US 20110181683A1

(19) United States

(12) Patent Application Publication

NAM

(10) Pub. No.: US 2011/0181683 A1

(43) Pub. Date: Jul. 28, 2011

(54) VIDEO COMMUNICATION METHOD AND DIGITAL TELEVISION USING THE SAME

(76) Inventor: **Sangwu NAM**, Seoul (KR)

(21) Appl. No.: **12/964,635**

(22) Filed: **Dec. 9, 2010**

(30) **Foreign Application Priority Data**

Jan. 25, 2010 (KR) 10-2010-0006460

Publication Classification

(51) **Int. Cl.**
H04N 7/14 (2006.01)

(52) **U.S. Cl.** **348/14.07**; 348/E07.078

(57) **ABSTRACT**

A digital TV capable of video communication is discussed. According to an embodiment, the DTV for a video call operation using a camera associated with the DTV, includes a display unit and at least one processor. The processor is configured to display simultaneously, on the display unit, (a) an image received from the camera for a video call operation, and (b) different image setting items for controlling characteristics of the image received from the camera. The processor is further configured to adjust at least one of the characteristics of the image based on a user's control of at least one of the different image setting items, to display on the display unit the image having the adjusted characteristic based on the user's control, and to perform the video call operation with another party using the image having the adjusted characteristic.

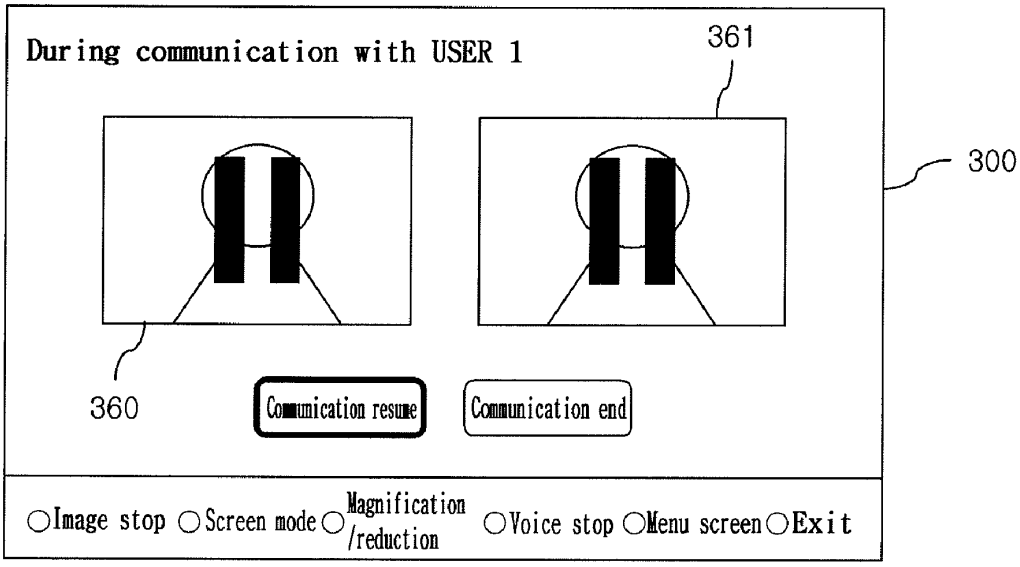


FIG.1

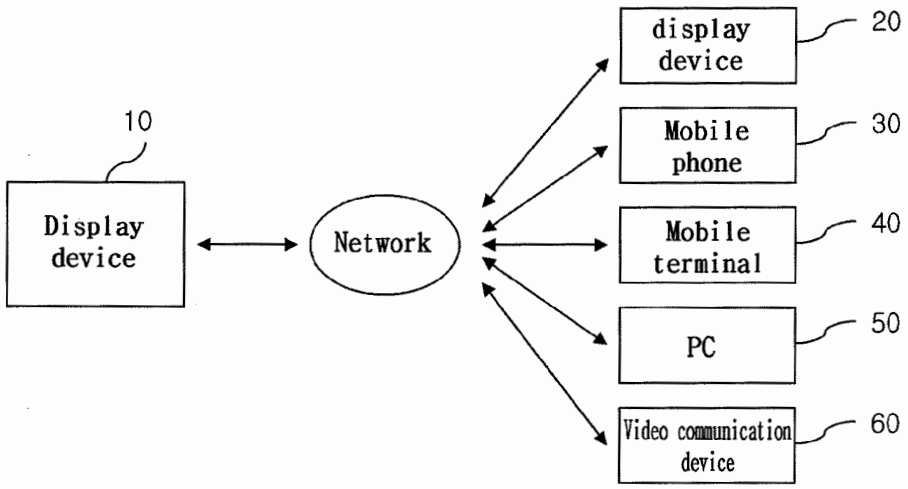

10
Display device
Network
display device
20
Mobile phone
30
Mobile terminal
40
PC
50
Video communication device
60

FIG.2

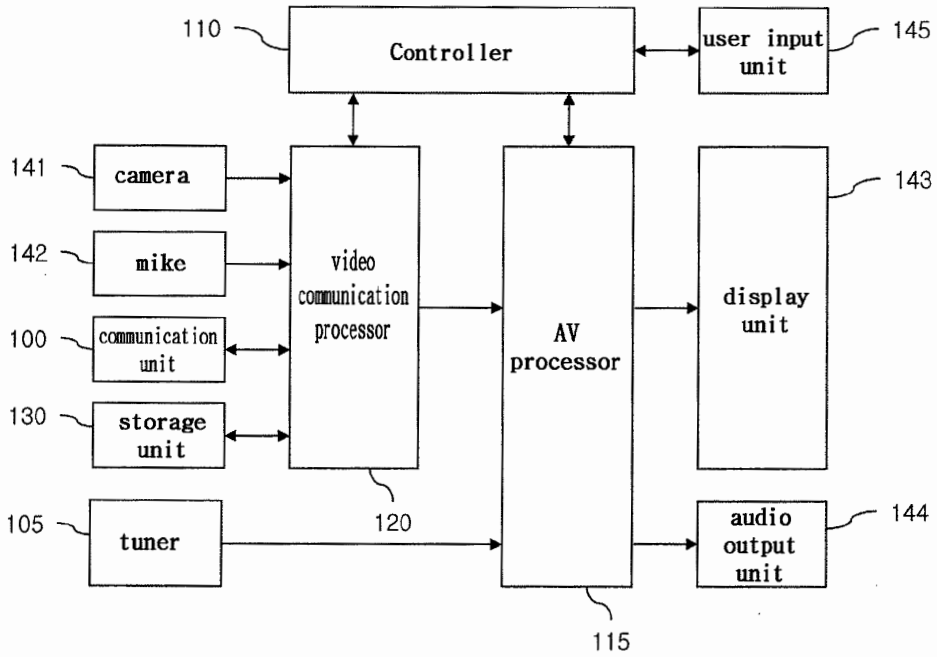

110
Controller
user input unit
145
141
camera
142
mike
100
communication unit
130
storage unit
video communication processor
120
AV processor
115
display unit
143
audio output unit
144
105
tuner

FIG.3

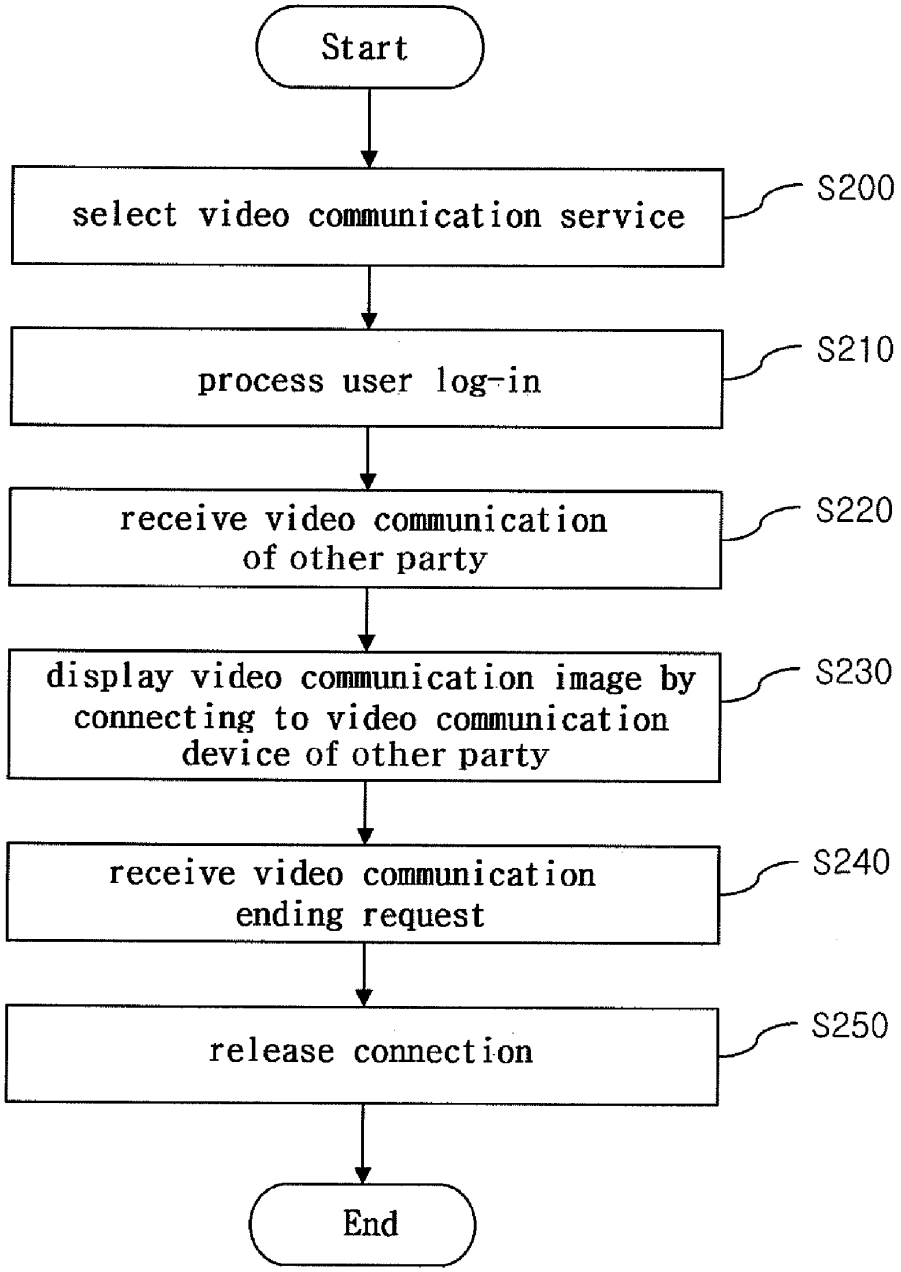

Start
select video communication service
S200
process user log-in
S210
receive video communication of other party
S220
display video communication image by connecting to video communication device of other party
S230
receive video communication ending request
S240
release connection
S250
End

FIG.4

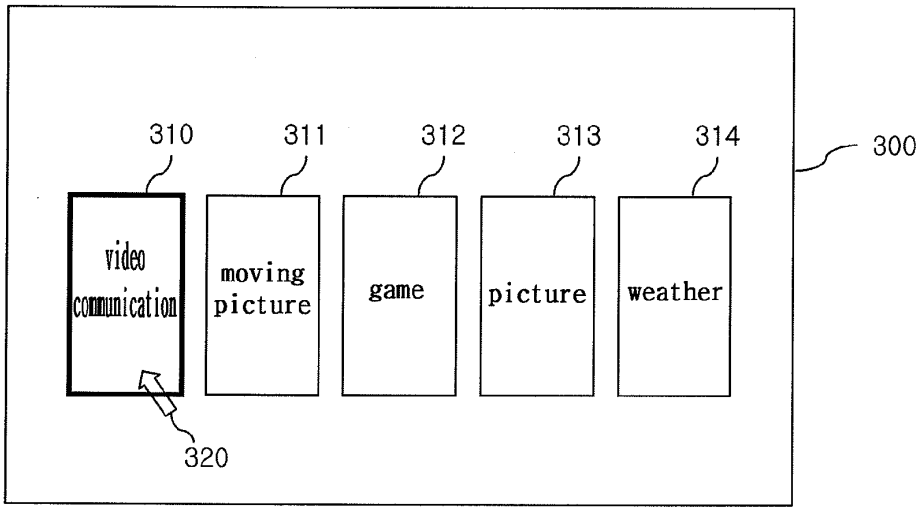

310
311
312
313
314
300
video communication
moving picture
game
picture
weather
320

FIG.5

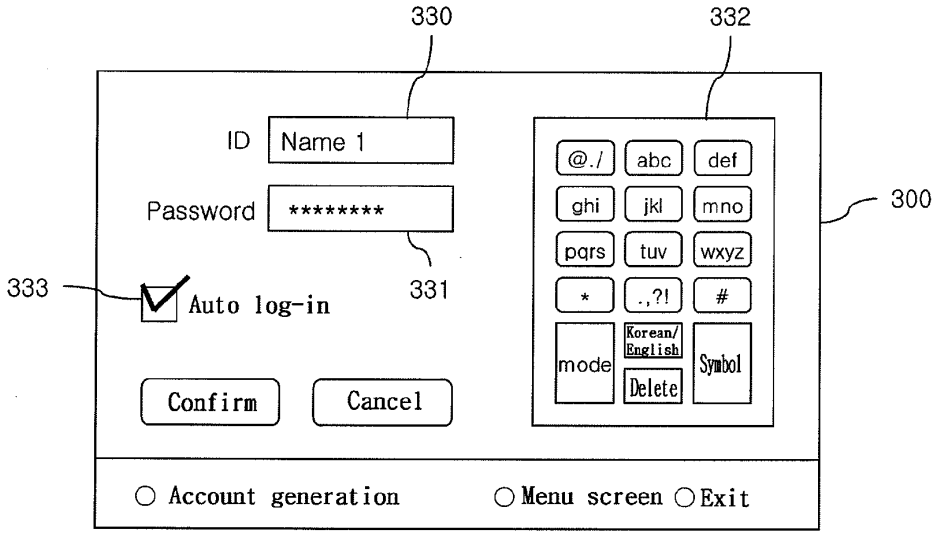

330
332
ID
Name 1
Password
****
331
333
Auto log-in
Confirm
Cancel
@./
abc
def
ghi
jkl
mno
pqrs
tuv
wxyz
*
.,?!
#
mode
Korean/ English
Delete
Symbol
300
Account generation
Menu screen
Exit

FIG.6

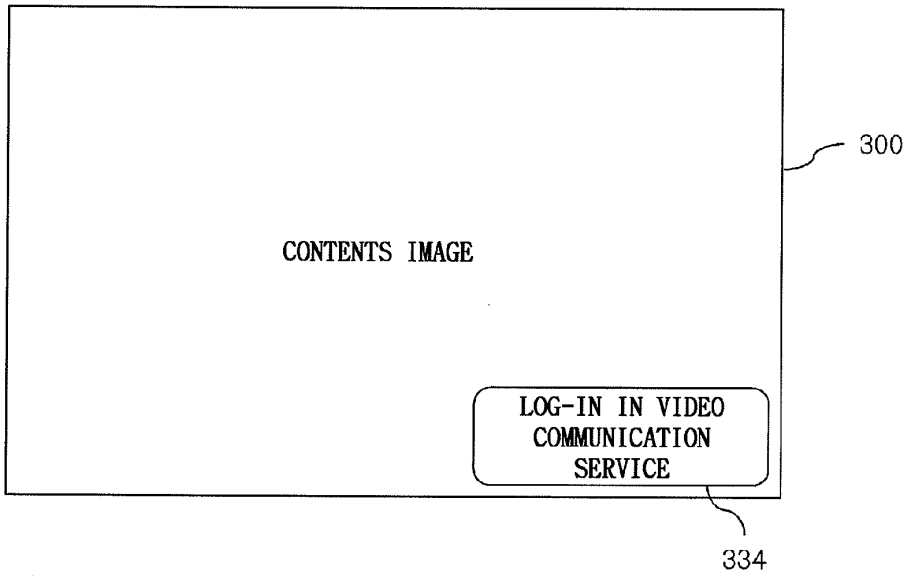

300
CONTENTS IMAGE
LOG-IN IN VIDEO COMMUNICATION SERVICE
334

FIG.7

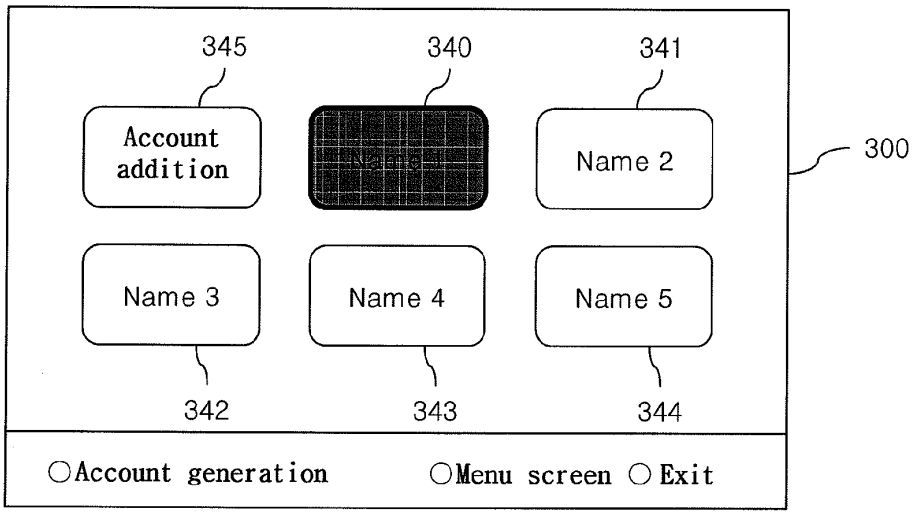

345
340
341
300
Account addition
Name 2
Name 3
Name 4
Name 5
342
343
344
○Account generation
○Menu screen
○Exit

FIG.8

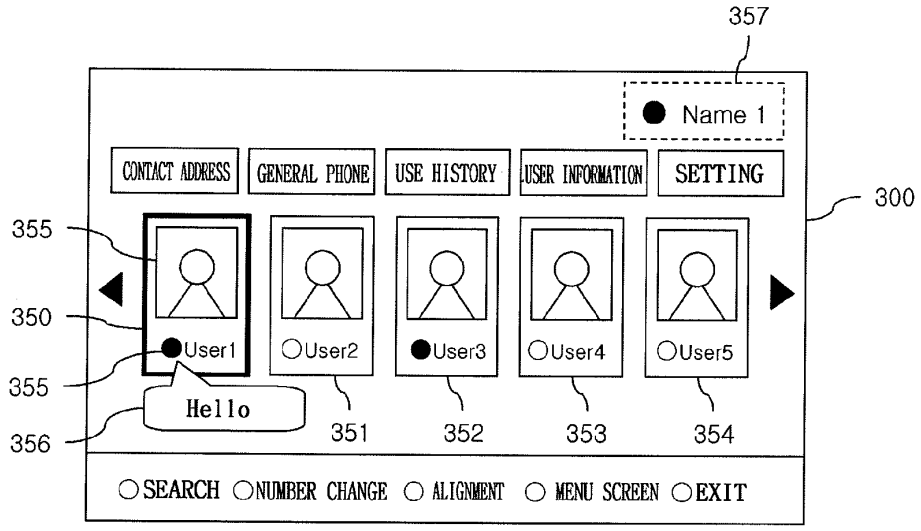

357
Name 1
CONTACT ADDRESS
GENERAL PHONE
USE HISTORY
USER INFORMATION
SETTING
300
355
350
355
356
User1
User2
User3
User4
User5
Hello
351
352
353
354
SEARCH
NUMBER CHANGE
ALIGNMENT
MENU SCREEN
EXIT

FIG.9

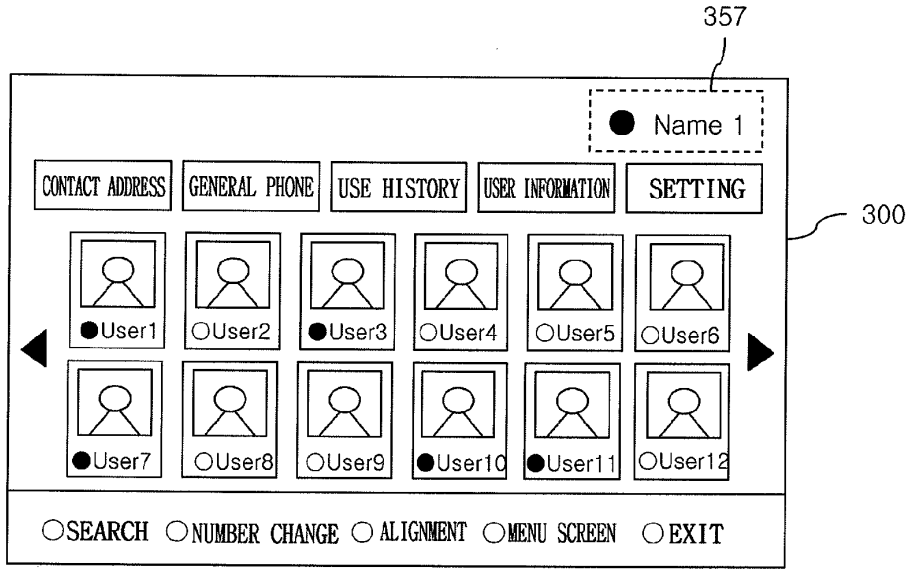

357
Name 1
CONTACT ADDRESS
GENERAL PHONE
USE HISTORY
USER INFORMATION
SETTING
300
User1
User2
User3
User4
User5
User6
User7
User8
User9
User10
User11
User12
SEARCH
NUMBER CHANGE
ALIGNMENT
MENU SCREEN
EXIT

FIG.10

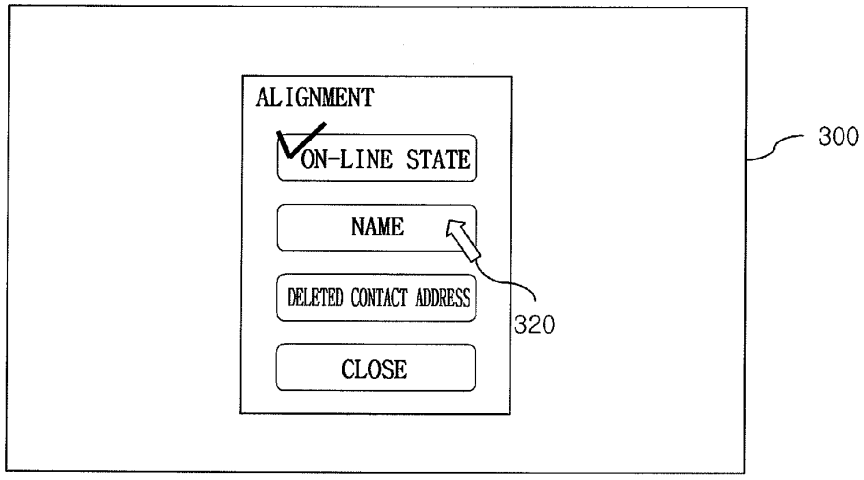

ALIGNMENT
ON-LINE STATE
NAME
DELETED CONTACT ADDRESS
CLOSE
320
300

FIG.11

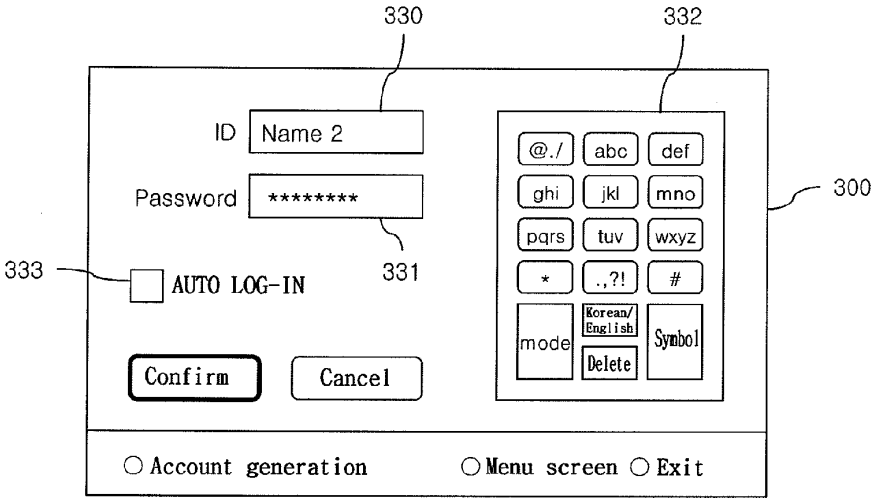

330
332
ID
Name 2
Password
****
331
333
AUTO LOG-IN
Confirm
Cancel
@./
abc
def
ghi
jkl
mno
pqrs
tuv
wxyz
*
.,?!
#
mode
Korean/ English
Delete
Symbol
300
Account generation
Menu screen
Exit

