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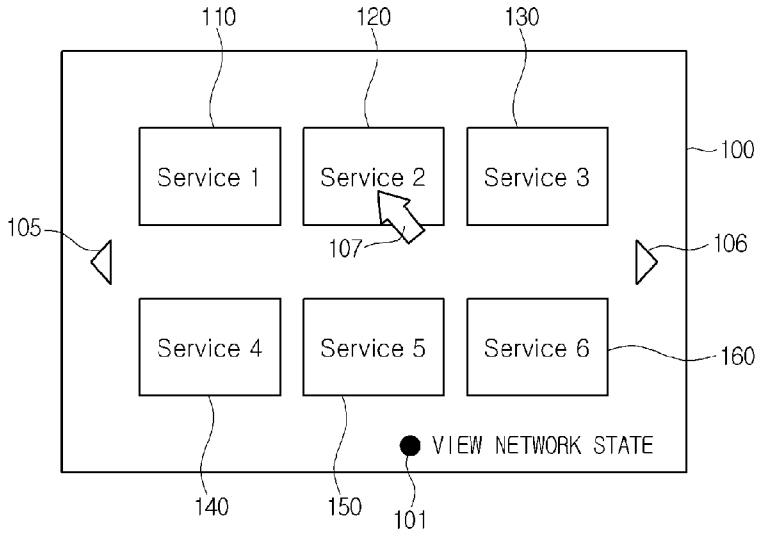
(54) Title: METHOD FOR DISPLAYING SERVICE LIST AND IMAGE DISPLAY DEVICE USING THE SAME

[Fig. 3]



(57) Abstract: The present invention provides a method of displaying a list of services receivable through network connection in an image display device and an image display device using the same and the method includes: detecting a network state for each service by measuring data transmission and reception velocities to and from servers providing a plurality of services, respectively; comparing a target bitrate required in the corresponding service with the detected network state for each service; and arranging information on the plurality of services according to the comparison result and displaying the information on a screen.

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Description

Title of Invention: METHOD FOR DISPLAYING SERVICE LIST AND IMAGE DISPLAY DEVICE USING THE SAME

Technical Field

[1] The present invention relates to a method for displaying a list of services which can be received through network connection in an image display device.

Background Art

[2] As a digital TV having signal having more excellent processing and storing capabilities than the existing analog TV and a wired/wireless network technology are developed and commercialized, various kinds of contents services such as real-time broadcasting, contents on demand (COD), a game, news, video communications, and the like can be provided to a user by using an Internet network connected to each home in addition to the existing propagation medium.

[3] As an example of providing the contents services using the Internet network, an Internet protocol TV (IPTV) may be used. In the IPTV, various information services, video contents, and a broadcast are transmitted and provided to a user's television by using a high-speed Internet network.

[4] In recent years, as a network TV type which is advanced from the IPTV, concepts such as a broadband TV, a web TV, and the like have been presented. Unlike the IPTV in the related art, in the broadband TV or the web TV, a plurality of contents providers are present and a user individually accesses the plurality of contents providers to receive contents such as various VODs, games, and the like.

Disclosure of Invention

Technical Problem

[5] The present invention has been made in an effort to provide a method for efficiently displaying a list services which can be received through network connection and an image display device using the same.

Solution to Problem

[6] A method for displaying a service list according to an exemplary embodiment of the present invention includes: detecting a network state for each service by measuring data transmission and reception velocities to and from servers providing a plurality of services, respectively; comparing a target bitrate required in the corresponding service with the detected network state for each service; and arranging information on the plurality of services according to the comparison result and displaying the information on a screen.

[7] Further, an image display device according to another exemplary embodiment of the

present invention includes: a network interface unit transmitting and receiving data for providing the service by accessing a contents provider server; a control unit detects a network state for each service by measuring data transmission and reception velocities to and from servers providing a plurality of services, respectively by using the network interface unit and determining a display location of service information on the basis of the detected network state for each service and a target bitrate required in the corresponding service; and a display unit displaying information on the plurality of services on a screen according to the determined display location.

[8] Meanwhile, the method for displaying a service list may be implemented by a computer-readable recording medium recording a program for executing the method in a computer.

Advantageous Effects of Invention

[9] According to the exemplary embodiments of the present invention, by arranging and displaying information on the plurality of services included in the service list according to the network state judged based on the target bitrate, user accessability to a service in which a network quality is excellent can be improved, and as a result, inconvenience in which the service provided through network connection is interrupted can be suppressed.

Brief Description of Drawings

[10] FIG. 1 is a network configuration diagram of a display system according to an exemplary embodiment of the present invention.

[11] FIG. 2 is a block diagram showing a configuration of an image display device according to an exemplary embodiment of the present invention.

[12] FIG. 3 is a diagram showing an exemplary embodiment of a method for displaying a service list which can be received through network connection.

[13] FIG. 4 is a block diagram showing an exemplary embodiment of a configuration of a network interface unit shown in FIG. 2.

[14] FIG. 5 is a flowchart showing a method for displaying a service list according to an exemplary embodiment of the present invention.

[15] FIGS. 6 to 11 are diagrams showing exemplary embodiments of a method for arranging and displaying service information depending on a network state.

[16] FIGS. 12 and 13 are diagrams an exemplary embodiment of a method for displaying contents information which can be reproduced by using a predetermined service in a service list.

[17] FIGS. 14 to 16 are diagrams showing exemplary embodiments of a method for displaying a network state of a service as 2 or more in accordance with a target bitrate.

Best Mode for Carrying out the Invention

[18] Hereinafter, a method for displaying a service list and an image display device using the same according to exemplary embodiments of the present invention will be described in detail.

[19] FIG. 1 shows a configuration of a display system according to an exemplary embodiment of the present invention and shows a configuration diagram of a network TV system that receives contents from a contents provider by using a network.

[20] Referring to FIG.1, the display system according to the exemplary embodiment of the present invention may include a network operator 10, at least one contents provider (CP) 20, and at least one network TV 30, which may be connected to each other by a network, e.g., the Internet.

[21] The network operator 10 may provide a base software required for contents provided by the contents provider 20 to operate normally in the network TV 30 or software required for the network TV 30 to operate. Further, hardware information of the network TV 30 required for the contents to be normally executed in the network TV 30 may also be provided to the contents provider 20.

[22] Meanwhile, the contents provider 20 generates various contents which can be provided on the network and configures the contents in a format which can be reproduced in the network TV 30 to provide the contents according to a request from the network TV 30. The contents according to the present invention may be predetermined multimedia contents which can be serviced through the network.

[23] For example, the contents provided by the contents provider 20 may be provided directly to the network TV 30 through the Internet or may be provided to the network TV 30 through the network operator 10.

