



US009578369B2

(12) **United States Patent**
Matsubara et al.

(10) **Patent No.:** **US 9,578,369 B2**
(45) **Date of Patent:** ***Feb. 21, 2017**

(54) **PORTABLE TERMINAL, INFORMATION PROCESSING APPARATUS, CONTENT DISPLAY SYSTEM AND CONTENT DISPLAY METHOD**

(71) Applicant: **Hitachi Maxell, Ltd.**, Osaka (JP)

(72) Inventors: **Takashi Matsubara**, Yokohama (JP);
Mayumi Nakade, Yokohama (JP);
Masahiro Yamazaki, Yokohama (JP);
Hiroyuki Higaki, Yokohama (JP)

(73) Assignee: **HITACHI MAXELL, LTD.**, Osaka (JP)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **14/919,367**

(22) Filed: **Oct. 21, 2015**

(65) **Prior Publication Data**

US 2016/0044367 A1 Feb. 11, 2016

Related U.S. Application Data

(63) Continuation of application No. 14/501,621, filed on Sep. 30, 2014, now Pat. No. 9,197,917, which is a (Continued)

(30) **Foreign Application Priority Data**

Sep. 26, 2007 (JP) 2007-248353

(51) **Int. Cl.**

G06F 15/16 (2006.01)

H04N 21/43 (2011.01)

(Continued)

(52) **U.S. Cl.**

CPC **H04N 21/4302** (2013.01); **G06F 3/04842** (2013.01); **H04H 60/80** (2013.01); (Continued)

(58) **Field of Classification Search**

CPC H04M 1/7253; H04N 21/4126; H04N 21/42204 (Continued)

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,412,404 A * 5/1995 Candy 345/211
7,190,977 B2 * 3/2007 Hikishima 455/566
(Continued)

FOREIGN PATENT DOCUMENTS

JP 2003-179773 A 6/2003
JP 2003-244289 A 8/2003
(Continued)

OTHER PUBLICATIONS

Japanese Office Action issued in Japanese Patent Application No. JP 2007-248353 dated Oct. 2, 2012.

(Continued)

Primary Examiner — Arvin Eskandarnia

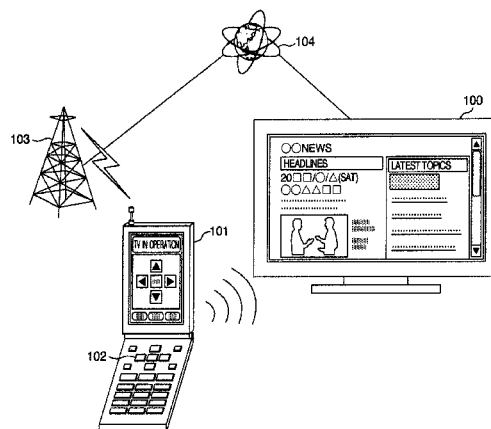
(74) *Attorney, Agent, or Firm* — McDermott Will & Emery LLP

(57)

ABSTRACT

A portable terminal includes a receiving unit which receives content information, an external device communication unit which conducts communication with an external information device, a display unit which displays the content information received by the receiving unit, an acquiring unit which acquires identification information identifying the content information displayed by the display unit, an operation unit which receives an operation indication from a user, and a control unit which conducts control such that if a transmission indication of the identification information is

(Continued)



received by the operation unit while the content information is being displayed, the identification information acquired by the acquiring unit is transmitted to the external information device and the display of the content information by the display unit is terminated.

18 Claims, 10 Drawing Sheets

Related U.S. Application Data

continuation of application No. 14/029,548, filed on Sep. 17, 2013, now Pat. No. 8,892,688, which is a continuation of application No. 13/489,877, filed on Jun. 6, 2012, now Pat. No. 8,549,109, which is a continuation of application No. 12/170,938, filed on Jul. 10, 2008, now Pat. No. 8,214,459.

(51) Int. Cl.

H04H 60/80 (2008.01)
H04N 5/44 (2011.01)
H04N 5/445 (2011.01)
H04N 21/41 (2011.01)
H04N 21/422 (2011.01)
H04N 21/4363 (2011.01)
H04N 21/462 (2011.01)
H04N 21/4782 (2011.01)
H04N 21/858 (2011.01)
H04N 21/258 (2011.01)
G06F 3/0484 (2013.01)
H04W 8/18 (2009.01)
H04N 21/414 (2011.01)
H04M 1/725 (2006.01)

(52) U.S. Cl.

CPC *H04M 1/72533* (2013.01); *H04N 5/44* (2013.01); *H04N 5/445* (2013.01); *H04N 21/25866* (2013.01); *H04N 21/4126* (2013.01); *H04N 21/41407* (2013.01); *H04N 21/42204* (2013.01); *H04N 21/43637* (2013.01); *H04N 21/4622* (2013.01); *H04N 21/4782* (2013.01); *H04N 21/8586* (2013.01); *H04W 8/18* (2013.01); *H04M 1/7253* (2013.01); *H04M 1/72561* (2013.01); *H04N 2005/4414* (2013.01); *H04N 2005/4425* (2013.01)

(58) Field of Classification Search

USPC 726/11; 709/217, 218, 231
 See application file for complete search history.

(56) References Cited

U.S. PATENT DOCUMENTS

7,251,478 B2 * 7/2007 Cortegiano 455/412.1
 7,987,491 B2 7/2011 Reisman
 2001/0055951 A1 12/2001 Slotznick
 2002/0002707 A1 1/2002 Ekel et al.
 2003/0078038 A1 4/2003 Kurosawa et al.
 2003/0097659 A1 * 5/2003 Goldman 725/89
 2003/0103088 A1 * 6/2003 Dresti et al. 345/835
 2004/0107449 A1 6/2004 Fukuda et al.
 2004/0242304 A1 12/2004 Walker et al.
 2005/0282582 A1 * 12/2005 Slotznick 455/557

2007/0053514 A1 3/2007 Imai et al.
 2007/0124775 A1 5/2007 DaCosta
 2007/0136488 A1 6/2007 Cho et al.
 2007/0198656 A1 * 8/2007 Mazzaferri et al. 709/218
 2007/0216760 A1 * 9/2007 Kondo et al. 348/14.02
 2007/0234048 A1 * 10/2007 Ziv 713/159
 2007/0269037 A1 * 11/2007 Gardiner et al. 379/235
 2008/0133715 A1 6/2008 Yoneda et al.
 2009/0030914 A1 * 1/2009 Goto G06F 17/30719
 2009/0063690 A1 * 3/2009 Verthein et al. 709/228
 2009/0149125 A1 * 6/2009 Slotznick 455/3.05
 2009/0254778 A1 * 10/2009 Huang et al. 714/38
 2009/0288132 A1 * 11/2009 Hegde 725/141

FOREIGN PATENT DOCUMENTS

JP 2004-048132 A 2/2004
 JP 2004-048521 A 2/2004
 JP 2004-159099 A 6/2004
 JP 2004-166256 A 6/2004
 JP 2005-135346 A 5/2005
 JP 2005-176218 A 6/2005
 JP 2005-210260 A 8/2005
 JP 2006-286855 A 10/2006
 JP 2006-338406 A 12/2006
 JP 2007-028079 2/2007
 JP 2007-074265 A 3/2007
 JP 2007-074529 A 3/2007
 JP 2007-195121 A 8/2007
 KR 10-2007-0061620 6/2007

OTHER PUBLICATIONS

Shih-Hsiang Lo, Controlling Digital TV Set-Top Box with Mobile Device via an IP Network, May 20, 2006, IEEE fellow, pp. 935-942.
 Takuji Imai, "Sony demonstrated a new feature of DLNA 1.5, in which images are thrown and caught on PSP and liquid crystal TV," issued on Jan. 12, 2006, Nikkei Electronics, w/ English translation.
 European Search Report issued in European Patent Application No. EP 08252339.0-2223/2061230, dated Apr. 24, 2009.
 "Google Brower Sync," Afterdawn.com Software, online, Jun. 19, 2007 XP0025200224, http://www.afterdawn.com/software/plug-ins/other_plug-ins_google_browser_sync.cf.
 Korean Office Action issued in Korean Patent Application No. 10-2008-0067190, dated May 26, 2010.
 Japanese Office Action, w/ partial English translation thereof, issued in Japanese Patent Application No. JP 2007-248353 dated Jan. 4, 2012.
 Japanese Office Action, w/ partial English translation thereof, issued in Japanese Patent Application No. JP 2007-248353 dated Mar. 13, 2012.
 Entire Prosecution of U.S. Appl. No. 13/489,877 to Matsubara et al. entitled "Portable Terminal, Information Processing Apparatus, Content Display System and Content Display Method".
 Japanese Office Action issued in Japanese Application No. 2012-268954 dated Sep. 17, 2013.
 Entire Prosecution of U.S. Appl. No. 12/170,938 to Matsubara et al. entitled "Portable Terminal, Information Processing Apparatus, Content Display System and Content Display Method".
 Entire Prosecution of U.S. Appl. No. 14/029,548 to Matsubara et al. entitled "Portable Terminal, Information Processing Apparatus, Content Display System and Content Display Method".
 Non-Final Office Action U.S. Appl. No. 14/501,621 dated Mar. 10, 2015.
 Notice of Allowance U.S. Appl. No. 14/501,621 dated Jul. 17, 2015.
 Notification of Reasons for Refusal Japanese Patent Application No. 2015-235234 dated Nov. 1, 2016 with full English translation.