FIG.12

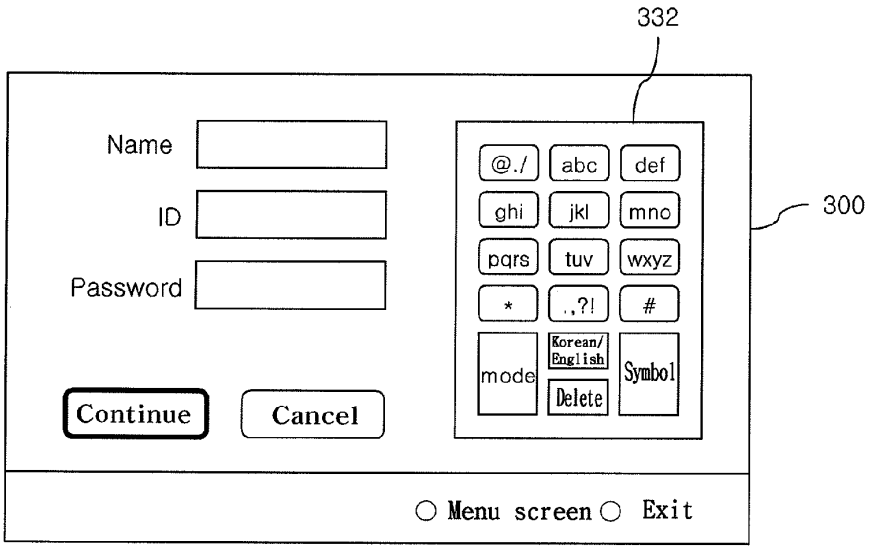

332
300
Name
ID
Password
Continue
Cancel
@./
abc
def
ghi
jkl
mno
pqrs
tuv
wxyz
*
.,?!
#
mode
Korean/ English
Delete
Symbol
Menu screen
Exit

FIG.13

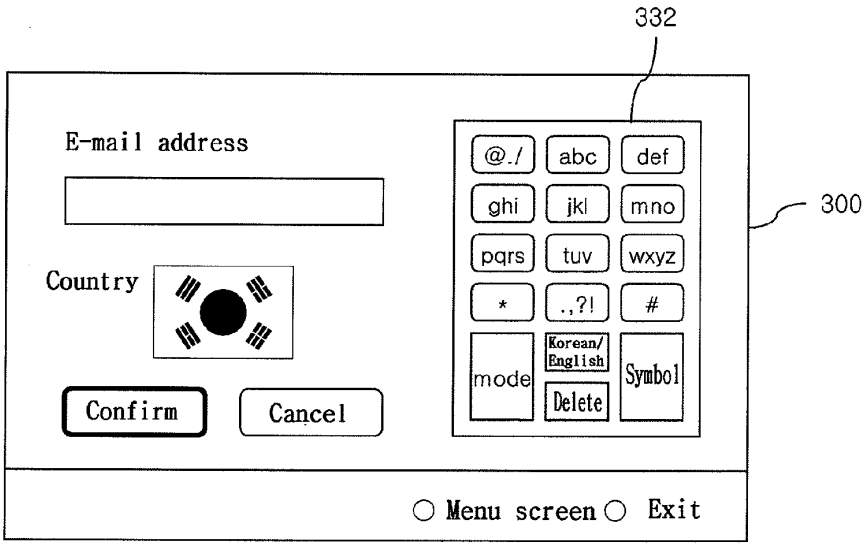

332
300
E-mail address
Country
Confirm
Cancel
@./
abc
def
ghi
jkl
mno
pqrs
tuv
wxyz
*
.,?!
#
mode
Korean/ English
Delete
Symbol
Menu screen
Exit

FIG.14

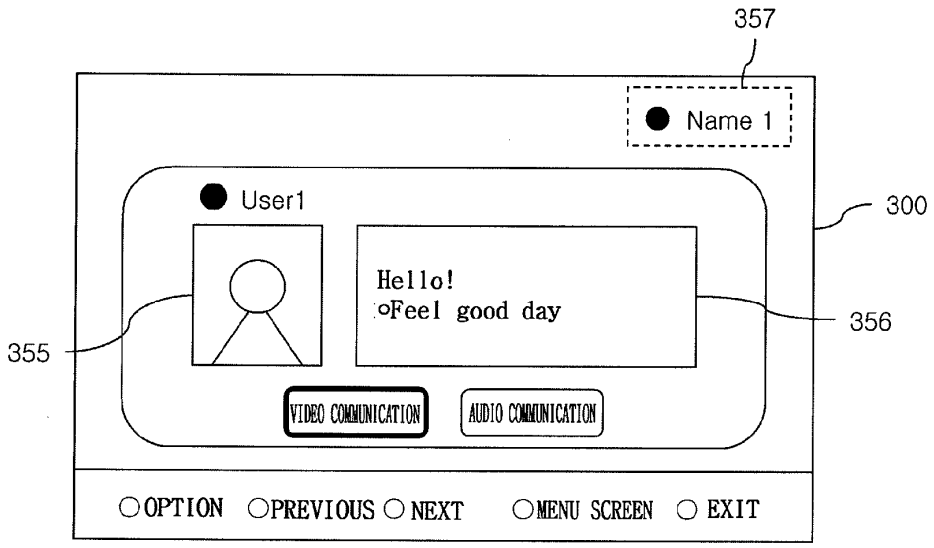

357
Name 1
User1
300
Hello!
Feel good day
356
355
VIDEO COMMUNICATION
AUDIO COMMUNICATION
OPTION
PREVIOUS
NEXT
MENU SCREEN
EXIT

FIG.15

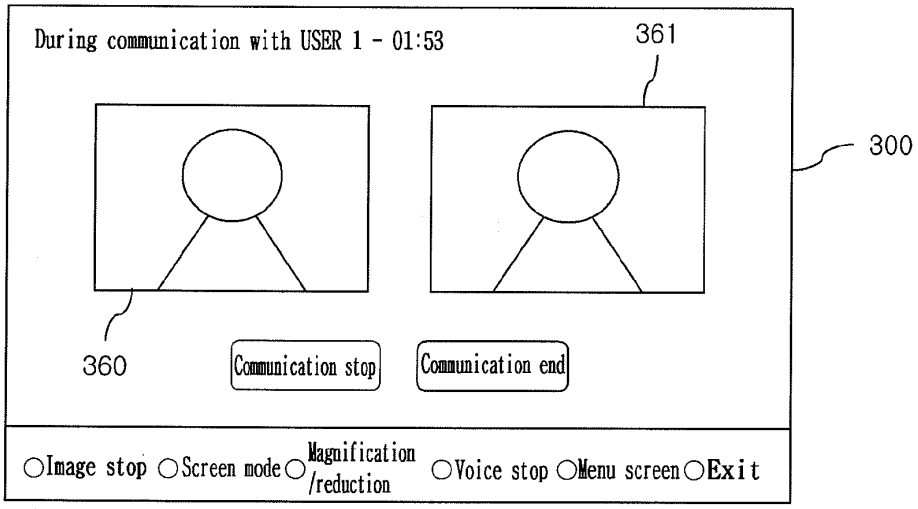

During communication with USER 1 - 01:53
361
300
360
Communication stop
Communication end
Image stop
Screen mode
Magnification /reduction
Voice stop
Menu screen
Exit

FIG.16

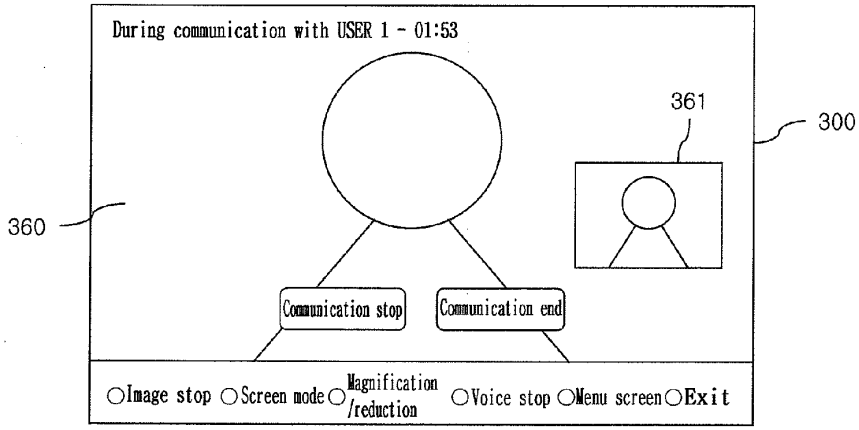

During communication with USER 1 - 01:53
361
300
360
Communication stop
Communication end
Image stop
Screen mode
Magnification /reduction
Voice stop
Menu screen
Exit

FIG.17

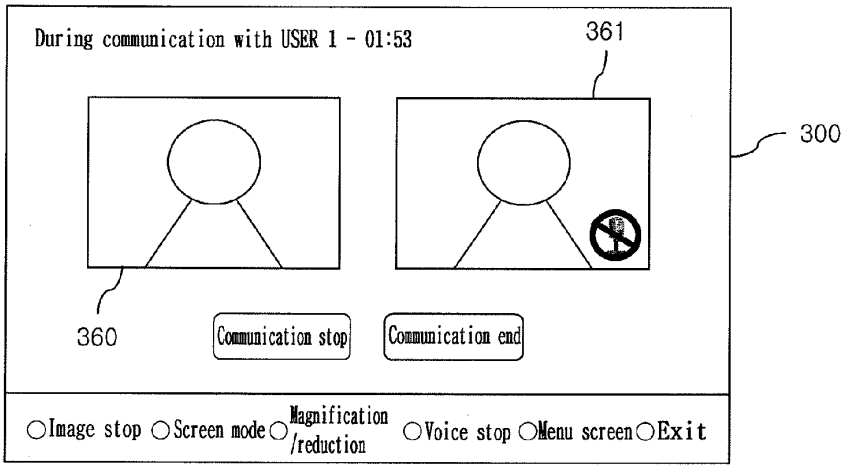

During communication with USER 1 - 01:53
361
300
360
Communication stop
Communication end
Image stop
Screen mode
Magnification /reduction
Voice stop
Menu screen
Exit

FIG.18

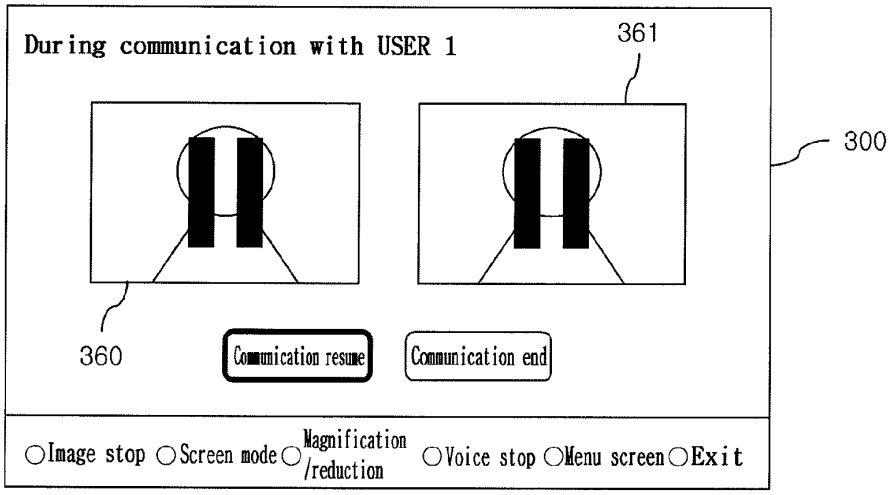

During communication with USER 1
361
300
360
Communication resume
Communication end
Image stop
Screen mode
Magnification /reduction
Voice stop
Menu screen
Exit

FIG.19

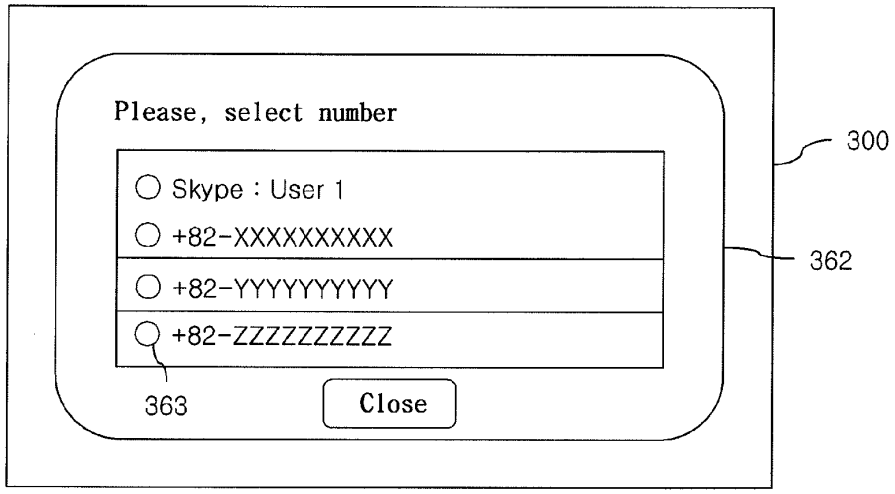

Please, select number
Skype : User 1
+82-XXXXXXXXXX
+82-YYYYYYYYYY
+82-ZZZZZZZZZZ
300
362
363
Close

FIG.20

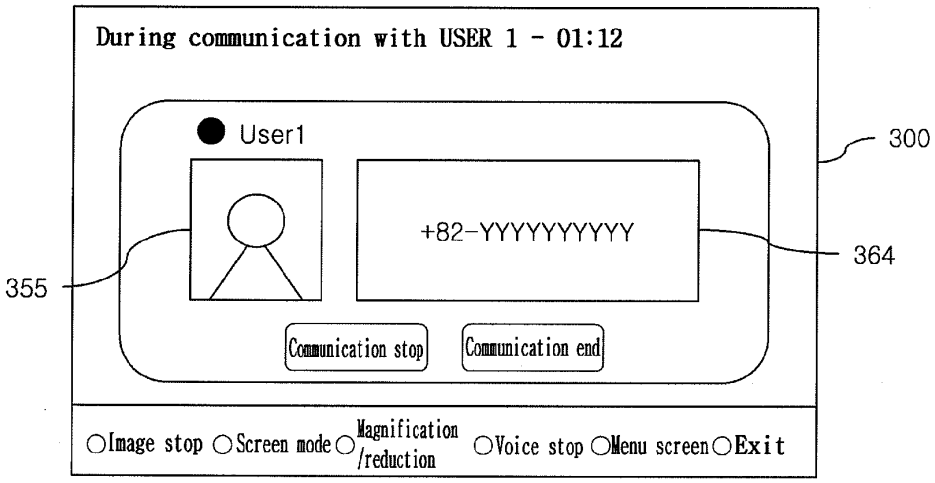

During communication with USER 1 - 01:12
User1
+82-YYYYYYYYYY
Communication stop
Communication end
300
355
364
Image stop
Screen mode
Magnification /reduction
Voice stop
Menu screen
Exit

FIG.21

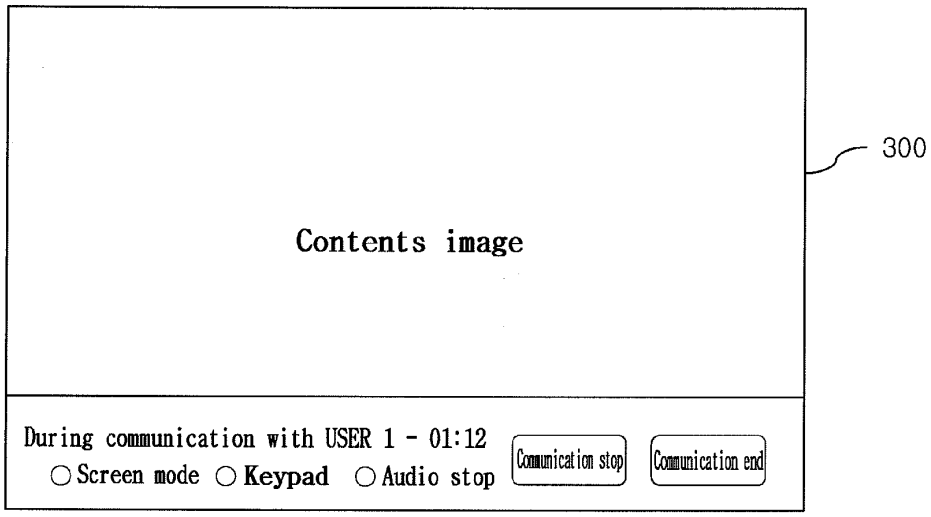

Contents image
300
During communication with USER 1 - 01:12
Screen mode
Keypad
Audio stop
Communication stop
Communication end

FIG.22

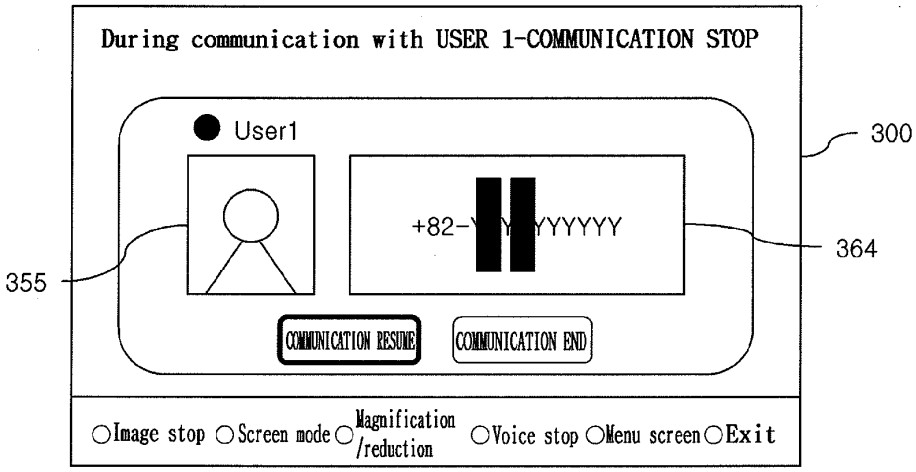

During communication with USER 1-COMMUNICATION STOP
User1
+82-
YYYYYY
COMMUNICATION RESUME
COMMUNICATION END
Image stop
Screen mode
Magnification /reduction
Voice stop
Menu screen
Exit
300
364
355

FIG.23

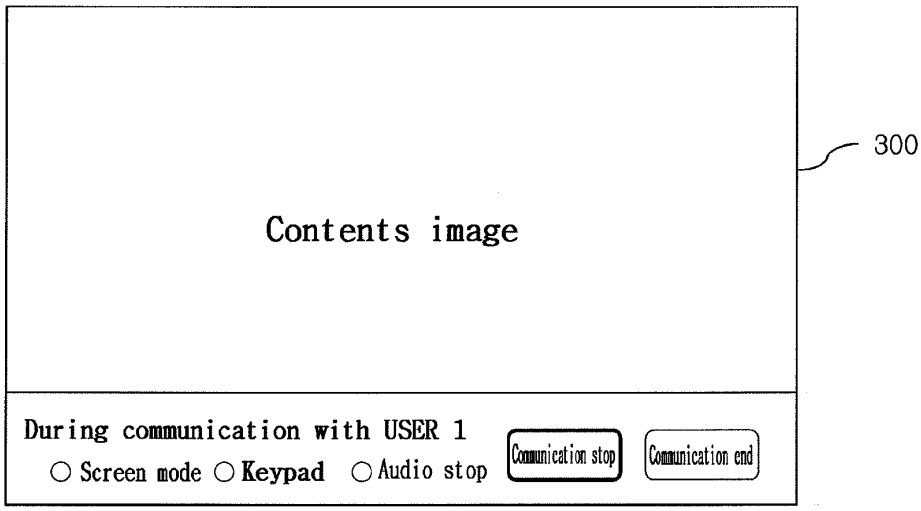

Contents image
During communication with USER 1
Screen mode
Keypad
Audio stop
Communication stop
Communication end
300

FIG.24

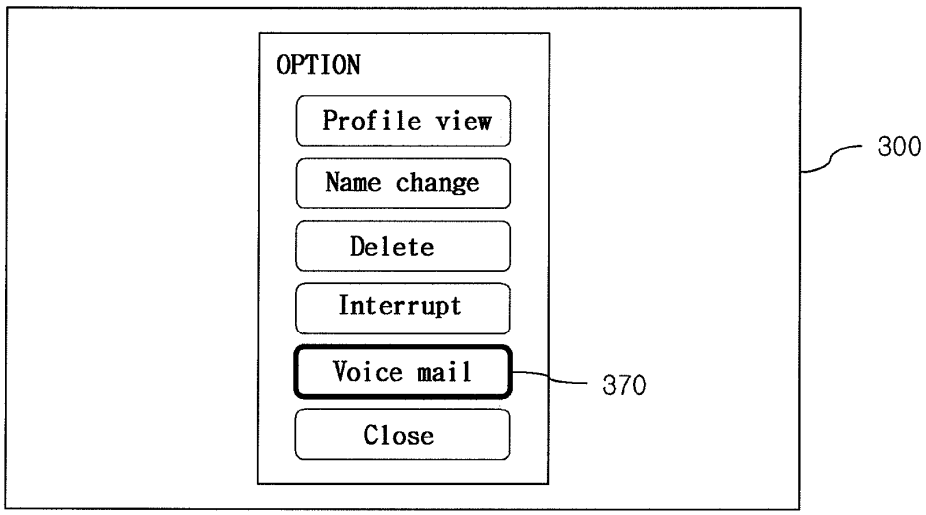

OPTION
Profile view
Name change
Delete
Interrupt
Voice mail
Close
300
370

FIG.25

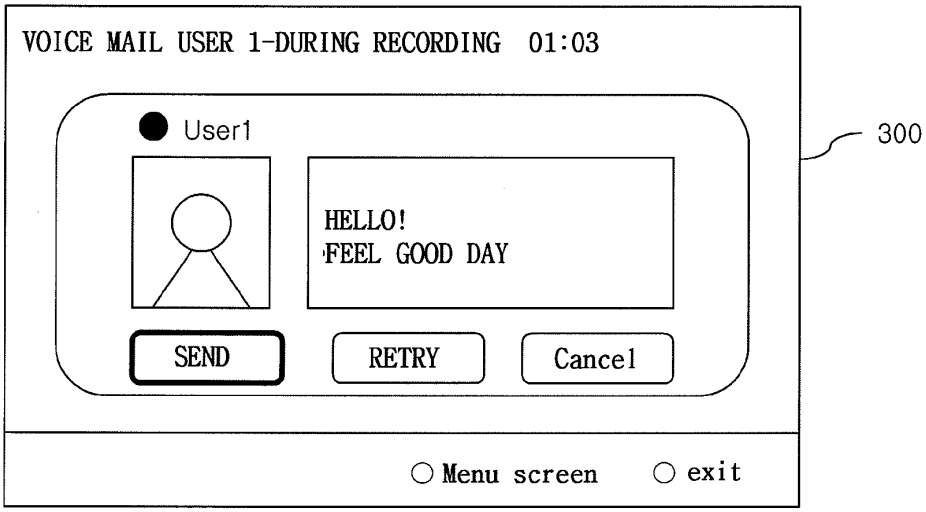

VOICE MAIL USER 1-DURING RECORDING 01:03
User1
HELLO!
FEEL GOOD DAY
SEND
RETRY
Cancel
Menu screen
exit
300

FIG.26

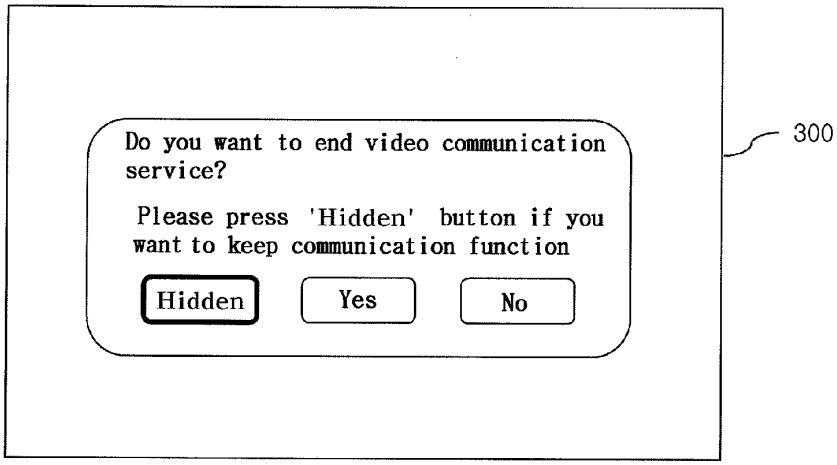

Do you want to end video communication service?
Please press 'Hidden' button if you want to keep communication function
Hidden
Yes
No
300

FIG.27

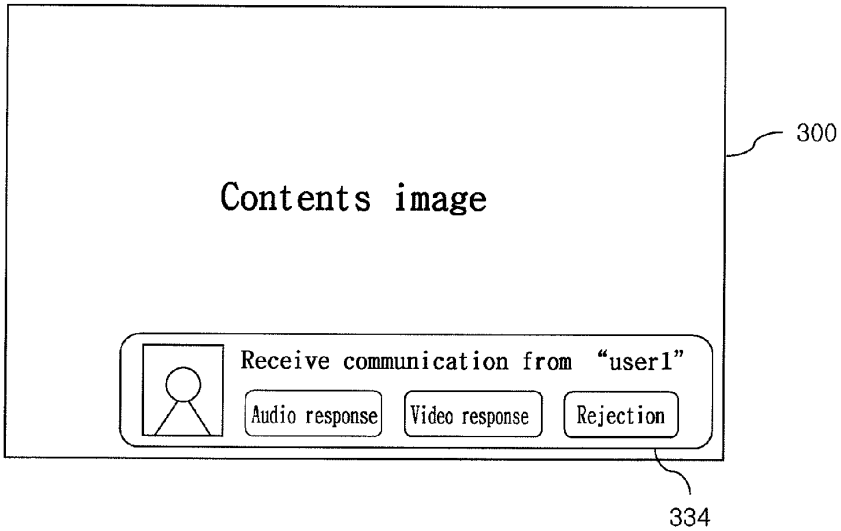

Contents image
Receive communication from "user1"
Audio response
Video response
Rejection
300
334

