Title: METHOD AND APPARATUS FOR DIGITAL BROADCASTING SET-TOP BOX CONTROLLER AND DIGITAL BROADCASTING SYSTEM

Abstract: A digital broadcasting set-top box controlling apparatus and a method of driving the digital broadcasting set-top box controlling apparatus are provided. The digital broadcasting set-top box controlling apparatus includes a touch pad which senses a touch of a user, converts the sensed touch into an input signal corresponding at least one of a location and a state of the sensed touch, and outputs the input signal; a micro control unit which receives the input signal from the touch pad and converts the input signal into a control signal; and a communication module which receives the control signal from the micro control unit and outputs the control signal to the digital broadcasting set-top box.
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Description

METHOD AND APPARATUS FOR DIGITAL BROADCASTING
SET-TOP BOX CONTROLLER AND DIGITAL
BROADCASTING SYSTEM

Technical Field

[1] The present invention relates to a user interface device, and more particularly, to a user interface device for conveniently controlling a digital broadcasting set-top box and supporting various inputting methods.

Background Art

[2] In the past, a one-way broadcasting system in which viewers only receive and watch broadcasting as in terrestrial broadcasting was mainly used. Nowadays, with the development of wireless communications and broadcasting technology, a digital broadcasting technique is used in terrestrial broadcasting, cable broadcasting, and satellite broadcasting, and a two-way broadcasting system in which viewers give and receive predetermined demands to and from broadcasting providers via digital TVs or digital TV set-top boxes are being introduced.

[3] The two-way broadcasting system is being enhanced to meet various demands of viewers. For example, digital broadcasting set-top boxes can be connected to the Internet via a wired/wireless communication network, and users can access necessary information from the Internet by using set-top boxes and TVs instead of using computers. In addition, as viewer-participation broadcasting becomes possible, viewers need to transmit messages, such as characters, to broadcasting providers.

[4] Digital broadcasting services using such a digital broadcasting set-top box become diversified and improved in quality, whereas a set-top box controller or an input device has not greatly improved compared with that in existing analog broadcasting or one-way broadcasting.

[5] In addition, although digital broadcasting set-top boxes can communicate with an existing wireless keyboard or mouse and can thus be controlled thereby, most of viewers desire to watch broadcasting in comfortable postures on the sofas. Thus, it is difficult for viewers to use an input device which is big and requires a flat surface, such as a keyboard or a mouse.

[6] Accordingly, a digital broadcasting set-top box controlling apparatus that supports various inputting methods by using a touch pad and uses a simply-manipulatable interface is desperately required to satisfy various demands of users.

Disclosure of Invention
Technical Problem

[7] The present invention provides a digital broadcasting set-top box controlling apparatus which can perform point recognition using a touch pad, and a digital broadcasting set-top box controlling method performed in the digital broadcasting set-top box controlling apparatus. The present invention also provides a digital broadcasting set-top box controlling apparatus which can perform point recognition and/or character recognition using a touch pad, and a digital broadcasting set-top box controlling method performed in the digital broadcasting set-top box controlling apparatus.

[8] The present invention also provides a digital broadcasting set-top box controlling apparatus which can perform two-way data communications with a digital broadcasting set-top box instead of outputting a one-way control signal as in an existing remote controller, and a digital broadcasting set-top box controlling method performed in the digital broadcasting set-top box controlling apparatus. The present invention also provides a digital broadcasting set-top box controlling apparatus which can receive an on-screen display (OSD) image displayed on a display device and directly perform various control operations by using the received OSD image because two-way data communications is possible, and a digital broadcasting set-top box controlling method performed in the digital broadcasting set-top box controlling apparatus.

Advantageous Effects

[9] In an apparatus and a method of controlling a digital broadcasting set-top box according to the present invention, point recognition can be performed using a touch pad. In addition, point recognition and/or character recognition can be performed using the touch pad, and the apparatus can perform two-way data communications with a digital broadcasting set-top box instead of outputting an one-way control signal as in an existing remote controller.

[10] Moreover, because two-way data communications is possible, the apparatus can receive an on-screen display (OSD) image displayed on a display device and directly perform various control operations by using the received OSD image. In addition, an effect where an operation of a digital broadcasting set-top box is directly performed in the digital broadcasting set-top box controlling apparatus can be obtained.

Brief Description of the Drawings

[11] The above and other features and advantages of the present invention will become more apparent by describing in detail exemplary embodiments thereof with reference to the attached drawings in which:

[12] FIG. 1 illustrates a digital broadcasting set-top box and a digital broadcasting set-top box controlling apparatus according to an embodiment of the present invention;
FIG. 2 is a functional block diagram of a structure of the digital broadcasting set-top box controlling apparatus illustrated in FIG. 1;

FIG. 3 illustrates a remote controller type interface of the digital broadcasting set-top box controlling apparatus illustrated in FIG. 2;

FIG. 4 illustrates a keyboard type interface of the digital broadcasting set-top box controlling apparatus illustrated in FIG. 2;

FIG. 5 illustrates a pattern input interface of the digital broadcasting set-top box controlling apparatus illustrated in FIG. 2;

FIG. 6 illustrates an on-screen-display (OSD) used interface of the digital broadcasting set-top box controlling apparatus illustrated in FIG. 2; and

FIG. 7 is a conceptual diagram for describing point control performed by using the digital broadcasting set-top box controlling apparatus illustrated in FIG. 2.