[24] An exclusive firmware for reproducing and retrieving the contents and displaying the list for each contents provider 20 may be mounted on the network TV 30. The firmware may be installed in the network TV 30 during manufacturing the network TV 30 or the user may download and install the firmware from the contents provider 20 or the network operator 10 during using the network TV 30.

[25] The network TV 30 may receive the contents from the contents provider 20 to reproduce or execute the contents. The network TV 30 may include a TV mounted with a network module, a broadcast receiving device such as a set-top box, and a predetermined display device mounted with the network , such as a network phone. Although the broadcast receiving device having a broadcast receiving function is described as an example, the exemplary embodiments of the present invention may be applied to a predetermined display device which can access the network and may be included in the scope of the present invention.

[26] More specifically, the contents provider 20 as a provider who makes or distributes various contents to be provided to the network TV 30 may provide services including

at least one content, e.g., a TV broadcast a radio broadcast, a VOD, an AOD, a game, a video phone, weather information, a photograph, and the like through the network such as the Internet.

[27] The network TV basically has a network interface capable of accessing the network and is allocated with an IP address to receive and process data packets through the network, and may store or reproduce the data packets when the data packets are multimedia data such as video, audio, and the like.

[28] The network TV 30 may operate to transmit user's requirements bidirectionally while processing the multimedia data. Further, buttons for controlling the network TV, i.e., buttons for selecting various menus are preferably provided in a user input unit such as a remote controller or a control button for controlling the network TV 30.

[29] According to yet another exemplary embodiment of the present invention, the display system shown in FIG. 1 may not include the network operator and in this case, the network TV 30 directly accesses the contents provider 20, more specifically, a server of the contents provider 20 by using the wired/wireless network to receive contents.

[30] FIG. 2 is a block diagram showing a configuration of an image display device according to an exemplary embodiment of the present invention and the image display device shown in FIG. 2 may perform an operation of the network TV 30 described referring to FIG. 1.

[31] Meanwhile, the network TV 30 may further have a function to receive an RF signal type broadcasting signal by using a broadcast receiving unit 41 wirelessly or through a cable system in addition to the function to receive contents through the network.

[32] Referring to FIG. 2, the network TV 30 may include a broadcast receiving unit 41, a demultiplexing unit 42, an image signal processing unit 43, a display unit 44, a network interface unit 45, an OSD generating unit 46, a user interface unit 47, a storage interface unit 48, a storage unit 49, an external signal inputting unit 39, and a control unit 50.

[33] Among the components, the broadcast receiving unit 41, the demultiplexing unit 42, and the image signal processing unit 43 may constitute one broadcast processing unit that receives the broadcasting signal and processes the received broadcasting signal as a format which can be outputted to the display unit 44 through various processing operations.

[34] In the case of digital broadcasting, a digital broadcasting signal may be transmitted as a transport stream format packetized by time-division multiplexing a video signal and an audio signal, and additional data.

[35] The broadcast receiving unit 41 includes an antenna receiving a broadcasting signal transmitted from the outside and may include a tuner tuning a broadcasting signal having a frequency band corresponding to a tuning control signal of the control unit 50

to be described below according to the tuning control signal and a demodulator outputting a broadcasting signal of a predetermined tuned channel through a vestigial sideband (VSB) demodulating process and an error correcting process of the broadcasting signal.

[36] Further, the broadcasting signal received through the broadcast receiving unit 41 is divided into various additional data defined as the video signal and the audio signal, and program and system information protocol (PSIP) information by the demultiplexing unit 42 to be outputted as a bitstream format.

[37] The video data divided through the demultiplexing unit 42 are processed by the image signal processing unit 43 to be displayed in the display unit 44.

[38] Meanwhile, the image signal processing unit 43 may include an MPEG-2 decoder and a scaler converting the video data to match a vertical frequency, resolution, a screen ratio, and the like which are dependent on an output specification of the display unit 44.

[39] The display unit 44 may display images by using various types of display panels such as a digital light processing (DLP), a liquid crystal display (LCD), a plasma display panel (PDP), and the like.

[40] The audio signal is processed by a voice signal processing unit (not shown) and outputted to a speaker. The voice signal processing unit may include an AC-3 decoder.

[41] Meanwhile, additional data included in the additional data divided through the demultiplexing unit 42 may be stored in the storage unit 49 through the storage interface unit 48 to be described below.

[42] The storage unit 49 may be implemented by an electrically erasable programmable read-only memory (EEPROM), and the like.

[43] The user interface unit 47 as means for receiving a request command from the user may generally an infrared receiving portion receiving an infrared signal inputted through the remote controller or a local key input portion provided at one side of a panel.

[44] The network interface unit 45 may receive contents or data from the contents provider 20 or the network operator 10 through the network. For example, the network interface unit 45 may access the server of the contents provider 20 through the wired/wireless network such as the Internet and may receive contents such as a broadcast, a game, a VOD, and a broadcasting signal provided from the contents provider and information related thereto.

[45] Further, update information and update files of firmware provided by the network operator 10 may be received through the network interface unit 45.

[46] The OSD generating unit 46 may generate a menu screen for receiving a user's judgment signal as an on screen display (OSD) format.

[47] That is, the OSD generating unit 46 may display the contents and the related information received through the network interface unit 45 through the display unit 44.

[48] The external signal inputting unit 39 is an interface capable of receiving inputs from other reproducing devices, e.g., a DVD player, a game machine. Other reproducing devices are connected to the external signal inputting unit 39 to display multimedia stored in the reproducing devices to the display unit 44.

[49] The control unit 50 may perform an overall operational control depending on the command inputted from the user interface unit 47.

[50] According to the exemplary embodiment of the present invention, the image display device having the configuration shown in FIG. 2 may display the list of the services which can be received by accessing the network.

[51] Referring to FIG. 3, the image display device may display on a screen 100 a service list including information on each of services which can be provided from a plurality of contents providers through the network such as the Internet.

[52] For example, in response to user's request for displaying the service list, the control unit 50 controls the network interface unit 45 to receive information on services which can be provided from servers of the plurality of contents providers by accessing the servers of the plurality of contents providers and may configure the service list by using the received information on the services.

[53] Meanwhile, the plurality of services included in the service list may be services preferentially registered by the user or services previously registered by a manufacturer of the image display device.

[54] Further, the service information included in the service list may be displayed on the screen 100 as icons 110 to 160 corresponding to the plurality of services, respectively as shown in FIG. 3 and the service icons 110 to 160 may include information on the respectively corresponding services (alternatively, the contents providers).

[55] For example, a first service icon 110 includes information on a service provided from a server operated by a predetermined contents provider and the service corresponding to the first service icon 110 may be a VOD service providing video contents such as a movie according to a request from the user.