FIG.28

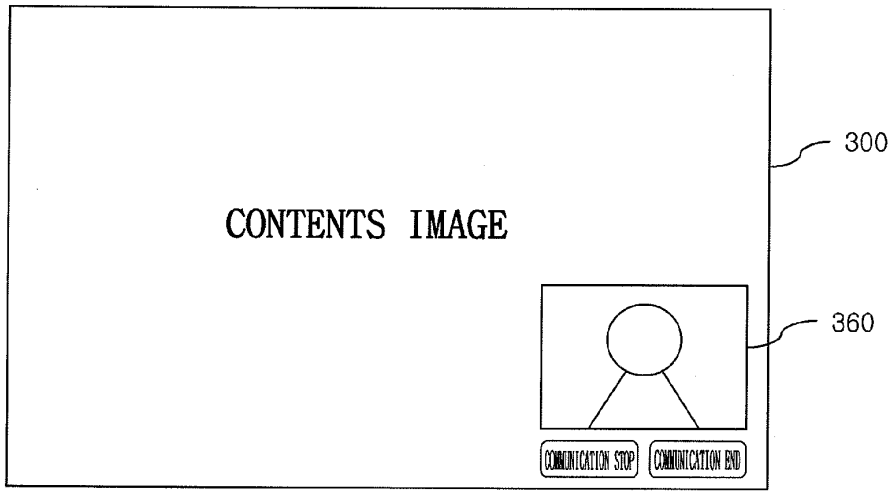

300
CONTENTS IMAGE
360
COMMUNICATION STOP
COMMUNICATION END

FIG.29

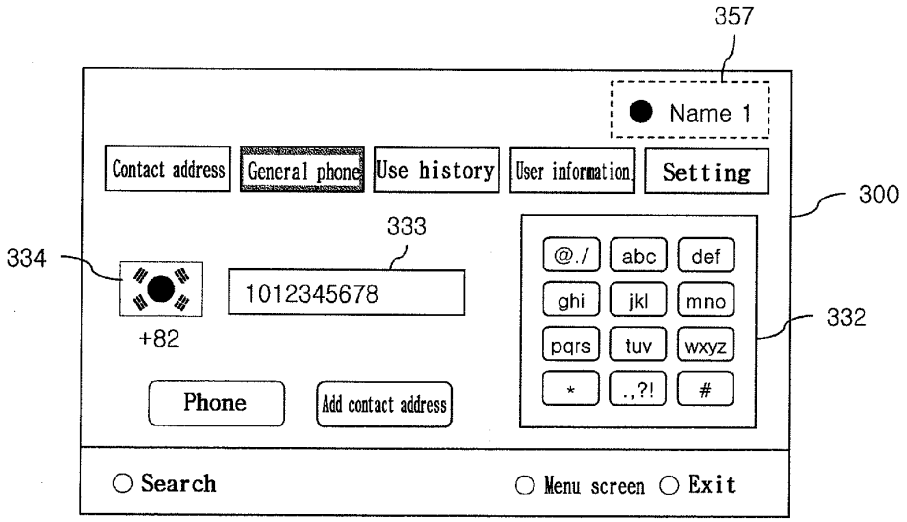

357
Name 1
Contact address
General phone
Use history
User information
Setting
300
333
334
1012345678
+82
@./
abc
def
ghi
jkl
mno
pqrs
tuv
wxyz
*
.,?!
#
332
Phone
Add contact address
Search
Menu screen
Exit

FIG.30

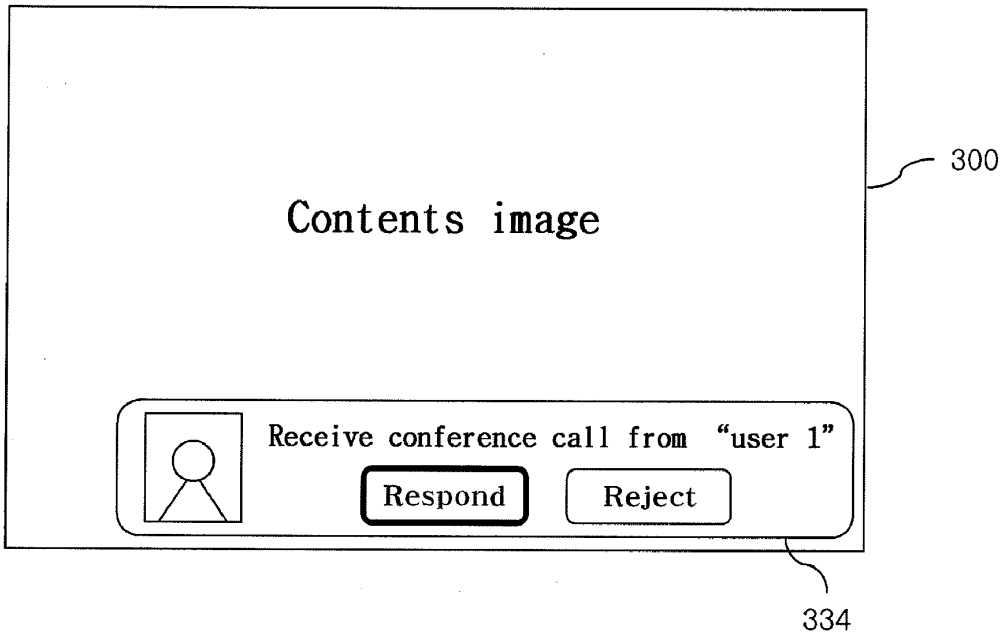

Contents image
Receive conference call from "user 1"
Respond
Reject
300
334

FIG.31

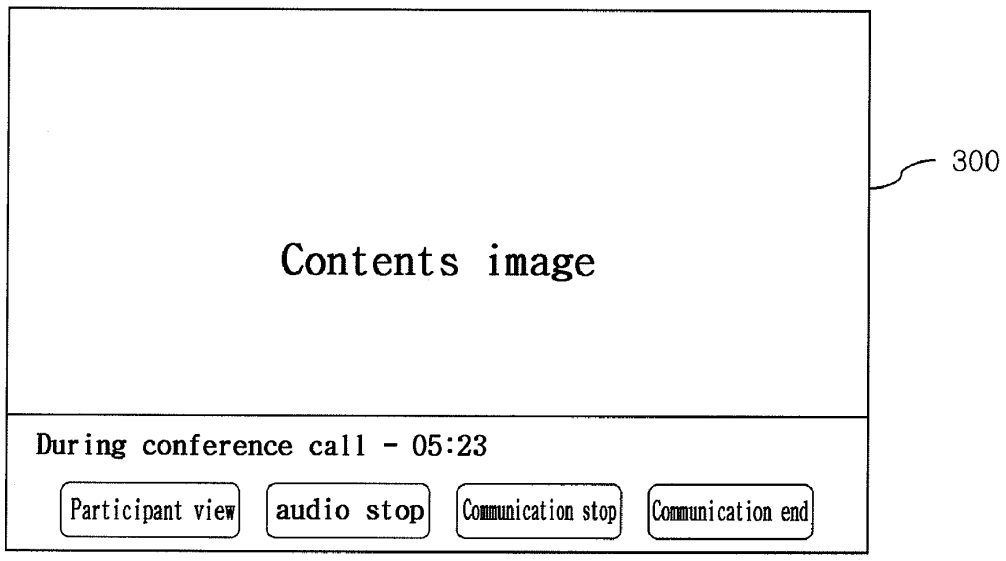

Contents image
During conference call - 05:23
Participant view
audio stop
Communication stop
Communication end
300

FIG.32

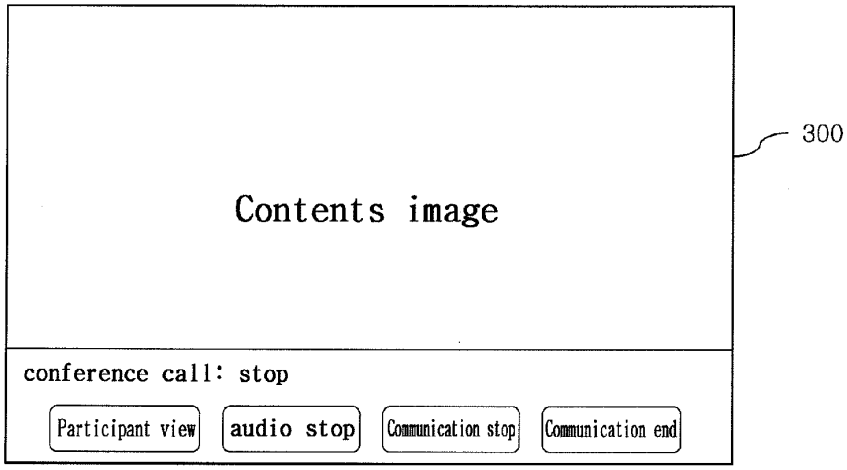

300
Contents image
conference call: stop
Participant view
audio stop
Communication stop
Communication end

FIG.33

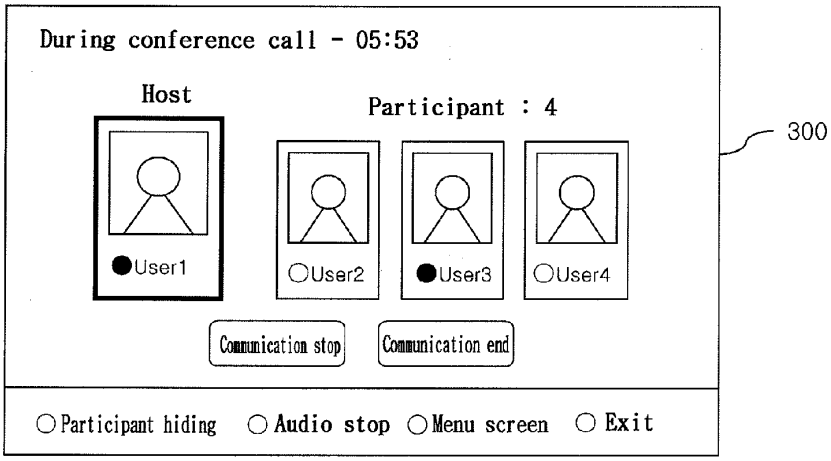

During conference call - 05:53
Host
Participant : 4
300
User1
User2
User3
User4
Communication stop
Communication end
Participant hiding
Audio stop
Menu screen
Exit

FIG.34

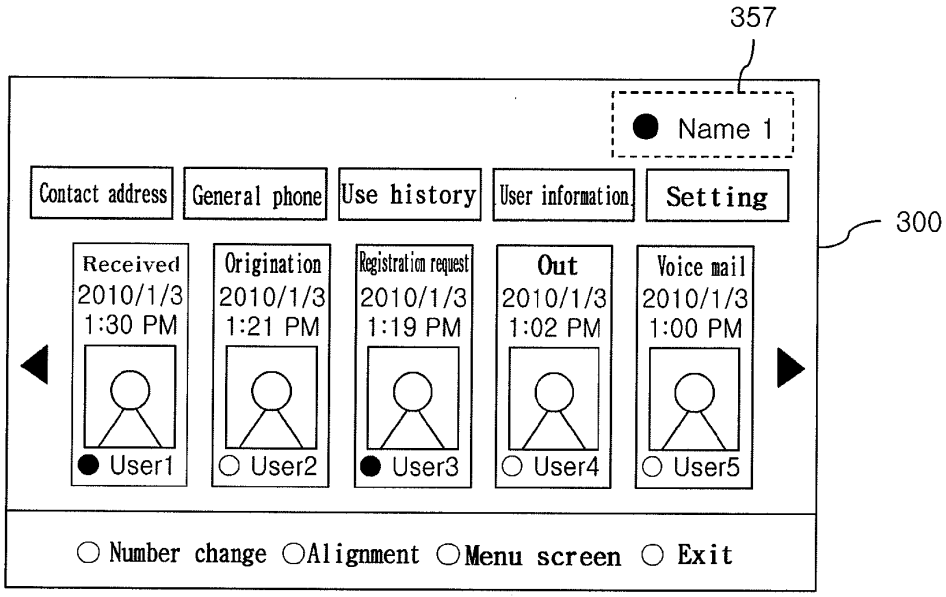

357
Name 1
Contact address
General phone
Use history
User information
Setting
300
Received
2010/1/3
1:30 PM
User1
Origination
2010/1/3
1:21 PM
User2
Registration request
2010/1/3
1:19 PM
User3
Out
2010/1/3
1:02 PM
User4
Voice mail
2010/1/3
1:00 PM
User5
Number change
Alignment
Menu screen
Exit

FIG.35

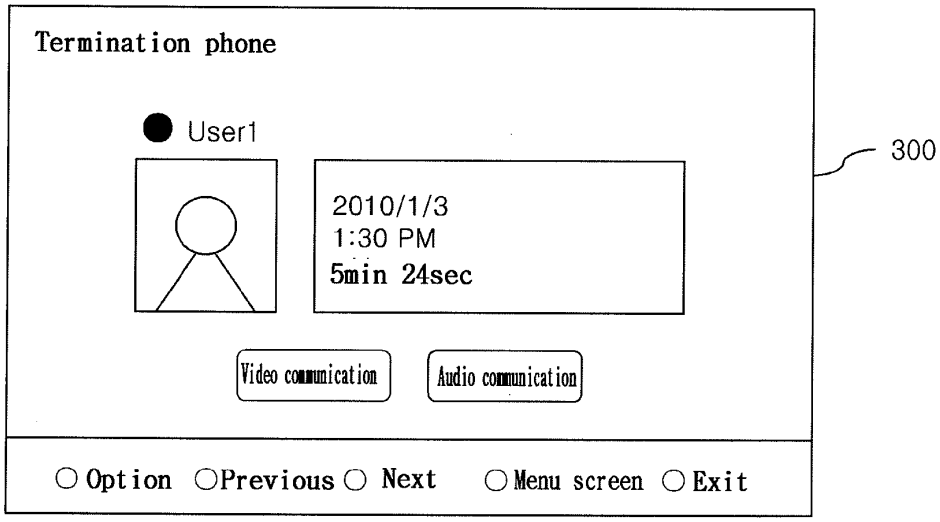

Termination phone
User1
300
2010/1/3
1:30 PM
5min 24sec
Video communication
Audio communication
Option
Previous
Next
Menu screen
Exit

FIG.36

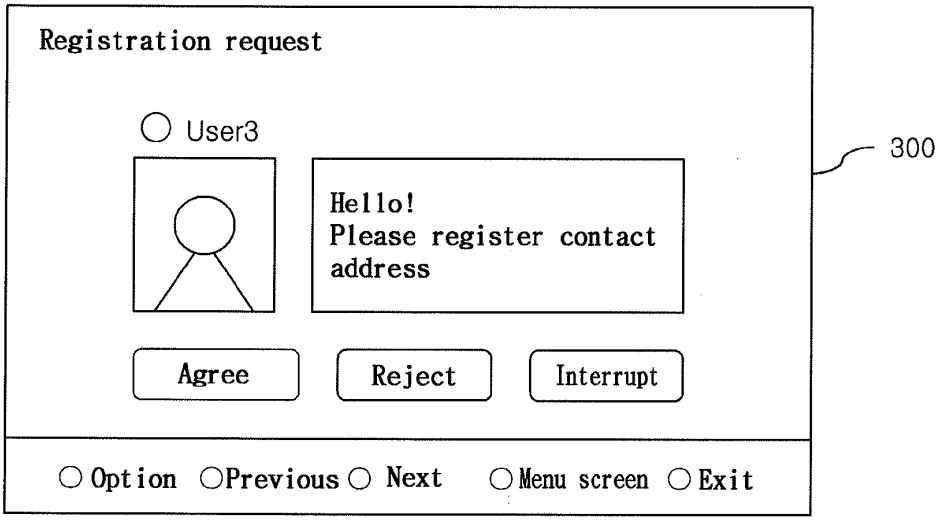

Registration request
User3
Hello!
Please register contact address
Agree
Reject
Interrupt
Option
Previous
Next
Menu screen
Exit
300

FIG.37

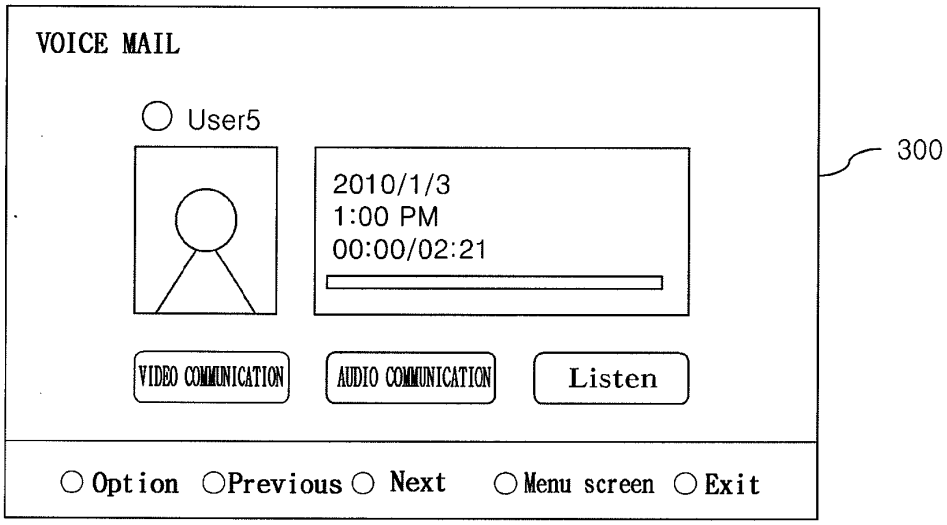

VOICE MAIL
User5
2010/1/3
1:00 PM
00:00/02:21
VIDEO COMMUNICATION
AUDIO COMMUNICATION
Listen
Option
Previous
Next
Menu screen
Exit
300

FIG.38

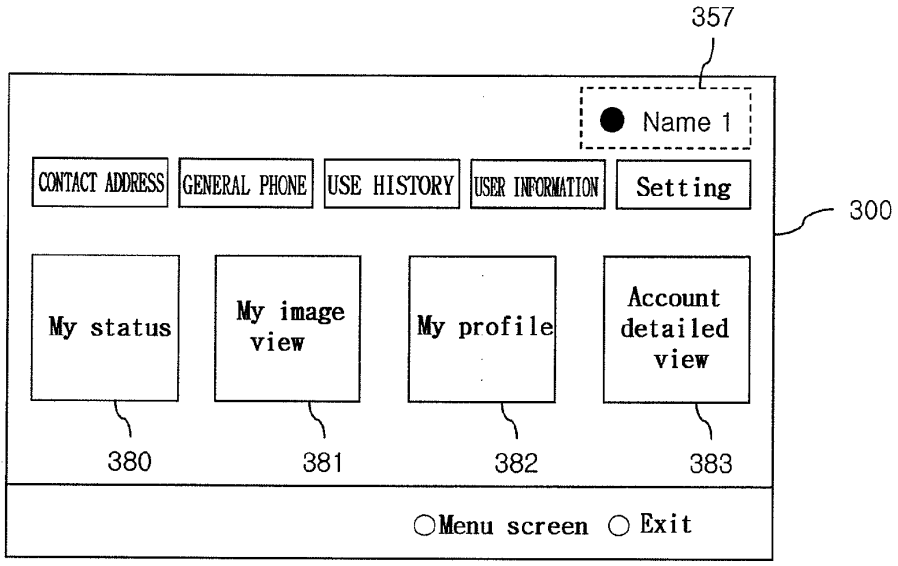

357
Name 1
CONTACT ADDRESS
GENERAL PHONE
USE HISTORY
USER INFORMATION
Setting
300
My status
My image view
My profile
Account detailed view
380
381
382
383
Menu screen
Exit

FIG.39

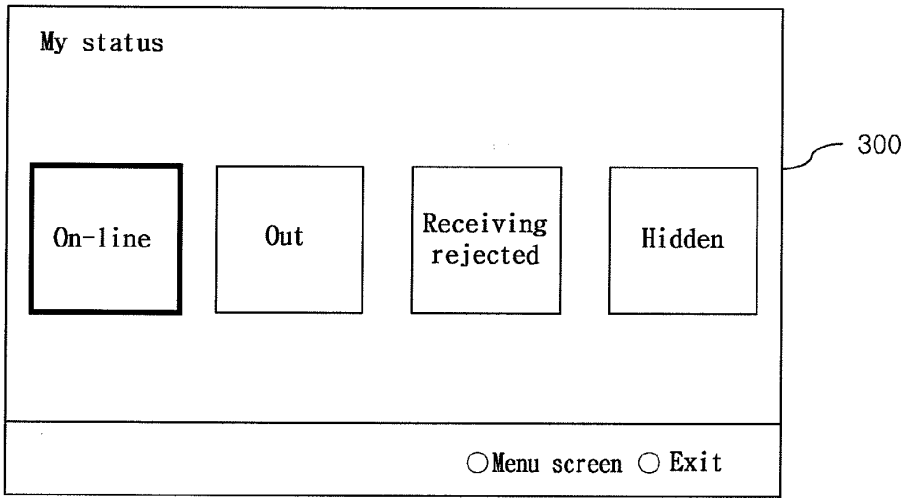

My status
300
On-line
Out
Receiving rejected
Hidden
Menu screen
Exit

FIG.40

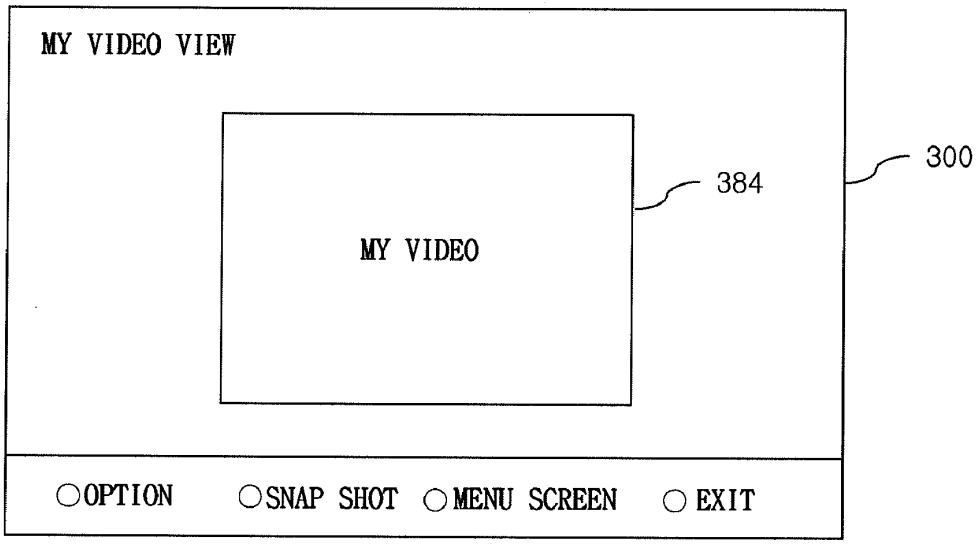

MY VIDEO VIEW
MY VIDEO
384
300
OPTION
SNAP SHOT
MENU SCREEN
EXIT

FIG.41

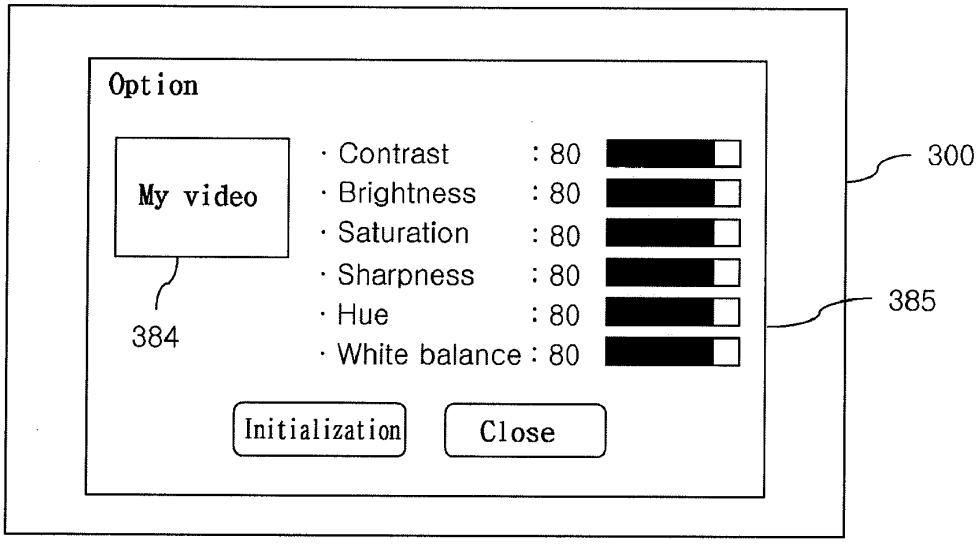

Option
My video
384
· Contrast : 80
· Brightness : 80
· Saturation : 80
· Sharpness : 80
· Hue : 80
· White balance : 80
Initialization
Close
300
385