**Best Mode for Carrying Out the Invention**

According to an aspect of the present invention, there is provided a digital broadcasting set-top box controlling apparatus comprising: a touch pad sensing a touch of a user, converting the sensed touch into an input signal corresponding at least one of a location and a state of the sensed touch, and outputting the input signal; a micro control unit receiving the input signal from the touch pad and converting the input signal into a control signal; a communication module receiving the control signal from the micro control unit and outputting the control signal to a digital broadcasting set-top box; and a display module displaying interface information which is received from at least one of the digital broadcasting set-top box and a memory and output via the micro control unit, wherein the micro control unit converts the input signal into the control signal on the basis of touched location information of the input signal and the interface information.

The micro control unit may receive the input signal from the touch pad and output the control signal corresponding to one of moving, clicking, and dragging on the basis of at least one of the touched location information and touch state information which are included in the input signal.

According to another aspect of the present invention, there is provided a digital broadcasting set-top box controlling apparatus comprising: a touch pad sensing a touch of a user, converting the sensed touch into an input signal corresponding at least one of a location and a state of the sensed touch, and outputting the input signal; a micro control unit receiving the input signal from the touch pad and converting the input signal into a control signal; a communication module receiving the control signal from the micro control unit and outputting the control signal to a digital broadcasting set-top box; and a display module displaying interface information which is output from the
micro control unit, wherein the micro control unit receives at least a portion of OSD (on-screen-display) information from the digital broadcasting set-top box via the communication module and outputs the received portion of the OSD information to the display module, and converts the input signal into the control signal on the basis of touched location information of the input signal and the received portion of the OSD information.

[22] According to another aspect of the present invention, there is provided a digital broadcasting set-top box controlling apparatus comprising: a touch pad sensing a touch of a user, converting the sensed touch into an input signal corresponding at least one of a location and a state of the sensed touch, and outputting the input signal; a micro control unit receiving the input signal from the touch pad and converting the input signal into a control signal; a communication module receiving the control signal from the micro control unit and outputting the control signal to a digital broadcasting set-top box; and a display module displaying interface information which is output from the micro control unit, wherein the micro control unit receives display information from the digital broadcasting set-top box via the communication module and outputs the display information to the display module, and outputs at least one of the touched location information and touch state information included in the input signal input based on an image displayed on the display module, to the digital broadcasting set-top box via the communication module.

[23] According to another aspect of the present invention, there is provided a digital broadcasting system comprising one of the two former digital broadcasting set-top box controlling apparatuses; and a digital broadcasting set-top box receiving the control signal from the digital broadcasting set-top box controlling apparatus and performing a control operation corresponding to the control signal.

[24] According to another aspect of the present invention, there is provided a digital broadcasting system comprising: the latter digital broadcasting set-top box controlling apparatus; and a digital broadcasting set-top box receiving at least one of the touched location information and the touch state information, performing an operation corresponding to the received information, and outputting display information obtained after the execution of the operation corresponding to the received information to the digital broadcasting set-top box controlling apparatus.

[25] According to another aspect of the present invention, there is provided a method of driving a digital broadcasting set-top box controlling apparatus, the method comprising: the digital broadcasting set-top box controlling apparatus, displaying interface information which is received from at least one of a digital broadcasting set-top box and a memory; sensing a touch of a user, converting the sensed touch into an input signal corresponding at least one of a location and a state of the sensed touch,
and outputting the input signal; and converting the input signal into a control signal on
the basis of touched location information of the input signal and interface information
and outputting the control signal to the digital broadcasting set-top box.

26] The method may further comprise determining whether the input signal corresponds
to moving, clicking, or dragging, on the basis of at least one of the touched location in-
formation and touch state information which are included in the input signal.

27] The method may further comprise: recognizing a pattern of the received input signal;
and outputting information about a character corresponding to the recognized pattern
to the digital broadcasting set-top box.

28] The method may further comprise: generating a pattern corresponding to the received
input signal; and outputting the generated pattern to the digital broadcasting set-top box.

29] According to another aspect of the present invention, there is provided a method of
driving a digital broadcasting set-top box controlling apparatus, the method
comprising: the digital broadcasting set-top box controlling apparatus, receiving and
displaying at least a portion of OSD information output from a digital broadcasting set-
top box; sensing a touch of a user, converting the sensed touch into an input signal cor-
responding at least one of a location and a state of the sensed touch, and outputting the
input signal; and converting the input signal into a control signal on the basis of
touched location information of the input signal and the received portion of the OSD
information and outputting the control signal to the digital broadcasting set-top box.