[56] The user selects any one of the services in the service list displayed on the screen 100 to allow the image display device to access a sever of a contents provider that provides the selected service and receive contents provided therefrom.

[57] For example, the user moves a pointer 107 displayed on the screen 100 to a location where a "Service 2" icon 120 is displayed by using the user interface unit 47 and thereafter, selects the corresponding icon 120 to verify information on the receivable contents through the "Service 2".

[58] Further, when the information on the receivable services through accessing the

network cannot be displayed on one screen, the user selects navigation keys 105 and 106 displayed on the screen 100 to verify information on services that are not displayed on the screen 100 at present.

[59] According to the exemplary embodiment of the present invention, the image display device detects a network state for each service and thereafter, compares a required target bitrate with the detected network state for each service and may determine a display location of each service information on the service list described with reference to FIG. 3 according to the comparison result.

[60] For example, when the user selects a "View network state" button 101 on the screen 100 shown in FIG. 3, display locations of the service information (i.e., the service icons 100 to 160 including the corresponding information) displayed on the screen 100 may be changed depending on a current network state between the server providing each service and the image display device.

[61] Hereinafter, referring to FIGS. 4 to 16, a configuration and an operation of an image display device according to an exemplary embodiment of the present invention will be described in more detail.

[62] FIG. 4 is a block diagram showing an exemplary embodiment of a configuration of the network interface unit 45 provided in the image display device. The network interface unit 45 may include a network manager 31, a protocol engine 32, and a stream buffer 33.

[63] The network interface unit 45 accesses a plurality of contents provider servers which are previously registered to collect data for detecting the network state for each service according to the control of the control unit 50.

[64] For example, the network interface unit 45 transmits sample data of a predetermined bitrate to each contents provider server and receives a response message to the sample data from the server and the control unit 50 may measure data transmission and reception velocities between the server and the image display device by using the received response message.

[65] Meanwhile, the control unit 50 estimates an available bandwidth of the network which can receive the service from the server according to the measured data transmission and reception velocities to detect the network state for each service.

[66] To this end, a network manager 31 included in the network interface unit 45 accesses the plurality of contents provider servers to transmit and receive data and a protocol engine 32 may process the transmitted and receive data according to a predetermined network protocol.

[67] Further, a stream buffer 33 may temporarily store a data stream which is processed by the protocol engine and thereafter, inputted and thereafter, output the data stream to the control unit 50.

[68] The control unit 50 may determine a display location of the service information on the basis of the network state for each service detected by the method and a target bitrate required in the corresponding service and control the display unit 44 to display information on a plurality of services on the screen 100 as the service list according to the determined display location.

[69] The target bitrate represents a bitrate at which a stream provided from the contents provider server is transcoded and may be previously stored in the storage unit 49 of the image display device for each service.

[70] Meanwhile, the target bitrate for each service stored in the storage unit 49 may be updated and an interface for updating the target bitrate may be provided to the contents provider.

[71] As a result, the contents provider may update the target bitrate stored in the image display device through a browser using the provided interface.

[72] Alternatively, by using data received from a service delivery platform (SDP) server, the target bitrate for each service stored in the storage unit 49 may be updated.

[73] FIG. 5 is a flowchart showing a method for displaying a service list according to an exemplary embodiment of the present invention. The service list displaying method shown in FIG. 5 will be described in connection with the block diagram showing the exemplary embodiment of the configuration of the image display device shown in FIG. 2.

[74] Referring to FIG. 5, the control unit 50 of the image display device detects a network state for each service (step S1) and compares a target bitrate required in a corresponding service with the detected network state for each service (step S2).

[75] For example, the control unit 50 may measure data transmission and reception velocities for each of services included in a service list by using the network interface unit and detect an available bandwidth of a network for each service according to the measured data transmission and reception velocities.

[76] Thereafter, the control unit 50 compares the detected network available bandwidth for each service with the target bitrate for each service stored in the storage unit 49 to verify whether a target bitrate for each of a plurality of services is included in a receivable range in the detected network available bandwidth.

[77] For example, the control unit 50 verifies whether the target bitrate for each of the plurality of services is included in the receivable range in the network available bandwidth to divide the services into a plurality of groups according to a current network state.

[78] In the case of the service list shown in FIG. 3 as an example, the control unit 50 compares the network available bandwidth detected in step S1 with the target bitrate stored in the storage unit 49 with respect to “Service 1” and when the target bitrate is

more than the receivable range in the network available bandwidth, the control unit 50 classifies a network state of the "Service 1" as "bad", when the target bitrate is included in the receivable range in the network available bandwidth, the control unit 50 classifies the network state of the "Service 1" as "normal", and when the target bitrate is less than the receivable range in the network available bandwidth, the control unit 50 classifies the network state of the "Service 1" as "good".

[79] Meanwhile, the control unit 50 may perform the classifying operation according to the network state even with respect to other "Service 2" to "Service 6" (alternatively, further including other services not displayed on the screen 100).

[80] Thereafter, the control unit 50 arranges service information include in the service list according to the comparison result and the display unit 44 displays information on a plurality of services at the arranged locations under the control of the control unit 50 (step S4).

[81] Referring to FIG. 6, the display locations of the service information included in the service list may be changed to the order in which the network state judged based on the target bitrate is excellent.

[82] For example, when the control unit 50 judges network states of "Service 3" and "Service 5" as "good", network states of "Service 1", "Service 2", and "Service 4" as "normal", and a network state "Service 6" as "bad", on the basis of the target bitrate and the network available bandwidth in step S2, the service icons 110 to 160 are arranged from the left to the right and from top to the bottom according to the order in which the network state is excellent to be displayed on the screen 100, as shown in FIG. 6.

[83] To this end, the control unit 50 designates the display location of each service information by matching identification information (e.g., IDs of the icons) of the service icons 110 to 160 according to the arranged order and loads the corresponding service information according to the designated location to display the service list shown in FIG. 6 on the screen 100.

[84] As a result, the user may recognize that contents can be successively received by using "Service 3" and "Service 5". Further, the user may smoothly receive the contents by using "Service 1", "Service 2" and "Service 4", but may recognize that the contents cannot be smoothly received by using "Service 6" because the network state of "Service 6" is bad.

[85] Meanwhile, in the above description, the exemplary embodiment of the present invention has been described by using classifying the current network states of the plurality of services included in the service list are classified as "good", "normal", and "bad" according to the network state for each service judged based on the target bitrate as an example, but the present invention is not limited thereto.

[86] For example, the control unit 50 may classify the plurality of services included in the service list into 2 or 4 or more groups according to the network state for each service judged based on the target bitrate and may convert the judged network states into predetermined values and display the converted values directly on the screen 100.