FIG.42

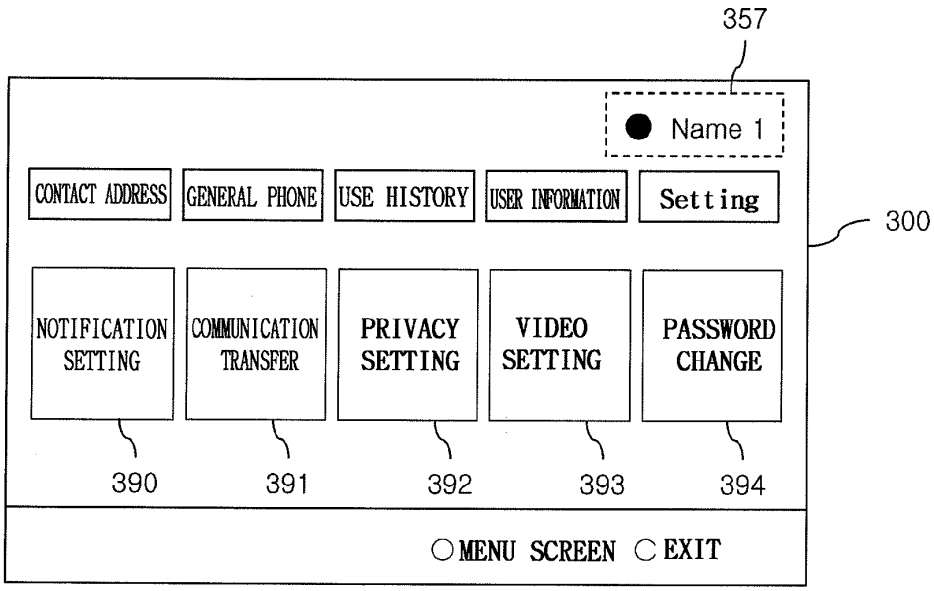

357
Name 1
CONTACT ADDRESS
GENERAL PHONE
USE HISTORY
USER INFORMATION
Setting
300
NOTIFICATION SETTING
COMMUNICATION TRANSFER
PRIVACY SETTING
VIDEO SETTING
PASSWORD CHANGE
390
391
392
393
394
MENU SCREEN
EXIT

FIG.43

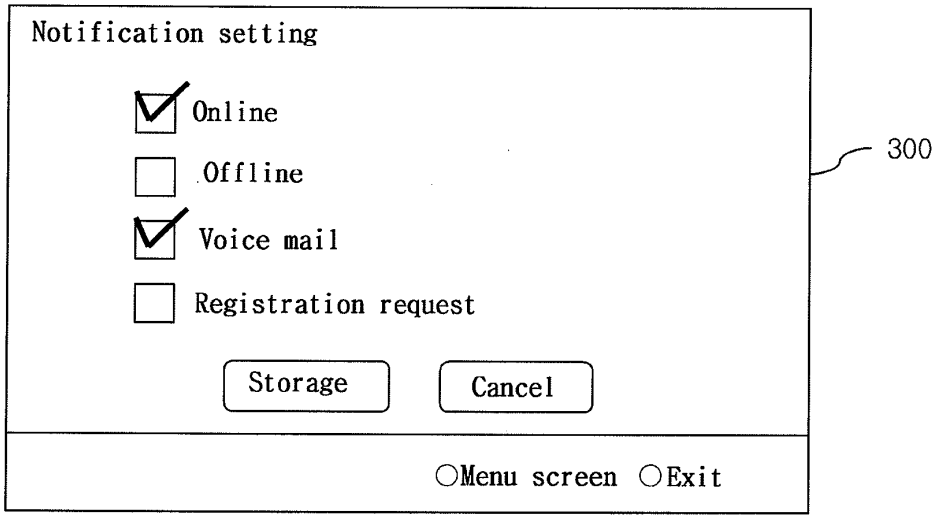

Notification setting
Online
Offline
Voice mail
Registration request
Storage
Cancel
300
Menu screen
Exit

FIG.44

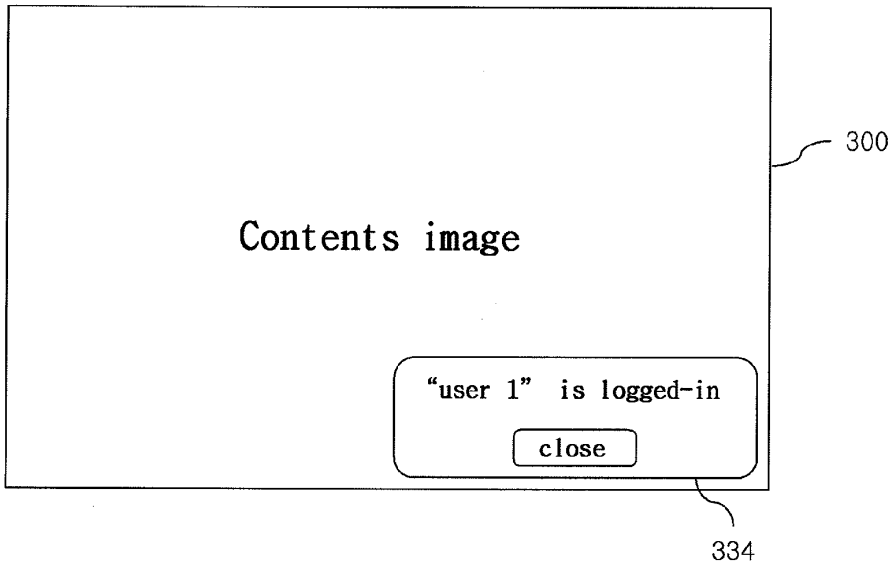

300
Contents image
"user 1" is logged-in
close
334

FIG.45

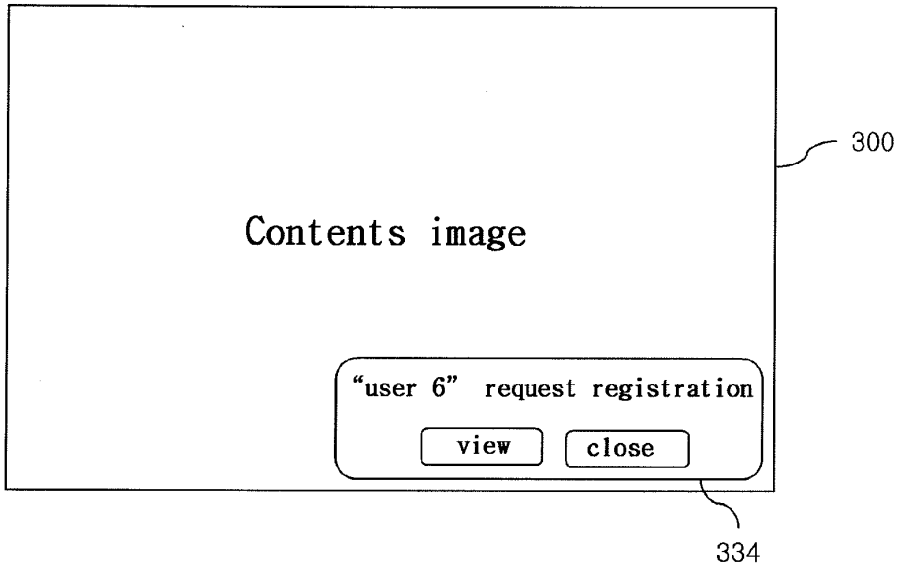

300
Contents image
"user 6" request registration
view
close
334

FIG.46

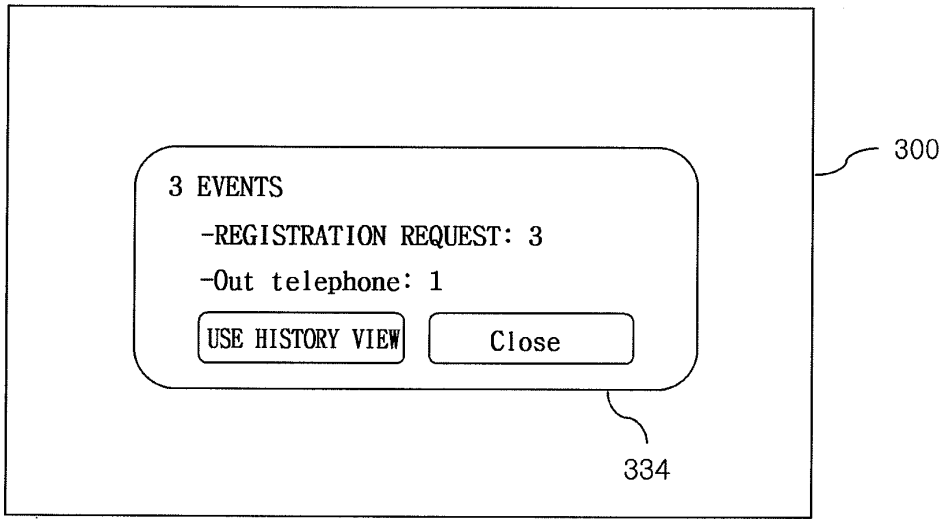

3 EVENTS
-REGISTRATION REQUEST: 3
-Out telephone: 1
USE HISTORY VIEW
Close
300
334

FIG.47

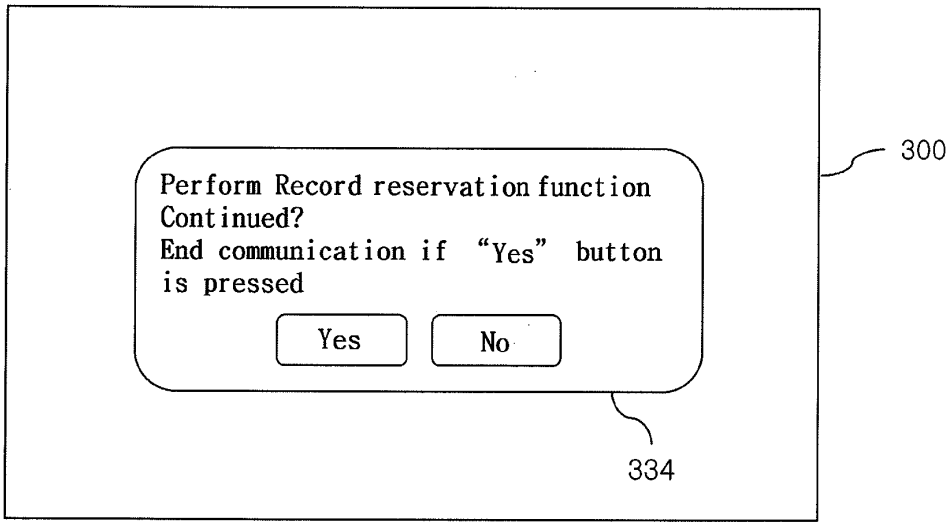

Perform Record reservation function
Continued?
End communication if "Yes" button
is pressed
Yes
No
300
334

FIG.48

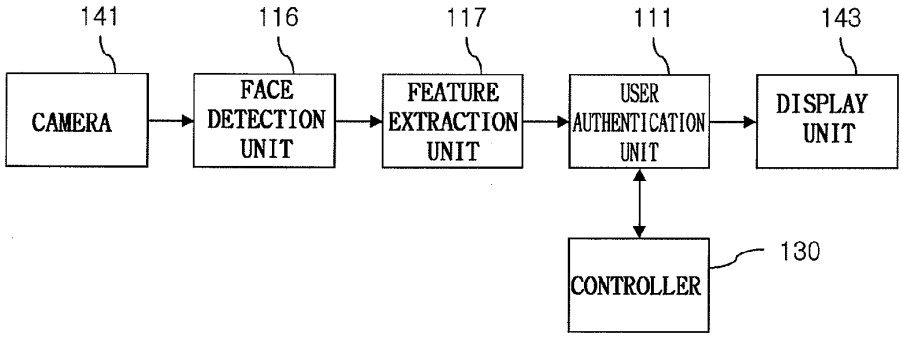

141
116
117
111
143
CAMERA
FACE DETECTION UNIT
FEATURE EXTRACTION UNIT
USER AUTHENTICATION UNIT
DISPLAY UNIT
CONTROLLER
130

FIG.49

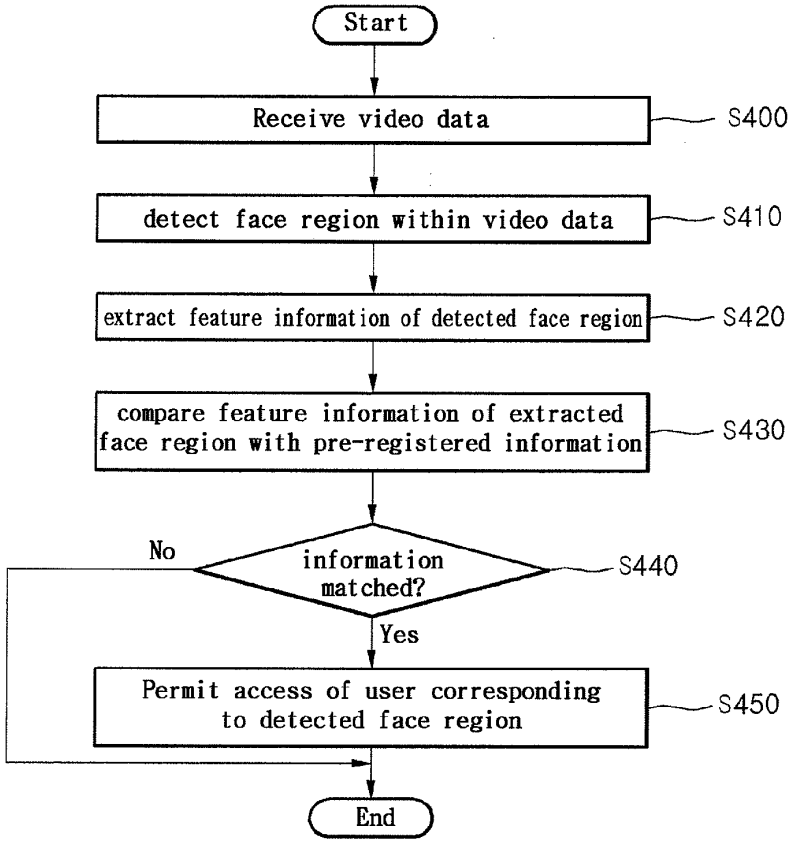

Start
Receive video data
S400
detect face region within video data
S410
extract feature information of detected face region
S420
compare feature information of extracted face region with pre-registered information
S430
information matched?
S440
No
Yes
Permit access of user corresponding to detected face region
S450
End