30] According to another aspect of the present invention, there is provided a method of
driving a digital broadcasting set-top box controlling apparatus, the method
comprising: the digital broadcasting set-top box controlling apparatus, receiving
display information from a digital broadcasting set-top box and displaying the display
information; sensing a touch of a user based on a displayed image and converting the
sensed touch into an input signal corresponding at least one of a location and a state of
the sensed touch; and outputting at least one of touched location information and touch
state information included in the input signal to the digital broadcasting set-top box.

Mode for the Invention

31] The attached drawings for illustrating preferred embodiments of the present
invention are referred to in order to gain a sufficient understanding of the present
invention, the merits thereof, and the objectives accomplished by the implementation
of the present invention. It will be understood that when a component is referred to as
"transmitting" data to another component, the component can transmit the data to the
other component directly or via at least one component.

32] In contrast, when a component is referred to as "directly transmitting" data to another
component, there are no intervening components via which the data is transmitted from
the former component to the latter component.

[33] Hereinafter, the present invention will be described in detail by explaining preferred
embodiments of the invention with reference to the attached drawings. Like reference
numerals in the drawings denote like elements.

[34] FIG. 1 illustrates a digital broadcasting set-top box 200 and a digital broadcasting
set-top box controlling apparatus 100 according to an embodiment of the present
invention. Referring to FIG. 1, the digital broadcasting set-top box controlling
apparatus 100 according to the current embodiment may be connected to the digital
broadcasting set-top box 200 via wired/wireless communications and transmit data to
and receive data from the digital broadcasting set-top box 200. In other words, a con-
ventional remote controller performs one-way communications where a signal is
simply generated and output to the digital broadcasting set-top box 200, whereas the
digital broadcasting set-top box controlling apparatus 100 may perform two-way com-
munications with digital broadcasting set-top box 200.

[35] The digital broadcasting set-top box 200 may be connected to a display device 300 in
a wired or wireless way and output display information or sound information to the
display device 300. The digital broadcasting set-top box 200 may include a personal
video recorder (PVR) function and be connected to the Internet via wired/wireless
communications.

[36] The digital broadcasting set-top box controlling apparatus 100 may be used as a
control device for controlling the digital broadcasting set-top box 200 or as an input
device for inputting information, such as characters, numbers, and/or symbols, to the
digital broadcasting set-top box 200. For convenience of viewers or users, the digital
broadcasting set-top box controlling apparatus 100 may be designed to have such a
size and weight as to be put and used on one hand of a viewer or a user.

[37] FIG. 2 is a functional block diagram of a structure of the digital broadcasting set-top
box controlling apparatus 100. Referring to FIG. 2, the digital broadcasting set-top box
controlling apparatus 100 includes a micro controller unit (MCU) 110, a touch pad
120, and a communication module 140. The digital broadcasting set-top box
controlling apparatus 100 may further include a pattern recognition module 150, a
display module 130, and/or a memory 160.

[38] The MCU 110 may serve as a central processing unit (CPU) or a control device for
controlling the digital broadcasting set-top box controlling apparatus 100. The MCU
100 may have various names, such as a processor, a CPU, etc., according to em-
bdiments or manufacturing companies. The touch pad 120 may sense a touch of a
user, generate a signal corresponding to the touch, and output the signal to the MCU
110. To achieve this, the touch pad 120 may include a touch panel (not shown), a touch
When a user applies a predetermined pressure on the touch pad 120 by using his or her hand, a touch pad pen, or the like, the touch pad 120 may sense the pressure and output, as an output signal, at least one of information about a touched location and information about a touch state. The information about a touched location includes information about a location on the touch pad 120 from which the pressure is sensed. The information about a touch state includes information about whether the pressure is continuously applied and/or information about a motion of the touched location generated when the pressure has been applied. Of course, the information about a touch state may only include the information about whether the pressure is continuously applied. In this case, the information about the motion of the touched location and/or information about a distance by which the touched location was moved when the pressure was applied may be recognized based on the information about a touched location and the information about a touch state including only the information about whether the pressure is continuously applied.

The information about a touched location may be a coordinate on a touch panel (not shown) included in the touch pad 120. The information about a touch state may include at least one of the information about whether the pressure is continuously applied by a user and the information about a motion of the touched location generated when the user has touched according to an embodiment.

The touch pad 120 may generate a control signal (e.g., a signal corresponding to movement, clicking, or dragging) for controlling an interface (e.g., an on-screen display (OSD) or a pointer on a browser) of the digital broadcasting set-top box 200, based on at least one of the information about a touched location and the information about a touch state. The communication module 140 is a communication device used in order for the digital broadcasting set-top box 200 and the digital broadcasting set-top box controlling apparatus 100 to transceive data bidirectionally, or software for controlling the communication device. The communication module 140 may use wireless communications, such as infrared communications, Bluetooth, or wireless Internet, or wired communications.