[87] Further, the image display device according to the exemplary embodiment of the present invention may display the judged network states as texts 170, 171, and 172 shown in FIG. 6 to correspond to the corresponding service icons, but besides, the image display device may transfer the information on the network states to the user by using different images or colors.

[88] Referring to FIG. 7, the icons 130 and 150 corresponding to "Service 3" and "Service 5" in which the current network states are judged as "good" may be displayed in a circular shape, the icons 110, 120, and 140 corresponding to "Service 1", "Service 2", and "Service 4" in which the current network states are judged as "normal" may be displayed in a rectangular shape, and the icon 160 corresponding to "Service 6" in which the current state is judged as "bad" may be displayed in a rhombus shape.

[89] Meanwhile, as shown in FIG. 8, the displayed color or transparencies may be changed depending on the current network states of the corresponding services corresponding to the icons 110 to 160 included in the service list, such as "good", "normal", and "bad".

[90] Referring to FIG. 9, the display unit 44 may display the service information for each of the classified groups on the screen 100.

[91] That is, the icons 130 and 150 corresponding to "Service 3" and "Service 5" may be displayed on the screen 100 as a group in which the current network state is "good", the icons 110, 120, and 140 corresponding to "Service 1", "Service 2", and "Service 4" may be displayed as a group in which the current network state is "normal", and the icon 160 corresponding to "Service 6" may be displayed as a group in which the current network state is "bad". As such, the icons may be dividually displayed on different designated areas on the screen 100.

[92] Further, a display size of the service information included in the service list on the screen 100 may be adjusted according to the network state judged based on the target bitrate.

[93] Referring to FIG. 10, the icons 130 and 150 corresponding to "Service 3" and "Service 5" in which the current network states are judged as "good" may be displayed on the screen 100 in the largest size, the icons 110, 120, and 140 corresponding to "Service 1", "Service 2", and "Service 4" in which the current network states are judged as "normal" may be displayed in the next largest size, and the icon 160 corresponding to "Service 6" in which the current state is judged as "bad" may be displayed in the smallest size.

[94] Information on at least one content which can be reproduced (alternatively, purchased) through the corresponding service may be displayed in the service icons 110 to 160 and as shown in FIG. 10, more contents information for the service in which the network state is good may be transferred to the user by changing the size of the icon according to the network state.

[95] According to yet another exemplary embodiment of the present invention, in the case of the service information included in the service list, a distance from a predetermined location on the screen 100 to a location wherein the service information is displayed may be adjusted according to the current network state of the corresponding service.

[96] Referring to FIG. 11, the icons 130 and 150 corresponding to "Service 3" and "Service 5" in which the current network states are judged as "good" may be displayed at locations closest from a center location P of the screen 100, the icons 110, 120, and 140 corresponding to "Service 1", "Service 2", and "Service 4" in which the current network states are judged as "normal" may be displayed at locations next closest, and the icon 160 corresponding to "Service 6" in which the current state is judged as "bad" may be displayed at a location farthest from the center location P.

[97] FIGS. 12 and 13 are diagrams an exemplary embodiment of a method for displaying contents information which can be reproduced by using a predetermined service in a service list.

[98] Referring to FIG. 12, each of the service icons 110 to 160 included in the service list may include information on the contents which can be reproduced (alternatively, purchased) through the corresponding service.

[99] For example, the contents information may include a name, a type, a reproduction time, or a purchasing price of the contents information and some (e.g., representative contents designated by the corresponding contents provider) of the contents which can be reproduced through the service may be displayed in the service icon.

[100] According to the exemplary embodiment of the present invention, when the user selects any one of the plurality of services included in the service list, another service providing the same contents as the contents provided through the selected service may be identified on the screen 100.

[101] Referring to FIG. 13, when the user locates a pointer 107 on the "Service 6" icon 160, the icons 110, 130, and 150 corresponding to services providing the same contents as any one of the contents provided through the "Service 6", i.e., "Service 1", "Service 3", and "Service 5" may be identified and displayed on the screen 100.

[102] For example, information on "contents 2" or "contents 8" (i.e., information on the same contents as the contents provided through the "Service 6") in the icons 110, 130, and 150 corresponding to "Service 1", "Service 3", and "Service 5" is highlighted and other icons 140 and 150 may be displayed in an inactivated state.

[103] That is, when the user locates the pointer 107 on the corresponding icon 106 in order to use “Service 6” in which the current network state is bad, information on other services (e.g., services in which the network state is better than the “Service 6”) which can provide the contents reproducible through the "Service 6” is displayed to be identified on the service list, such that contents which the user intends to purchase may be induced to be provided under a better network environment.

[104] According to yet another exemplary embodiment of the present invention, a contents provider providing a predetermined service may provide the corresponding service at plural target bitrates and in this case, the service network state may be displayed on the service list as 2 or more according to the target bitrate.

[105] FIGS. 14 to 16 are diagrams showing exemplary embodiments of a method for displaying a network state of a service as 2 or more in accordance with a target bit rate.

[106] Referring to FIG. 14, a contents provider providing “Service 2” may designate a target bitrate of 2 or more to the corresponding service, and as a result, the text 170 indicating that the current network state is “good” and the text 171 indicating that the current network state is “normal” may be both displayed on the icon 120 corresponding to the “Service 2”.

[107] For example, the contents provider may provide “Service 2” at a target bitrate of 8.24 Mbps and in addition, may provide the “Service 2” at 4.12 Mbps lower than the target bitrate.

[108] Meanwhile, when the target bitrate of 2 or more is designated with respect to the predetermined service, the same image contents may be provided with resolution of 2 or more through the corresponding service.

[109] For example, “Service 2” provided at the target bitrate of 8.24 Mbps may include image contents of high-definition (HD) resolution and “Service 2” provided at the target bitrate of 4.12 Mbps may include image contents of standard-definition (SD) resolution.

[110] As a result, the user may select whether the user receives the image contents of the SD resolution in the good network state or the image contents of the HD resolution in the normal network state with respect o the predetermined image contents provided through the “Service 2”.

[111] That is, the contents provided through "Service 2” at the target bitrate of 8.24 Mbps may be higher than the contents provided through the “Service 2” at the target bitrate of 4.12 Mbps in resolution of the image or quality of voice.

[112] Further, as shown in FIG. 15, when the user locates the pointer 107 on the text 170 indicating “good” in the “Service 2” icon 120, the target bitrate (i.e., 4.12 Mbps) of the “Service 2” provided through the good-state network may be displayed on the screen 100.