FIG.50

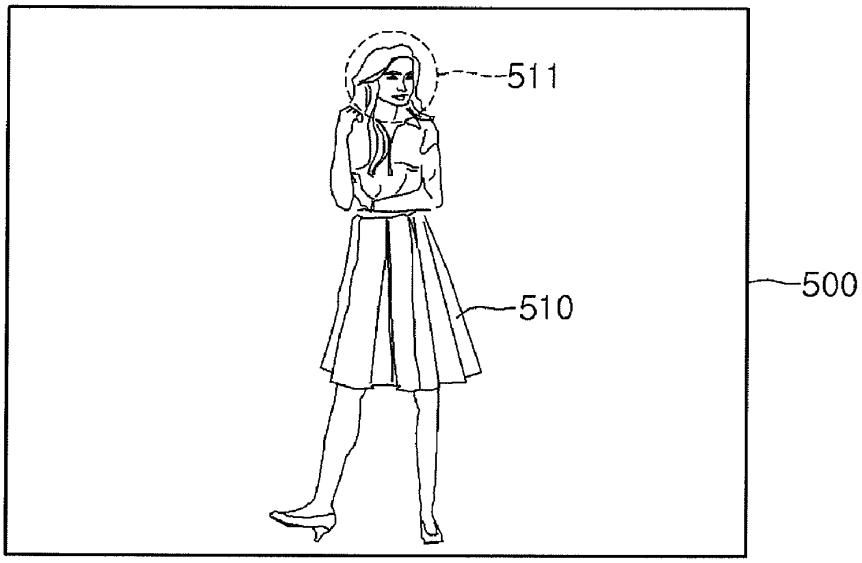


FIG.51

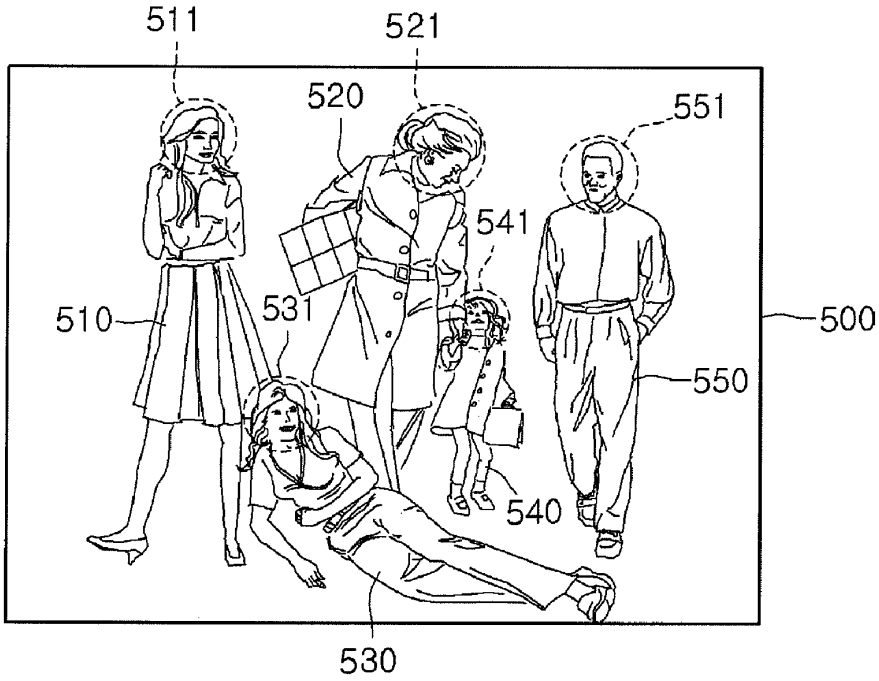


FIG.52

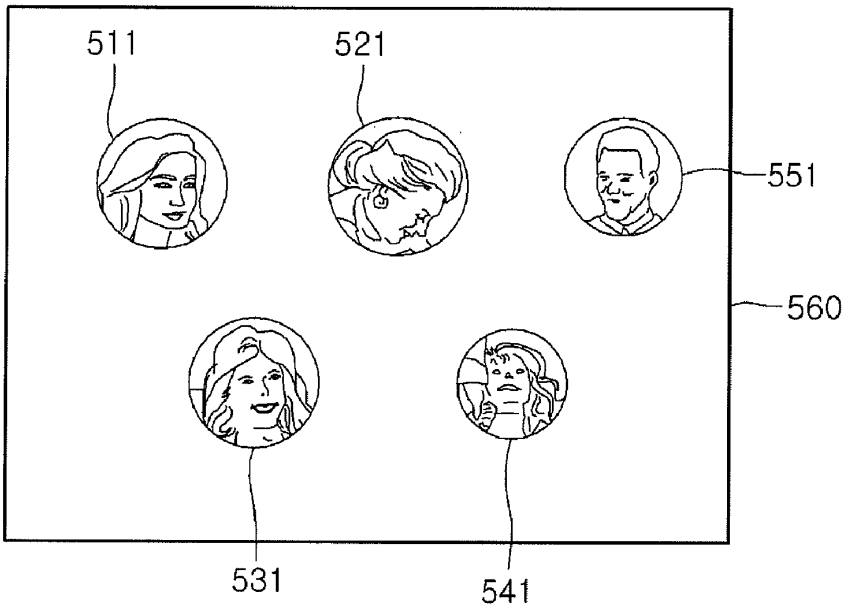


FIG.53

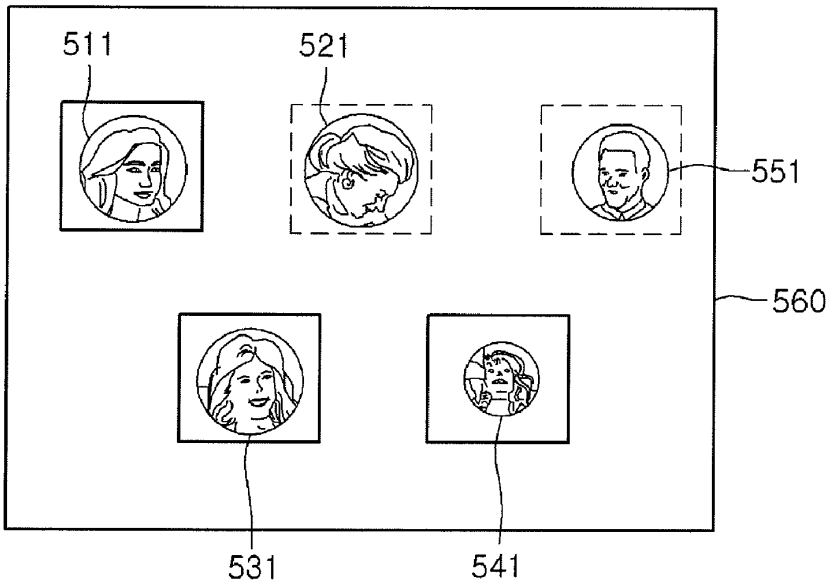


FIG.54

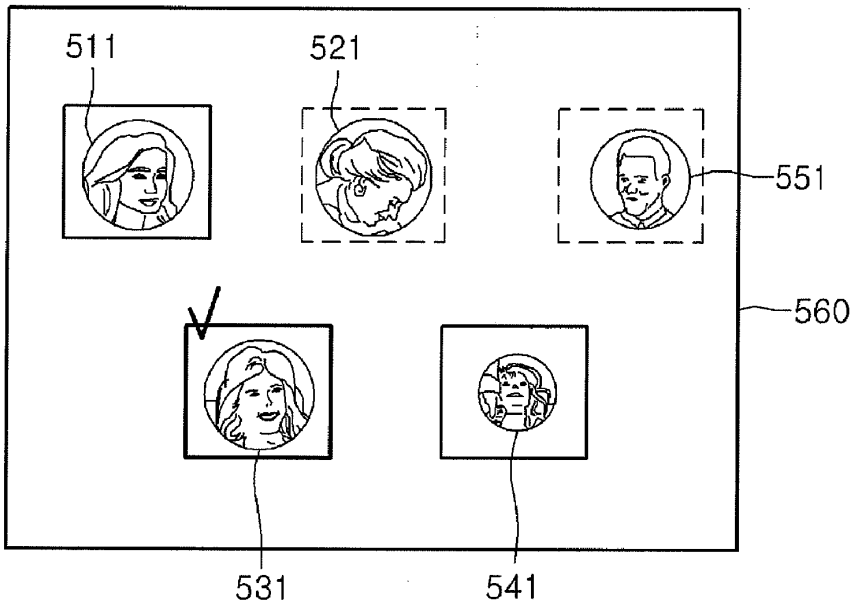


FIG.55

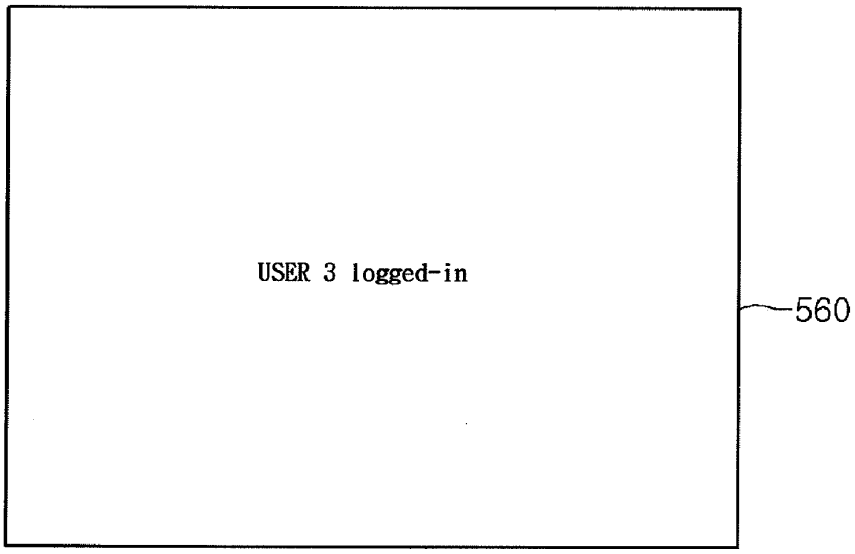


FIG.56

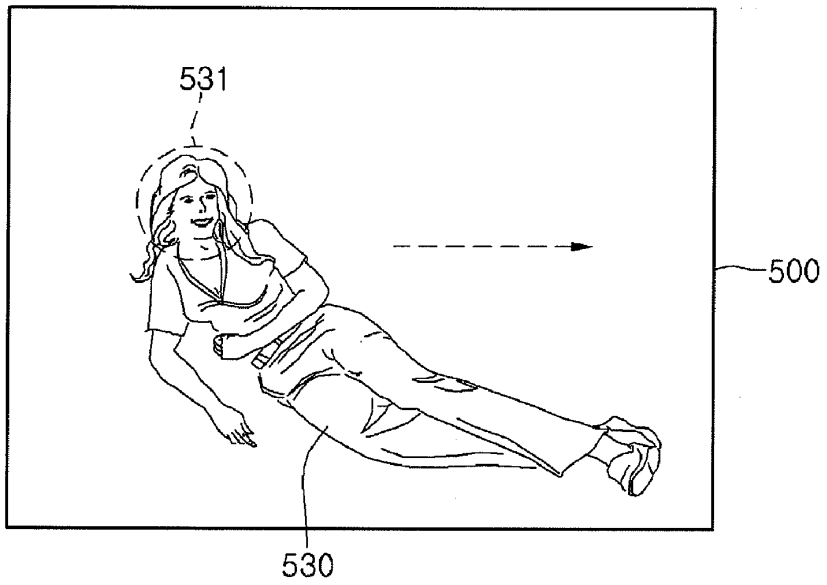


FIG.57

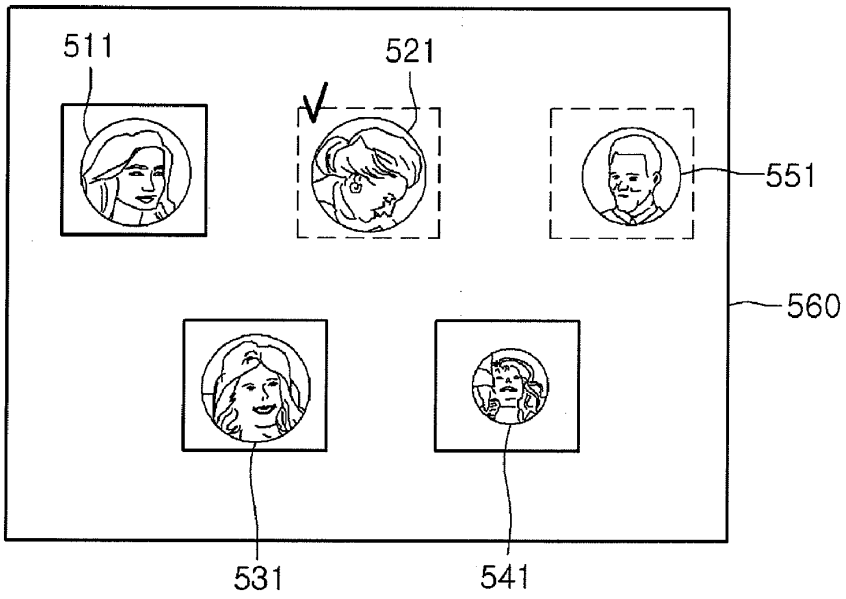


FIG.58

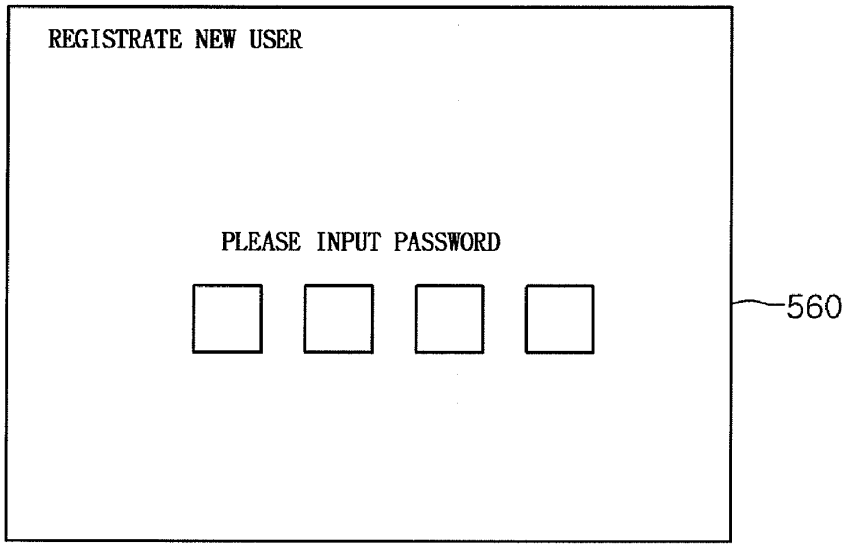

REGISTRATE NEW USER
PLEASE INPUT PASSWORD
560

FIG.59

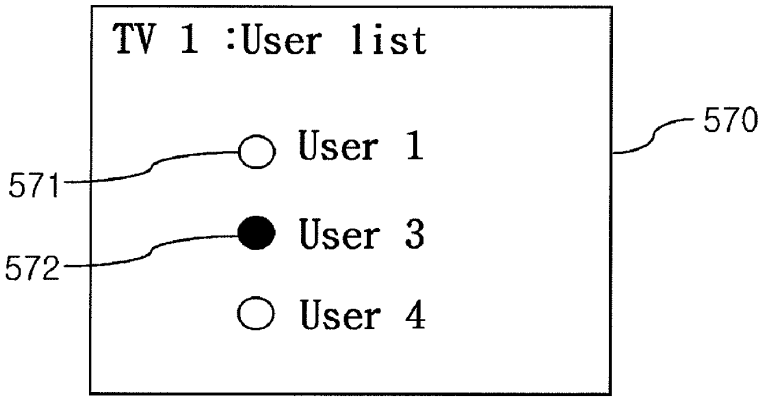

TV 1 :User list
User 1
User 3
User 4
570
571
572

FIG.60

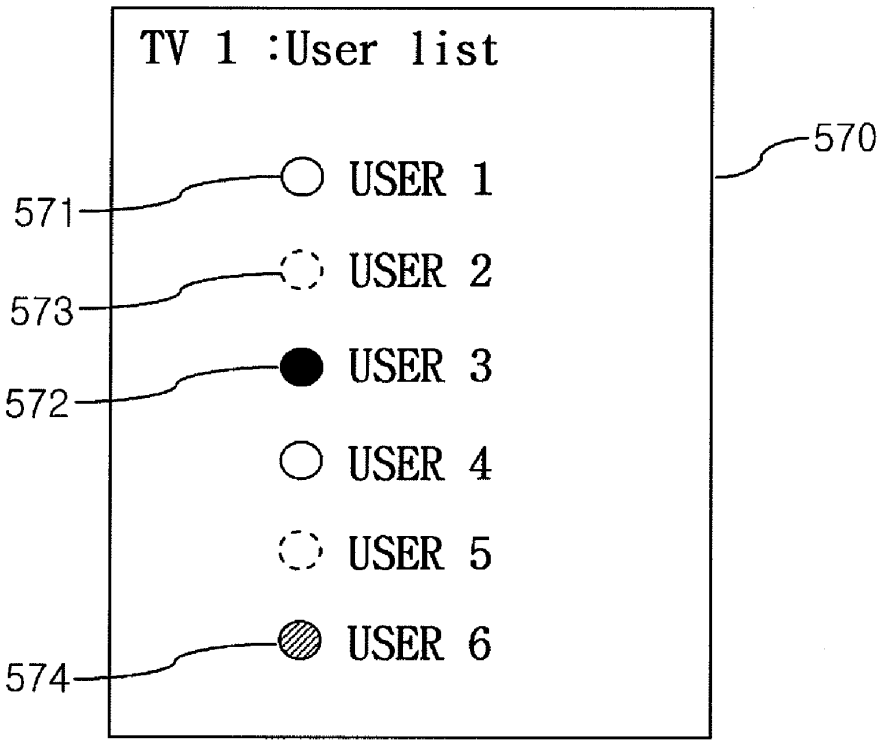

TV 1 :User list
USER 1
USER 2
USER 3
USER 4
USER 5
USER 6
570
571
573
572
574

FIG.61

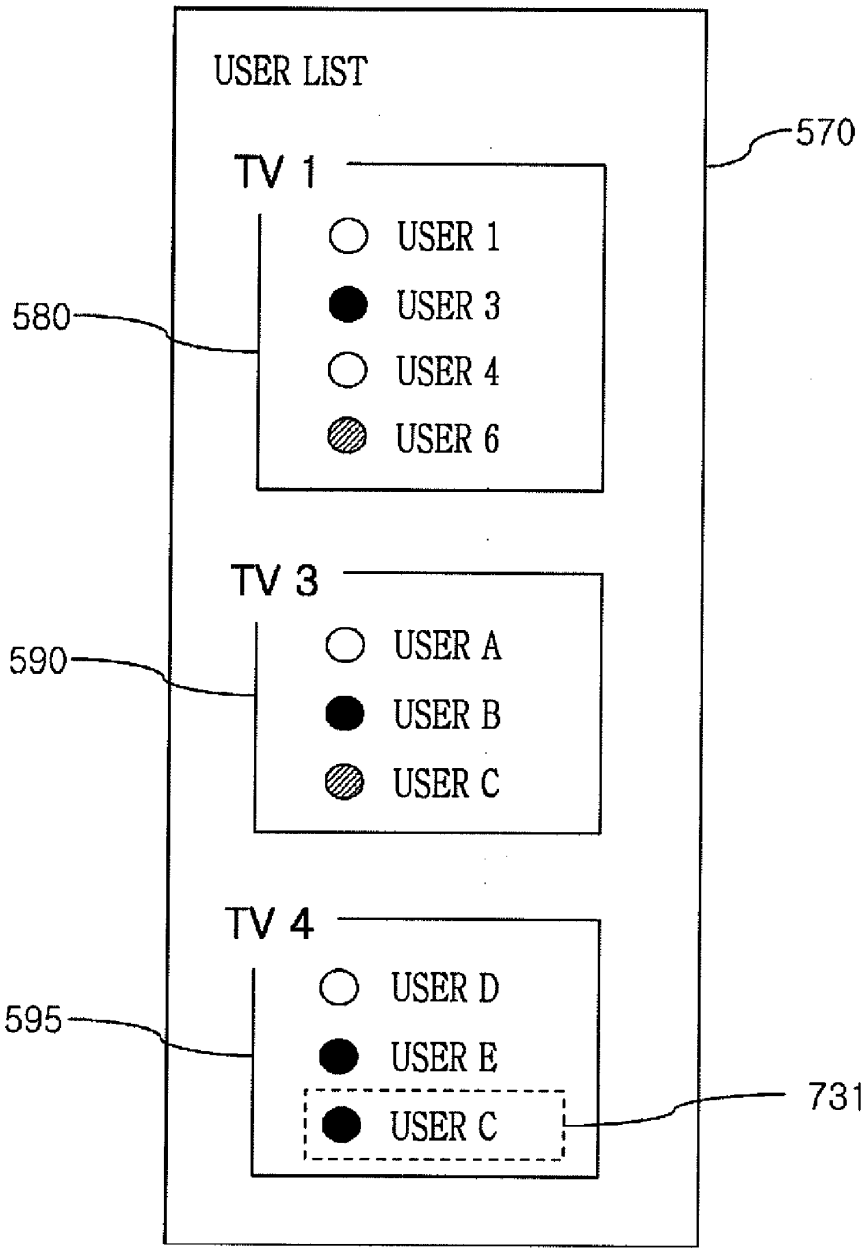

USER LIST
570
TV 1
USER 1
USER 3
USER 4
USER 6
580
TV 3
USER A
USER B
USER C
590
TV 4
USER D
USER E
USER C
595
731

FIG.62

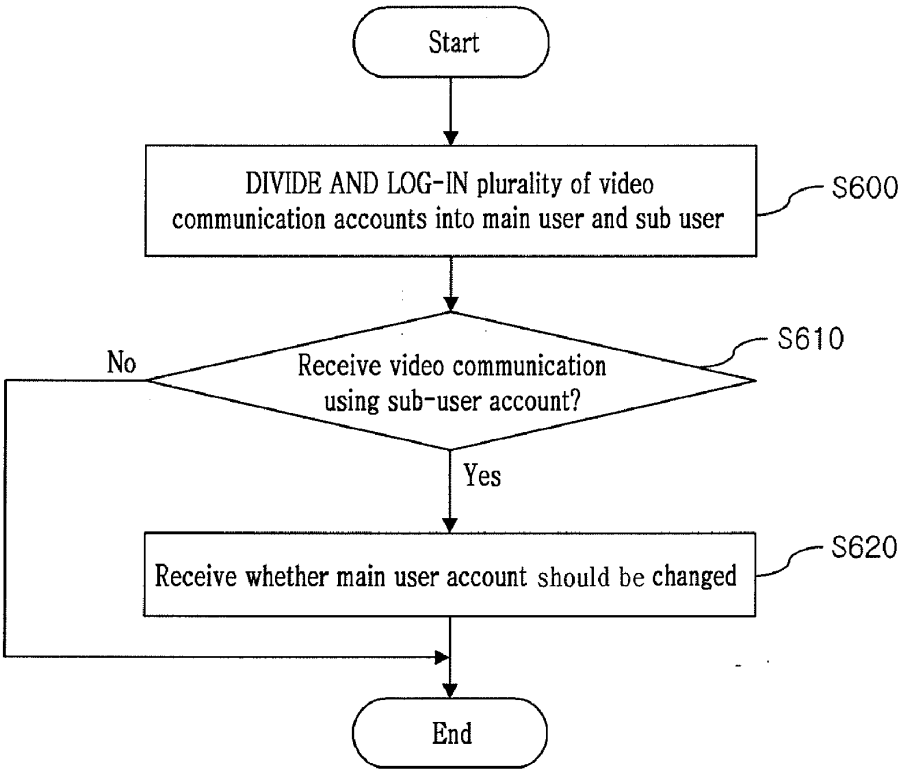

Start
DIVIDE AND LOG-IN plurality of video communication accounts into main user and sub user
S600
Receive video communication using sub-user account?
S610
No
Yes
Receive whether main user account should be changed
S620
End

FIG.63

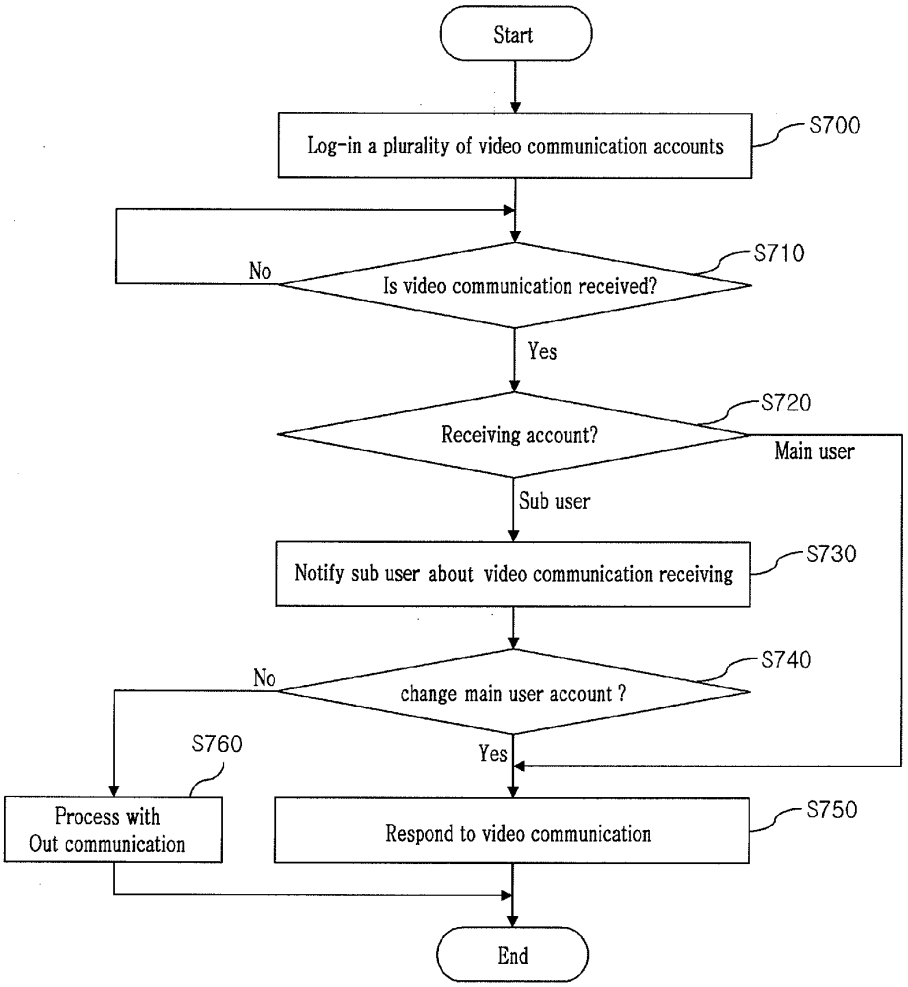

Start
Log-in a plurality of video communication accounts
S700
Is video communication received?
S710
No
Yes
Receiving account?
S720
Main user
Sub user
Notify sub user about video communication receiving
S730
change main user account ?
S740
No
Yes
S760
Process with
Out communication
Respond to video communication
S750
End

FIG.64

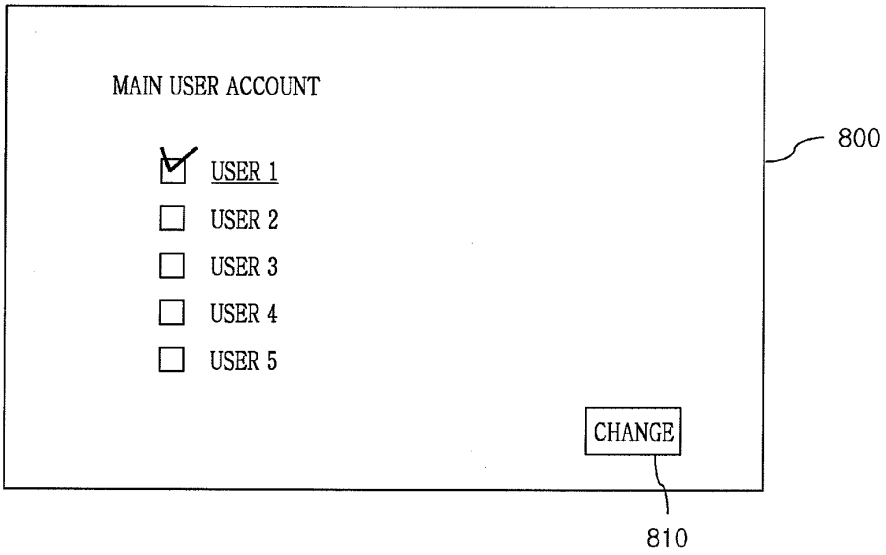

MAIN USER ACCOUNT
USER 1
USER 2
USER 3
USER 4
USER 5
CHANGE
800
810

FIG.65

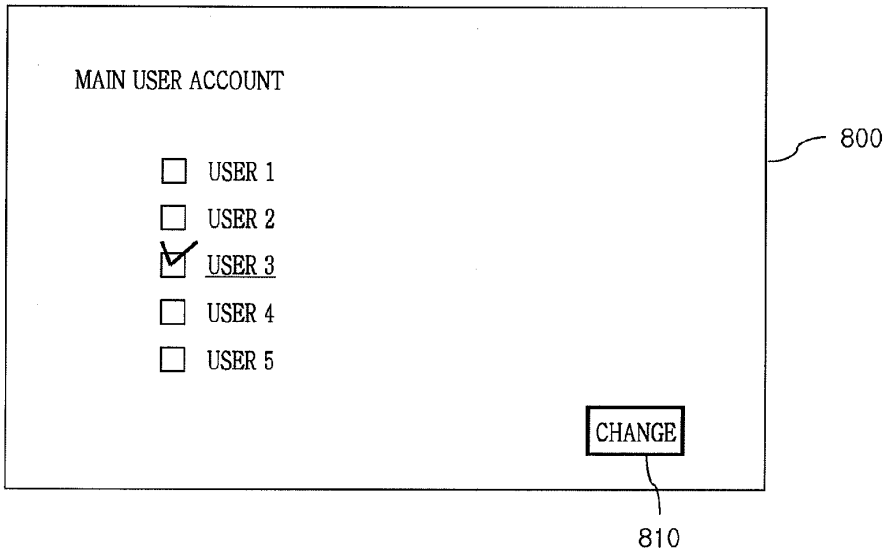

MAIN USER ACCOUNT
USER 1
USER 2
USER 3
USER 4
USER 5
CHANGE
800
810

FIG.66

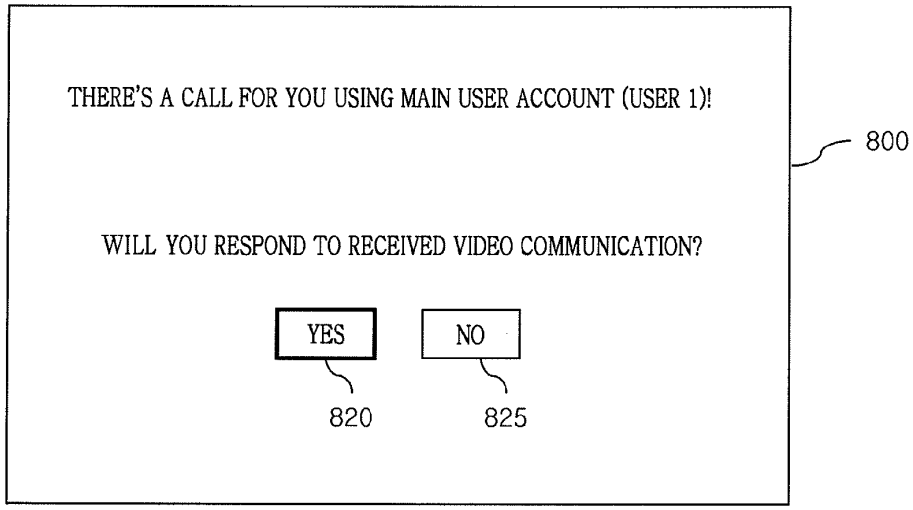

THERE'S A CALL FOR YOU USING MAIN USER ACCOUNT (USER 1)!
WILL YOU RESPOND TO RECEIVED VIDEO COMMUNICATION?
YES
NO
820
825
800

FIG.67

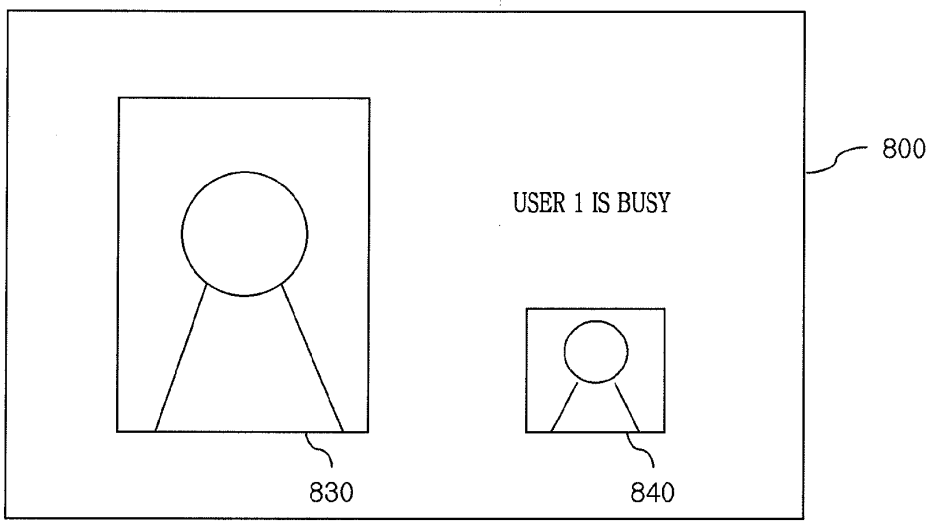

USER 1 IS BUSY
830
840
800

FIG.68

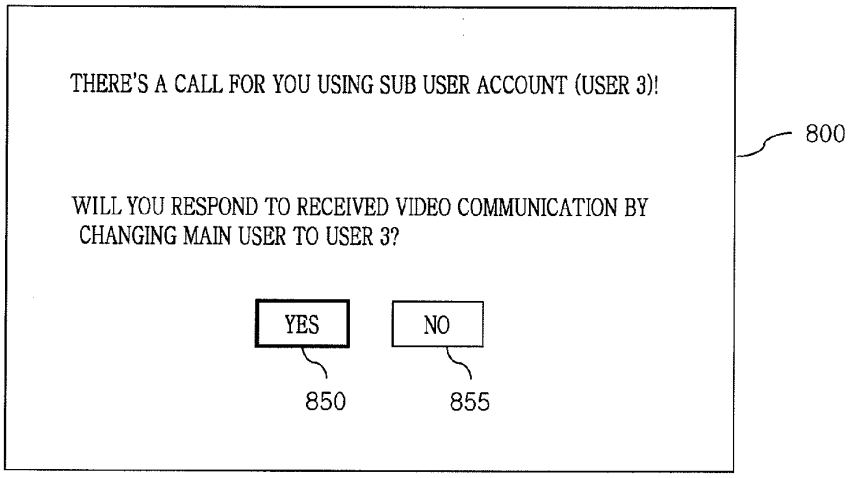

THERE'S A CALL FOR YOU USING SUB USER ACCOUNT (USER 3)!
WILL YOU RESPOND TO RECEIVED VIDEO COMMUNICATION BY CHANGING MAIN USER TO USER 3?
YES
NO
800
850
855