* cited by examiner

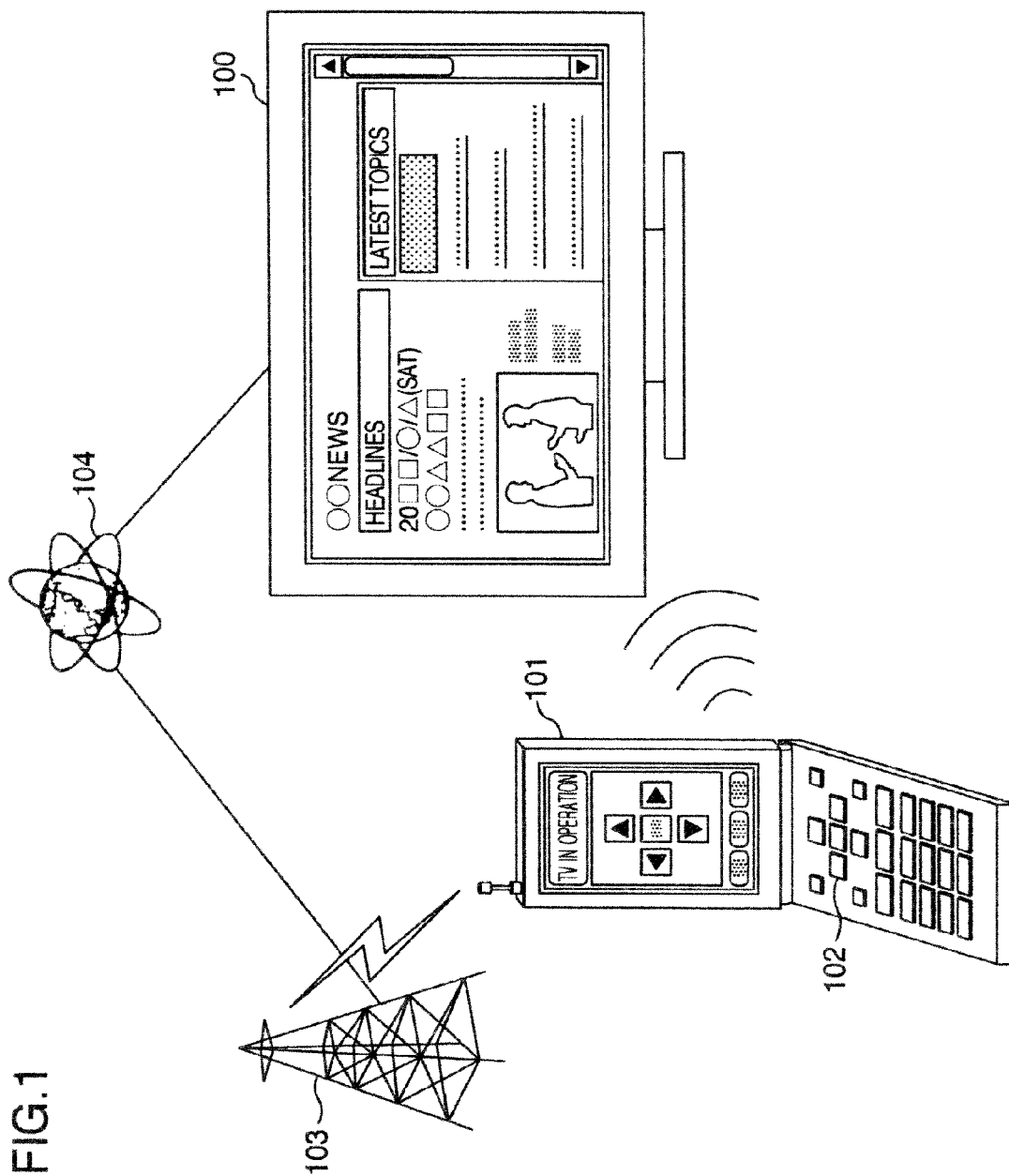


FIG. 2

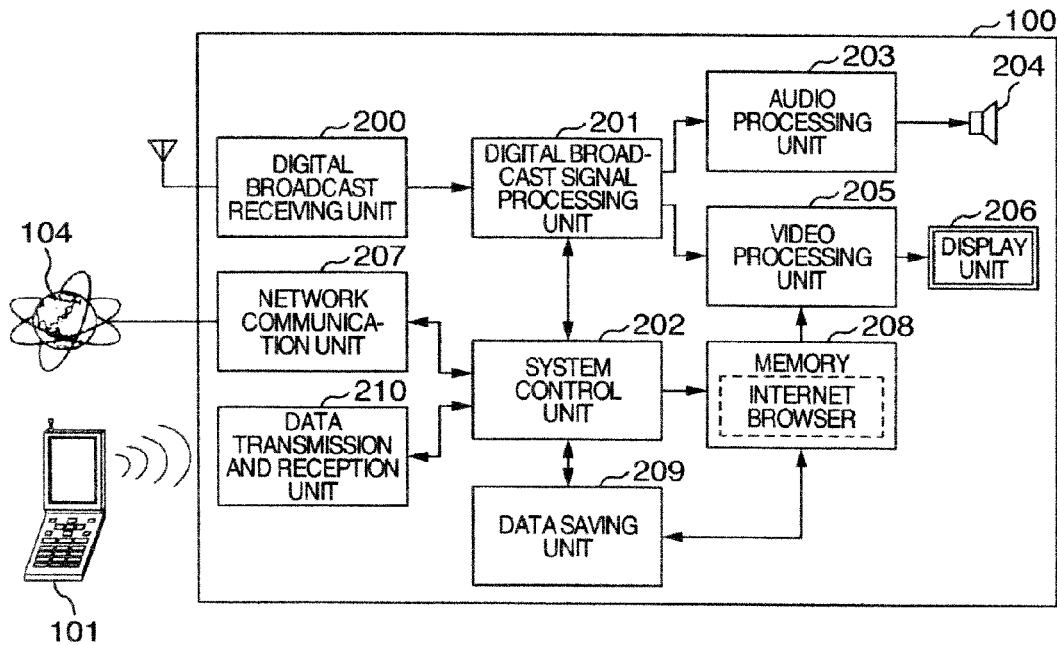
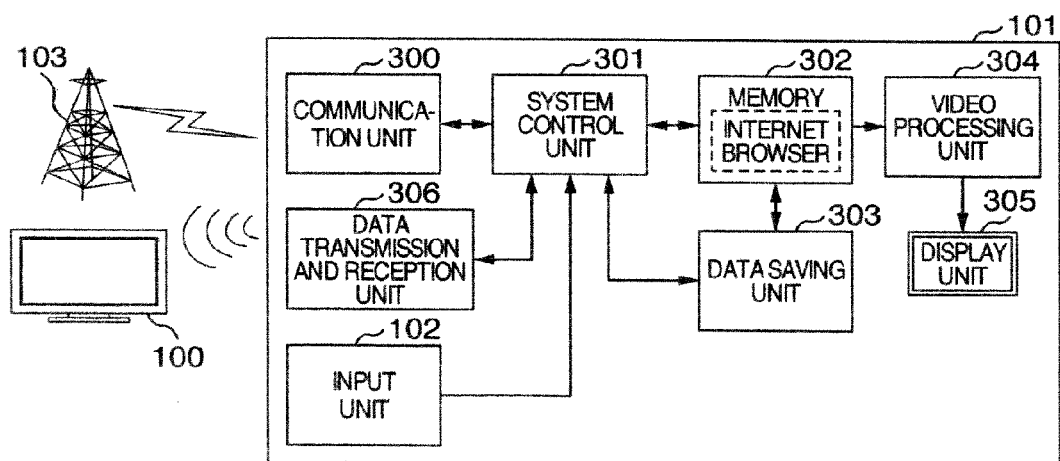
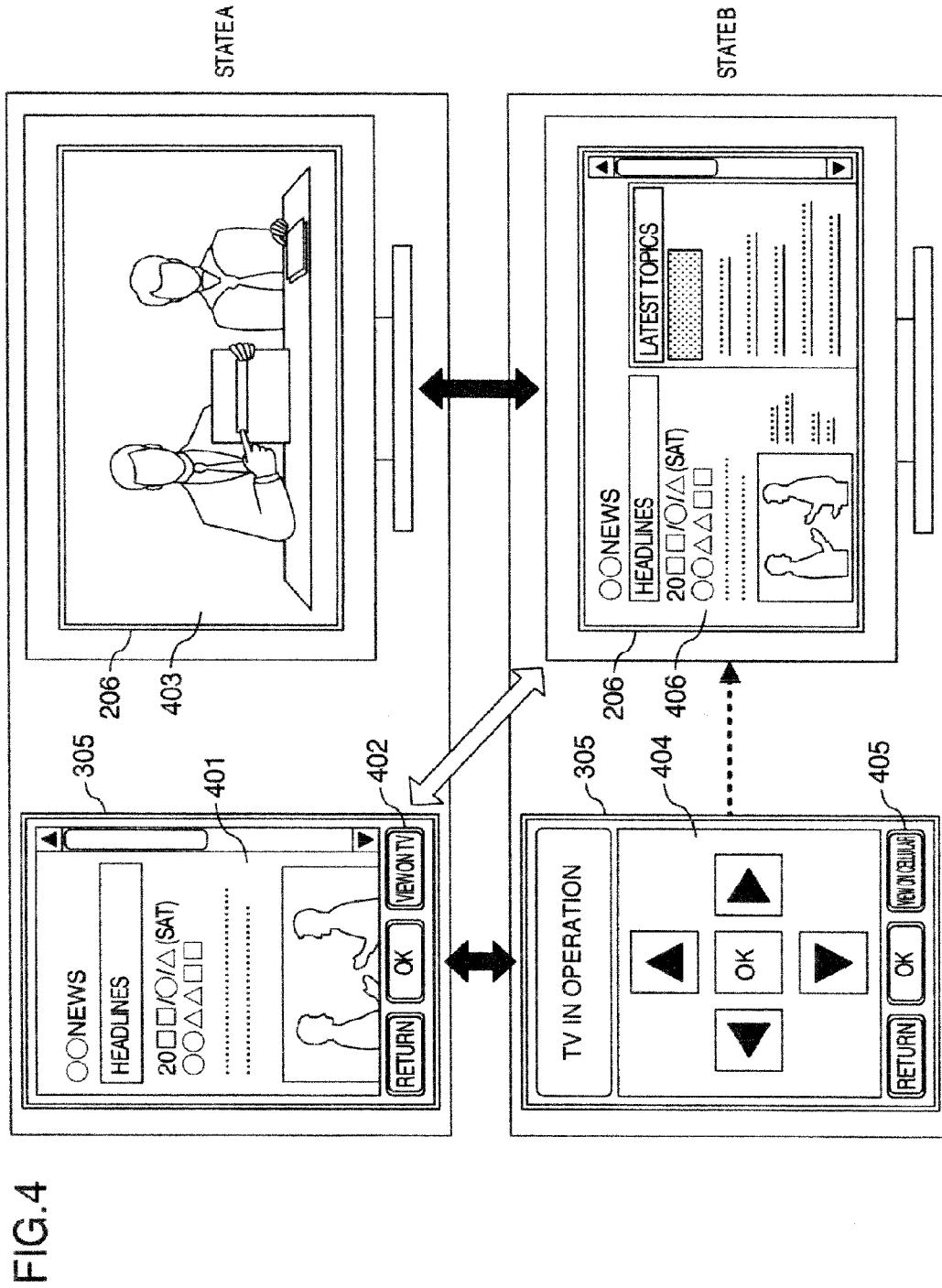