[113] Meanwhile, referring to FIG. 16, when the user locates the pointer 107 on the text 171 indicating “normal” in the “Service 2” icon 120, the target bitrate (i.e., 8.24 Mbps) of the “Service 2” provided through the normal-state network may be displayed on the screen 100.

[114] As a result, when the user puts more emphasis on the image resolution by considering both the quality of the contents and the network state, the user selects the text 170 indicating "good” in the “Service 2” icon 120 to use the “Service 2” provided at the target bitrate of 8.24 Mbps and when the user puts more emphasis on the network state, the user selects the text 171 indicating “normal” to use the “Service 2” provided at the target bitrate of 4.12 Mbps.

[115] According to the exemplary embodiments of the present invention, by arranging and displaying information on the plurality of services included in the service list according to the network state judged based on the target bitrate, user accessability to a service in which a network quality is excellent can be improved, and as a result, inconvenience in which the service provided through network connection is interrupted can be suppressed.

[116] The method for displaying a service list according to the present invention is prepared as a program for executing the method in the computer to be stored in the computer-readable recording medium and examples of the computer-readable recording medium include a ROM, a RAM, a CD-ROM, a magnetic tape, a floppy disk, an optical data storage, and the like and in addition, include a type of a carrier wave (e.g., transmission through the Internet).

[117] The computer-readable recording media are distributed on computer systems connected through the network, and thus the computer-readable recording media may be stored and executed as the computer-readable code by a distribution scheme. In addition, functional programs, codes, and code segments for implementing the method can be easily deduced by programmer skilled in the art.

[118] Further, as described above, Although the exemplary embodiments of the present invention have been illustrated and described, the present invention is not limited to the above-mentioned exemplary embodiments and various modifications can be made by those skilled in the art without the scope of the appended claims of the present invention. In addition, these modified examples should not be appreciated separately from technical spirits or prospects.

Claims

[Claim 1] A method for displaying a list of services receivable through network connection in an image display device, the method comprising:
detecting a network state for each service by measuring data transmission and reception velocities to and from servers providing a plurality of services, respectively;
comparing a target bitrate required in the corresponding service with the detected network state for each service; and
arranging information on the plurality of services according to the comparison result and displaying the information on a screen.

[Claim 2] The method of claim 1, wherein in the detecting, a network available bandwidth is detected between the image display device and the service according to the measured data transmission and reception velocities.

[Claim 3] The method of claim 2, wherein the comparing includes verifying whether the target bitrate is included in a receivable range in the detected network available bandwidth.

[Claim 4] The method of claim 1, wherein the target bitrate is stored in a memory provided in the image display device.

[Claim 5] The method of claim 4, wherein the target bitrate stored in the memory is updated by using data received from a service delivery platform (SDP) server.

[Claim 6] The method of claim 1, wherein the displaying includes changing a display location of the service information in the order in which the network state judged based on the target bitrate is excellent.

[Claim 7] The method of claim 1, wherein the displaying includes:
dividing the plurality of services into 2 or more groups according to the network state judged based on the target bitrate; and
displaying the information on the services for each of the divided groups.

[Claim 8] The method of claim 1, wherein the displaying includes adjusting a distance from a predetermined location on the screen to a location where the service information is displayed according to the network state judged based on the target bitrate.

[Claim 9] The method of claim 1, , wherein the service information displayed on the screen includes information on the network state of the corresponding service judged based on the target bitrate.

[Claim 10] The method of claim 9, wherein the network state information is

identified by using at least one of a text, an image, a color, and a size.

[Claim 11] The method of claim 1, wherein the service information displayed on the screen includes information on at least one content reproducible by using the corresponding service.

[Claim 12] The method of claim 1, wherein at least one of the plurality of services is designated with a target bitrate of 2 or more according to resolution of the provided image contents.

[Claim 13] An image display device receiving a service by accessing a network, comprising:
a network interface unit transmitting and receiving data for providing the service by accessing a contents provider server;
a control unit detects a network state for each service by measuring data transmission and reception velocities to and from servers providing a plurality of services, respectively by using the network interface unit and determining a display location of service information on the basis of the detected network state for each service and a target bitrate required in the corresponding service; and
a display unit displaying information on the plurality of services on a screen according to the determined display location.

[Claim 14] The device of claim 13, wherein the control unit detects a network available bandwidth between the image display device and the server according to the measured data transmission and reception velocities and verifies whether the target bitrate is included in a receivable range in the detected network available bandwidth.

[Claim 15] The device of claim 13, further comprising:
a storage unit storing the target bitrate,
wherein the stored target bitrate is updated by using data received from an SDP server.

[Claim 16] The device of claim 13, wherein the control unit changes a display location of the service information in the order in which the network state judged based on the target bitrate is excellent.

[Claim 17] The device of claim 13, wherein the service information displayed on the screen includes information on the network state of the corresponding service judged based on the target bitrate.

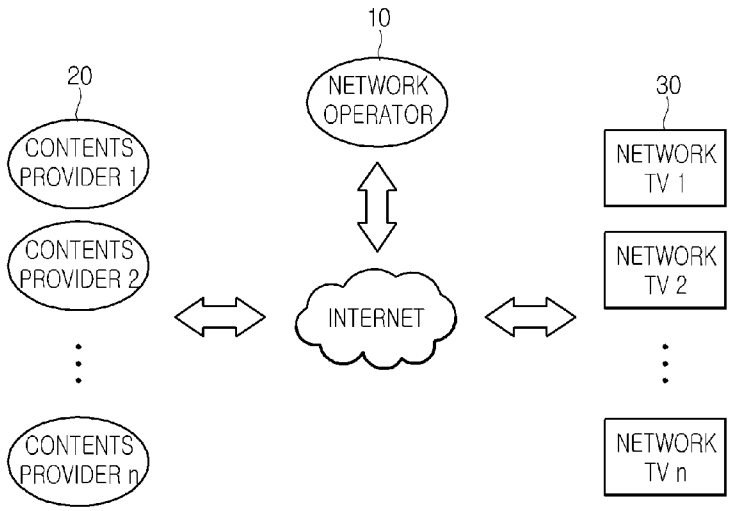
[Claim 18] The device of claim 17, wherein the network state information is identified by using at least one of a text, an image, a color, and a size.