FIG.69

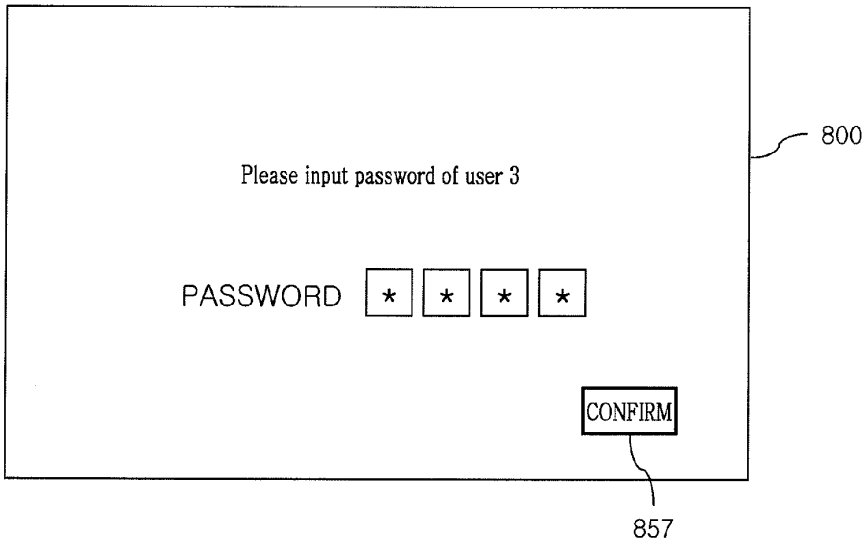

Please input password of user 3
PASSWORD
* * * *
CONFIRM
800
857

FIG.70

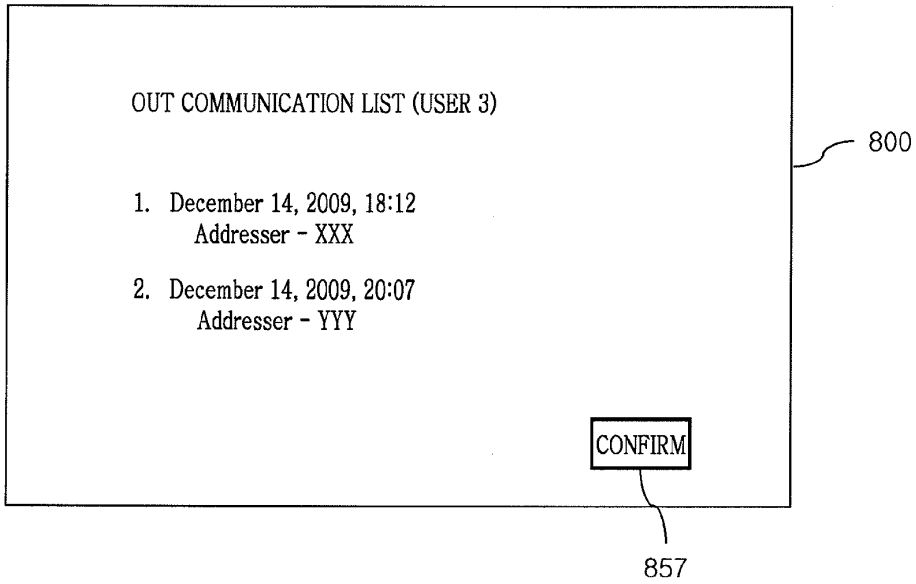

OUT COMMUNICATION LIST (USER 3)
1. December 14, 2009, 18:12
Addresser - XXX
2. December 14, 2009, 20:07
Addresser - YYY
CONFIRM
800
857

FIG.71

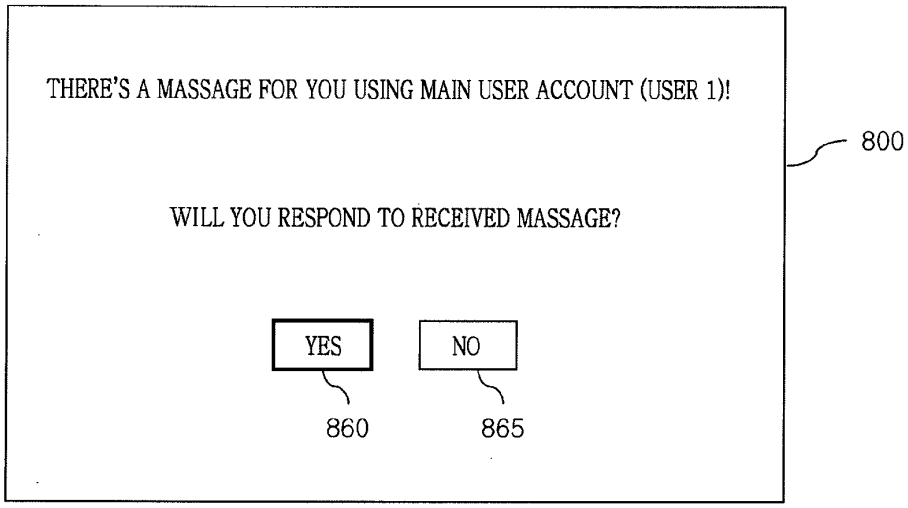

THERE'S A MASSAGE FOR YOU USING MAIN USER ACCOUNT (USER 1)!
WILL YOU RESPOND TO RECEIVED MASSAGE?
YES
NO
800
860
865

FIG.72

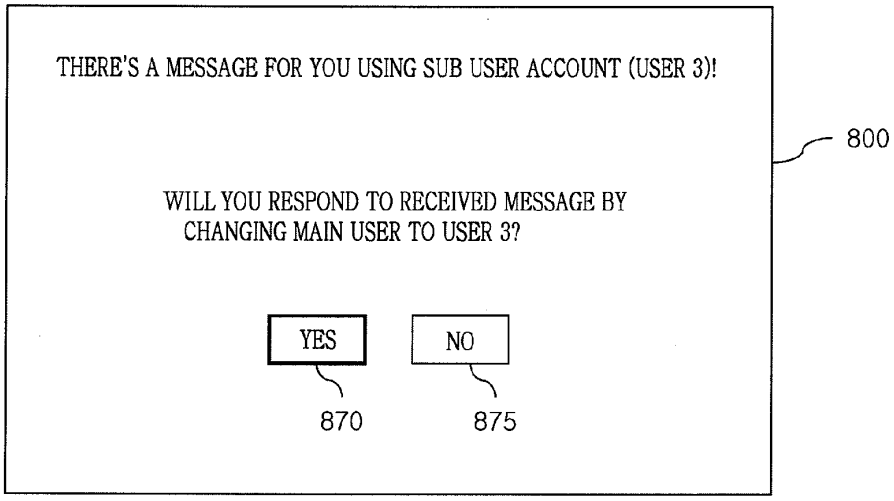

THERE'S A MESSAGE FOR YOU USING SUB USER ACCOUNT (USER 3)!
WILL YOU RESPOND TO RECEIVED MESSAGE BY CHANGING MAIN USER TO USER 3?
YES
NO
870
875
800

FIG.73

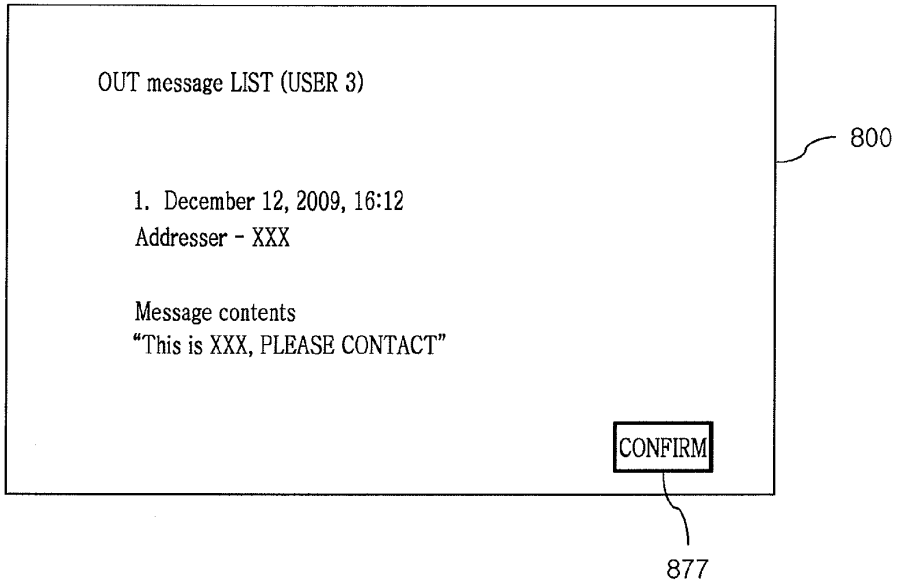

OUT message LIST (USER 3)
1. December 12, 2009, 16:12
Addresser - XXX
Message contents
"This is XXX, PLEASE CONTACT"
CONFIRM
800
877

FIG.74

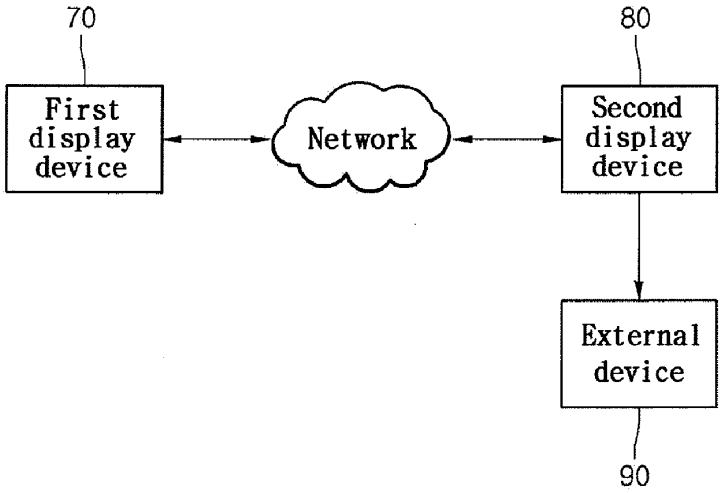

70
80
First display device
Network
Second display device
External device
90

FIG.75

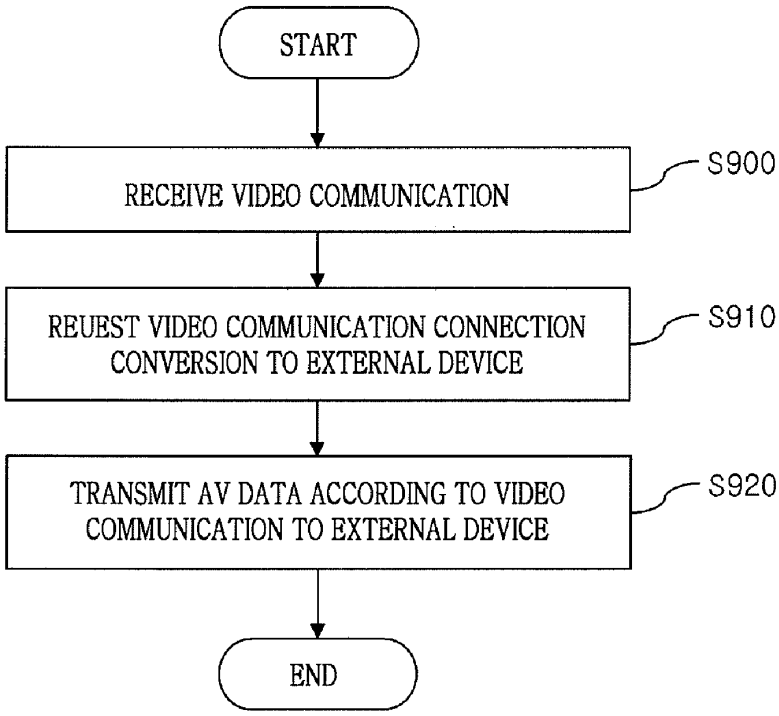

START
RECEIVE VIDEO COMMUNICATION
S900
REUEST VIDEO COMMUNICATION CONNECTION CONVERSION TO EXTERNAL DEVICE
S910
TRANSMIT AV DATA ACCORDING TO VIDEO COMMUNICATION TO EXTERNAL DEVICE
S920
END

FIG.76

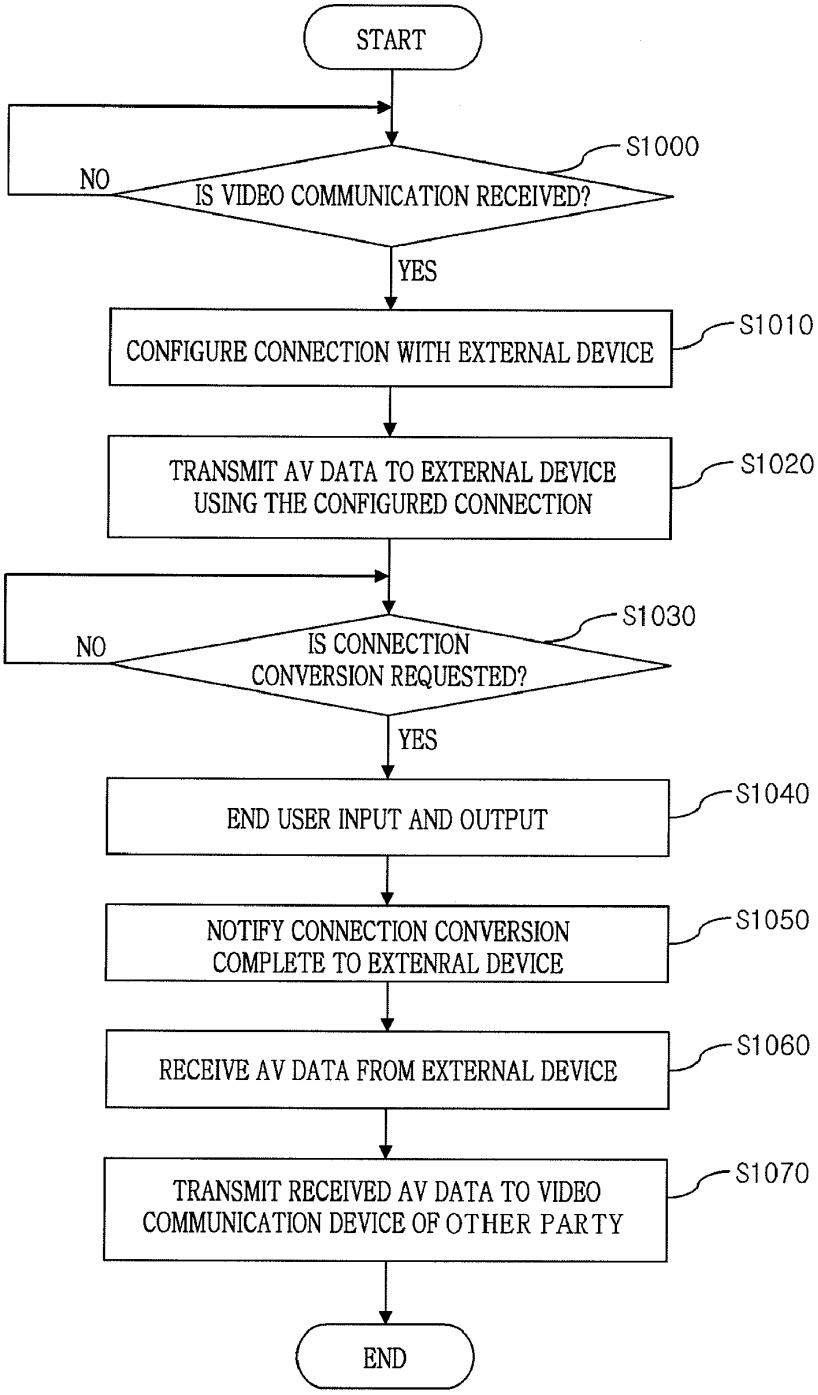

START
S1000
NO
IS VIDEO COMMUNICATION RECEIVED?
YES
CONFIGURE CONNECTION WITH EXTERNAL DEVICE
S1010
TRANSMIT AV DATA TO EXTERNAL DEVICE USING THE CONFIGURED CONNECTION
S1020
S1030
NO
IS CONNECTION CONVERSION REQUESTED?
YES
END USER INPUT AND OUTPUT
S1040
NOTIFY CONNECTION CONVERSION COMPLETE TO EXTENRAL DEVICE
S1050
RECEIVE AV DATA FROM EXTERNAL DEVICE
S1060
TRANSMIT RECEIVED AV DATA TO VIDEO COMMUNICATION DEVICE OF OTHER PARTY
S1070
END

FIG.77

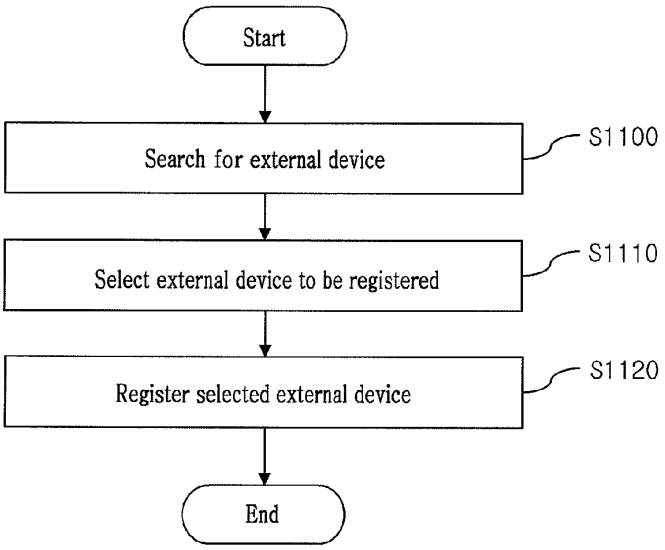

Start
Search for external device
S1100
Select external device to be registered
S1110
Register selected external device
S1120
End

FIG.78

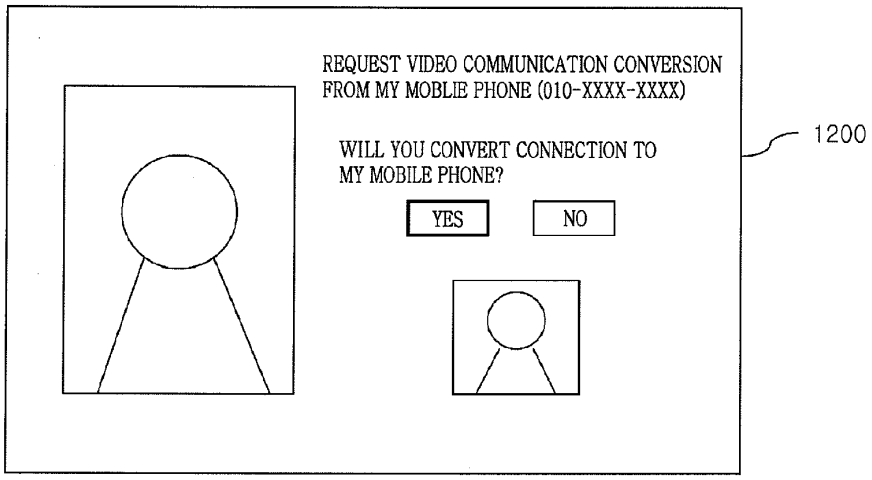

REQUEST VIDEO COMMUNICATION CONVERSION
FROM MY MOBLIE PHONE (010-XXXX-XXXX)
WILL YOU CONVERT CONNECTION TO
MY MOBILE PHONE?
YES
NO
1200

FIG.79

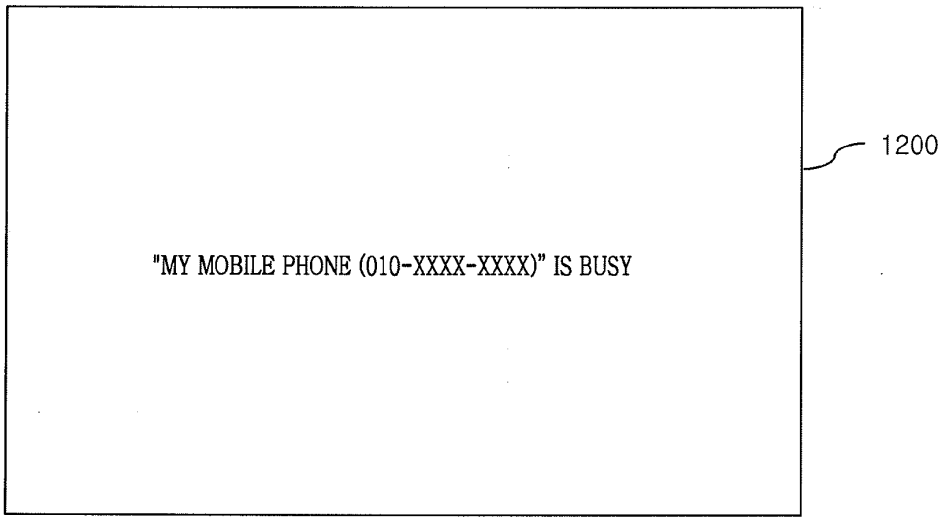


FIG.80

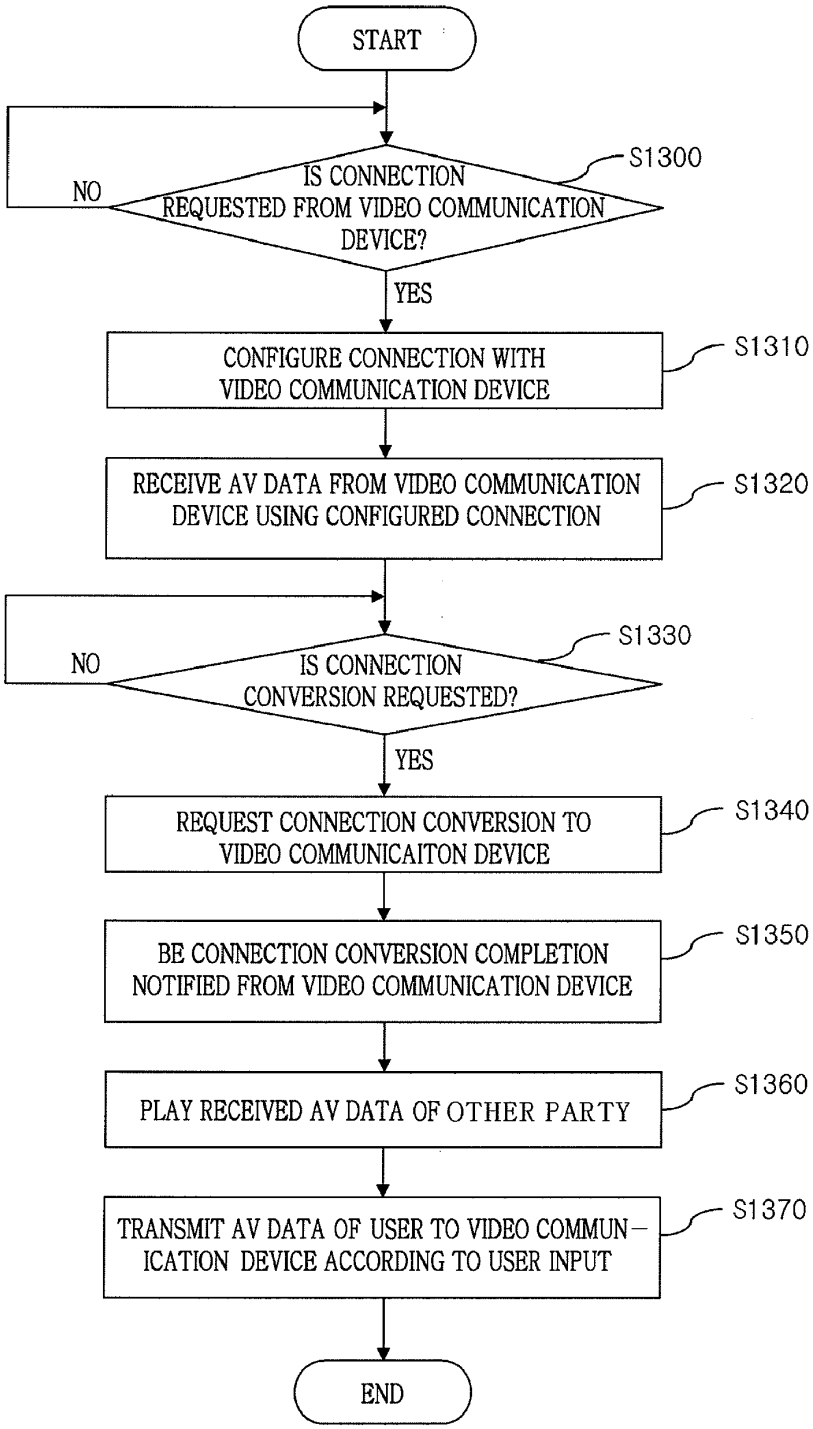

START
IS CONNECTION REQUESTED FROM VIDEO COMMUNICATION DEVICE?
S1300
NO
YES
CONFIGURE CONNECTION WITH VIDEO COMMUNICATION DEVICE
S1310
RECEIVE AV DATA FROM VIDEO COMMUNICATION DEVICE USING CONFIGURED CONNECTION
S1320
IS CONNECTION CONVERSION REQUESTED?
S1330
NO
YES
REQUEST CONNECTION CONVERSION TO VIDEO COMMUNICAITON DEVICE
S1340
BE CONNECTION CONVERSION COMPLETION NOTIFIED FROM VIDEO COMMUNICATION DEVICE
S1350
PLAY RECEIVED AV DATA OF OTHER PARTY
S1360
TRANSMIT AV DATA OF USER TO VIDEO COMMUNICATION DEVICE ACCORDING TO USER INPUT
S1370
END

