such a remote control unit may be formed by an
element which does not comprise a display, since the displaying of any necessary information
may be performed on the visual interface unit. Thus, the remote control unit may be formed
by an element having low complexity and may be easy to manufacture. Another possibility
may be that the receiving unit is a camera integrated in the visual interface unit and the first
control signal may correspond to the detection and/or analyzing movements in front of the
camera. These movements may be performed by a user of the visual interface unit. In
particular, the term "remote control" may particularly refer to the functionality of controlling
devices from a distance while the term "remote control unit" or "remote control device" may
particularly refer to a physical device which enables the remote control functionality.

The visual interface unit may in particular be a television set or a computer
including a monitor, e.g. a laptop computer or a desktop computer having a monitor attached
thereto. In particular, the visual interface unit may have a single housing in which the
receiver unit and the transmitter unit are arranged. Furthermore, the remote device may be a
distinct device, i.e. may be separate to the visual interface, and may be an electronic device,
e.g. a DVD recorder or player, a video recorder or player, a stereo audio device, remotely
switchable or controllable lights or the like. The visual interface may be formed as an
interactive visual interface. The receiver unit and/or the transmitter unit may be adapted to
receive and/or to transmit signals in a wireless manner, e.g. as RF signals and/or infrared
signals, i.e. as electromagnetic waves of different wavelengths or in the case of a camera as
the receiving unit the receiving unit is adapted to receiving a first control signal formed by
movements of a user, for example.

According to an exemplary aspect of the invention a visual interface system is
provided which comprises a visual interface unit according to an exemplary aspect of the
invention and a remote control wherein the remote control is adapted to send the first control signal to the receiver unit of the visual interface unit. In particular, the visual interface system may further comprise a display unit and a processing unit, wherein the processing unit is adapted to generate the second control signal based on the first control signal.

According to an exemplary aspect of the invention a method of operating a visual interface unit, wherein the method comprises receiving a first control signal in a visual interface unit, wherein the first control signal originate from a remote control, e.g. from a remote control unit, generating a second control signal based on the first control signal in the visual interface unit, and transmitting the second control signal to a remote device.

According to an exemplary aspect of the invention a program element is provided, which, when being executed by a processor, is adapted to control or carry out a method according to an exemplary aspect of the invention.

According to an exemplary aspect of the invention a computer-readable medium is provided, in which a computer program is stored which, when being executed by a processor, is adapted to control or carry out a method according to an exemplary aspect of the invention.

The term "visual interface unit" may particularly denote a unit or device comprising a display on which a menu may be displayable, e.g. a TV set or a monitor. In particular, the visual interface may comprise an input and an output terminal connected to the receiving unit and the transmitting unit, respectively. Furthermore, all components of the visual interface unit may be arranged in a common housing.

The term "remote" may particularly denote a device, unit, element, component or the like which is remote and/or separated from another device, unit or element. In particular, the two devices which are remote from each other may be arranged in different housings. Examples of a remote control unit may be commonly-known remote controller for a television set or for a DVD player, while a remote device in the sense of the present application may be a DVD player, a hi-fi system or the like.

The term "unit" may particularly denote an element or component which may comprise several sub-components which however may form a single functional component and which may be located in a single housing.

The term "signal" may denote any kind of data which can be transmitted and which can contain information, commands or the like from one device or unit to another device or unit. In particular, the term signal may also include the plural, i.e. multiple signals, or a signal may comprise several sub-signals, wherein one sub-signal corresponds to a first
information or command while a second sub-signal corresponds to a second information or
command.

The term "remote control" may particularly denote a unit like an ordinary
remote control unit of a TV set or a DVD player. However, in a broader sense the term may
also cover each possibility of providing a signal which can be used for controlling or
conveying commands, e.g. this may also cover the detecting and analyzing of movements in
front of a camera used as the receiving unit of the visual interface unit. These movement may
be analyzed in the visual interface unit and may there be used to generate the second control
signal.

By providing a visual interface unit according to an exemplary aspect of the
invention it may be possible to provide a simpler and less complex remote controlling of a
remote device, since a great number of remote control functions may be implementable due
to the use of a visual interface unit. Thus, it may be possible to use a small hand-held remote
control unit which may also be called a remote control device and which is used to send a
first control signals or command to the visual interface unit which then converts the first
control signals into second control signals or commands which can be sent to a respective
remote device.