The touch pad 120 may sense a touch (e.g., a pressure applied by a hand, a pen, or the like) of a user, convert the sensed touch into an input signal, and output the input signal. The MCU 110 may receive the input signal from the touch pad 120, convert the input signal into a control signal, and output the control signal to the digital broadcasting set-top box 200 via the communication module 140. The digital broadcasting set-top box controlling apparatus 100 may further include the display module 130, which may be implemented as a liquid crystal display (LCD) module. The LCD module may include an LCD panel, a driver, etc.
The display module 130 may be located below the touch pad 120 from the viewpoint of a user, and the touch pad 120 may be implemented as a transparent pad and stacked on the display module 130. Thus, users can feel that they directly touch a user interface (e.g., a button) displayed on the display module 130. The display module 130 may receive interface information from the MCU 110 and display an interface corresponding to the interface information.

The user may input a predetermined signal to the touch pad 120 by touching based on the interface displayed on the display module 130. The MCU 110 may convert the input signal into a control signal based on the interface information and touched location information which is included in the input signal, and output the control signal. The interface information may be pre-stored in the memory 160 or received from the digital broadcasting set-top box 200. The interface information may be a remote controller type interface as illustrated in FIG. 3 or a keyboard type interface as illustrated in FIG. 4.

FIGS. 3 and 4 illustrate a remote controller type interface and a keyboard type interface of the digital broadcasting set-top box controlling apparatus 100, respectively.

Referring to FIGS. 2 through 4, the display module 130 of the digital broadcasting set-top box controlling apparatus 100 may receive interface information previously stored in the memory 160 and display the interface information under the control of the MCU 110. Alternatively, the display module 130 may receive and display interface information (e.g., a remote controller type interface as illustrated in FIG. 3) which is received from the digital broadcasting set-top box 200 and then stored in the memory 160 or a storage device (not shown), under the control of the MCU 110.

The display module 130 may basically display interfaces for selecting several control modes, for example, interfaces 1, 2, 3, and 4 for selecting a remote controller control mode, a keyboard control mode, a pattern input control mode, and an OSD control mode, respectively. Hereinafter, the interfaces 1, 2, 3, and 4 are referred to as a remote controller interface 1, a keyboard interface 2, a pattern input interface 3, and an OSD interface 4. As illustrated in FIG. 3, each of the remote controller interface 1, the keyboard interface 2, the pattern input interface 3, and the OSD interface 4 may be a button-type graphic user interface (GUI). However, the present invention is not limited to this example, and various modifications in the type of each of the interfaces 1, 2, 3, and 4 may be made.

When a user touches a location on the touch pad 120, which corresponds to a location of the remote controller interface 1 displayed on the display module 130 (i.e., a portion of the touch pad 120 located directly over the remote controller interface 1), a remote controller type interface as illustrated in FIG. 3 may be displayed, and information about the remote controller type interface may be previously stored in the
memory 160. Of course, the memory 160 may receive the information about the remote controller type interface from the digital broadcasting set-top box 200 and store the information.

When the user touches a portion of the touch pad 120 corresponding to a volume-up interface 11 on the remote controller type interface displayed on the display module 130, the MCU 110 may convert an input signal corresponding to the touch into a control signal (that is, a volume-up control signal) based on the interface information (that is, information about the remote controller type interface and a location of the volume-up interface 11) and touched location information (that is, a touched location on the touch pad 120) of the input signal.

Of course, even when the user touches a portion of the touch pad 120 corresponding to a channel-up interface 12 on the remote controller type interface displayed on the display module 130, the MCU 110 may convert an input signal corresponding to the touch into a control signal (that is, a channel-up control signal), based on the interface information and the touched location information (that is, a touched location on the touch pad 120). Then, the digital broadcasting set-top box 200 may receive the control signal and perform a control operation (for example, a volume-up or channel-up operation) corresponding to the control signal.

When the user touches a location on the touch pad 120 corresponding to a location of the keyboard interface 2 of the display module 130 (i.e., a portion of the touch pad 120 located directly over the keyboard interface 2), a keyboard type interface as illustrated in FIG. 4 may be displayed, and information about the keyboard type interface may be previously stored in the memory 160. Of course, the memory 160 may receive the information about the keyboard type interface from the digital broadcasting set-top box 200 and store the information.

Then, the user may input characters, numbers, symbols, etc. by using a displayed GUI. A method of inputting the characters, numbers, symbols, etc. is similar to what described above with reference to FIG. 3, and thus a detailed description thereof will be omitted. In other words, the digital broadcasting set-top box controlling apparatus 100 can provide an input interface based on point recognition by using the GUI illustrated in FIG. 3 or 4 and the touch pad 120.