[Claim 19] The device of claim 13, wherein the service information displayed on the screen includes information on at least one content reproducible by

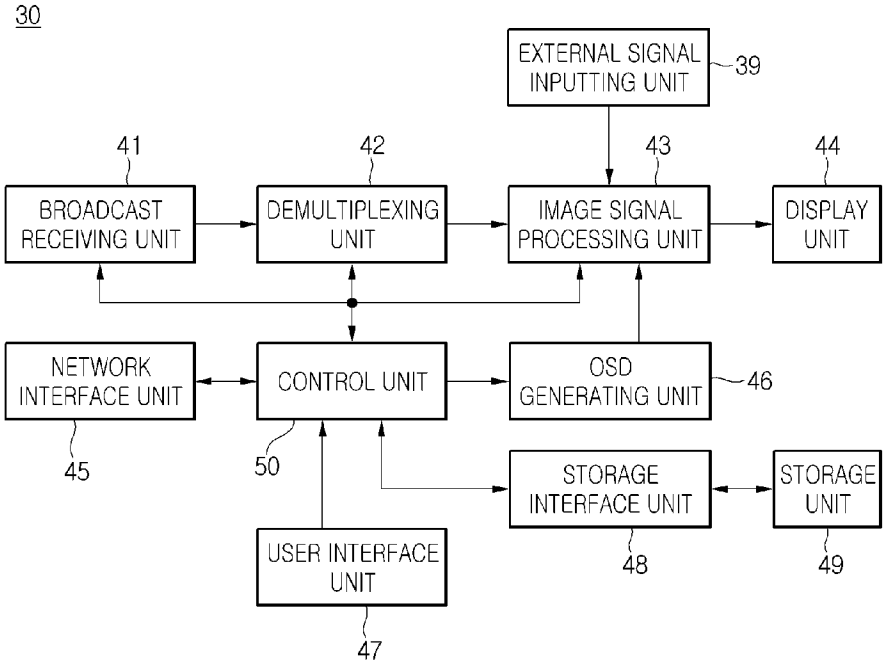
using the corresponding service.

[Claim 20] A computer readable recording medium recording a program for executing the method of any one of claims 1 to 12 in a computer.

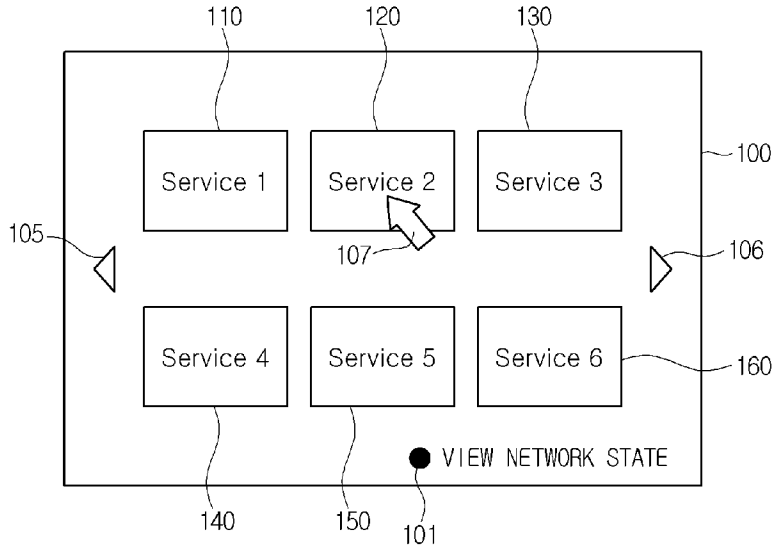
[Fig. 1]



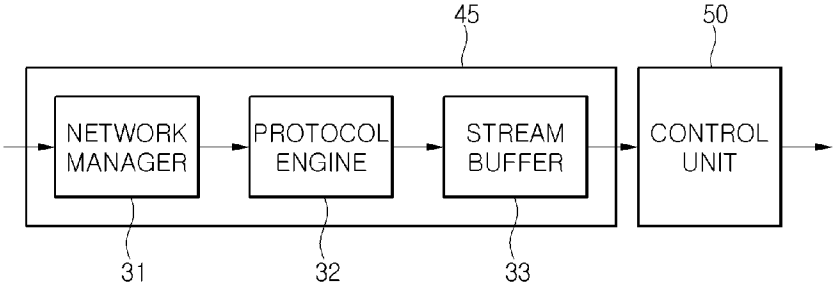
[Fig. 2]



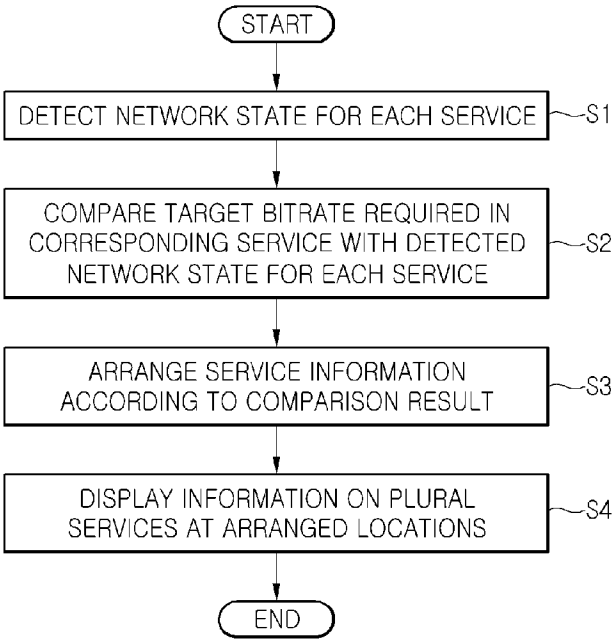
[Fig. 3]



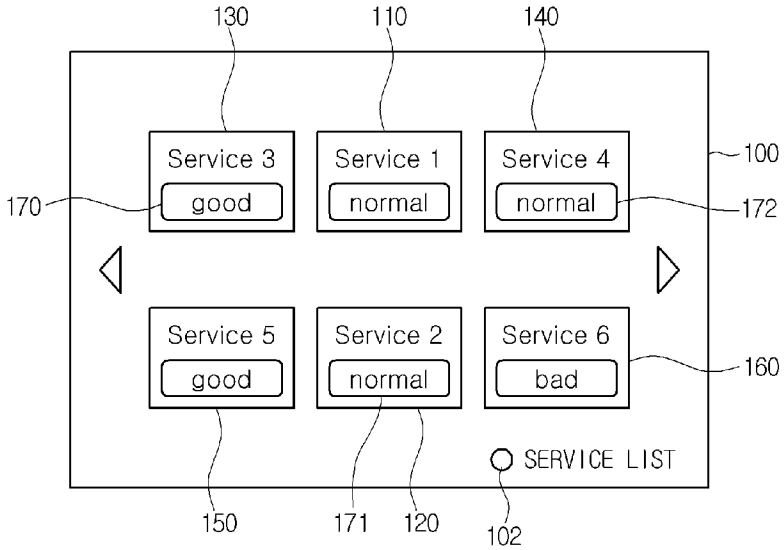
[Fig. 4]