Thus, the need to make a balance between completeness of the set of the remote
control functions or commands, and the number of keys or touch screen buttons may
be avoidable. This may lead to a remote control unit which may be less complex, less
confusing and less difficult to operate since the number of keys and/or buttons on the remote
control unit may be held low so that there may be no need to implement small keys or buttons
on the remote control unit. Furthermore, it may be possible that specific keys do not have to
be omitted due to space limitation so that it may be possible to avoid that a missing
specialized commands occur. In addition it may be possible to omit a display integrated into a
remote control unit by using the visual interface unit.

The remote control unit of the system may not require a display, which may
allow more space and less power consumption which may be in particular advantageous in
case of a handheld remote control unit.

An advantage of the visual interface unit may be the enhanced convenience for
operating all remotely controllable devices through one visual interface unit and a
corresponding single remote control unit, e.g. a TV set and the corresponding remote control
unit. While watching TV, normally multiple features of multiple devices are operated, for
example the volume of the stereo set, the picture control of the TV and the play
speed/direction of the DVD player, while the user's attention is on the TV screen, i.e. the visual interface unit. The TV screen, or a part of the screen, may therefore be an advantageous medium to provide the user with the visual feedback.

The display of typical remote control units are in general quite small, so that in general a user has to go through multiple pages for finding a desired command. The visual interface unit, e.g. a TV set, may be provided with a large size and a high resolution display which may offer orderly and intuitive visual user interface, for optimum convenience, since no space have to be saved due to the limited possibilities, e.g. size and resolution of the display of a handheld remote control unit.

All remote control units may be replaced by a single remote control unit which may be the ordinary remote control unit of the visual interface unit, e.g. the TV set remote control unit of a TV set. The user may not need to purchase an all-in-one remote control unit, which may reduce costs, or learn the key configurations of an extra remote control unit, which may increase the convenience for the user.

The visual user interface may be very flexible, thanks to higher computation power and memory that may be available in a visual interface unit, e.g. TV set. Additionally, remote control functionality for new devices may be added without using a new remote control unit, since the computational load and may be performed by the visual interface unit. Additionally, the user may select the outlook and/or the layout of the visual feedback of the visual interface unit that graphically represents the available control commands of the remote device.

As all user commands go through the visual interface unit or system, the system may analyze the user behavior, and optimize the visual user interface accordingly, for example by optimized or personalized placement of the visual control buttons, or by performing certain sequences of commands automatically. For example, the visual interface unit can learn the sequence of commands or signals used to switch on or off multiple devices such as the audio amplifier, the DVD player, the satellite or cable receiver, the VCR, etc., and offer to the user to perform these sequence of commands automatically, instead of the user having to perform each of them manually.

Furthermore, an increased operating comfort may be provided for the user, as the user may not have to point the remote control to different remote devices. It is sufficient that the visual interface unit, e.g. TV or computer including a monitor, receives the first control signal of the remote control unit. The generated second control signal may then be transmitted by the visual interface unit and may be as strong as necessary for guaranteed
reception by the target remote devices. The second control signal may be reflected from walls or the like to the target remote device.

Additionally, in specific embodiments it may also be possible to use visual based user inputs, e.g. gestures, made in front of a camera used as the receiving unit for providing first control signals.

A gist of an exemplary aspect of the invention may be seen in providing a system adapted to replace several or all remote control devices or units in a household through using a flexible, high resolution visual user interface, e.g. a TV set. This system may use the TV remote control for capturing the user input and the TV screen as visual user interface. The TV may interpret the user commands, may translate these to control signals, e.g. infrared signals, and may transmit them through a transmitter integrated in the TV.

Next, further exemplary embodiments of the visual interface unit are described. However, these embodiments also apply the visual interface system and the method of operating the visual interface unit.

According to another exemplary embodiment of the visual interface unit the receiver unit is adapted to receive electromagnetic waves of an infrared wavelength, and/or wherein the transmitter unit is adapted to send electromagnetic waves of an infrared wavelength.

According to another exemplary embodiment the visual interface unit further comprises a display unit, wherein the display unit is adapted to display a menu of selectable items.

In particular, each of the selectable items may correspond to specific second control signals. Furthermore, each second control signal may represent an available command, i.e. by selecting a specific selectable item a specific second control signal may be send by the transmitter unit which will cause the remote device to perform a specific action or function.

According to another exemplary embodiment of the visual interface unit the menu of selectable items may be arranged in a pattern simulating a remote control unit.