In addition, the memory 160 may not store only the remote controller type interface or keyboard type interface illustrated in FIG. 3 or 4 but also store various pieces of GUI information according to various embodiments and various user requests. Of course, the digital broadcasting set-top box controlling apparatus 100 may receive information about the remote controller type interface or keyboard type interface and stored the information in the memory 160 or a predetermined storage device (not shown).
The digital broadcasting set-top box controlling apparatus 100 can provide not only the input interface based on point recognition but also an input interface based on pattern recognition.

FIG. 5 illustrates a pattern input interface of the digital broadcasting set-top box controlling apparatus 100. Referring to FIGS. 2 and 5, the MCU 110 may receive the input signal from the touch pad 120 and output the control signal corresponding to moving, clicking, or dragging to the digital broadcasting set-top box 200 via the communication module 140 on the basis of at least one of touched location information and touch state information which are included in the input signal.

For example, the user may perform one of touch actions 21 through 28 on the touch pad 120 by using a user's finger or an input pen. Then, in a current mode of the digital broadcasting set-top box 200, the MCU 110 may convert an input signal corresponding to the performed touch action into a control signal (e.g., a control signal corresponding to moving) and output the control signal.

For example, when the current mode is a mode for displaying a video on demand (VOD) list as illustrated in FIG. 6 and "Movie 2" is currently selected, an area corresponding to "movie 2" may be displayed as a predetermined interface (for example, a highlighted or reverse-colored character 13) in order to represent selection of "movie 2".

In this case, if the user performs one of the touch actions (for example, the touch action 21, 28, or 27) on the touch pad 120, the predetermined interface (for example, the highlighted or reverse-colored character 13) may be transformed so as to represent "movie 1". In other words, the interface 13 corresponding to "movie 2" may disappear, and an interface 15 corresponding to "movie 1" may be generated.

In order to achieve this, the MCU 110 may analyze information such as a direction and duration of a user's touch by using touched location information or touch state information which are included in an input signal corresponding to the touch action (for example, the touch action 21, 28, or 27), and generate a control signal corresponding to the analyzed information. Meanwhile, if the user performs one of the touch actions (for example, the touch action 23, 24, or 25) on the touch pad 120, "movie 3" is selected, and an interface 14 corresponding to "movie 3" may be generated.

If the user performs one of the touch actions (for example, the touch action 26) on the touch pad 120, an upper menu (for example, "movie" of a currently selected item (for example, "movie 2") may be selected.

For example, if the current mode is a mode in which a web browser is activated as illustrated in FIG. 7, the user may perform one of the touch actions 21 through 28 on the touch pad 120 in order to control an interface 40, and the MCU 110 may receive an input signal corresponding to the performed touch action and output a control signal.
(for example, a control signal corresponding to moving) corresponding to the input signal.

[62] The user may perform a touch action corresponding to clicking through the touch pad 120. For example, the digital broadcasting set-top box controlling apparatus 100 may display an interface (for example, a button-type GUI) corresponding to clicking and perform an operation corresponding to the clicking when the user touches the interface corresponding to clicking. Alternatively, the MCU 110 may determine whether clicking has been performed, according to the length of a touching duration, which is included in touch state information included in an input signal. Alternatively, if two touches are consecutively made for a predetermined period of time, it may be determined that clicking has been performed.

[63] Similarly, it is determined that dragging has been performed, when a touch corresponding to movement is made in a state where a portion of the touch pad 120 corresponding to a predetermined GUI corresponding to dragging has been depressed. Alternatively, if two or more areas on the touch pads 120 are touched simultaneously, the MCU 110 may control dragging to be performed in directions of the touched areas.

[64] Depending on the type of embodiment, this pattern recognition may be performed in the MCU 110 or in the pattern recognition module 150. If the pattern recognition is performed in the pattern recognition module 150, the MCU 110 may transmit the received input signal to the pattern recognition module 150, and the pattern recognition module 150 may identify an operation corresponding to the input signal and transmit a result of the identification to the MCU 110.

[65] Alternatively, the pattern recognition module 150 may receive the input signal from the patch pad 120, recognize a pattern of the input signal, and output information about a character corresponding to the pattern to the MCU 150.

[66] For example, if the user inputs a pattern 30 similar to "A" as illustrated in FIG. 5, the pattern recognition module 150 may recognize the pattern 30 based on touched location information included in the input signal, compare the recognized pattern with a pre-stored pattern, and recognize a character corresponding to the input pattern 30. Of course, the pattern recognition module 150 may include a conventional character recognition program or the like and capture an input pattern in the form of an image so as to perform character recognition. In some embodiments, the digital broadcasting set-top box 200 may perform a role of the pattern recognition module 150.

[67] In other words, the MCU 110 included in the digital broadcasting set-top box controlling apparatus 100 may generate a pattern corresponding to the input signal and output the pattern to the digital broadcasting set-top box 200. The pattern may include information about coordinates for representing the trace of a user's touch. The information about the coordinates itself may be output to the digital broadcasting set-top
box 200, or the trace of the user's touch may be output in the form of an image to the digital broadcasting set-top box 200.