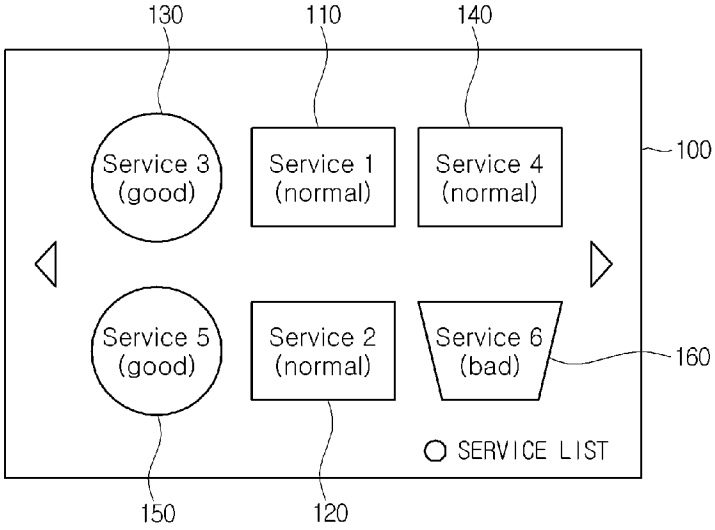
[Fig. 5]



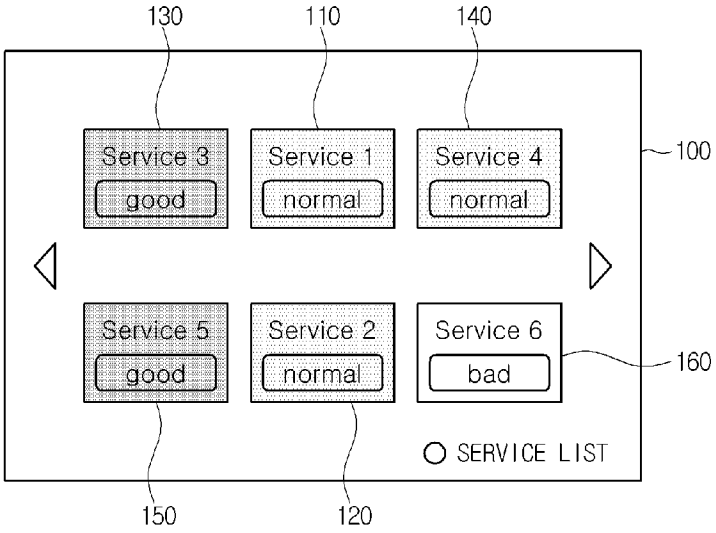
[Fig. 6]



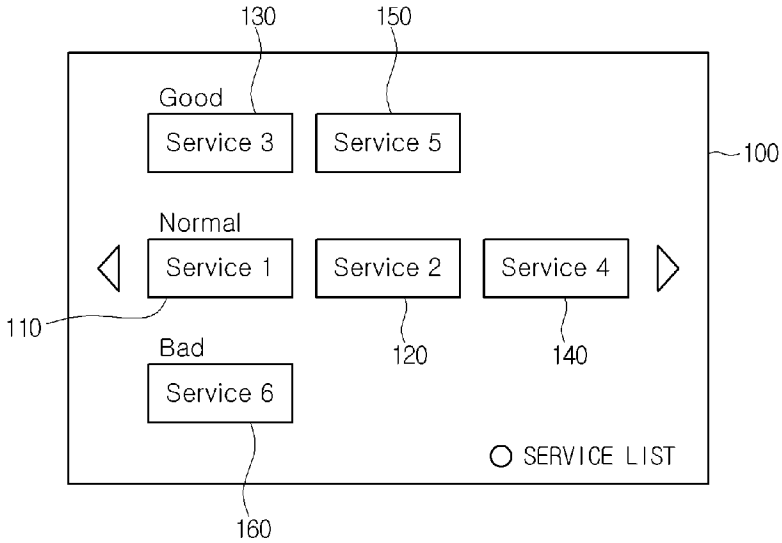
[Fig. 7]



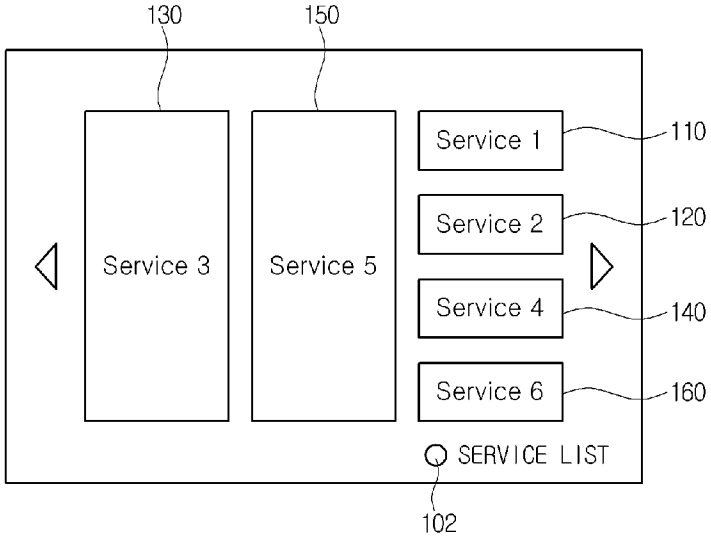
[Fig. 8]



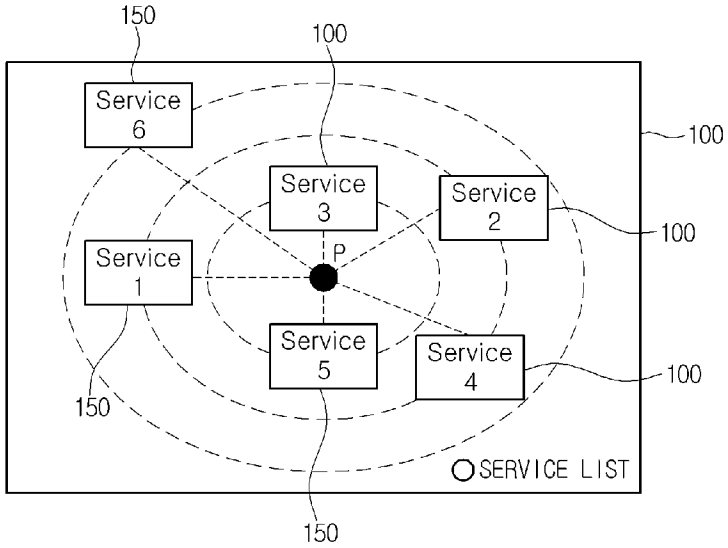
[Fig. 9]