FIG. 3





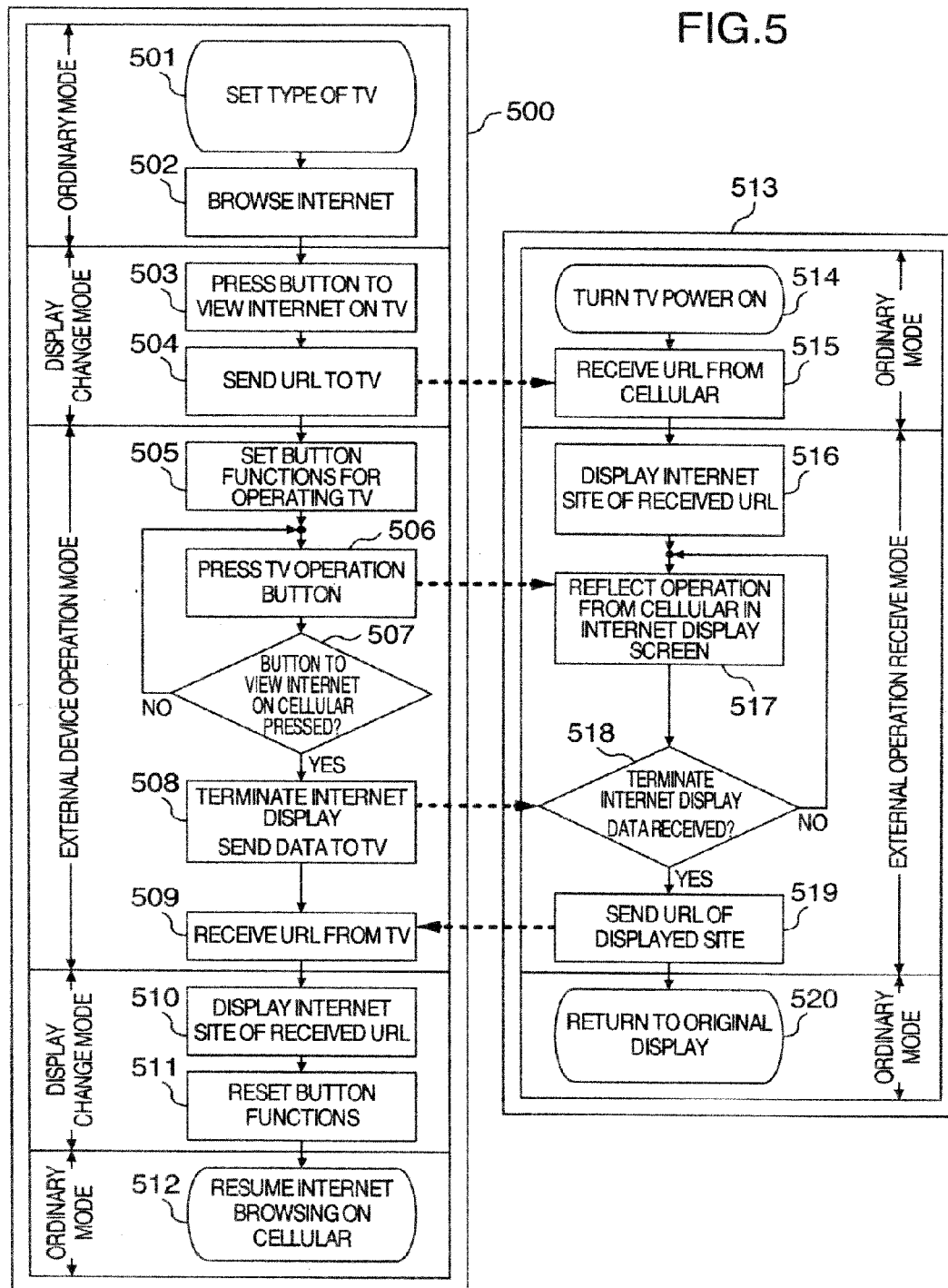


FIG. 6

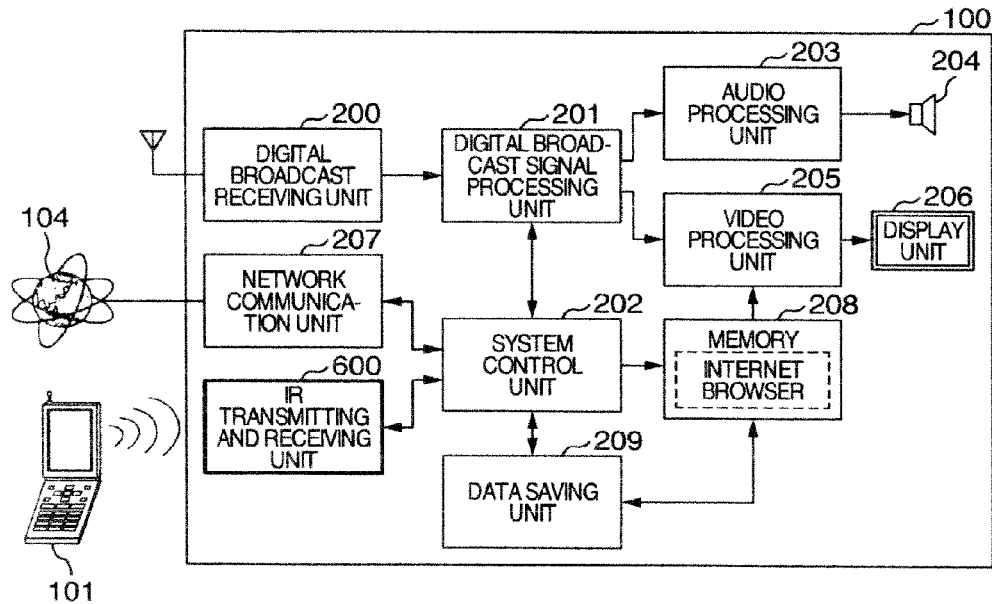
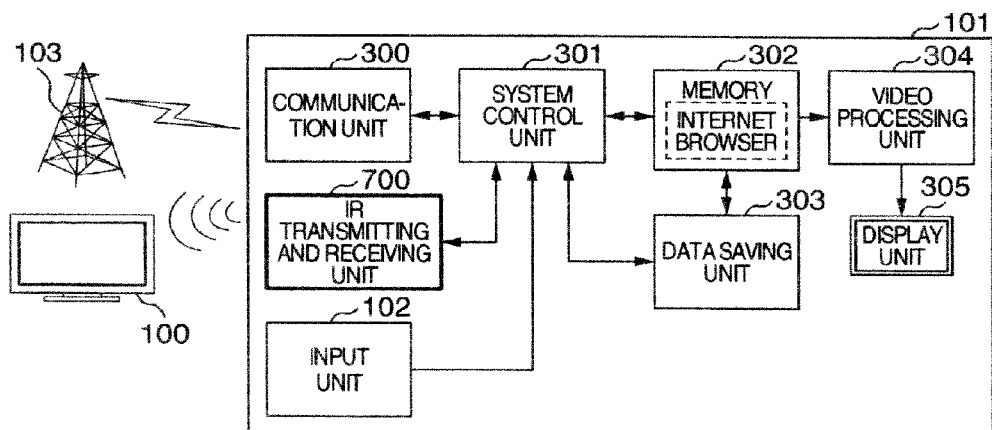


FIG. 7



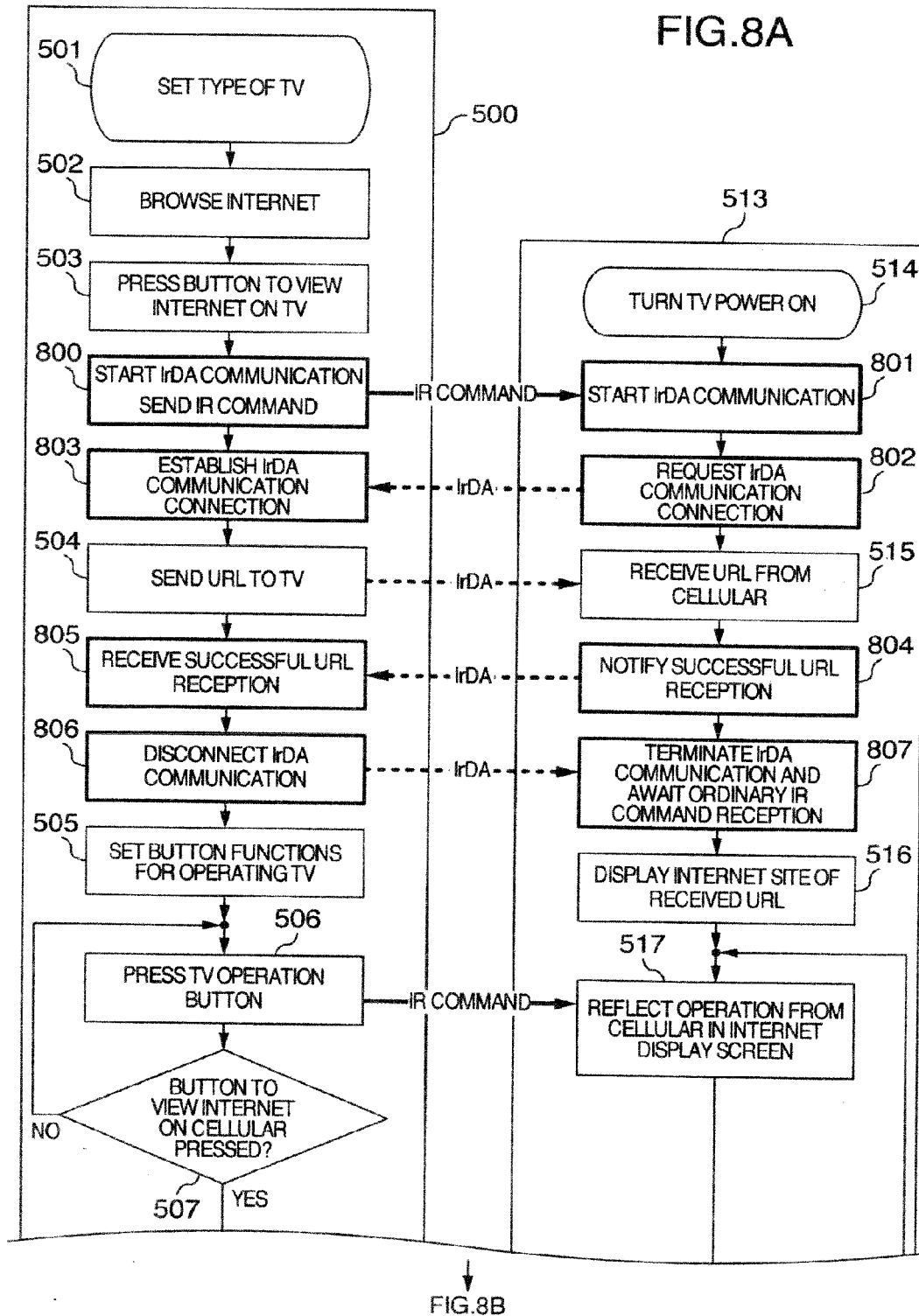


FIG.8B

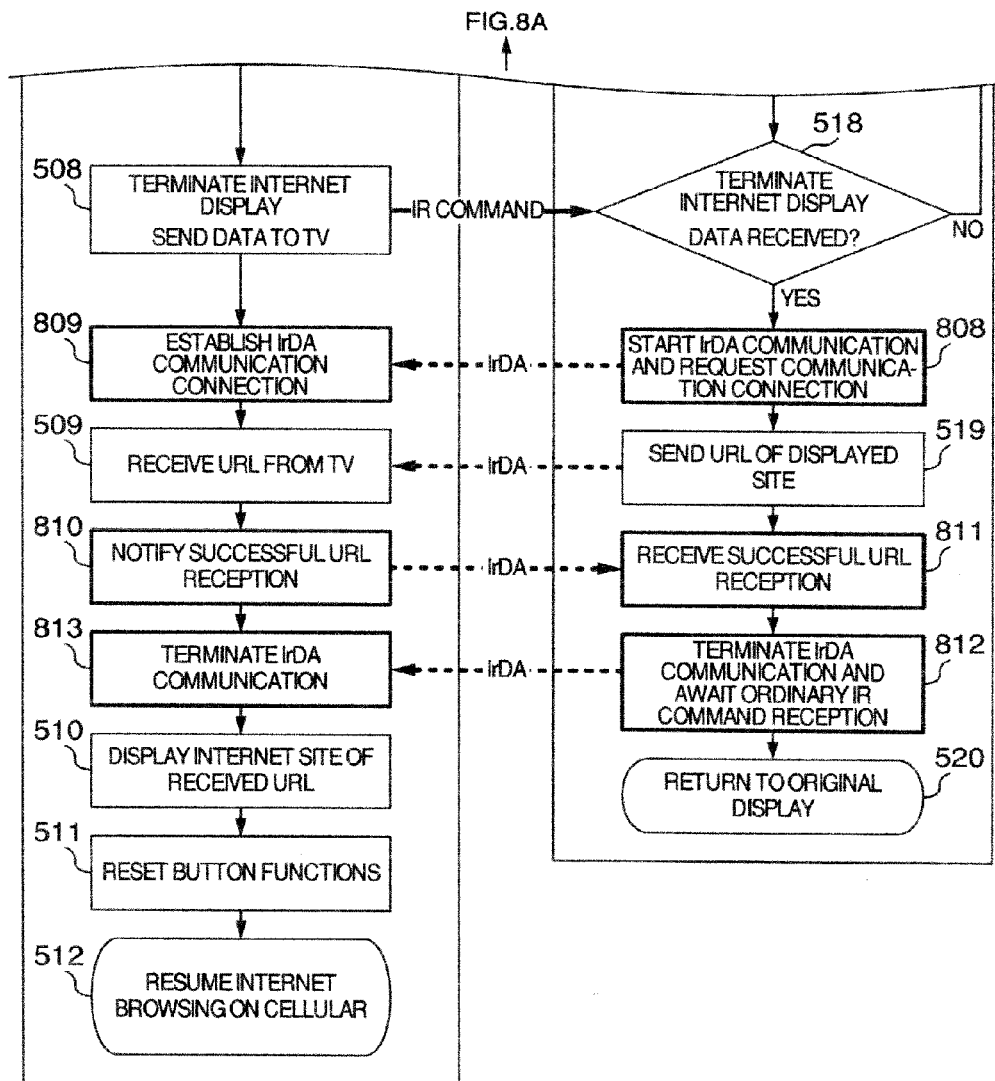


FIG. 9

900

No.	OPERATION OBJECT	OPERATION
1	TEXT BOX 1	CHARACTER STRING "....." INPUT
2	TEXT BOX 2	CHARACTER STRING "....." INPUT
3	BUTTON 1	CLICK
4	NONE	URL "....." DISPLAY
5	LIST BOX	ITEM "...." SELECT
5	BUTTON 2	CLICK
4	NONE	URL "....." DISPLAY

FIG.10

1000

No.	OPERATION OBJECT	OPERATION
1	CONTENT 1	COORDINATES "..., ..." SELECT
2	CONTENT 1	COORDINATES "..., ..." SELECT
3	NONE	URL "....." DISPLAY

FIG.11

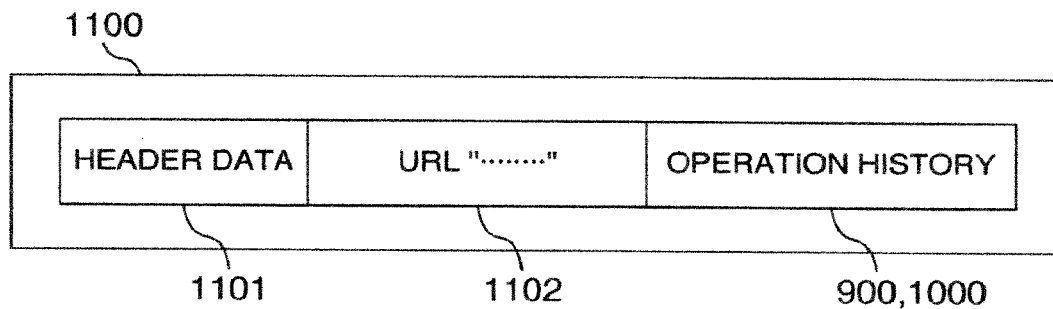
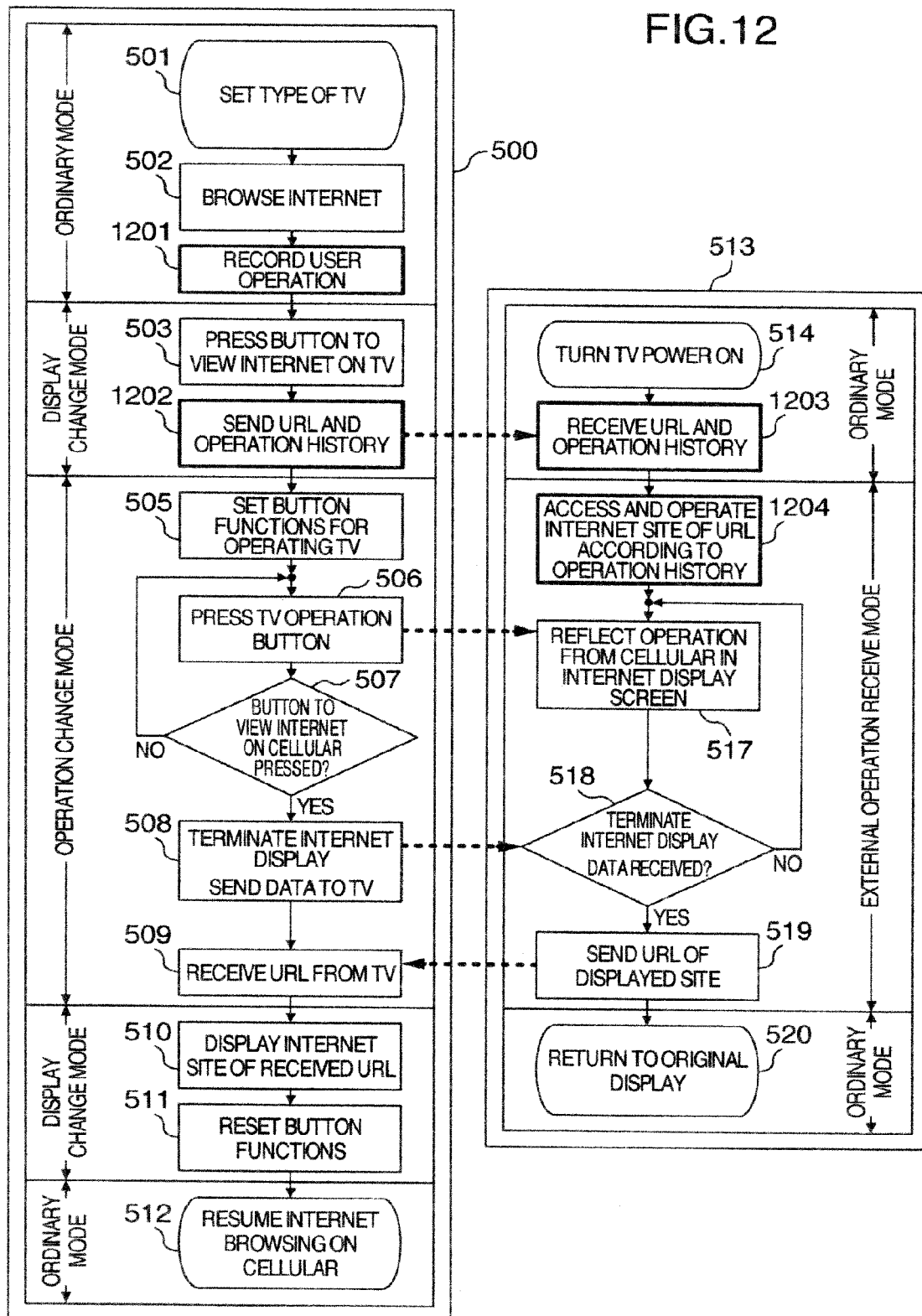