According to another exemplary embodiment of the visual interface unit the menu of selectable items may be arranged in a pattern simulating the remote control unit and/or simulating a remote control unit of the remote device.

In particular, the pattern may simulate or reproduce an ordinary remote control unit of the remote device. For example, the selectable items may simulate the shape and/or arrangement of selectable buttons arranged in a way similar or identical to the ordinary
remote control unit of the remote device. Based on the first control signal or further control signals received from the remote control unit a specific one of the selectable items, which simulate buttons, may be selected so that a second control signal is generated corresponding to a functionality associated with the selectable item or button.

Alternatively, the pattern may simulate or reproduce the remote control unit from which the first control signals are received by the receiving unit of the visual interface unit. According to this exemplary embodiment, functionalities associated with specific buttons may be remapped.

That is, in case that the visual interface unit is a TV set and the remote control unit is the remote control unit of the TV set and the remote device is a DVD player, it may be possible to display an image on the TV set simulating the remote control unit of the TV set itself wherein the functionalities of the respective buttons or keys are remapped in order to conform with the functions of the DVD player (remote device). It may also be possible to display an image on the TV set simulating an ordinary remote control unit of the DVD player (remote device) showing buttons or keys which can be selected in order generate second control signals which can be sent to the DVD player to control the same.

According to another exemplary embodiment of the visual interface unit the menu of selectable items may be arranged in a pattern simulating the remote control unit and/or simulating a remote control unit of the visual interface unit, of which the functionalities associated with specific buttons are remapped with the functions of the remote device.

According to another exemplary embodiment the visual interface unit further comprises a processing unit, wherein the processing unit is adapted to generate the second control signal based on the first control signal. In particular, the processing unit may be adapted to perform all necessary processing steps to generate the second control signal out of or based on the first control signal. Thus, it may be possible that a remote control unit is used having no or only very small amount of processing power. For example, an ordinary remote control unit of a television set may be suitable.

According to another exemplary embodiment of the visual interface unit the processing unit is further adapted to generate data that can be converted in the display unit in such a way that the menu of selectable items is displayable.

Such a menu of selectable items may be similar to a menu generally known in the field of computers, i.e. a list of different commands that can be selected. For example, in a first step a specific one of the listed selectable items may be highlighted and in a following
step the highlighted selectable item may be selected. In this context the term "selected" may particularly denote the triggering of a generation of a specific signal which, when received by a respective device, will cause a specific action or function of the respective device. For example, the selecting of an item called "off" may cause the generation of a signal which, when received by the respective device will effect a switching off of the respective device.

According to another exemplary embodiment of the visual interface unit the visual interface unit is adapted to select at least one of the selectable items based on the first control signal.

According to another exemplary embodiment of the visual interface unit the visual interface is designed in such a way that the second control signal corresponds to a selected one of the selectable items.

In particular, the selectable items may correspond to different second control signals, e.g. a specific second control signal will be generated based on a specific first control signal. For example, the first control signal will cause that a menu list is displayed on a display unit of the visual interface and/or a specific menu item is highlighted or selected. Based on the highlighted or selected menu item the second control signal is generated, i.e. the second control signal is adapted to activate the operation function associated with the selected menu item.

According to another exemplary embodiment of the visual interface unit the receiver unit is adapted to receive the first control signal through analyzing gestures and/or motions of a user, and/or wherein the transmitter unit is adapted to send electromagnetic waves of an infrared wavelength.

Summarizing, an exemplary aspect of the present invention may be seen in providing a user interface for replacing multiple remote control units, aimed at offering better operating convenience for the user, higher flexibility in including new types of remote control units, and cost reduction for the user. The essence of an exemplary aspect may be to implement a part of the functionality of a universal remote control unit, namely the user command interpretation and translation of these commands to infrared signals, in an interactive visual interface such as a TV. Using a simple remote control unit, such as the standard TV remote control unit, (1) the user may select the device he/she wants to control, (2) the TV may display the available control options for this device, (3) the user further may apply his desired command using the remote control unit and the visual feedback from the TV, (4) the TV may translate the desired command to corresponding control signal for the target device and transmit this signal via a signal transmission device such as infrared to the
target device, and (5) finally, the target device may receive the infrared signal.