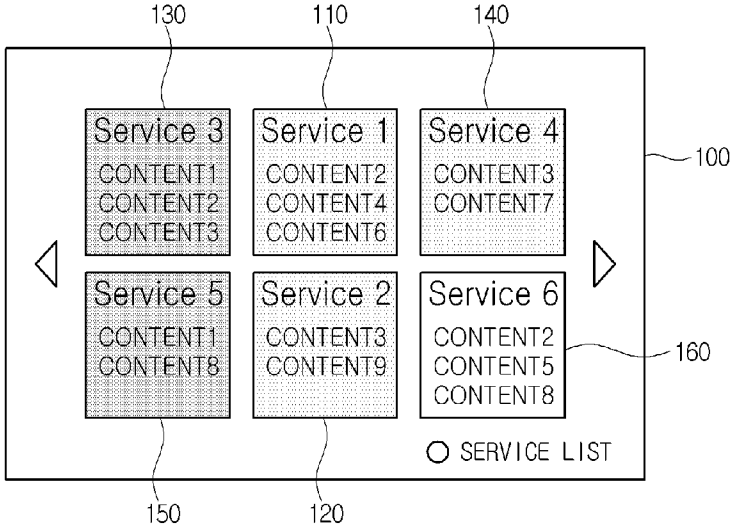
[Fig. 10]



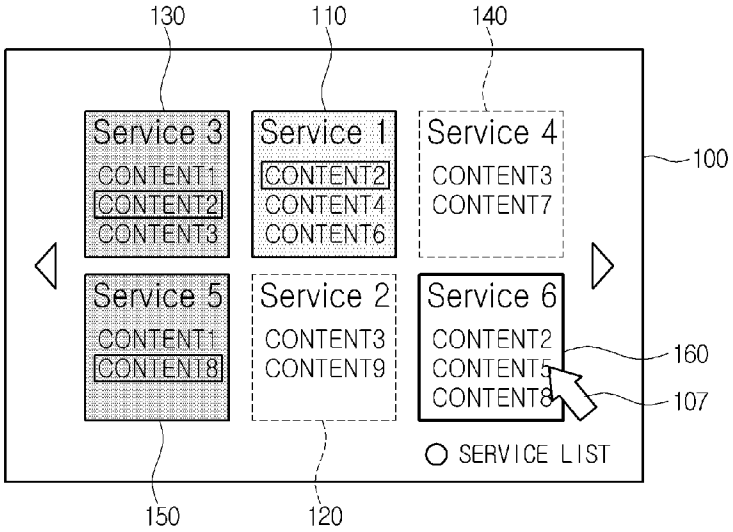
[Fig. 11]



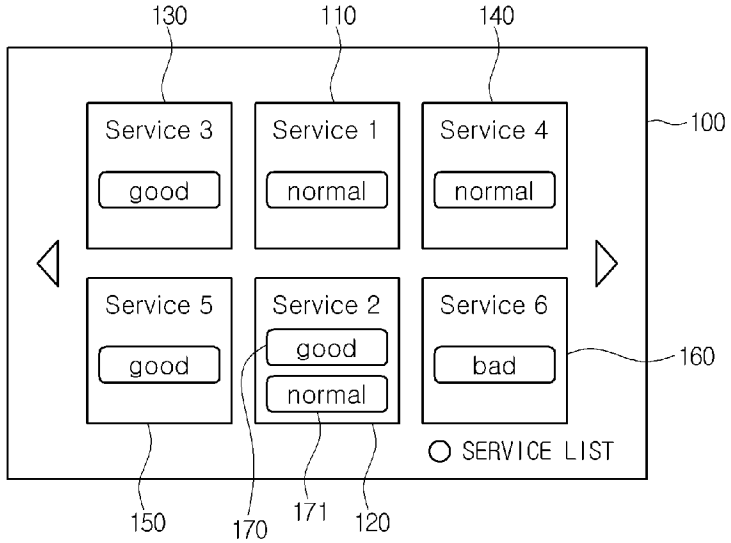
[Fig. 12]



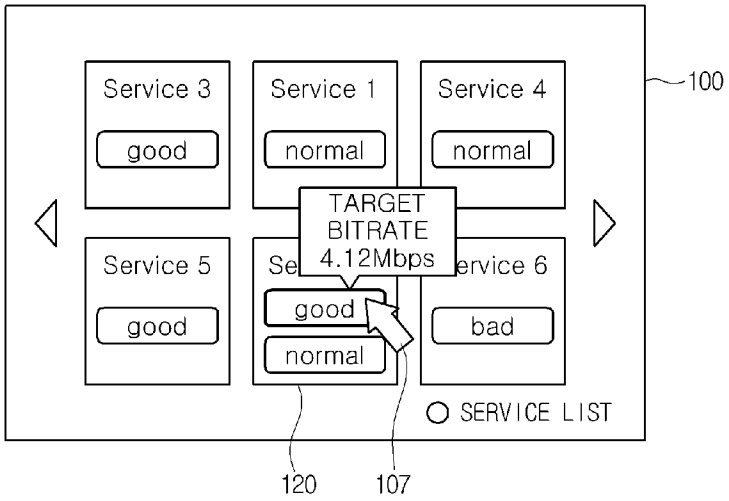
[Fig. 13]



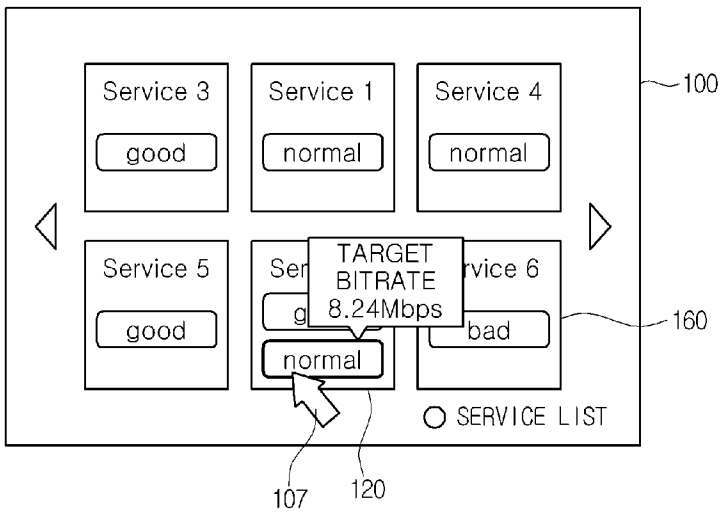
[Fig. 14]



[Fig. 15]



[Fig. 16]


Service 3
good
Service 1
normal
Service 4
normal
100
Service 5
good
TARGET
BITRATE
8.24Mbps
normal
bad
160
SERVICE LIST
107
120