FIG. 12



PORTABLE TERMINAL, INFORMATION PROCESSING APPARATUS, CONTENT DISPLAY SYSTEM AND CONTENT DISPLAY METHOD

This application is a continuation of U.S. application Ser. No. 14/501,621, filed on Sep. 30, 2014, which is a continuation of U.S. application Ser. No. 14/029,548, filed on Sep. 17, 2013, now U.S. Pat. No. 8,892,688, which is a continuation of U.S. application Ser. No. 13/489,877, filed on Jun. 6, 2012, now U.S. Pat. No. 8,549,109, which is a continuation of U.S. application Ser. No. 12/170,938, filed on Jul. 10, 2008, now U.S. Pat. No. 8,214,459, which claims the benefit of Japanese Application No. 2007-248353 filed Sep. 26, 2007, the entire contents of each of which are hereby incorporated by reference.

BACKGROUND OF THE INVENTION

The present invention relates to a portable terminal, an information processing apparatus, a content display system, and a content display method.

Cellular phones capable of browsing internet sites and television (TV) programs have come into wide use today. On the other hand, there have been increasingly employed television sets capable of connecting to networks. In this environment, a technique in which a content received by a cellular phone is viewed by a television set with higher usability and a technique in which a cellular phone is employed as a remote control device to operate a television set are under discussion.

For example, JP-A-2006-286855 describes a cellular phone including a broadcast receiving function. The cellular phone transmits a history of viewed programs and playback indication signals thereof to a video playback device. According to the cellular phone, a program which the user viewed outside his or her house can be again viewed on a large screen after returning home. It is also possible that when the user viewed part a program outside home during a free period of time, the user can view its subsequent part, parts before and after the viewed part, or the entire program from the start point to the end point thereof after returning home by using a recording and reproducing device in the house.

JP-A-2005-135346 describes a technique for use in a system including a cellular phone, an information processing apparatus, and a display. When mail data including Uniform Resource Locator (URL) information is received, the cellular phone transfers the mail data via radio communication to the information processing apparatus. On receiving the mail data, the information processing apparatus displays the mail data on the display. If an operation is conducted for the URL information in the mail data, an operation is conducted to access a radio communication network other than a network used for the radio communication on the basis of the URL information, and resultantly obtained information is displayed on the display.

JP-A-2006-338406 describes a technique in which a communication terminal device including another function is ordinarily employed as a remote control device to remotely control other communication terminal devices.

Additionally, JP-A-2007-74265 describes a videoconference system using a cellular phone connected via the internet to a videoconference server to communicate information with the server and a display device capable of, when connected via a communication function to the cellular phone, displaying the information. The videoconference

system controls devices connected thereto via the videoconference server and a network. The videoconference system includes an information display module to display on a first display of the cellular phone a first videophone screen on which the information is displayed using letters. The information display module also displays on a second display of the display device a second videophone screen on which image information included in the information communicated as above is displayed. JP-A-2007-74265 describes a system in which a monitor camera is remotely controlled by a cellular phone, and a video image produced from the camera is displayed on a display screen of a Personal Computer (PC).

SUMMARY OF THE INVENTION

The portable terminal described in JP-A-2006-286855 is configured to meet the desires such as a desire in which a program viewed by the user outside his or her house is to be again viewed on a large screen after returning home and a desire to view, for part of a program viewed by the user outside his or her house during a free period of time, its subsequent part, parts before and after the viewed part, or the entire program from the start point to the end point thereof after returning home by using a recording and reproducing device in the house (paragraph 0006). Specifically, the portable terminal is constructed such that a list of programs viewed in the past is displayed (FIG. 7) and a program selected therefrom is reproduced by the video playback device.

However, there exists a desire in which a content just being viewed by a portable terminal is to be passed to a video playback device to continuously viewed the content thereon. This corresponds to, for example, a situation as follows. In a room in which the video playback device is installed, the user is viewing a program on a portable terminal and desires to pass the viewing of the program to the video playback device.

In this case, according to the portable terminal described in JP-A-2006-286855, it is required that the user terminates the viewing on the portable terminal and then selects from the list of programs viewed in the past a program to be reproduced by the video playback device. This leads to an increase in the number of operation steps depending on cases.

According to the mail terminal described in JP-A-2005-135346, it is possible, by transmitting a URL, for the information processing apparatus or device to receive information indicating whether or not an internet site has been viewed by the cellular phone. However, in use of the mail terminal described in JP-A-2005-135346, if it is desired to view an internet site on the information processing device side, it is required that the user operates the information processing device. This leads to an increase in the number of operation steps in some cases.

In JP-A-2006-338406 and JP-A-2007-74265, description has not been given of the continuation of the viewing of a content on a communication terminal device in which the viewing of the content on the communication terminal is passed to a television set or the like. Therefore, in a situation wherein the viewing of a content just being conducted on the communication terminal device is to be continued on the video playback device, it is required, even if a cellular terminal is used as a remote control device, that the user terminates the viewing on the cellular terminal and then

3

reproduces the video on the video playback device. This leads to an increase in the number of operation steps depending on cases.

That is, description has not been given of an idea to achieve a smoother cooperative operation when the viewing of a content just being conducted on the portable terminal is to be relayed or passed to the video playback device.

It is therefore an object of the present invention to provide a portable terminal, an information processing apparatus, a content display system, and a content display method wherein viewing of a content on a portable terminal is smoothly passed to an information processing apparatus.

To achieve the object according to the present invention, there is provided a portable terminal including a receiving unit which receives content information, an external device communication unit which conducts communication with an external information device, a display unit which displays the content information received by the receiving unit, an acquiring unit which acquires identification information identifying the content information displayed by the display unit, an operation unit which receives an operation indication from a user, and a control unit which conducts control such that if a transmission indication of the identification information is received by the operation unit while the content information is being displayed, the identification information acquired by the acquiring unit is transmitted to the external information device and the display of the content information by the display unit is terminated.

According to the present invention, there is also provided an information processing apparatus including an input unit which inputs content information, a communication unit which conducts communication with a portable terminal, a display unit which displays the content information inputted by the input unit, a control unit which conducts control such that if the communication unit receives identification information identifying second content information displayed on the portable terminal from the portable terminal while the display unit is displaying first content information, the input unit inputs the second content information corresponding to the identification information to be displayed on the display unit, and the display unit displays the second content information in place of the first content information, the control unit conducting control such that if the communication unit receives an indication signal indicating termination of the display of the second content information by the display unit, the display of the second content information is terminated and the display of the first content information is resumed.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other features, objects and advantages of the present invention will become more apparent from the following description when taken in conjunction with the accompanying drawings wherein:

FIG. 1 is a schematic diagram showing an operation environment of an internet connection terminal and a mobile terminal in first and second embodiments;

FIG. 2 is a block diagram showing a configuration of a first embodiment of an internet connection terminal;

FIG. 3 is a block diagram showing a configuration of a first embodiment of a mobile terminal;

FIG. 4 is a diagram showing a transition example of screen display on an internet connection terminal and a mobile terminal in the first to third embodiments;

4

FIG. 5 is a flowchart for explaining operations of an internet connection terminal and a mobile terminal in the first embodiment;

FIG. 6 is a block diagram showing a configuration of a second embodiment of an internet connection terminal;

FIG. 7 is a block diagram showing a configuration of a second embodiment of a mobile terminal;

FIGS. 8A and 8B are a flowchart for explaining operations of an internet connection terminal and a mobile terminal in the second embodiment;

FIG. 9 is a table showing a data layout of an operation history in the third embodiment;

FIG. 10 is a table showing a data layout of an operation history in the third embodiment;

FIG. 11 is a table showing a data layout of transmitted data in the third embodiment; and

FIG. 12 is a flowchart for explaining operations of an internet connection terminal and a mobile terminal in the third embodiment.

DESCRIPTION OF THE EMBODIMENTS

While we have shown and described several embodiments in accordance with our invention, it should be understood that disclosed embodiments are susceptible of changes and modifications without departing from the scope of the invention. Therefore, we do not intend to be bound by the details shown and described herein but intend to cover all such changes and modifications a fall within the ambit of the appended claims.

First Embodiment

Description will now be given of an embodiment including as an example a mobile terminal **101** as a portable terminal, an internet connection terminal **100**, and an internet site as a content.

In the embodiment, the internet connection terminal **100** and the mobile terminal **101** are terminals capable of connecting to the internet to display a homepage provided by an internet site. FIG. 1 shows an outline of associated facilities and connection environments for the terminals **100** and **101** to connect to the internet **104**. Specifically, the terminal **100** connects to the internet **104** and the terminal **101** connects thereto using an input unit **102** and a base station **103**. The mobile terminal **101** is a portable information processing terminal, for example, a cellular phone (abbreviated to "cellular"), a Personal Digital Assistant (PDA), or a smart phone.

The input unit **102** is an input device of the mobile terminal **101** and includes, for example, a plurality of buttons. The user conducts an operation for the mobile terminal **101** using a key, a button, and a dial of the input unit **102**.

The base station **103** is a base station with which the mobile terminal **101** conducts radio communication to connect to the internet.

The internet **104** conceptually represents a set of Web servers and various services on the internet and is connected to the internet connection terminal **100** and the mobile terminal **101**. The mobile terminal **101** connects via the base station **103** to the internet **104**.

The internet connection terminal **100** is, for example, a television (TV) set, a SetTop Box (STB), or a home server for Digital Living Network Alliance (DLNA) and has a function to output video signals and a function to connect to the internet. The terminal **100** is capable of connecting to the

5

internet to display a homepage. The terminal **100** also enables the user to view digital broadcast programs delivered using a ground wave, Broadcasting by Satellite (BS), Communication Satellite (CS), the internet, and the like. As FIG. 2 shows, the internet connection terminal **100** includes a digital broadcast receiving unit **200**, a digital broadcast signal processing unit **201**, a system control unit **202**, an audio processing unit **203**, a speaker **204**, a video processing unit **205**, a display unit **206**, a network communication unit **207**, an internet browser **208**, a data saving unit **209**, and a data transmitting and receiving unit **210**.

The digital broadcast receiving unit **200** is a circuit which receives desired broadcast data via an antenna or a cable and restores, based on received signals, the broadcast data into data to be digitally processed by the digital broadcast signal processing unit **201**.

The digital broadcast signal processing unit **201** includes, for example, a signal separator to conduct demultiplexing of a signal and a decoder to conduct decoding of a signal. The processing unit **201** receives digital broadcast data from the receiving unit **200**, separates audio data and video data therefrom, converts the audio data into data of a data format to be processed by the audio processing unit **203** and converts the video data into data of a data format to be processed by the video processing unit **205**, and outputs the converted data items to the audio and video processing units **203** and **205**, respectively.

The system control unit **202** includes, for example, a microprocessor and controls operations of processing units required to reproduce digital broadcast and those required to access the internet.