The visual interface unit or system described may aim at solving the previously described problem of too many remote control commands, by using the TV screen as the visual interface of the remote control unit. Improved convenience and higher flexibility may be achieved through the use of the TV screen that may provide a high resolution and orderly visual user interface, and simple navigation through the standard TV remote control unit. The system may comprise the following elements. It may use an element for receiving user input, such as a simple (e.g. the standard TV) remote control unit and the corresponding receiver unit like an infrared receiver, or a visual-based input such as gestures and motions of the user. It may use the TV display as visual feedback to the user. It may contain a program for generating menus and graphics on the TV screen, and for interpreting user inputs for activating the desired command for a selected device, and it may contain an infrared transmitter, for sending the infrared commands to the selected device.

It has to be noted that exemplary aspects and exemplary embodiments of the invention have been described with reference to different subject-matters. In particular, some embodiments have been described with reference to apparatus type claims whereas other embodiments have been described with reference to method type claims. However, a person skilled in the art will gather from the above and the following description that, unless other notified, in addition to any combination of features belonging to one type of subject matter also any combination between features relating to different subject-matters, in particular between features of the apparatus type claims and features of the method type claims is considered to be disclosed with this application.

The exemplary aspects and exemplary embodiments defined above and further aspects of the present invention are apparent from the examples of embodiment to be described hereinafter and are explained with reference to the examples of embodiment. The invention will be described in more detail hereinafter with reference to examples of embodiment but to which the invention is not limited.

BRIEF DESCRIPTION OF THE DRAWING

Fig. 1 schematically illustrates a visual interface system according to an exemplary embodiment of the invention

DETAILED DESCRIPTION

The illustration in the drawing is schematic. Identical or similar elements are
labeled with identical or similar reference signs.

In the following, referring to Fig. 1, some basic principles of the visual interface system according to exemplary embodiments will be explained.

Fig. 1 schematically illustrates a visual interface system 100 comprising a visual interface unit 101, formed by a display, e.g. of a television set (TV set), and further comprising a receiver unit 102, formed by an infrared receiver, and a transmitter unit 103, formed by an infrared transmitter. Furthermore, the system 100 comprises a handheld remote control unit 104 that is adapted to send a first control signal, indicated by line 105, to the receiving unit 102. The visual interface unit 101 is adapted to generate a second control signal, indicated by line 106, to remote devices or target devices 107 and 108. The remote devices may be a DVD player, a hi-fi or stereo system, or a video player, for example. In general every controllable electric or electronic device may be suitable. Furthermore, a reflection of the second control signal 106 is indicated at point 109. Such a reflection may occur on a wall, for example. Additionally, a user 110 is also depicted in Fig. 1. The visual interface unit 101 may comprise a processing unit (not shown) which is adapted to perform the generation of the second control signal based on the received first control signal. Furthermore, the visual interface unit 101 comprises a display unit 111 on which a menu 112 of selectable items may be displayed.

In the following the use of the visual interface system 100 by a user is described in greater detail. In particular, the following steps may be undertaken when the user decides to send a command, e.g. the PLAY command to a desired remote or target device, e.g. a DVD player. Here, the term TV refers to a TV set in which the functionality of visual interface unit is integrated.

1. Using the standard TV remote control unit, the user requests the remote control menu of a device from the TV, in this case the DVD remote control menu.

2. The TV receives this request and displays the control menu of the selected device on the TV screen, in this case the DVD control menu. This can be done by e.g.:

   a) Showing a graphical (button) layout, representing the available commands,

   b) Showing a picture of the original remote control unit of the desired device, of which the buttons can be selected.

   c) Showing the TV remote control unit, with a remapped functionality of
the keys.

3. The user sees the available control options for the selected device, and activates the desired action by selecting the corresponding control option, in this case the PLAY command. Depending on the menu styles in step-2, the selection can be implemented by

   a) Selecting the corresponding graphical button, using the TV remote control unit's arrows/rotary cursor control
   b) Same as a)
   c) Selecting the corresponding remapped key of the TV remote control unit, for example PLAY of the DVD may be, in this case, mapped to the OK button of the TV control key

4. The desired command (PLAY in this case) is translated to the corresponding infrared signal of the selected device (DVD player in this case) and transmitted into the room through the infrared transmitter integrated in the TV.