[68] According to embodiments, when a data processing ability (for example, an ability to perform an arithmetic operation for pattern recognition) of the digital broadcasting set-top box 200 is higher than that of the digital broadcasting set-top box controlling apparatus 100, pattern recognition may be performed in the digital broadcasting set-top box 200.

[69] As described above, the digital broadcasting set-top box controlling apparatus 100 may generate not only a control signal (for example, a control signal corresponding to movement, clicking, or dragging) for controlling the digital broadcasting set-top box 200 but also a signal (for example, a signal corresponding a character, a number, or a symbol) for inputting predetermined information.

[70] FIG. 6 illustrates an OSD-used interface of the digital broadcasting set-top box controlling apparatus 100 illustrated in FIG. 2. Referring to FIGS. 2 and 6, the MCU 110 may receive at least a portion of OSD information from the digital broadcasting set-top box 200 via the communication module 140 and output the portion of the OSD information to the display module 130.

[71] The OSD information includes information about a GUI displayed on the display device 300, and may be pre-stored in the digital broadcasting set-top box 200. Accordingly, the display module 130 of the digital broadcasting set-top box controlling apparatus 100 may display the same GUI as the GUI displayed on the display device 300.

[72] In some cases, the digital broadcasting set-top box controlling apparatus 100 may receive only a portion of the OSD information from the digital broadcasting set-top box 200 and allow only the received portion of the OSD information to be displayed on the display module 130. For example, if OSD information as illustrated in FIG. 6 is displayed on the display device 300 while a user is watching a broadcasting program, the user is interrupted, and thus the OSD information may be controlled to be displayed only on the digital broadcasting set-top box controlling apparatus 100 instead of on the display device 300. In some embodiments, only a portion of the OSD information may be controlled to be displayed on the digital broadcasting set-top box controlling apparatus 100.

[73] When a GUI as illustrated in FIG. 6 is displayed on the display device 300 and a user touches the OSD interface 4 of FIG. 3, the digital broadcasting set-top box controlling apparatus 100 may receive the OSD information from the digital broadcasting set-top box 200. Thus, the GUI as illustrated in FIG. 6 may also be displayed on the digital broadcasting set-top box controlling apparatus 100. Of course, as described above, only a portion of the GUI may be displayed on the digital broadcasting set-top box
controlling apparatus 100.

Then, the user may perform a predetermined touch action based on the GUI displayed on the digital broadcasting set-top box controlling apparatus 100. For example, when the GUI displayed on the display module 130 is as illustrated in FIG. 6 and the user touches a portion of the touch pad 120 corresponding to a button "movie", lower items (for example, "movie 1" through "movie 3") of the button "movie" may be displayed as illustrated in FIG. 6.

To achieve this, the MCU 110 may convert an input signal corresponding to the user's touch into a control signal, based on touched location information of the input signal and the OSD information, and output the control signal. In other words, the MCU 110 may extract an interface (for example, the button "movie") corresponding to the input signal from the OSD information on the basis of the touched location information of the input signal and then output a control signal for selecting the button "movie" to the digital broadcasting set-top box 200.

The user may obtain an effect where digital broadcasting set-top box controlling apparatus 100 independently performs a program by using the digital broadcasting set-top box 200. For example, if the digital broadcasting set-top box 200 is able to be connected to the Internet and execute a web browser, a web browser as illustrated in FIG. 7 may be activated in the digital broadcasting set-top box 200.

Accordingly, the web browser as illustrated in FIG. 7 may be displayed on the display device 300 connected to the digital broadcasting set-top box controlling apparatus 100.

Then, the digital broadcasting set-top box 200 may generate, as display information, an image (for example, the web browser as illustrated in FIG. 7) being displayed on the display device 300. For example, the digital broadcasting set-top box 200 may generate display information output to the display device 300 in the form of an image file and output the image file to the digital broadcasting set-top box controlling apparatus 100. Alternatively, the digital broadcasting set-top box 200 may output the display information, which is output later to the display device 300, to the digital broadcasting set-top box controlling apparatus 100.

Then, the MCU 110 may receive the display information from the digital broadcasting set-top box 200 via the communication module 140 and output the display information to the display module 130 so that the same image as an image being displayed on the display device 300 can be displayed on the digital broadcasting set-top box controlling apparatus 100. In other words, as described above, not only the OSD information but also the same image as the image being displayed on the display device 300 may be displayed on the digital broadcasting set-top box controlling apparatus 100.
Then, the user may input a predetermined touch by using the touch pad 120, based on the image displayed on the display module 130. Then, the MCU 110 may output at least one of the touched location information and the touch state information included in an input signal corresponding to the input touch, to the digital broadcasting set-top box 200 via the communication module 140.