The audio processing unit **203** includes, for example, an Analog-to-Digital (AD) converter. The processing unit **203** converts digital audio data from the digital broadcast signal processing unit **201** into analog audio data to output the data to the speaker **204**.

The speaker **204** receives the analog audio data from the audio processing unit **203** to produce sounds from the data.

The video processing unit **205** includes, for example, processing devices such as an Application Specific Integrated Circuit (ASIC), a Field Programmable Gate Array (FPGA), and a Micro Processing Unit (MPU). The unit **205** receives video data from the digital broadcast signal processing unit **201** and the internet browser **208**, which will be described later, converts the data into data to be processed by the display unit **206**, and delivers the data thereto.

The display unit **206** includes, for example, a display device such as a liquid-crystal display, a plasma display, or the like. The display unit **206** includes a display panel, a panel control circuit, and a panel control driver, and displays an image on the display panel using data supplied from the video processing unit **205**. If the internet connection terminal is a settop box or a home server for DLNA, a video signal including, for example, data in a Red, Blue, and Green (RGB) format is outputted to an external display device, without using the display unit **206**.

The network communication unit **207** includes, for example, a communication module capable of connecting to the internet. According to a request from the system control unit **202**, the network communication unit **207** communicates predetermined data with the internet **104**.

The internet browser **208** is software which operates according to an indication from the system control unit **202** and which conducts display control and management for contents received via the network communication unit **207** from the internet **104**. The system control unit **202** reads the browser **208** from the data saving unit **209** to store it in a

6

memory and controls the browser **208**. The browser **208** may be implemented using a dedicated circuit.

A URL to be displayed on the internet browser **208** is received via the data transmitting and receiving unit **210** or the network communication unit **207**, which will be described later, or is inputted by the user from a remote control device, not shown.

The data saving unit **209** includes an information recording device, e.g., a flash memory, an optical disk, a magnetic disk or the like to store program information of received digital broadcast programs, contents obtained from the internet **104**, and data necessary for operations in respective processing units.

The data transmitting and receiving unit **210** includes a communication device which conducts radio communication with an external terminal such as the mobile terminal **101** according to standards of, for example, Bluetooth or the wireless Local Area Network (LAN). The unit **210** outputs data and signals received through the communication, to the system control unit **202**.

As FIG. 3 shows, the mobile terminal **101** includes a communication unit **300**, a system control unit **301**, an internet browser **302**, a data saving unit **303**, a video processing unit **304**, a display unit **305**, and a data transmitting and receiving unit **306**.

The communication unit **300** includes a function to conduct radio communication with the base station **103** and communicates necessary data according to a request from the system control unit **301**. The unit **300** includes, for example, a transmitting and receiving device such as a front-end module.

The system control unit **301** includes an information processing device, for example, an MPU or a microprocessor and controls processing units required to access the internet and processing units required to conduct operations for another mobile terminal **101**.

The internet browser **302** is software which conducts management and display control for contents received from the internet **104** via the communication unit **300** and the base station **103**, according to an instruction from the system control unit **301**. The system control unit **301** reads the browser **302** from the data saving unit **303** to store it in a memory and controls the browser **302**. The browser **302** may be implemented using a dedicated circuit. It is assumed in the configuration that a URL of an internet site is obtained from the input unit **102** or is received via the communication unit **300** or the data transmitting and receiving unit **306**, which will be described later.

The data saving unit **303** includes a flash memory and stores contents obtained from the internet **104** and data necessary for operations in respective processing units.

The video processing unit **304** includes a processing device such as an MPU. The unit **304** converts a content supplied from the internet browser **302** into data to be processed by the display unit **305** and delivers the data thereto.

The display unit **305** includes, for example, a display panel, a panel control circuit, and a panel control driver and displays an image on the display panel using data supplied from the video processing unit **304**.

The data transmitting and receiving unit **306** conducts radio communication with an external terminal such as the internet connection terminal **100** according to standards of, for example, Bluetooth (registered trademark) or the wireless LAN. The unit **210** outputs data and signals received through the communication, to the system control unit **301**.

In operation of the internet connection terminal **100** and the mobile terminal **101**, an internet site being displayed on the mobile terminal **101** can be displayed on the internet connection terminal **100**. Also, the user can operate the internet connection terminal **100** by use of the mobile terminal **101**. FIG. 4 shows an outline of screen layouts and screen transitions on the terminals **100** and **101** in the configuration including state A, a screen display **401**, a button display **402**, a screen display **403**, state B, a screen display **404**, a button display **405**, and a screen display **406**.

State A shows states of screens on both terminals **100** and **101** when the user is conducting an internet browsing operation using the mobile terminal **101**. The screen display **401** is an example when an internet site is displayed on the display unit **305** of the mobile terminal **101**. The button display **402** is an icon displayed in the display unit **305** of the mobile terminal **101** and displays a relationship between the button display **402** and an operation conducted in response to depression of an associated button. This also applies to the button display **405**. In the example, when the user presses a selection button of the button display **402** using the input unit **102**, the system executes change-over processing to pass the display of the internet site to the internet connection terminal **100**. The button is ordinarily assigned with another function of the cellular phone. The button may be configured such that the function is assigned in the change-over processing when the internet site is being displayed on the mobile terminal **101**. The screen display **403** is an example in which a TV program is displayed on the display unit **206** of the internet connection terminal **100**.

State B shows states of screens on both terminals **100** and **101** when the user is conducting an internet browsing operation using the internet connection terminal **100**. The screen display **404** is an example when an operation guide is displayed on the display unit **305** of the mobile terminal **101** to operate the internet connection terminal **100** from the mobile terminal **101**. In a state wherein the screen display **404** is being displayed on the display unit **305**, the mobile terminal **101** can conduct operation for the internet connection terminal **100**. The screen display **406** is an example in which an internet site is displayed on the display unit **206** of the internet connection terminal **100**. Also, the screen display **406** shows a state in which a homepage of the internet site displayed on the mobile terminal **101** in the screen state **401** is displayed on the internet connection terminal **100**. In the example, when the user presses a selection button of the button display **405** using the input unit **102**, the system executes change-over processing to change the display of the internet site from the internet connection terminal **100** to the portable terminal **101**.

In this situation, if the display operation changes from state A to state B, the internet site display on the mobile terminal **101** is terminated. if the display operation changes from state B to state A, the internet site display on the internet connection **100** is terminated.

In place of the button displays **402** and **405** and the buttons associated therewith, there may be arranged an input device of touch panel type.

Next, description will be given of operations in the internet connection terminal **100** and the mobile terminal **101** configured as above by referring to FIGS. 2 to 4 and the flowchart of FIG. 5.

During reception or playback of a digital broadcast, if the internet connection **100** receives a URL of an internet site sent by radio from the mobile terminal **101** as a result of an operation by the user, the internet connection terminal **100** displays an internet site indicated by the URL. Thereafter,

the internet connection terminal **100** accepts an operation for the terminal **100** from the mobile terminal **101**.

First, referring to FIG. 2, description will be given of an operation in which the internet connection terminal **100** conducts reception and playback of a digital broadcast.

Assume that the user carries out an operation to send an indication to the internet connection terminal **100**, the indication requesting start of reception and playback of a digital broadcast, by using, for example, a remote control device, not shown.

In response to the indication, the terminal **100** converts the signal received by the data transmitting and receiving unit **210** from the remote control device into predetermined information and notifies the information to the system control unit **202**. The control unit **202** delivers an indication to start reception processing to the digital broadcast receiving unit **200**, digital broadcast signal processing unit **201**, the audio processing unit **203**, and the video processing unit **205**.

In response to the indication from the system control unit **202**, the digital broadcast receiving unit **200** decodes signals obtained from the antenna and the cable to produce data to be digitally processed by the digital broadcast processing unit **201** and outputs the data thereto.

The processing unit **201** separates video data and audio data from the received data and converts the video data and the audio data respectively into a predetermined video signal and a predetermined audio signal. In this situation, to output the video and audio signals with a correspondence established therebetween, these signals are outputted at synchronized timing.

The audio processing unit **203** converts the audio signal from the processing unit **201** into a signal suitable for an input to the speaker **204** and outputs the signal thereto. As a result, the speaker **204** produces sounds.

On the other hand, the video processing unit **205** converts the video signal from the processing unit **201** into a signal suitable for an input to the display unit **206** and outputs the signal thereto. As a result, the display unit **206** displays an associated image.

Through the sequence of operations, the internet connection terminal **100** conducts the reception and playback of the digital broadcast.

Referring now to FIG. 2, description will be given of an operation in which the terminal **100** accesses the internet **104** to display an internet site.

Assume that the user sends a URL of an internet site by radio from the input unit **102** or the like of the mobile terminal **101** to the internet connection terminal **100**, which will be described later. The terminal **100** receives data through the radio communication by the data transmitting and receiving unit **210** and notifies the URL obtained from the data to the system control unit **202**.

The system control unit **202** outputs the URL to the internet browser **208**. The browser **208** having received the URL accesses via the system control unit **202** and the network communication unit **207** an internet site indicated by the URL to thereby receive data of the homepage of the internet site.

The network communication unit **207** accesses the internet **104** using a communication protocol of, for example, HyperText Transfer Protocol (HTTP) to receive the homepage data of the internet site and outputs the data via the system control unit **202** to the internet browser **208**. The browser **208** constructs an image to be displayed as a

homepage using the data, converts the image into a video signal to be inputted to the video processing unit 205, and outputs the signal thereto.

The video processing unit 205 converts the video signal from the browser 208 into a signal suitable for an input to the display unit 206 and outputs the signal thereto. The display unit 206 resultantly displays the homepage image. During the operation, if there exists data to be temporarily stored in the terminal, the internet browser 208 saves the data in the data saving unit 209 according to necessity.

If the user conducts a predetermined operation when the internet site is being displayed as above, the mobile terminal 101 transmits by radio the URL of the internet site to the internet connection terminal 100 and then enters a state capable of operating the internet connection terminal 100. This enables the user to operate the internet connection terminal 100 from the mobile terminal 101.

Referring now to FIG. 3, description will be given of an operation in which the mobile terminal 101 accesses the internet 104 via the base station 103 to display an internet site.

Assume that the user conducts a predetermined operation for the mobile terminal 101 via the input unit 102 of the mobile terminal 101 to indicate display of the internet site existing in the mobile terminal 101.

In response to the indication from the user received via the input unit 102, the system control unit 301 of the mobile terminal 101 activates the internet browser 302 to display the internet site. The control unit 301 accesses the internet site which the browser 302 displays via the communication unit 300 immediately after the activation, and issues an indication to the communication unit 300 to receive data of the homepage of the internet site.

The communication unit 300 conducts radio communication with the base station 103 to access the internet 104 via the base station 103 and receives the homepage data of the internet site. Also, the communication unit 300 outputs the data to the internet browser 302. When the data is received, the browser 302 constructs an image to be displayed as a homepage using the data and converts the image into a video signal to be inputted to the video processing unit 304 to output the signal thereto. The processing unit 304 converts the video signal from the browser 302 into a signal to be inputted to the display unit 305 to output the signal thereto. As a result, the display unit 305 displays an image of the homepage. During the operation, if there exists data to be temporarily stored in the terminal, the internet browser 302 saves the data in the data saving unit 303 according to necessity.

Similarly, the mobile terminal 101 obtains a URL as an input from the user or a URL included in the hyper link and controls operation to access an internet site indicated by the URL. The system control unit 301 controls operation to store the URL of the internet site displayed by the browser 302 in the data saving unit 303.

Next, description will be given in detail of an operation using the internet connection terminal 100 and the mobile terminal 101. Specifically, an internet site to be displayed on the mobile terminal 101 is displayed on the internet connection terminal 100. After the display of the internet site, the internet connection terminal 100 is operated from the mobile terminal 101. The operation is explained using FIGS. 4 and 5.

In FIG. 5, operations respectively of the mobile terminal 101 and the internet connection terminal 100 are shown in frames 500 and 513, respectively. In association with explanation of respective operation flows in the frames 500 and

513, description will be given of the operation flows in the terminals 101 and 100 and a relationship therebetween. Assume in the description that a cellular phone is employed as an example of the mobile terminal 101 and a television set including an internet connecting function is used as an example of the internet connection terminal 100.

First, by using, for example, the input unit 102, the user beforehand sets a type of the television set for the internet browsing to the cellular phone, which will be described later, by designating a maker and a model number using a predetermined setting screen (step 501). The number such as the model number, the operation, and a signal and information to be transmitted are stored in the data saving unit 303 with a correspondence established therebetween. The control unit 301 establishes a correspondence between the operation stored in the data saving unit 303 and the information to be transmitted. This resultantly sets a command to transmit the information to the TV set. After the setup of the command, the system enters a state in which the cellular phone is capable of transmitting a command recognizable by the TV set thereto.

The user powers the TV set by conducting an ordinary operation, and the TV set receives and reproduces a broadcast received from the digital broadcast receiving unit 200 as described above (step 514). In step 514, the user operates the TV set as a single device. This state is referred to as an ordinary mode of the TV set. The state in which the TV has been powered indicates a state in which at least a main power source thereof is on.