FIG.81

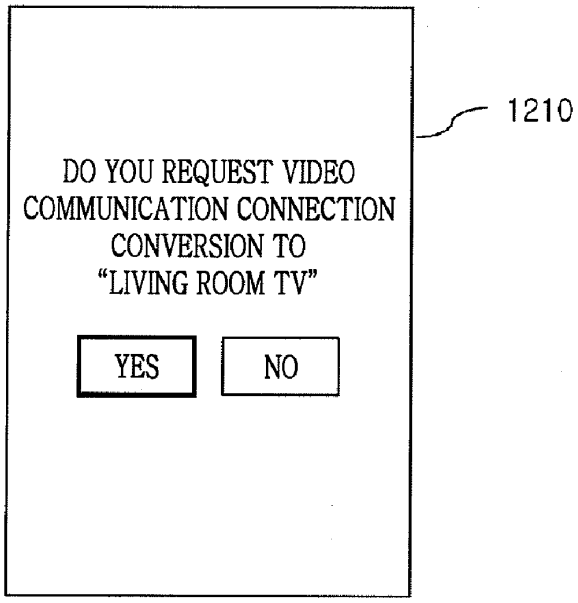

1210
DO YOU REQUEST VIDEO COMMUNICATION CONNECTION CONVERSION TO "LIVING ROOM TV"
YES
NO

FIG.82

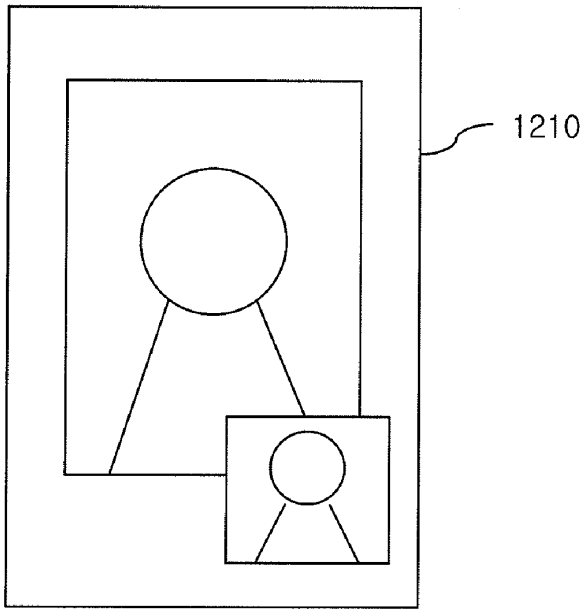

1210

FIG.83

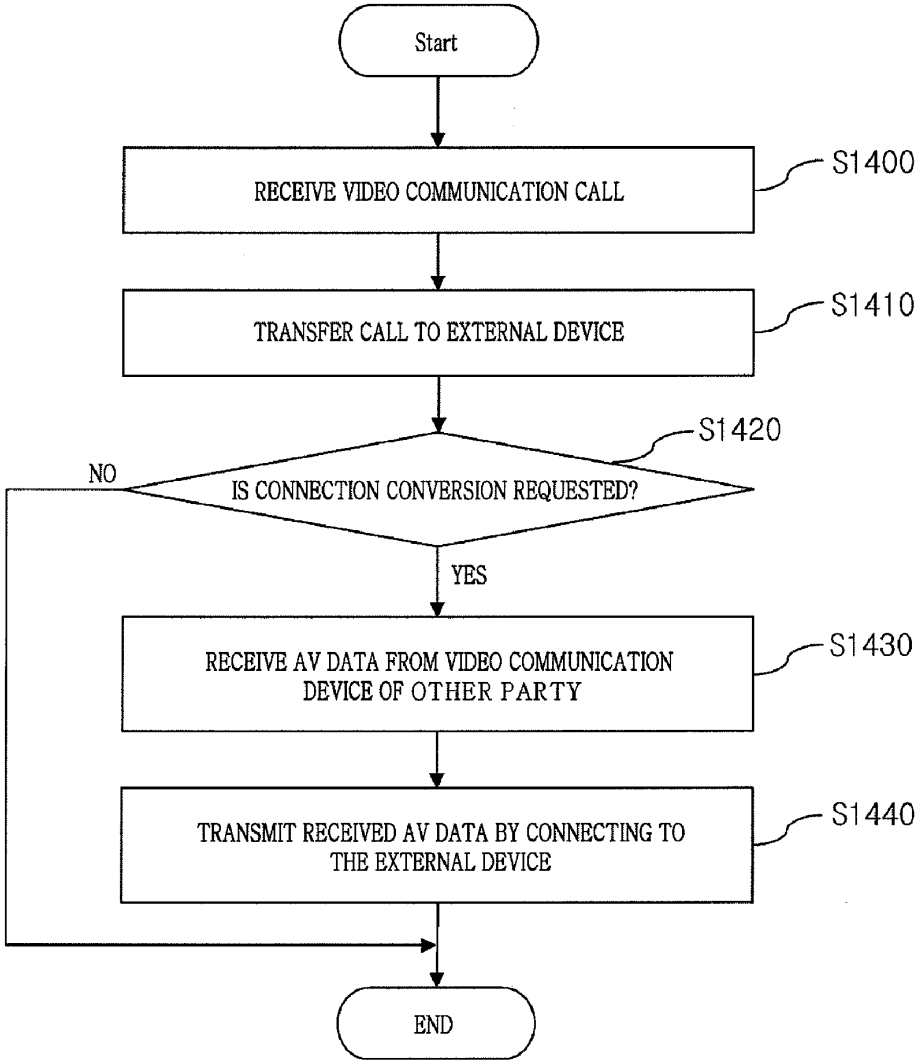

Start
RECEIVE VIDEO COMMUNICATION CALL
S1400
TRANSFER CALL TO EXTERNAL DEVICE
S1410
S1420
NO
IS CONNECTION CONVERSION REQUESTED?
YES
RECEIVE AV DATA FROM VIDEO COMMUNICATION DEVICE OF OTHER PARTY
S1430
TRANSMIT RECEIVED AV DATA BY CONNECTING TO THE EXTERNAL DEVICE
S1440
END

FIG.84

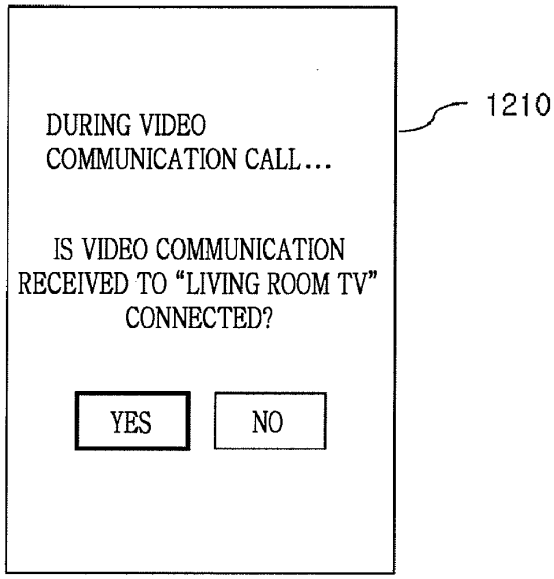

DURING VIDEO
COMMUNICATION CALL...
IS VIDEO COMMUNICATION
RECEIVED TO "LIVING ROOM TV"
CONNECTED?
YES
NO
1210

FIG.85

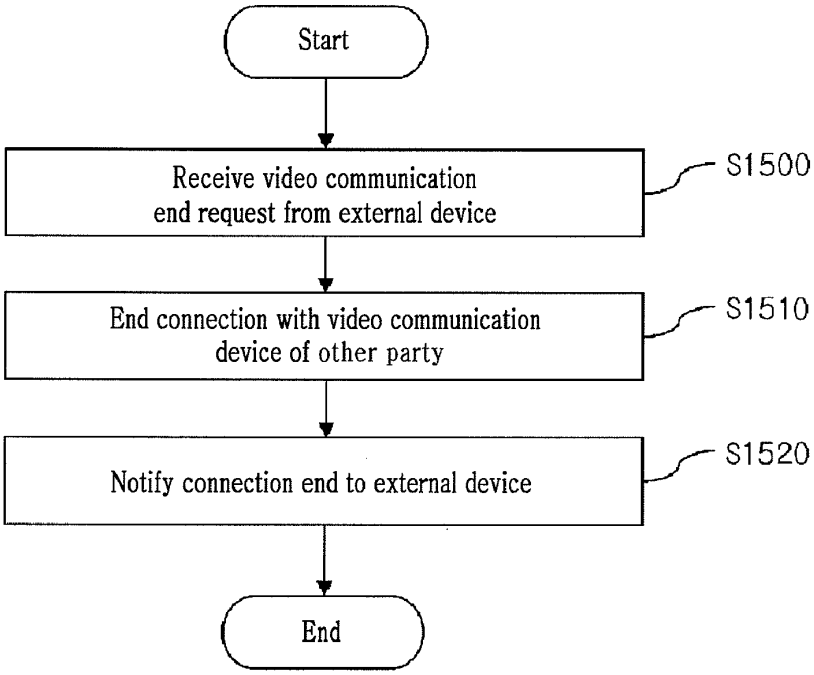

Start
Receive video communication
end request from external device
S1500
End connection with video communication
device of other party
S1510
Notify connection end to external device
S1520
End

FIG.86

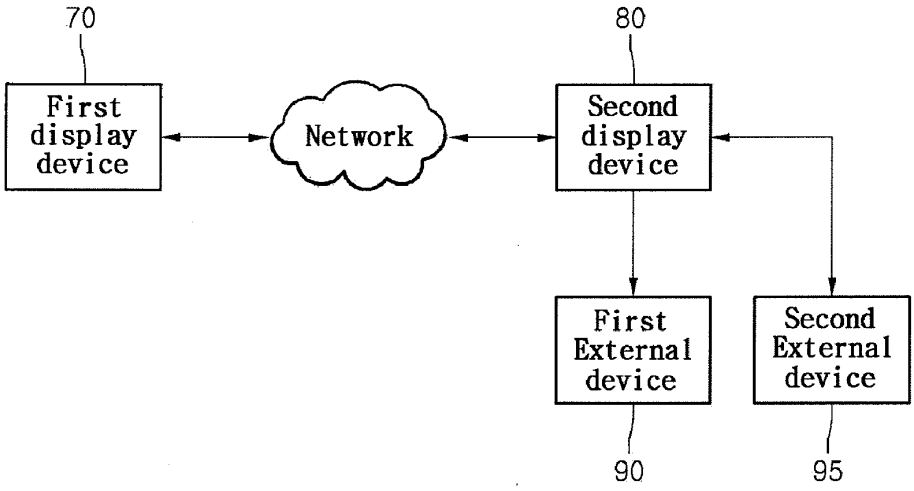

70
First display device
Network
80
Second display device
First External device
Second External device
90
95

FIG.87

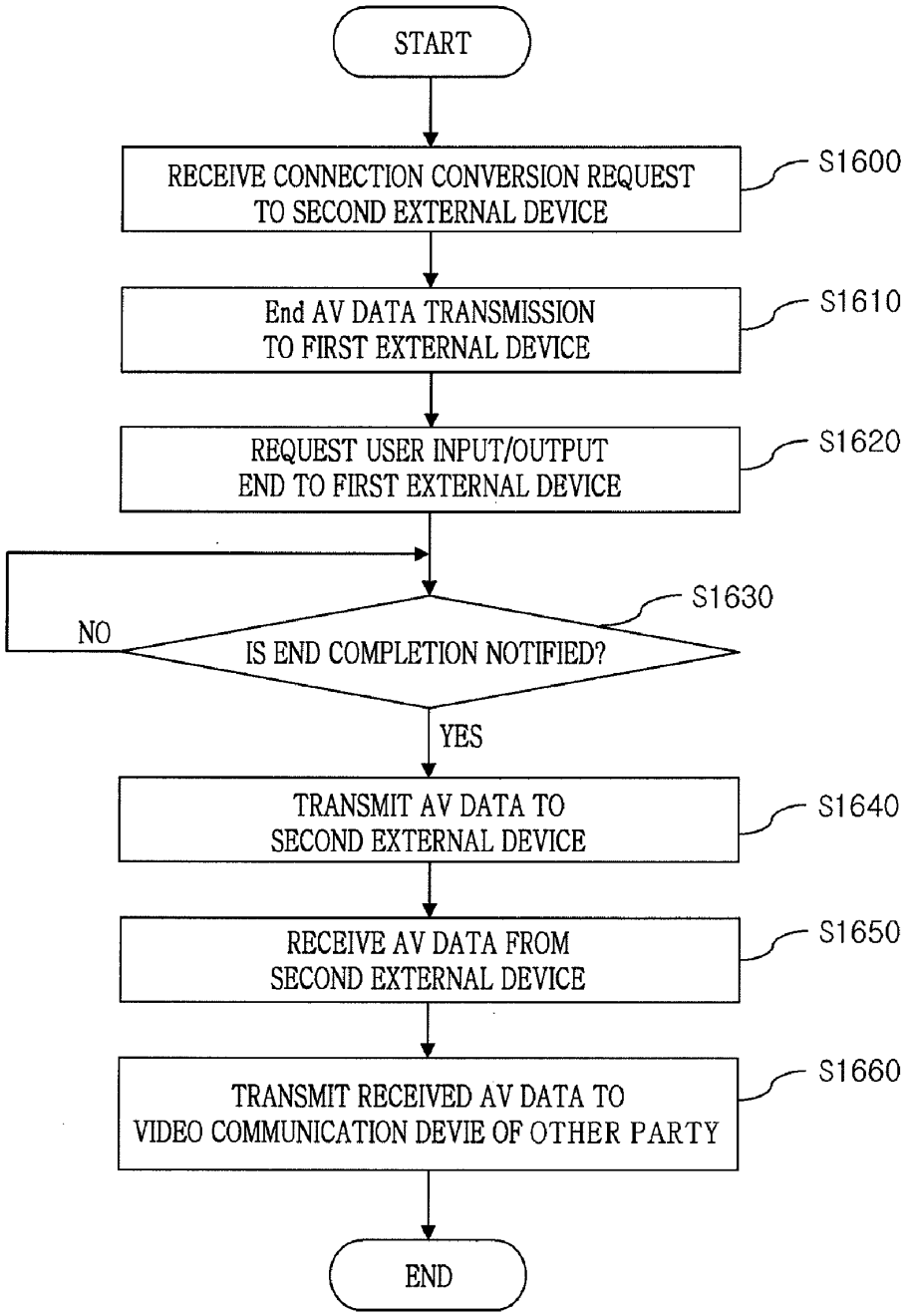

START
RECEIVE CONNECTION CONVERSION REQUEST TO SECOND EXTERNAL DEVICE
S1600
End AV DATA TRANSMISSION TO FIRST EXTERNAL DEVICE
S1610
REQUEST USER INPUT/OUTPUT END TO FIRST EXTERNAL DEVICE
S1620
S1630
NO
IS END COMPLETION NOTIFIED?
YES
TRANSMIT AV DATA TO SECOND EXTERNAL DEVICE
S1640
RECEIVE AV DATA FROM SECOND EXTERNAL DEVICE
S1650
TRANSMIT RECEIVED AV DATA TO VIDEO COMMUNICATION DEVIE OF OTHER PARTY
S1660
END

FIG.88

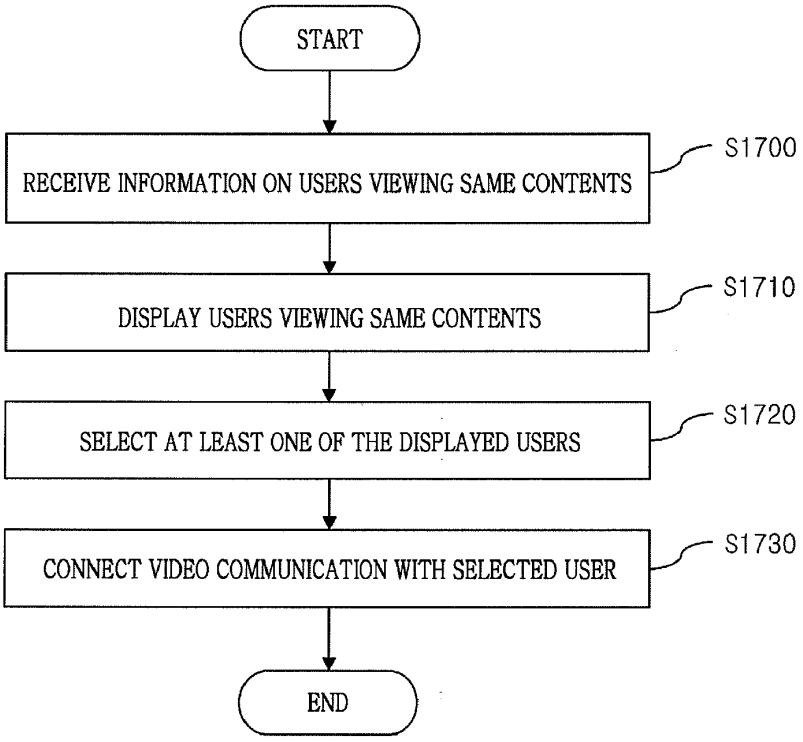

START
RECEIVE INFORMATION ON USERS VIEWING SAME CONTENTS
S1700
DISPLAY USERS VIEWING SAME CONTENTS
S1710
SELECT AT LEAST ONE OF THE DISPLAYED USERS
S1720
CONNECT VIDEO COMMUNICATION WITH SELECTED USER
S1730
END

FIG.89

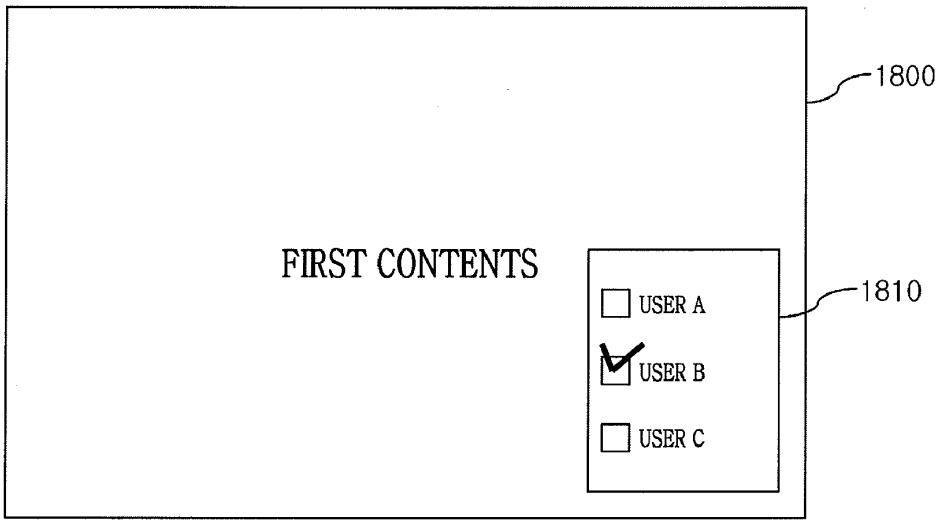

1800
FIRST CONTENTS
USER A
USER B
USER C
1810

FIG.90

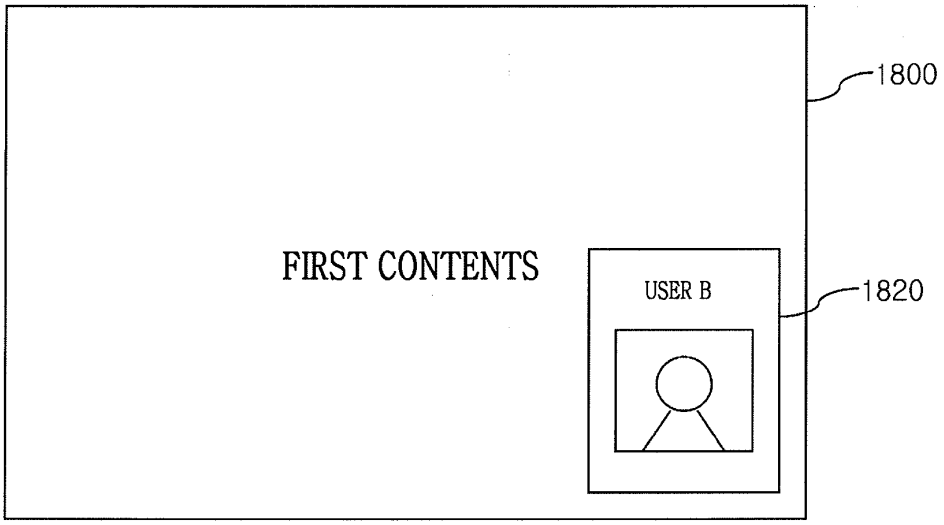

1800
FIRST CONTENTS
USER B
1820

FIG.91

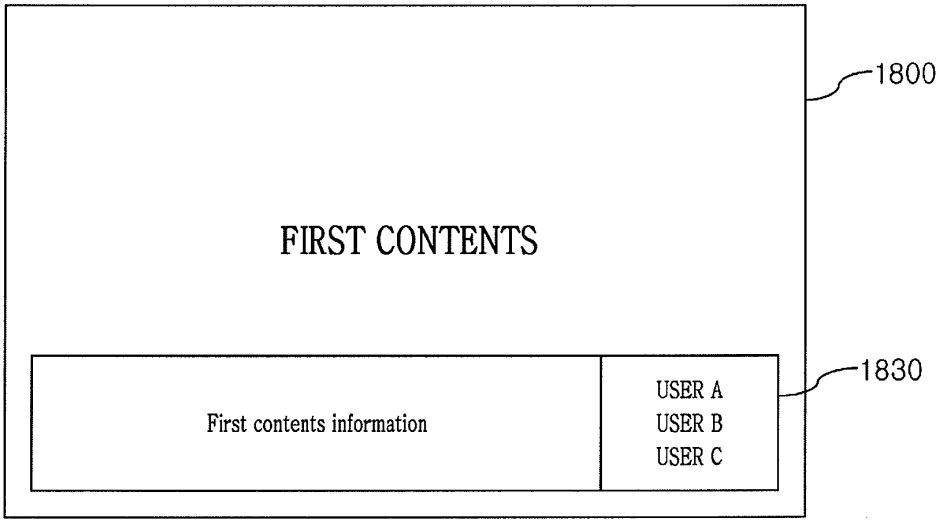

1800
FIRST CONTENTS
First contents information
USER A
USER B
USER C
1830

FIG.92

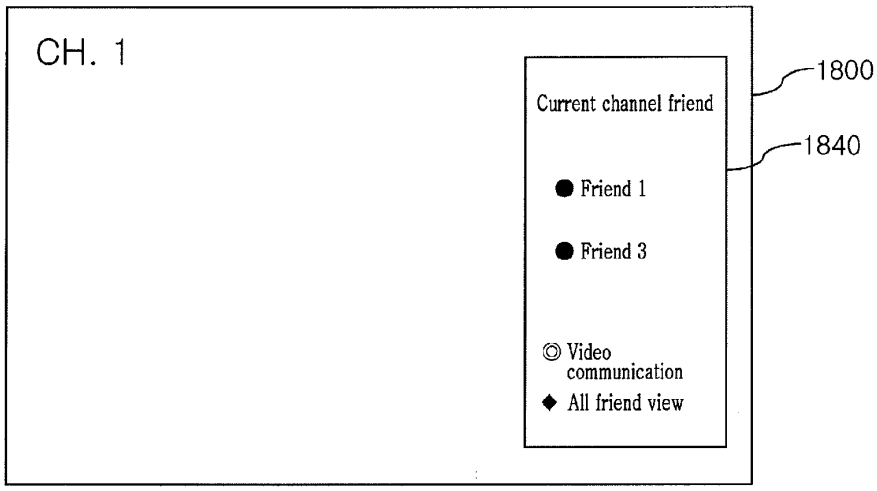

CH. 1
Current channel friend
Friend 1
Friend 3
Video communication
All friend view
1800
1840