In other words, the user can see the same image as that displayed on the display device 300 even on the digital broadcasting set-top box controlling apparatus 100. In addition, the user can apply a pressure while watching the display device 300 and also can apply a pressure while watching the digital broadcasting set-top box controlling apparatus 100.

At least one of the touched location information and touch state information included in the input signal input by the user to the digital broadcasting set-top box controlling apparatus 100 may be output again to the digital broadcasting set-top box 200. The digital broadcasting set-top box 200 may receive at least one of the touched location information and touch state information and perform a predetermined operation on the basis of the received information.

For example, the web browser as illustrated in FIG. 7 may be displayed on the display device 300 and the digital broadcasting set-top box controlling apparatus 100. Then, the user may perform a predetermined touch action (for example, the touch action 28 representing an upward movement) as illustrated in FIG. 5. Then, the digital broadcasting set-top box controlling apparatus 100 may output information about the predetermined touch action to the digital broadcasting set-top box 200. The digital broadcasting set-top box 200 may receive the information about the predetermined touch action and perform an operation (for example, an operation of moving the pointer 40 upward) corresponding to the predetermined touch action. The digital broadcasting set-top box 200 may transmit display information about an image obtained after the execution of the operation corresponding to the predetermined touch action, to the digital broadcasting set-top box controlling apparatus 100. Thus, an image displayed on the digital broadcasting set-top box controlling apparatus 100 may be the image obtained after the execution of the operation corresponding to the predetermined touch action.

In some embodiments, the digital broadcasting set-top box 200 may transmit the display information to the digital broadcasting set-top box controlling apparatus 100 in real time. Only when a predetermined signal is input through the digital broadcasting set-top box controlling apparatus 100, the digital broadcasting set-top box 200 may perform an operation corresponding to the input signal and continuously transmit the display information to the digital broadcasting set-top box controlling apparatus 100 in real time.
Accordingly, an effect where the digital broadcasting set-top box controlling apparatus 100 directly performs a predetermined program (for example, a web browser) can be obtained. The predetermined program may be not only the exemplified web browser but also all kinds of contents that can be displayed on the screen of a display device. In other words, not only a specific program but also all kinds of images being displayed on the display device 300 may be displayed on the digital broadcasting set-top box controlling apparatus 100.

Therefore, the user can communicate with the digital broadcasting set-top box 200. However, when the user is in a location where the user cannot see a currently displayed image, the user can see the currently displayed image by using the digital broadcasting set-top box controlling apparatus 100 and control the digital broadcasting set-top box 200.

A method of driving a digital broadcasting set-top box controlling apparatus according to the present invention can be embodied as computer readable codes on a computer readable recording medium. The computer readable recording medium is any data storage device that can store data which can be thereafter read by a computer system. Examples of the computer readable recording medium include read-only memory (ROM), random-access memory (RAM), CD-ROMs, magnetic tapes, floppy disks, optical data storage devices, and carrier waves (such as data transmission through the Internet). The computer readable recording medium can also be distributed over network coupled computer systems so that the computer readable code is stored and executed in a distributed fashion. Also, functional programs, codes, and code segments for accomplishing the present invention can be easily construed by programmers of ordinary skill in the art to which the present invention pertains.

While the present invention has been particularly shown and described with reference to exemplary embodiments thereof, it will be understood by those of ordinary skill in the art that various changes in form and details may be made therein without departing from the spirit and scope of the present invention as defined by the following claims.

**Industrial Applicability**

The present invention is applicable to electronic devices, particularly, digital broadcasting receiving apparatuses.
Claims

[1] A digital broadcasting set-top box controlling apparatus comprising:
a touch pad sensing a touch of a user, converting the sensed touch into an input
signal corresponding at least one of a location and a state of the sensed touch,
and outputting the input signal;
a micro control unit receiving the input signal from the touch pad and converting
the input signal into a control signal;
a communication module receiving the control signal from the micro control unit
and outputting the control signal to a digital broadcasting set-top box; and
a display module displaying interface information which is received from at least
one of the digital broadcasting set-top box and a memory and output via the
micro control unit,
wherein the micro control unit converts the input signal into the control signal on
the basis of touched location information of the input signal and the interface in-
formation.

[2] The digital broadcasting set-top box controlling apparatus of claim 1, wherein
the micro control unit receives the input signal from the touch pad and outputs
the control signal corresponding to one of moving, clicking, and dragging on the
basis of at least one of the touched location information and touch state in-
formation which are included in the input signal.

[3] A digital broadcasting set-top box controlling apparatus comprising:
a touch pad sensing a touch of a user, converting the sensed touch into an input
signal corresponding at least one of a location and a state of the sensed touch,
and outputting the input signal;
a micro control unit receiving the input signal from the touch pad and converting
the input signal into a control signal;
a communication module receiving the control signal from the micro control unit
and outputting the control signal to a digital broadcasting set-top box; and
a display module displaying interface information which is output from the micro
control unit,
wherein the micro control unit receives at least a portion of OSD
(on-screen-display) information from the digital broadcasting set-top box via the
communication module and outputs the received portion of the OSD information
to the display module, and converts the input signal into the control signal on the
basis of touched location information of the input signal and the received portion
of the OSD information.