The user conducts a predetermined operation to start displaying an internet site on the cellular phone. As a result, an internet site is displayed on the screen display 401 so that the user browse the internet site (step 502).

In steps 501 and 502, the user operates the cellular phone as a single device. This state is referred to as an ordinary mode of the cellular phone.

Assume that the user attempts, during the internet site browsing, to browse the internet site by use of the TV set. In this situation, the user operates the input unit 102 to select the button 402 in the display unit 305 of the cellular phone (step 503). Then, the cellular phone enters a display change mode to execute processing to change the display of the internet site to the TV set.

When the cellular phone enters the display change mode, the system control unit 301 of the cellular phone sends the URL of the internet site on the display via the data transmitting and receiving unit 306 to the TV set (step 504). After the URL transmission or in concurrence with therewith, the system control unit 301 controls the display unit 305 and the like to terminate the display of the internet site on the cellular phone. Also, the cellular phone may be configured such that the cellular phone transmits together with the URL a signal indicating the internet site display to the TV set.

The TV set receives the URL via the data transmitting and receiving unit 210 from the cellular phone (step 515), connects to the internet site indicated by the URL in the procedure described above, and displays the internet site on the display unit 206 as indicated by the screen display 406 (step 516). As a result of step 516, the TV set enters a state to receive operation from the cellular phone. This mode is referred to as an external operation receive mode. Through the operation of step 516, the display on the TV set changes from the old content to a content corresponding to the URL from the cellular phone.

On the other hand, the cellular phone enters, after the transmission of the URL, a state in which the system control unit 301 is capable of operating the TV set using part of the

11

input unit **102**, which will be described later. This mode is referred to as an operation change mode. The display unit **305** presents a display to inform the user of operations which can be conducted by pressing keys as shown, for example, in the screen display **404** (step **505**).

In this state in which the TV set can be operated if the user presses a desired key of the input unit **102**, data which indicates an operation for the TV set and which can be interpreted by the TV set designated in step **501** is sent to the TV set. The data includes data items almost the same as those of data sent from a remote control device of the TV set. Therefore, in a situation wherein it is desired to move a selection item of an internet site being displayed on the TV set or to determine a selection item, if the user operates the input unit **102** of the cellular phone to press a key corresponding to an operation information item shown in the screen display **404**, the cellular phone sends an information item and a signal indicating an indication of the operation to the TV set (step **506**). As a result of this step, the cellular phone serves as a remote control device of the TV set. The operation of this step is carried out, for example, under supervision of the system control unit **301**.

When the data transmitting and receiving unit **210** receives the information and the signal of the operation indication such as "move" or "select" from the cellular phone, the TV set reflects, under control of the system control unit **201**, the information of the indication in the screen display **406** displaying the internet and in the operation of the browser **208** (step **517**).

If the user desires to return from the state in which the user browses the internet site on the TV set to a state in which the user browses the internet site on the cellular phone, the user conducts an operation to select an item of the button display **405** in the display unit **305** of the cellular phone (step **507**). Then, the cellular phone sends data indicating termination of the internet display via the data transmitting and receiving unit **306** to the TV set (step **508**). After or in concurrent with the URL transmission, the internet control unit **202** controls, for example, the display unit **206** to terminate the internet site display on the TV set.

When the data transmitting and receiving unit **210** receives the data, the TV set interrupts the internet site display (step **518**). Also, the TV set sends the URL of the internet site last displayed on the TV set via the data transmitting and receiving unit **210** to the cellular phone (step **519**) and then displays a TV program being displayed before the start of the internet display, for example, as shown in the screen display **403** (step **520**). In step **520**, the TV set again enters the state to operate as a single unit, i.e., in the ordinary mode. Moreover, in step **520**, the TV set resumes displaying the content being displayed before the reception of the URL from the cellular phone. It is also possible in step **520** that the TV set only terminates the display of the internet site. This mitigates the operation load imposed on the user to terminate the display on the TV set.

The cellular phone receives the URL of the internet site last displayed on the TV set and then accesses and displays the internet site of the URL (step **510**). Resultantly, the internet site display is changed from the TV set to the cellular phone, and hence the cellular phone enters the display change mode. The operation of the step is carried out, for example, under supervision of the control unit **301**. Through the operation of this step, the cellular phone resumes the internet site display.

In this situation, the system control unit **301** changes the function to assign part of the keys of the input unit **102** to operate the TV set from the cellular phone and treats the

12

keys as those to ordinarily operate the cellular phone (step **511**). The screen display is changed, for example, from the screen display **404** to the screen display **401**, and the user continues browsing the internet site display as shown in the screen display **401** (step **512**). In step **512**, the cellular phone returns to the state to operate as a single unit, i.e., in the ordinary mode.

As above, the URL of the internet site to be browsed on the mobile terminal **101** is sent by radio to the internet connection terminal **100**. The terminal **100** having received the URL displays the internet site. From the mobile terminal **101**, the user operates the internet connection terminal **100** displaying the internet site.

When the user presses only once the button to change the internet display to the internet connection terminal **100**, the mobile terminal **101** changes from the ordinary mode for the operation as a single unit to the display change mode to change the display to the internet connection terminal **100**. Subsequently, the mode is sequentially changed to the operation change mode to operate the internet connection terminal **100** from the mobile terminal **101**. Also, to display the internet again on the mobile terminal **101**, if the user presses only once the button to view the internet on the mobile terminal **101**, the mobile terminal **101** conducts a sequence of transition steps. Specifically, the mobile terminal **101** terminates the operation change mode and enters to the display change mode, and then returns to the ordinary mode.

Without conducting any operation for the terminal which desires to display an internet site as above, the user can display the internet site on a large screen through a simple operation using only the mobile terminal **100**. Also, the user can continuously employ the mobile terminal **100** to operate the terminal which has displayed the internet site. The user is capable of smoothly conducting a change-over of the display of the internet site between different terminals.

In the screen display **406** of the embodiment, the internet site is displayed on the display unit **206** of the internet connection terminal **101** in the full screen display mode. However, the internet site may be displayed in a partial area of the screen.

In the embodiment, while an internet site is being browsed on the mobile terminal **101**, an entity which conducts the communication via the internet and the processing to receive information to produce a video therefrom is changed from the mobile terminal **101** to the internet communication device or terminal **100**. Therefore, for example, if the communication speed of the internet communication device **100** to conduct communication via the internet is higher than that of the mobile terminal **101** to conduct communication via the internet, the user can conduct the operation to carry out the internet browsing from the mobile terminal **101** and also can of conducting the operation through the higher-speed communication.

In the description of the embodiment, a TV set, a set box device, and a server for DLNA may be employed as the internet communication device **100**. In this connection, by using these devices, it is possible to solve problems occurring in some situations as follows.

For example, these information processing devices such as a TV set are installed in a living room or the like to be commonly used by a plurality of persons in many cases. There likely occurs a situation wherein the viewing of the display of the TV set is required to be abruptly interrupted, leading to a problem. Specifically, since a plurality of persons are viewing the TV set, it is difficult for a person to display an internet site on the TV.

13

For the user to continue the viewing of the internet site on the mobile terminal **100**, there will be considered a case in which, for example, the user interrupts the viewing of the internet site display screen on the TV set to activate the browser of the cellular phone with a communication function and then inputs a URL of the internet site to the cellular phone to thereby continue the viewing on the cellular phone. This however leads to a problem of increase in the number of operation steps.

In consideration of this situation, the problem can be solved by using the mobile terminal **101** and the internet connection device **100** according to the embodiment. Additionally, there is obtained usability and operability for the user to easily carry out the operation to change the entity of the display and the communication from the mobile terminal **101** to the internet connection device **100** and vice versa.

Although description has been given of the internet as an example of content information in conjunction with the embodiment, the embodiment is not restricted by this example. That is, information indicating such content as a TV program is also available. Also, a URL has been described as an example of the identification information. However, the embodiment is not limited to the URL. For example, information indicating a channel of a TV program may also be used as the identification information.

Second Embodiment

Description will now be given of a second embodiment. Specifically, description will be given of a method of implementing an operation equivalent to that of the first embodiment, by use of an infrared-ray communication to communicate a URL and indications of various operations between the internet communication terminal **100** and the mobile terminal **101**.

The second embodiment will be described by referring to the drawings. In the description, almost the same constituent components as those of the first embodiment are assigned with the same reference numerals, and description thereof will be avoided.

The internet communication terminal **100** of the second embodiment shown in FIG. **6** differs from that of the first embodiment shown in FIG. **2** in that the data transmitting and receiving unit **210** is replaced by an infrared-ray transmitting and receiving unit **600**. The unit **600** communicates data according to a communication format prescribed by, for example, a maker and using an infrared-ray communication conforming to the IrDA (Infrared Data Association) standard.

The mobile terminal **101** of the second embodiment shown in FIG. **7** differs from that of the first embodiment shown in FIG. **2** in that the data transmitting and receiving unit **306** is replaced by an infrared-ray transmitting and receiving unit **700**. The unit **700** communicates data using an infrared-ray signal conforming to, for example, the IrDA standard.

Referring now to FIGS. **6** and **7** and the flowchart of FIGS. **8A** and **8B**, description will be given of operation of the second embodiment. According to this embodiment, in the reception and reproduction of a digital broadcast, when the internet connection terminal **100** receives a URL of an internet site sent through an infrared-ray communication from the mobile terminal **101** as a result of an operation by the user, the internet connection terminal **100** displays the internet site and then receives an operation of the terminal **100** from the mobile terminal **101** through the infrared-ray communication.

14

FIGS. **8A** and **8B** are added with the steps in bold-line frames to the flowchart of FIG. **5** of the first embodiment. In FIGS. **8A** and **8B**, like in FIG. **5**, operations respectively of the mobile terminal **101** and the internet connection terminal **100** are shown in the frames **500** and **513**, respectively. In association with explanation of respective operation flows in the frames **500** and **513**, description will be given of the operation flows in the terminals **101** and **100** and a relationship therebetween. Assume in the description that a cellular phone is employed as an example of the mobile terminal **101** and a television set including an internet connecting function is used as an example of the internet connection terminal **100**.

First, by using, for example, the input unit **102**, the user beforehand sets to the cellular phone a type of the television set for the internet browsing, which will be described later, by designating a maker and a model number using a predetermined setting screen (step **501**). In this embodiment, the command is, for example, a general infrared-ray command to be received and processed by a TV set. The general infrared-ray command is a command which is transmitted in a format of, for example, a Pulse Position Modulation (PPM). The format of the command is determined, for example, for each maker and is a format employed for the communication with an associated remote control device.

The user powers the TV set by conducting an ordinary operation. The TV set receives a broadcast via the digital broadcast receiving unit **200** and reproduces the broadcast as described above (step **514**).

The user conducts an operation to start a predetermined internet display on the cellular phone. As a result, an internet site is displayed on the screen display **401** so that the user browses the internet site (step **502**).

Assume that the user attempts, during the internet site browsing, to browse the internet site by use of the TV set. In this situation, the user operates the input unit **102** of the cellular phone to select the button **402** in the display unit **305** (step **503**).

In response to the operation, the infrared-ray transmitting and receiving unit **700** of the cellular phone transmits an infrared-ray command recognizable by a TV set of the type designated in step **501** to thereby start IrDA communication (step **800**). The TV set having received the command starts the IrDA communication (step **801**) to request the cellular phone to connect to the IrDA communication (step **802**). The cellular phone prepares, immediately after the command transmission in step **800**, to start connecting to the IrDA communication and responds to the IrDA communication connection from the TV set. The IrDA communication connection is established between the TV set and the cellular phone (step **803**). After the URL transmission or in concurrence therewith, the system control unit **301** controls the display unit **305** and associated constituent elements to terminate the internet site display on the cellular phone.

After the IrDA communication connection is established, the system control unit **301** of the cellular phone sends by the infrared-ray transmitting and receiving unit **700** the URL of the internet site being on the display through the IrDA communication to the TV set (step **504**).

The TV set receives the URL via the infrared-ray transmitting and receiving unit **600** from the cellular phone (step **515**). Also, the TV set sends by the infrared-ray transmitting and receiving unit **700** data indicating successful reception of the URL via the IrDA communication to the cellular phone (step **804**). When the data is received (step **805**), the cellular phone disconnects the IrDA communication conducted by the unit **700** (step **806**). As a result of the

15

disconnection, the TV set also terminates the IrDA communication of the data transmitting and receiving unit 600 to enter a state to receive an ordinary infrared-ray command also used by a remote control device, not shown. The TV set then connects to the internet site indicated by the URL in the procedure described above, and displays the internet site on the display unit 206 as indicated by the screen display 406 (step 516).