5. The selected device (the DVD player in this case) receives the infrared signal or a reflection thereof and executes the desired command (PLAY in this case)

Thus, a visual interface system may be provided suitable for replacing multiple remote control units to use an all-in-one handheld remote control unit. In existing all-in-one remote control units the large number of control commands cannot be conveniently combined with the small size of the handheld remote control unit. Contrary, to the existing all-in-one remote control units which put the entire remote control functionality (the user interface and the infrared transmission) on the small handheld device, the system according to an exemplary aspect of the invention implements a part of the functionality in a visual user interface unit which can be e.g. integrated in a TV. As such, the remote control functionality is split into

On the handheld remote control unit (e.g. the standard TV remote control unit):
- the physical user input interface, e.g. the user pressing the physical buttons of the remote control unit.

On the TV:
- visual feedback to the user through the TV screen
- reception of the user commands
- translation and transmission of the user commands to the target device via infrared.
It should be noted that the term "comprising" does not exclude other elements or steps and the "a" or "an" does not exclude a plurality. Also elements described in association with different embodiments may be combined. It should also be noted that reference signs in the claims should not be construed as limiting the scope of the claims.
CLAIMS:

1. A visual interface unit (101) comprising:
   a receiver unit (102), and
   a transmitter unit (103),
   wherein the receiver unit (102) is adapted to receive a first control signal (105) from a remote control (104), and
   wherein the transmitter unit (103) is adapted to send a second control signal (106) to a remote device (107, 108) based on the first control signal (105).

2. The visual interface unit (101) according to claim 1,
   wherein the receiver unit (102) is adapted to receive electromagnetic waves of an infrared wavelength, and/or
   wherein the transmitter unit (103) is adapted to send electromagnetic waves of an infrared wavelength.

3. The visual interface unit (101) according to claim 1, further comprising:
   a display unit (111),
   wherein the display unit (111) is adapted to display a menu (112) of selectable items.

4. The visual interface unit (101) according to claim 3,
   wherein the menu of selectable items may be arranged in a pattern simulating a remote control unit.

5. The visual interface unit (101) according to claim 4,
   wherein the menu of selectable items may be arranged in a pattern simulating the remote control unit and/or simulating a remote control unit of the remote device.

6. The visual interface unit (101) according to claim 4,
   wherein the menu of selectable items may be arranged in a pattern simulating
the remote control unit and/or simulating a remote control unit of the visual interface unit, of
which the functionalities associated with specific buttons are remapped with the functions of
the remote device.

7. The visual interface unit (101) according to claim 3, further comprising:
   a processing unit,
   wherein the processing unit is adapted to generate the second control signal
   (106) based on the first control signal (105).

8. The visual interface unit (101) according to claim 7,
   wherein the processing unit is further adapted to generate data which
   can be converted in the display unit (111) in such a way that the menu (112) of selectable
   items is displayable.

9. The visual interface unit (101) according to claim 7,
   wherein the visual interface unit (101) is adapted to select at least one of the
   selectable items based on the first control signal (105).

10. The visual interface unit (101) according to claim 3,
    wherein the visual interface unit (101) is designed in such a way that the
    second control signal (106) corresponds to a selected one of the selectable items.

11. The visual interface unit (101) according to claim 1,
    wherein the receiver unit (102) is adapted to receive the first control signal
    through analyzing gestures and/or motions of a user, and/or
    wherein the transmitter unit (103) is adapted to send electromagnetic waves of
    an infrared wavelength.

12. A visual interface system (100) comprising:
    a visual interface unit (101) according to claim 1,
    a remote control unit (104),
    wherein the remote control unit (104) is adapted to send the first control signal
    (105) to the receiver unit (102) of the visual interface unit (101).
13. The visual interface system (100) according to claim 10,
wherein the visual interface system (100) further comprises:
   a display unit (111); and
   a processing unit,
wherein the processing unit is adapted to generate the second control signal (106) based on the first control signal (105).

14. A method of operating a visual interface unit (101), the method comprising:
   receiving a first control signal (105) from a remote control (104) in the visual interface unit (101),
   generating a second control signal (106) based on the first control signal (105) in the visual interface unit (101), and
   transmitting the second control signal (106) to a remote device (107, 108).

15. A program element, which, when being executed by a processor, is adapted to control or carry out a method according to claim 12.

16. A computer-readable medium, in which a computer program is stored which, when being executed by a processor, is adapted to control or carry out a method according to claim.
**INTERNATIONAL SEARCH REPORT**

**A. CLASSIFICATION OF SUBJECT MATTER**

**INv. Cl.** 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)

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

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

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**Date of the actual completion of the international search**

17 March 2010

**Date of mailing of the international search report**

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Authorized officer

Pham, Phong

Form: PCT/ISA/210 (second shW) (April 2005)
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