[4] A digital broadcasting set-top box controlling apparatus comprising:
a touch pad sensing a touch of a user, converting the sensed touch into an input
signal corresponding at least one of a location and a state of the sensed touch,
and outputting the input signal;
a micro control unit receiving the input signal from the touch pad and converting
the input signal into a control signal;
a communication module receiving the control signal from the micro control unit
and outputting the control signal to a digital broadcasting set-top box; and
a display module displaying interface information which is output from the micro
control unit,
wherein the micro control unit receives display information from the digital
broadcasting set-top box via the communication module and outputs the display
information to the display module, and outputs at least one of the touched
location information and touch state information included in the input signal
input based on an image displayed on the display module, to the digital
broadcasting set-top box via the communication module.

[5] A digital broadcasting system comprising:
the digital broadcasting set-top box controlling apparatus stated in any of claims
1, 2, and 3; and
a digital broadcasting set-top box receiving the control signal from the digital
broadcasting set-top box controlling apparatus and performing a control
operation corresponding to the control signal.

[6] A digital broadcasting system comprising:
the digital broadcasting set-top box controlling apparatus stated in claim 4; and
a digital broadcasting set-top box receiving at least one of the touched location
information and the touch state information, performing an operation cor-
responding to the received information, and outputting display information
obtained after the execution of the operation corresponding to the received in-
formation to the digital broadcasting set-top box controlling apparatus.

[7] A method of driving a digital broadcasting set-top box controlling apparatus, the
method comprising:
the digital broadcasting set-top box controlling apparatus, displaying interface in-
formation which is received from at least one of a digital broadcasting set-top
box and a memory;
sensing a touch of a user, converting the sensed touch into an input signal cor-
responding at least one of a location and a state of the sensed touch, and
outputting the input signal; and
converting the input signal into a control signal on the basis of touched location
information of the input signal and interface information and outputting the
control signal to the digital broadcasting set-top box.

[8] The method of claim 7, further comprising determining whether the input signal corresponds to moving, clicking, or dragging, on the basis of at least one of the touched location information and touch state information which are included in the input signal,

wherein the control signal may be a signal corresponding to moving, clicking, or dragging based on the determined result.

[9] The method of claim 7, further comprising:

recognizing a pattern of the received input signal; and

outputting information about a character corresponding to the recognized pattern to the digital broadcasting set-top box.

[10] The method of claim 7, further comprising:

generating a pattern corresponding to the received input signal; and

outputting the generated pattern to the digital broadcasting set-top box.

[11] A method of driving a digital broadcasting set-top box controlling apparatus, the method comprising:

the digital broadcasting set-top box controlling apparatus, receiving and displaying at least a portion of OSD information output from a digital broadcasting set-top box;

sensing a touch of a user, converting the sensed touch into an input signal corresponding at least one of a location and a state of the sensed touch, and

outputting the input signal; and

converting the input signal into a control signal on the basis of touched location information of the input signal and the received portion of the OSD information and outputting the control signal to the digital broadcasting set-top box.

[12] A method of driving a digital broadcasting set-top box controlling apparatus, the method comprising:

the digital broadcasting set-top box controlling apparatus, receiving display information from a digital broadcasting set-top box and displaying the display information;

sensing a touch of a user based on a displayed image and converting the sensed touch into an input signal corresponding at least one of a location and a state of the sensed touch; and

outputting at least one of touched location information and touch state information included in the input signal to the digital broadcasting set-top box.
A. CLASSIFICATION OF SUBJECT MATTER

H04N 5/44(2006.01)i

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 H04N

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

Korean Utility models and applications for Utility Models IPC as above

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

eKIPASS(KIPO Internal) "Remote control", "Set-top box"

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No</th>
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<tbody>
<tr>
<td>A</td>
<td>KR 10-2002-0057399 A (LG INNOTEC CO , LTD ) 11 Jul 2002 See abstract, claims 1-4, figures 1-4</td>
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<td>A</td>
<td>KR 10-2006-0008735 A (DAEWOO ELECTRONICS CORPORATION) 27 Jan 2006 See abstract, claims 1-2, figures 1-5</td>
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<td>A</td>
<td>KR 10-2005-0022557 A (SAMSUNG ELECTRONICS CO , LTD ) 8 Mar 2005 See abstract, claims 1-7, figures 1-3</td>
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☐ Further documents are listed in the continuation of Box C ☒ See patent family annex

* "A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"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

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"&" document member of the same patent family

Date of the actual completion of the international search 26 AUGUST 2008 (26 08 2008)

Date of mailing of the international search report 26 AUGUST 2008 (26.08.2008)

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<td>KR 10-2002-0057399 A</td>
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