On the other hand, after the transmission of the URL, the cellular phone enters a state in which the system control unit 301 is capable of operating the TV set, which will be described later, by using part of the input unit 102. The display unit 305 presents a display to inform the user of operations which can be conducted by pressing keys as shown, for example, in the screen display 404 (step 505). In this state in which the TV set can be operated, if the user presses an associated key of the input unit 102, an infrared-ray command which indicates an operation for the TV set and which can be interpreted by the TV set designated in step 501 is sent via the infrared-ray transmitting and receiving unit 700 to the TV set. The infrared-ray command includes information almost the same as that of an infrared-ray command sent from a remote control device of the TV set. Therefore, in a situation wherein it is desired to move a selection item of an internet site being displayed on the TV set or to determine a selection item, if the user operates the input unit 102 of the cellular phone to press a key corresponding to an operation information item shown in the screen display 404, the cellular phone sends an indication of the operation to the TV set (step 506).

When the operation indication is received from the cellular phone, the TV set reflects the information of the indication in the screen display 406 displaying the internet and in the operation of the browser 208 (step 517).

In the state in which the user browses the internet site on the TV set, if it is desired to return to a state in which the user browses the internet site on the cellular phone, the user conducts an operation to select an associated item of the button display 405 in the display unit 305 of the cellular phone (step 507). Then, the cellular phone sends an infrared-ray command indicating termination of the internet display via the infrared-ray transmitting and receiving unit 700 to the TV set (step 508).

When the infrared-ray command is received, the TV set interrupts the internet site display (step 518). The TV set starts the IrDA communication to request the cellular phone to connect to the IrDA communication (step 808). On the other hand, immediately after the transmission of the infrared-ray command, the cellular phone starts the IrDA communication to receive the request for the connection to the IrDA communication from the TV set, and the IrDA communication is resultantly established (step 809).

After the communication connection is established, the TV set sends the URL of the internet site last displayed on the TV set via the infrared-ray transmitting and receiving unit 600 to the cellular phone (step 519). The cellular phone receives the URL (step 509) and sends data indicating successful reception of the URL through the IrDA communication to the TV set (step 810). The TV set receives the data (step 811), terminates the IrDA communication of the unit 600, and enters a state to receive an ordinary infrared-ray command like that to be received from a remote control device, not shown (step 812). Also, the TV displays a TV program being displayed before the start of the internet display, for example, as shown in the screen display 403 (step 520).

16

On the other hand, after receiving the URL of the internet site last displayed on the TV set, the cellular phone terminates the IrDA communication (step 813) and then accesses and displays the internet site of the URL (step 510). In this situation, the system control unit 301 changes the function to assign part of the keys of the input unit 102 to operate the TV set from the cellular phone and treats the keys as those to ordinarily operate the cellular phone (step 511). The screen display is changed, for example, from the screen display 404 to the screen display 401, and the user continues browsing the internet site display as shown in the screen display 401 (step 512).

As above, the URL of the internet site to be browsed on the mobile terminal 101 is sent through the infrared-ray communication to the internet connection terminal 100. The terminal 100 having received the URL displays thereon the internet site. From the mobile terminal 101, the user operates the internet connection terminal 100 displaying the internet site. In Association with the transmission of the URL and the operation indication, the operation in which the TV set is operated from the cellular phone is implemented, by conducting a change-over between the communication using an infrared-ray command received by the TV from a remote control device and the communication of IrDA.

Therefore, without conducting any operation for the terminal which desires to display an internet site as above, the user can display the internet site on a larger screen through a simple operation using only the mobile terminal 100. Also, the user can continuously use the mobile terminal 100 to operate the terminal which has displayed the internet site. The user is capable of smoothly conducting a change-over of the internet site display between different terminals.

Although the IrDA communication is employed to transmit the URL in the configuration of the embodiment, there may be employed any appropriate communication other than the IrDA communication.

In the description of the embodiment, a TV set, a set box device, and a server for DLNA may be employed as the internet communication device 100. In this connection, by using these devices, it is possible to solve problems occurring in some situations as follows.

For example, for the general infrared-ray command used in a TV set, the types of such commands to be communicated are limited or the communication speed is limited. On the other hand, the signal indicating information of operation is larger in the amount of information than the signal which is communicated by a remote control device only to turn on or off the power source. Hence, when the general infrared-ray command used, there occurs a problem in which the URL and the information of operation cannot be communicated between the portable terminal and the information processing apparatus or a problem in which the communication of information, even if possible, takes a long period of time.

On the other hand, in the communication conforming to IrDA, it is required to establish communication between the mobile terminal 101 and the internet connection terminal 100 to communicate information therebetween. Therefore, if a change-over from the communication of the general command to the IrDA communication is not conducted, it is required in any situation that the information processing apparatus enters the state to wait for the IrDA communication. Moreover, if the state to establish the connection is kept set as above, there occurs a drawback in which the internet connection terminal 100 cannot conduct the infrared-ray communication with other devices.

17

According to the embodiment, since the communication is changed using as a trigger a command, i.e., a general infrared-ray command, the drawback is removed, and it is possible to improve operability and usability.

Although the IrDA communication has been described as an example in the embodiment, it is also possible to use, for example, a communication by Bluetooth, a wireless communication such as a wireless LAN, and a short-distance communication such as a communication by sound waves. The embodiment is particularly useful in a communication using a communication scheme in which a communication link is established to communicate information.

Although description has been given of the internet as an example of the content information in conjunction with the embodiment, the embodiment is not restricted by this example. That is, information indicating such content as a TV program is also available. Moreover, a URL has been described as an example of the identification information. However, the embodiment is not limited by this example. For example, information indicating a channel of a TV program may also be used as the identification information.

Third Embodiment

Description will now be given of a third embodiment, specifically, a method of implementing an operation in the communication of an URL and indications of various operations between the internet communication terminal **100** and the mobile terminal **101** of the first embodiment. According to the embodiment, there are conducted not only an operation to display internet indicated by the URL, but also an operation in which the state of the mobile terminal **101** displaying the internet site is also passed from the mobile terminal **101** to the internet communication terminal **100**.

The state of the mobile terminal **101** displaying the internet site indicates, for example, a state wherein the mobile terminal **101** is displaying a screen after the login of an internet site for which authentication is required. Furthermore, the state wherein the mobile terminal **101** is displaying a screen indicates a display state after a display state change of an internet site in which a content display state dynamically changes with an associated URL kept unchanged.

The information representing the display state includes, for example, information indicating a history of user operations which have influenced upon the display on the display unit **305**. The information representing the display state may also include information which is not included in the URL and which influences upon the display on the display unit **305** in the internet site browsing. Also, the display state representing information may be information indicating a character encoding item designating, for example, Shift-JIS, enhanced Unix Code (EUC), or Unicode Transformation Format (UTF)-8. In addition, the information may also be Cookie. Furthermore, in a situation wherein the mobile terminal **101** is displaying an internet site, the information may be information indicating, for example, the position of a scroll bar. As for the position of a pointer or the like, the information may be information indicating a relative position thereof on the display screen. As a result, even if the display area size varies between the mobile terminal **101** and the internet connection terminal **100**, the relative position can be reproduced on the internet connection terminal **100**.

The third embodiment will be described by referring to the drawings wherein an internet site requiring authentication is passed from the mobile terminal **101** to the internet connection terminal **100**. In the description, almost the same

18

constituent components as those of the preceding embodiments are assigned with the same reference numerals, and description thereof will be avoided.

FIG. **9** shows an example of items and information thereof in a user operation history **900** used in an operation in which the user browses an internet site requiring authentication. Specifically, the mobile terminal **101** records the items of the operation history for each user operation for the internet site and then saves the operation history **900** in the data saving unit **303**.

The information in the operation history **900** includes, for example, a character string inputted to a text box, information items indicating a button and an icon used on the internet site, and information indicating an item selected in a list box. The information in the operation history **900** may also include information indicating a URL displayed as a result of the operation.

FIG. **10** shows an example of items and information thereof in a user operation history **1000** used in an operation wherein the user browses an internet content in which the internet content dynamically changes with the URL kept unchanged. The mobile terminal **101** records the items of the operation history **1000** for each user operation for the internet content and then saves the operation history **1000** in the data saving unit **303**. The operation history **1000** includes, for example, information indicating a position of coordinates clicked by the user.

FIG. **11** shows transmitted data sent from the mobile terminal **101** to the internet connection terminal **100**. The data **1100** includes header data **1101** including a data length and information to identify a data type, an internet site URL **1102**, and an operation history **900**.

Next, operation of the third embodiment will be described by referring to FIGS. **9** to **11** and the flowchart of FIG. **12**. In the embodiment, if the internet site to be browsed by the user is, for example, an internet site requiring authentication or an internet content in which the internet content dynamically changes with the URL kept unchanged, the mobile terminal **101** records an operation history **900** of user operations for the internet site. In the transmission of a URL of an internet site to the internet connection terminal **100** in a manner similar to that of the first embodiment, the mobile terminal **101** sends transmission data **1100** including the operation history in addition to the URL thereto. If the data **1100** is received, the terminal **100** accesses the internet site of the URL, conducts an operation substantially equal to the user operation indicated by the operation history **900** for the resultantly displayed internet site, and displays the internet site for which the operation has been carried out.

FIG. **12** is a flowchart implemented by adding steps shown in bold-line frames to the flowchart of FIG. **1** used in the first embodiment. FIG. **12** shows operations respectively of the mobile terminal **101** and the internet connection terminal **100** respectively in frames **500** and **513** as in FIG. **5**. Description will be given of the operations of the frames **500** and **513** in a concurrent fashion. That is, the operation flows of the terminals **101** and **100** and a relationship between the operation flows will be described at the same time. Assume in the description that a cellular phone is employed as an example of the mobile terminal **101** and a television set including an internet connecting function is used as an example of the internet connection terminal **100**.

According to the embodiment, in a situation wherein the user is browsing an internet site in step **502**, each time the user conducts an operation, e.g., selection or input of a data

19

item for the internet site, the cellular phone records the operation histories **900** and **1000** in the data saving unit **209** (step **1201**).

However, it is not necessary required that the cellular phone records the operation histories **900** and **1000** of all internet sites browsed by the user. That is, the cellular phone may record the histories only for each internet site for which, for example, the URL starts with Hypertext Transfer Protocol Security (HTTPS), i.e., for which security is essential, each internet site dynamically created by a function such as Active Server Pages (ASP), or each internet site of which document layout information of the displayed internet site includes an interactive content such as FLASH (registered trademark). If the internet site includes a content of FLASH or ASP, the site is defined using a tag in a source file. Hence, the cellular phone can determine the type of the internet site using the tag.

Also, if the internet site is an internet site dynamically created, it is not required to store all operation histories in the operation history **1100**. The operation history may be configured to record a history associated with operations which have changed the display. For example, if the internet site includes a dynamic FLASH content, the operation history may be configured to record operations such as a clicking operation and an input operation of a character string for the dynamic content.

In step **503**, to view the internet site on the TV set, when the user conducts an operation to select a button corresponding to the button display **402** presented on the display unit **305** of the cellular phone, the cellular phone creates transmission data **1100** including a URL **1102** of the internet site as an initial point of the recording for the operation history **900** or **1000**, the operation history **900** or **1000**, and header data **1101**, and then sends the transmission data **1100** to the TV set. After the URL transmission, the system control unit **301** controls the display unit **305** to terminate the display of the internet site on the cellular phone.

On the other hand, at reception of the transmission data **1100** (step **1203**), the TV set accesses the internet of the URL **1102**, conducts the operation indicated by the operation history **900** or **1000** for the internet site, and displays the internet site for which the operation has been conducted (step **1204**).

In steps **509** and **519** in which the TV set sends a URL to the cellular phone to return control to the cellular phone to access and to display the internet site, a method similar to that described above is also employed.

If the internet site which the user browses on the cellular phone is an internet site requiring authentication or an internet content in which the internet content dynamically changes with the URL kept unchanged, the TV set records the operation histories **900** and **1000** of user operations for the internet site in the data saving unit **209**. Also, the TV set sends transmission data **1100** including a URL of the internet site as an initial point of the recording for the operation histories **900** and **1000** and the operation histories **900** or **1000** to the cellular phone. The cellular phone having received the data **1100** accesses the internet site of the URL and conducts an operation indicated by the operation histories **900** and **1000**, producing an internet site in the state after the operation. The TV set also displays the internet site thus produced.

Therefore, to conduct a change-over operation of the access to one and the same internet site between different terminals, it is possible for the user, also in a situation wherein the internet site being browsed is an internet site requiring authentication or is a dynamically changing inter-

20

net content with the URL kept unchanged, to smoothly achieve the change-over operation without again conducting the authentication and the content operation for the terminal which accesses the internet site after the change-over.

In a situation wherein a cellular phone sends a URL without any display information to an information processing apparatus such as a TV set, an internet site of the URL is displayed on the information processing apparatus in a state in which no operation influencing the display has been conducted. Hence, if the configuration of the internet site becomes more complex, a larger number of operation steps are required from the transmission of the URL to the setup of the state in which the operation on the cellular phone is reflected in the information processing apparatus. However, according to the mobile terminal **101** and the internet connection terminal **100** of the embodiment, it is possible to reduce the operation steps.

Description has been given of the first to third embodiments. The smooth access change-over associated with the internet communication between a plurality of terminals is achievable even if the mobile terminal **101** is replaced with any other information processing terminal.

According to the portable terminal of the embodiments, there are provided a portable terminal, an information processing apparatus, a content display system, and a content display method in which the viewing of a content on the portable terminal is smoothly passed to an information processing apparatus.

It should be further understood by those skilled in the art that although the foregoing description has been made on embodiments of the invention, the invention is not limited thereto and various changes and modifications may be made without departing from the spirit of the invention and the scope of the appended claims.

The invention claimed is:

1. An information processing apparatus for displaying a content acquired via the internet, the information processing apparatus comprising:

a communication unit arranged to conduct communication with a mobile terminal;
a display unit arranged to display a video content; and
a control unit arranged to control the display unit, wherein the control unit is arranged to:

control the display unit to display a first video content;
control the display unit to terminate displaying of the first video content and to start displaying a second video content acquired via the internet when the communication unit receives first information from the mobile terminal, wherein the second video content is a same video content as a video content displayed on the mobile terminal before the mobile terminal sends the first information to the information processing apparatus, and wherein a state of displaying of the video content on the mobile terminal at a time when the first information is sent from the mobile terminal is taken over to a state of displaying of the second video content on the display unit at a time when the display unit starts displaying the second video content, based on the first information;

control displaying of the second video content on the display unit based on second information for operating the second video content displayed on the display unit when the communication unit receives the second information from the mobile terminal; and

21

control the display unit to terminate displaying of the second video content when the communication unit receives third information from the mobile terminal.

2. A display apparatus for displaying a content acquired via a broadcast signal or via the internet, the display apparatus comprising:

a communication unit arranged to conduct communication with a mobile terminal;

a display unit arranged to display a video content; and a control unit arranged to control the display unit,

wherein the control unit is arranged to:

control the display unit to display a first video content acquired via the broadcast signal;

control the display unit to terminate displaying of the first video content and to start displaying a second video content acquired via the internet when the communication unit receives first information from the mobile terminal, wherein the second video content is a same video content as a video content displayed on the mobile terminal before the mobile terminal sends the first information to the display apparatus, and wherein a state of displaying of the video content on the mobile terminal at a time when the first information is sent from the mobile terminal is taken over to a state of displaying of the second video content on the display unit at a time when the display unit starts to display the second video content, based on the first information;

control displaying of the second video content on the display unit based on second information for operating the second video content displayed on the display unit when the communication unit receives the second information from the mobile terminal; and

control the display unit to terminate displaying of the second video content when the communication unit receives third information from the mobile terminal.

3. The display apparatus according to claim 2, further comprising:

a video processing unit to conduct video processing to both a video content acquired via the broadcast signal and a video content acquired via the internet.

4. A display apparatus for displaying a content acquired via a broadcast signal or via the internet, the display apparatus comprising:

a communication unit arranged to conduct communication with a mobile terminal;

a display unit arranged to display a video content; and a control unit arranged to control the display unit,

wherein the control unit is arranged to:

control the display unit to display a first video content acquired via the broadcast signal;

control the display unit to terminate displaying of the first video content and to start displaying a second video content acquired from an internet site via the internet when the communication unit receives first information including information relating to that the mobile terminal logs in to said internet site from the mobile terminal, wherein the second video content is a same video content as a video content which can be acquired by the mobile terminal after login authentication of said internet site and is displayed on the mobile terminal before the mobile terminal sends the first information to the display apparatus, and wherein a state of displaying of the video content on the mobile terminal at a time when the first information is sent from the mobile terminal is taken over

22

to a state of displaying of the second video content on the display unit at a time when the display unit starts to display the second video content, based on the first information;

control displaying of the second video content on the display unit based on second information for operating the second video content displayed on the display unit when the communication unit receives the second information from the mobile terminal; and

control the display unit to terminate displaying of the second video content when the communication unit receives third information from the mobile terminal.

5. The display apparatus according to claim 4, further comprising:

a video processing unit to conduct video processing to both a video content acquired via the broadcast signal and a video content acquired via the internet.

6. A display apparatus for displaying a video content acquired via a broadcast signal or via the internet, the display apparatus comprising:

a communication unit arranged to conduct communication with a mobile terminal;

a display unit arranged to display a video content; and a control unit arranged to control the display unit,

wherein the control unit is arranged to:

control the display unit to display a broadcast video content acquired via the broadcast signal;

control the display unit to terminate displaying of the broadcast video content and to start displaying an internet video content acquired via the internet when the communication unit receives first information from the mobile terminal, wherein the internet video content acquired via the internet is a same video content as an internet video content displayed on the mobile terminal before the mobile terminal sends the first information to the display apparatus, and wherein a state of displaying of the internet video content on the mobile terminal at a time when the first information is sent from the mobile terminal is taken over to a state of displaying of the internet video content on the display unit at a time when the display unit starts to display the internet video content, based on the first information;

control displaying of the internet video content on the display unit based on second information for operating the internet video content displayed on the display unit when the communication unit receives the second information from the mobile terminal; and

control the display unit to terminate displaying of the internet video content and to start displaying the broadcast video content acquired via the broadcast signal when the communication unit receives third information from the mobile terminal.

7. The display apparatus according to claim 6, further comprising:

a video processing unit to conduct video processing to both a video content acquired via the broadcast signal and a video content acquired via the internet.

8. A display apparatus for displaying a content acquired via a broadcast signal or via the internet, the display apparatus comprising:

a communication unit arranged to conduct communication with a mobile terminal;

a display unit arranged to display a video content; and

23

a control unit arranged to control the communication unit and the display unit,

wherein the control unit is arranged to:

control the display unit to display a broadcast video content acquired via the broadcast signal;

control the display unit to terminate displaying of the broadcast video content and to start displaying an internet video content acquired from an internet site via the internet when the communication unit receives first information including information relating to that the mobile terminal logs in to the internet site from the mobile terminal, wherein the internet video content acquired via the internet site is a same video content as an internet video content which is acquired by the mobile terminal after login authentication of the internet site and is displayed on the mobile terminal before the mobile terminal sends the first information to the display apparatus, and wherein a state of displaying of the internet video content on the mobile terminal at a time when the first information is sent from the mobile terminal is taken over to a state of displaying of the internet video content on the display unit at a time when the display unit starts to display the internet video content, based on the first information;

control displaying of the internet video content on the display unit based on second information for operating the internet video content displayed on the display unit when the communication unit receives the second information from the mobile terminal; and

control the display unit to terminate displaying of the internet video content and to start displaying the broadcast video content acquired via the broadcast signal when the communication unit receives third information from the mobile terminal.

9. The display apparatus according to claim 8, further comprising:

a video processing unit to conduct video processing to both a video content acquired via the broadcast signal and a video content acquired via the internet.

10. An information processing apparatus for displaying a content acquired via the internet, the information processing apparatus comprising:

a communication unit arranged to conduct communication with a mobile terminal;

a display unit arranged to display a video content; and a control unit arranged to control the display unit,

wherein the control unit is arranged to:

control the display unit to display a first video content; control the display unit to terminate displaying of the first video content and to start displaying a second video content acquired via the internet when a first communication between the mobile terminal and the information processing apparatus is conducted, wherein the second video content is a same video content as a video content displayed on the mobile terminal before the first communication is conducted, and wherein a state of displaying of the video content on the mobile terminal at a time when the first communication is conducted is taken over to a state of displaying of the second video content on the display unit at a time when the display unit starts to display the second video content, based on the first communication;

control displaying of the second video content on the display unit based on a second communication

24

between the mobile terminal and the information processing apparatus for operating the second video content displayed on the display unit when the second communication is conducted; and

control the display unit to terminate displaying of the second video content based on a third communication between the mobile terminal and the information processing apparatus when the third communication is conducted.

11. A display apparatus for displaying a content acquired via a broadcast signal or via the internet, the display apparatus comprising:

a communication unit arranged to conduct communication with a mobile terminal;

a display unit arranged to display a video content; and a control unit arranged to control the display unit,

wherein the control unit is arranged to:

control the display unit to display a first video content acquired via the broadcast signal;

control the display unit to terminate displaying of the first video content and to start displaying a second video content acquired via the internet when a first communication between the mobile terminal and the display apparatus is conducted, wherein the second video content is a same video content as a video content displayed on the mobile terminal before the first communication is conducted, and wherein a state of displaying of the video content on the mobile terminal at a time when the first communication is conducted is taken over to a state of displaying of the second video content on the display unit at a time when the display unit starts to display the second video content, based on the first communication;

control displaying of the second video content on the display unit based on a second communication between the mobile terminal and the display apparatus for operating the second video content displayed on the display unit when the second communication is conducted; and

control the display unit to terminate displaying of the second video content when a third communication between the mobile terminal and the display apparatus is conducted.

12. The display apparatus according to claim 11, further comprising:

a video processing unit to conduct video processing to both a video content acquired via the broadcast signal and a video content acquired via the internet.

13. A display apparatus which for displaying a content acquired via a broadcast signal or via the internet, the display apparatus comprising:

a communication unit arranged to conduct communication with a mobile terminal;

a display unit arranged to display a video content; and a control unit arranged to control the display unit,

wherein the control unit is arranged to:

control the display unit to display a first video content acquired via a broadcast signal;

control the display unit to terminate displaying of the first video content and to start displaying a second video content acquired from an internet site via the internet when a first communication between the mobile terminal and the display apparatus is conducted during the mobile terminal logs in to said internet site, wherein the second video content is a same video content as a video content which can be acquired by the mobile terminal after login authentication

25

tication of said internet site and is displayed on the mobile terminal before the first communication is conducted, and wherein a state of displaying of the video content on the mobile terminal at a time when the first communication is conducted is taken over to a state of displaying of the second video content on the display unit at a time when the display unit starts to display the second video content, based on the first communication;

control displaying of the second video content on the display unit based on a second communication between the mobile terminal and the display apparatus for operating the second video content displayed on the display unit when the second communication is conducted; and

control the display unit to terminate displaying of the second video content when a third communication between the mobile terminal and the display apparatus is conducted.

14. The display apparatus according to claim 13, further comprising:

a video processing unit to conduct video processing to both a video content acquired via the broadcast signal and a video content acquired via the internet.

15. A display apparatus which for displaying a video content acquired via a broadcast signal or via the internet, the display apparatus comprising:

a communication unit arranged to conduct communication with a mobile terminal;

a display unit arranged to display a video content; and a control unit arranged to control the display unit,

wherein the control unit is arranged to:

control the display unit to display a broadcast video content acquired via the broadcast signal;

control the display unit to terminate displaying of the broadcast video content and to start displaying an internet video content acquired via the internet when a first communication between the mobile terminal and the display apparatus is conducted, wherein the internet video content acquired via the internet is a same video content as an internet video content displayed on the mobile terminal before the first communication is conducted, and wherein a state of displaying of the internet video content on the mobile terminal at a time when the first communication is conducted is taken over to a state of displaying of the internet video content on the display unit at a time when the display unit starts to display the internet video content, based on the first communication;

control displaying of the internet video content on the display unit based on a second communication between the mobile terminal and the display apparatus for operating the internet video content displayed on the display unit when the second communication is conducted; and

control the display unit to terminate display of the internet video content and to start displaying a broad-

26

cast video content acquired via the broadcast signal when the a third communication between the mobile terminal and the display apparatus is conducted.

16. The display apparatus according to claim 15, further comprising:

a video processing unit to conduct video processing to both a video content acquired via the broadcast signal and a video content acquired via the internet.

17. A display apparatus for displaying a content acquired via a broadcast signal or via the internet, the display apparatus comprising:

a communication unit arranged to conduct communication with a mobile terminal;

a display unit arranged to display a video content; and a control unit arranged to control the communication unit and the display unit,

wherein the control unit is arranged to:

control the display unit to display a broadcast video content acquired via the broadcast signal;

control the display unit to terminate displaying of the broadcast video content and to start displaying an internet video content acquired from an internet site via the internet when a first communication between the mobile terminal and the display apparatus is conducted during the mobile terminal logins to said internet site from the mobile terminal, wherein the internet video content acquired via the internet site is a same video content as an internet video content which is acquired by the mobile terminal after login authentication of said internet site and is displayed on the mobile terminal before the first communication is conducted, and wherein a state of displaying of the internet video content on the mobile terminal at a time when the first communication is conducted is taken over to a state of displaying of the internet video content on the display unit at a time when the display unit starts to display the internet video content, based on the first communication;

control displaying of the internet video content on the display unit based on a second communication between the mobile terminal and the display apparatus for operating the internet video content displayed on the display unit when the second communication is conducted; and

control the display unit to terminate display of the internet video content and to start displaying the broadcast video content acquired via the broadcast signal when the a third communication between the mobile terminal and the display apparatus is conducted.

18. The display apparatus according to claim 17, further comprising:

a video processing unit to conduct video processing to both a video content acquired via the broadcast signal and a video content acquired via the internet.

* * * * *