FIG.93

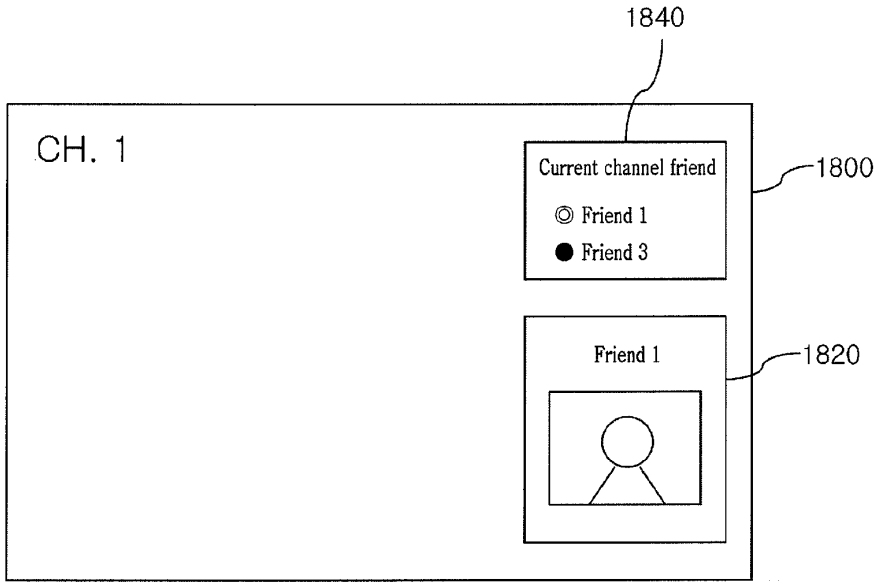

1840
CH. 1
Current channel friend
Friend 1
Friend 3
1800
Friend 1
1820

FIG.94

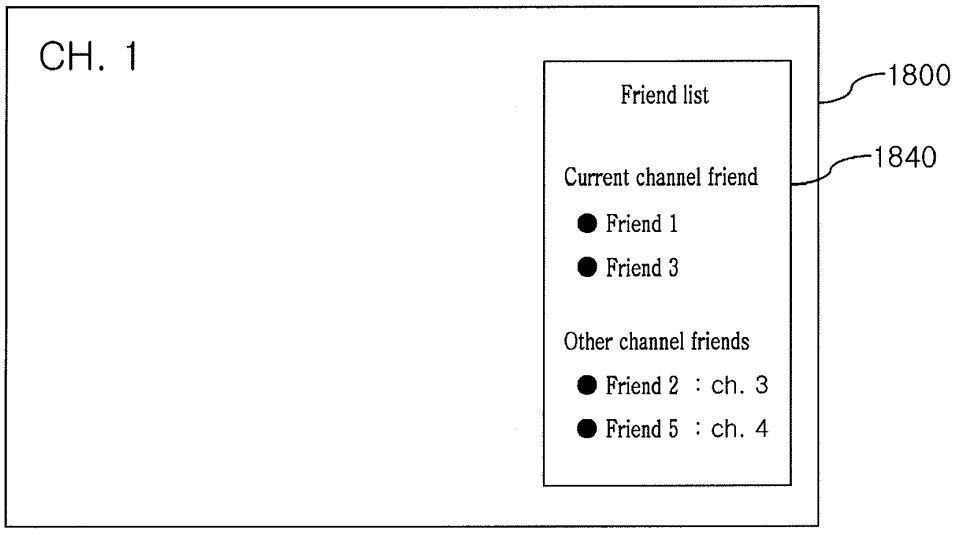

CH. 1
Friend list
Current channel friend
Friend 1
Friend 3
Other channel friends
Friend 2 : ch. 3
Friend 5 : ch. 4
1800
1840

FIG.95

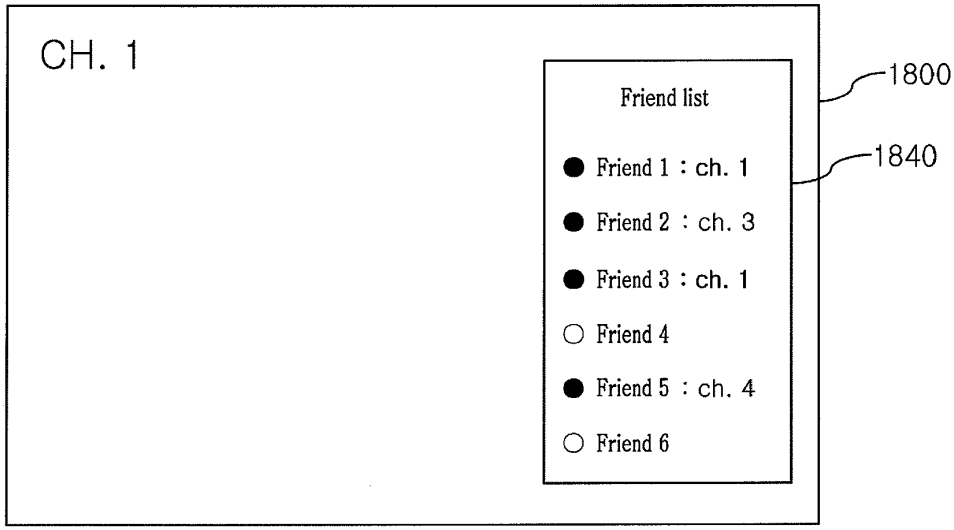

CH. 1
Friend list
Friend 1 : ch. 1
Friend 2 : ch. 3
Friend 3 : ch. 1
Friend 4
Friend 5 : ch. 4
Friend 6
1800
1840

FIG.96

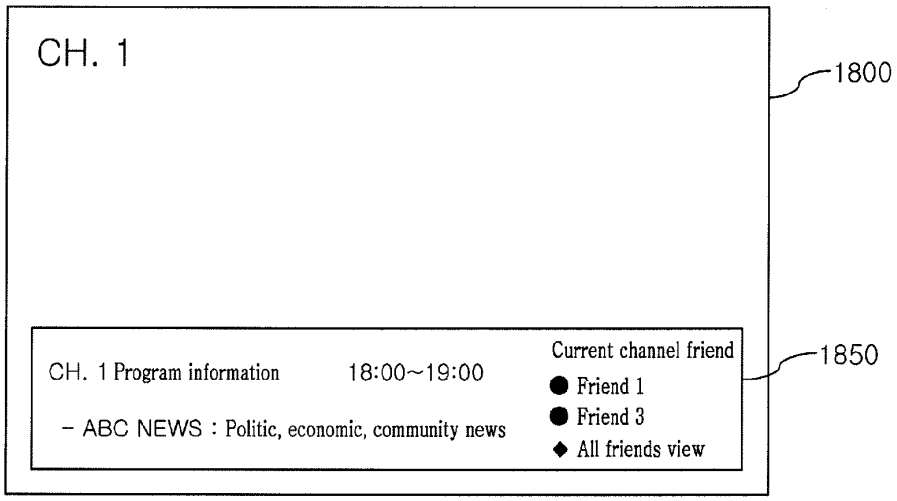
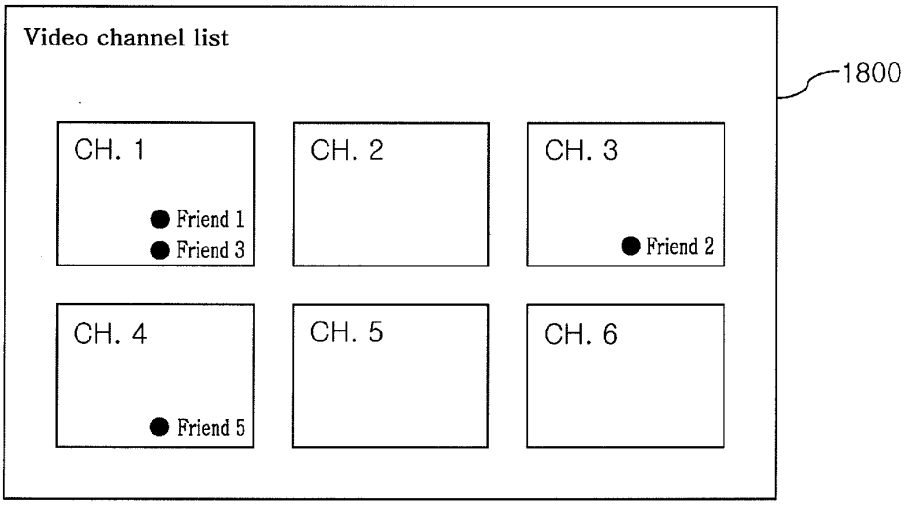

CH. 1
1800
CH. 1 Program information
18:00~19:00
- ABC NEWS : Politic, economic, community news
Current channel friend
Friend 1
Friend 3
All friends view
1850

FIG.97


Video channel list
1800
CH. 1
Friend 1
Friend 3
CH. 2
CH. 3
Friend 2
CH. 4
Friend 5
CH. 5
CH. 6

VIDEO COMMUNICATION METHOD AND DIGITAL TELEVISION USING THE SAME

[0001] The present application claims priority benefits of Korean Patent Application No. 10-2010-006460 filed on 25 Jan. 2010 in Republic of Korea, the entire contents of which are fully incorporated by reference.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] The present invention relates to a video communication method using a digital TV.

[0004] 2. Description of the Related Art

[0005] As digital TV and wired and wireless network technologies having more excellent signal processing and storage capacity than the existing analog TVs have commercially developed, it has been possible to provide the users with various kinds of contents services such as real-time broadcast, COD (Contents on Demand), games, news, video communication, etc., using the Internet network connected to each house, in addition to the existing broadcast media.

[0006] An example of providing contents services using the Internet network may include an IPTV (Internet Protocol TV). The IPTV technology implies transmitting various information services, video contents, and broadcast by using high speed Internet networks and providing them to the user's TVs.

[0007] Recently, concepts such as a broadband TV, a web TV, etc., have been proposed as a type of network TV, which is developed one step further from the IPTV. Unlike the existing IPTV, in the broadband TV or the web TV, there are several contents providers and a user can be provided with the contents such as various VODs, games, etc. provided by the contents provider, by individually accessing several contents providers.

[0008] In the foregoing network TV system, it is possible to provide information to the users in various types. A need exists for a method of exchanging the information and contents between the users and performing the video communication between them as needed.

SUMMARY OF THE INVENTION

[0009] The present invention has been made in an effort to provide a video communication method capable of effectively perform video communication in display devices such as a digital TV, etc., and to provide a digital TV using the same method.

[0010] A digital TV (DTV) according to an exemplary embodiment of the present invention transmits and receives video communication data by using a wired/wireless network and displays at least one of communication image according to the transmitted and received video communication data and the contents image input from the outside or stored therein on a screen.

[0011] A digital TV according to an exemplary embodiment of the present invention includes: a communication unit that transmits and receives video communication using a wired and wireless network; a video communication processor that processes the transmitted and received video communication data according to a predetermined video communication scheme; an AV processor that processes communication images according to the transmitted and received video communication data contents images input from the outside or stored therein; and a display unit that displays at least one of the communication images and the contents images processed in the AV processor on a screen.

[0012] A video communication method according to an exemplary embodiment of the present includes: transmitting and receiving video communication data by using a wired and wireless network; processing the transmitted and received video communication data according to a predetermined video communication scheme; processing communication images according to the transmitted and received video communication data and contents images input from the outside or stored therein; and displaying at least one of communication images and contents images processed in an AV processor on a screen.

[0013] A video communication method according to an exemplary embodiment of the present includes: selecting video communication services; processing a user log-in for the video communication services; and transmitting and receiving video communication data to and from video communication apparatuses of other party wishing to try video communication.

[0014] The video communication method may be implemented by a computer-readable recording medium for recording therein computer-readable programs executable with a computer.

[0015] As set forth above, embodiments of the present invention preferably implement the video communication function using the digital TV to enable the user to receive and transmit the video communication while watching the contents, thereby making it possible to improve the user convenience. In addition, the present invention can provide the user interface capable of effectively performing the video communication by using the digital TV. According to an embodiment, the invention provides a digital TV (DTV) for a video call operation using a camera associated with the DTV, the DTV comprising: a display unit; and at least one processor configured to: display simultaneously, on the display unit, (a) an image received from the camera for a video call operation, and (b) a plurality of different image setting items for controlling characteristics of the image received from the camera; adjust at least one of the characteristics of the image based on a user's control of at least one of the plurality of different image setting items; display, on the display unit, the image having the at least one adjusted characteristic based on the user's control; and perform the video call operation with another party using the image having the at least one adjusted characteristic.

[0016] According to an embodiment, the invention provides a method for controlling a digital TV (DTV) for a video call operation using a camera associated with the DTV, the DTV including a display unit and at least one processor, the method comprising: displaying simultaneously, on the display unit, (a) an image received from the camera for a video call operation, and (b) a plurality of different image setting items for controlling characteristics of the image received from the camera; adjusting, by the at least one processor, at least one of the characteristics of the image based on a user's control of at least one of the plurality of different image setting items; displaying, on the display unit, the image having the at least one adjusted characteristic based on the user's control; and performing, by the at least one processor, the video call operation with another party using the image having the at least one adjusted characteristic.

[0017] These and other objects of the present application will become more readily apparent from the detailed description given hereinafter. However, it should be understood that the detailed description and specific examples, while indicating preferred embodiments of the invention, are given by way of illustration only, since various changes and modifications within the spirit and scope of the invention will become apparent to those skilled in the art from this detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] The present invention will become more fully understood from the detailed description given hereinbelow and the accompanying drawings which are given by way of illustration only, and thus are not limitative of the present invention and wherein:

[0019] FIG. **1** is a block diagram showing a configuration of a video communication system according to an embodiment of the present invention;

[0020] FIG. **2** is a block diagram showing a configuration of a display device according to a first exemplary embodiment of the present invention.

[0021] FIG. **3** is a flowchart showing a video communication method according to an exemplary embodiment of the present invention;

[0022] FIGS. **4** to **47** are diagrams for explaining exemplary embodiments of a method for performing video communication by using a display device;

[0023] FIG. **48** is a block diagram showing a configuration of a display device according to a second exemplary embodiment of the present invention;

[0024] FIG. **49** is a flow chart showing a user authentication method according to an exemplary embodiment of the present invention;

[0025] FIG. **50** is a diagram for explaining a user authentication method according to a first exemplary embodiment;

[0026] FIGS. **51** to **58** are diagrams for explaining a user authentication method according to a second exemplary embodiment;

[0027] FIGS. **59** to **61** are diagrams showing a method for displaying user authentication results according to exemplary embodiments;

[0028] FIG. **62** is a flowchart showing a method for managing a video communication account according to a first embodiment of the present invention;

[0029] FIG. **63** is a flowchart showing a method for managing a video communication account according to a second exemplary embodiment of the present invention;

[0030] FIGS. **64** to **73** are diagrams for explaining the method for managing video communication account according to the exemplary embodiments;

[0031] FIG. **74** is a block diagram showing a configuration of a video communication system according to another exemplary embodiment of the present invention;

[0032] FIG. **75** is a flowchart showing a method for connecting video communication according to a first embodiment of the present invention;

[0033] FIG. **76** is a flowchart showing a method for connecting video communication according to a second exemplary embodiment of the present invention;

[0034] FIG. **77** is a flowchart showing a method for registering external devices according to an exemplary embodiment

[0035] FIGS. **78** and **79** are diagrams for explaining a method for switching and connecting video communication to external devices according to an exemplary embodiment;

[0036] FIG. **80** is a flowchart showing a method for connecting video communication according to a third exemplary embodiment of the present invention;

[0037] FIGS. **81** and **82** are diagrams for explaining a method for switching and connecting video communication according to an exemplary embodiment;

[0038] FIG. **83** is a flow chart showing a method for transmitting communication calls to external devices according to an exemplary embodiment;

[0039] FIG. **84** is a diagram for explaining a method for connecting video communication to external devices receiving video communication calls;

[0040] FIG. **85** is a flow chart showing a method for ending video communication according to an exemplary embodiment;

[0041] FIG. **86** is a block diagram showing a configuration of a video communication system according to another exemplary embodiment of the present invention;

[0042] FIG. **87** is a flowchart showing a method for connecting video communication according to a fourth exemplary embodiment of the present invention;

[0043] FIG. **88** is a flow chart showing a method for connecting video communication according to an exemplary embodiment of the present invention;

[0044] FIGS. **89** to **91** are diagrams showing a method for connecting video communication according to a first exemplary embodiment;

[0045] FIGS. **92** to **96** are diagrams showing a method for connecting video communication according to a second exemplary embodiment; and

[0046] FIG. **97** is a diagram showing a method for displaying channel information according to an exemplary embodiment.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0047] A video communication method and a digital TV using the same method according to exemplary embodiments of the present invention will now be described with reference to the accompanying drawings. Various methods and operations of the invention discussed below can be implemented in any of the devices or systems discussed below or in any other suitable device or system. Any feature discussed in connection with one embodiment can be added to or applied to any other embodiment of the invention. Various examples of embodiments of the invention may be combined into one embodiment or example.

[0048] FIG. **1** is a block diagram showing a configuration of a video communication system according to an embodiment of the invention.

[0049] Referring to FIG. **1**, a video communication system is a system that uses a plurality of devices capable of processing, transmitting, and receiving video data and audio data so that a calling party and a called party may communicate with each other, while seeing videos transmitted from the other party. Preferably, audio sounds such as voices are also exchanged between the call parties. In the present disclosure, call parties preferably include at least one party among called party(ies) and calling party(ies). The video communication system may include a display device **10** and other devices **20**,

30, **40**, **50**, **60**, etc. communicating with each other via one or more networks. All components of the system are operatively coupled and configured.

[0050] For example, the display device **10** may use input devices such as a camera, a microphone, etc., to acquire image and audio data corresponding to the image and voice of the user and transmit the acquired image and audio data to one or more other devices **20** to **60** connected to wired and/or wireless network(s).

[0051] According to an exemplary embodiment of the present invention, the display device **10** may be a digital TV that receives and displays digital broadcasting, wherein the digital broadcasting depends on a scheme of compressing and transmitting the image and voice signals.

[0052] Meanwhile, the display device **10** may receive the image and audio data from other devices **20** to **60** connected to the wired/wireless network, such that communication may be made between the display device **10** and the external devices **20** to **60**.

[0053] As shown in FIG. **1**, the external device capable of performing the video communication (e.g., video conference, video chatting, etc.) with the display device **10** may be another display device **20** of a different party, a mobile terminal **40** such as a mobile phone **30**, a PDA, smart phone, or a notebook computer, a PC **50**, a video communication device **60**, or the like.

[0054] Further, a network connecting the display device **10** with the external devices **20** to **60** can transmit and receive the image and audio data according to a communication protocol for video communication.

[0055] For example, the display device **10** and the external devices **20** to **60** may use a network depending on the protocols of Ethernet or IEEE 802.3, etc., to transmit and receive the image and audio data and use a wireless network depending on the standards of IEEE 802.11 to transmit and receive the data.

[0056] Meanwhile, the network can use voice over broadband (VoBB) or legacy services, etc., to transmit and receive data between the display device **10** and the external devices **20** to **60**.

[0057] In more detail, the VoBB may include services such as a voice over cable modem (VoBB), a voice over DSL (VoSL), a voice over Internet protocol (VoIP), a fixed wireless access (FWA), a fiber to the home (FTTH), or a voice over ATM (VoATM), etc.

[0058] Meanwhile, the legacy service may include an integrated service digital network (ISDN), a plain old telephone service (POTS), a cellular or 3G service, or the like.

[0059] Therefore, the display device **10** and the external devices **20** to **60** may use a wireless network, an existing telephone network, a data network such as the Internet, etc., a cable modem system, or a cellular network, etc., to transmit and receive the image and audio data.

[0060] Meanwhile, the display device **10** and the external device **20** to **60** may transmit and receive the image and audio data according to the established protocol therebetween. For example, they may use protocols such as a H.261 standard for video data coding, a H.221 standard for image and audio data communication, and a H.242 standard for call setup and release, etc.

[0061] In more detail, the video communication system using the Internet may uses protocols implemented in video communication standards such as H.323, H.263, and H.264 standards for video coding and G723.1, G.711, and G.729 for audio coding, etc.

[0062] However, the video communication system according to the exemplary embodiment of the present invention is not limited to the above-mentioned configurations. For example, the devices **20** to **60** that perform video communication with the display device **10** are not limited the devices **20** to **60** as shown in FIG. **1** and the standards such as SIP, RTP/RTCP protocols other than (or in addition to) the above-mentioned standards may be used.

[0063] FIG. **2** is a block diagram of a configuration of the display device **10** (or **20**) according to a first exemplary embodiment of the present invention. The display device shown may include a communication unit **100**, a tuner **105**, a controller (e.g., processor) **110**, an AV processor **115**, a video communication processor **120**, a storage unit **130**, a camera **141**, a microphone **142**, a display unit **143**, an audio output unit **144**, and a user input unit **145**. Referring to FIG. **2**, the communication unit **100** is connected to a server for video communication services or the video communication device of the other party, thereby making it possible to transmit and receive the video communication data.

[0064] For example, the communication unit **100** may transmit data streams including the AV data corresponding to the videos and audios of the user to the external devices, for example, the video communication device of another party through the wired and wireless network. Here, the video communication occurs between the user at the display device **10** and the another party at the external device.

[0065] In addition, the communication unit **100** may receive data streams including the AV data corresponding to the videos and audios of the other party performing the video communication from the video communication device of the other party.

[0066] For instance, the communication unit **100** is connected to the video communication device of the other party using the wired/wireless network such as Ethernet or IEEE 802.3, IEEE 802.11, etc., thereby making it possible to transmit and receive the AV data to and from the video communication device of the other party.

[0067] The video communication processor **120** can process and output the transmitted and received video communication data, e.g., the AV data of the user acquired by using the camera **141** and the microphone **142** and the AV data of the other party(ies) received through the communication unit **100** according to video communication protocols, such as preset video communication schemes, for example, H.323, H.2.63, or H264 standards for video data, G723.1, G.711, or G.729 for audio data, or the like.

[0068] For example, the video communication processor **120** may encode the video data according to H.323, H.263, and H.264 standards, or the like, to output a basic stream of digital data, e.g., a video stream in an elementary stream form.

[0069] In addition, the video communication processor **120** may encode the audio data according to G.723.1, G.711, and G.729 standards, or the like, to output an audio stream in an elementary stream form.

[0070] The AV processor **115** converts the image and audio data of the user (current user at the display device **10**) and the image and audio data of the other party (e.g., another user at

the external device **20-60**) according to video communication data, for example, video communication output from the video communication processor **120** into a form that can be output from the display unit **143** and the audio output unit **144**. For instance, the AV processor **115** can process the communication image of each of the involved parties to be output from the display unit **143** by using the video communication data processed in the video communication processor **120**.

[0071] The AV processor **115** can process the communication voice of each of the involved parties to be output from the audio output unit **144** by using the video communication data processed in the video communication processor **120**.

[0072] In addition, the AV processor **115** may convert the contents input from the outside or stored in the display device **10** into a form that can be output from the display unit **143** and the audio output unit **144**.

[0073] Referring to FIG. **2**, the AV processor **115** may process the digital broadcasting signals received through the tuner **105** to be output from the display unit **143** and the audio output unit **144**.

[0074] In more detail, the AV processor **115** converts the communication image according to the video communication data transmitted and received through the communication unit **100** and the contents image according to the broadcasting signal input through the tuner **105** into the displayable form, such that the display unit **143** can display at least one of the communication image (e.g., picture of the other party's face) and the contents image on a screen.

[0075] The AV processor **115** may perform pre-processing operations adjusted to improve the quality of video or meet a specific purpose, for example, video processing such as readjustment of contrast, removal of noise, smoothing, sharpening, or the like.

[0076] The storage unit **130** such as a memory or database may store programs and/or user information, or the like, for the operation of the display device.

[0077] The camera **141** photographs the peripheral regions of the display device, e.g., a region including an image of the current user at the display device **10**, thereby making it possible to acquire and output the corresponding video data.

[0078] Meanwhile, the camera **141** may be provided to be mounted on one side of the main body of the display device such as a web cam, etc., such that it may be disposed to photograph the front of the display device.

[0079] The mike (microphone) **142** may collect the audio generated around the display device, e.g., the audio including the voice of the user at the display device **10** and output the corresponding audio data.

[0080] Meanwhile, the mike **142** may be mounted on one side of the main body of the display device or may be disposed at the outside of the display device, for example, at a position adjacent to the user at the display device **10**.

[0081] The display unit **143** may display the video of the user acquired by the camera **141**, e.g., the communication image to be transmitted to the video communication device of the other party, display the communication image of the other party received through the communication unit **100** and display the video of the contents input from the outside and stored therein.

[0082] For example, the display unit **143** may display videos using various types of displays, such as a DLP (Digital Light Processing), an LCD (Liquid Crystal Display), PDP (Plasma Display Panel), etc.

[0083] Further, the audio output unit **144** may output the communication voice of the user at the display device **10** obtained by the mike **142**, output the communication voice of another party involved in the video communication which is received through the communication unit **100**, and transfer it to the user at the display device **10**.

[0084] The user input unit **145** includes a plurality of key buttons for a user input and/or displays the plurality of key buttons using a touch panel, thereby making it possible to receive an input for controlling the operation of the display device **10** from the user.

[0085] Meanwhile, the user input unit **145** may be provided at the outside of the display device **10**. For example, the user input unit **145** may be a remote controller including the plurality of key buttons for the user input.

[0086] The controller **110** controls the entire operation of the display device **10** as described above. For example, the controller **110** can control the communication processor **120**, the AV processor **115**, and the user input unit **145**, respectively.

[0087] According to the exemplary embodiment of the present invention, the display device **10** uses a wired/wireless network to transmit and receive the video communication data and may display at least one of the communication image according to the transmitted and received video communication data and at least one of the contents images input from the outside and stored therein on a screen of the display unit **143**.

[0088] FIG. **3** is a flow chart showing a video communication method according to the exemplary embodiment of the present invention. The video communication method shown in FIG. **3** will be described in combination with a block diagram showing a configuration of the display device according to the exemplary embodiment of the present invention shown in FIG. **2**

[0089] Referring to FIG. **3**, the user input unit **145** of the display device **10** selects the video communication service identified from the user (S**200**) and the controller **110** processes a log-in for the user (S**210**).

[0090] For example, the controller **110** performs the user authentication using the user information input from the user through the user input unit **145**, e.g., a user ID and a password, etc., to process the user log-in.

[0091] The user input unit **145** receives the selection command of the other party that the user wishes to try video communication with the user (S**220**). In this embodiment and any other embodiments of the invention, the other party includes a single party or a plurality of parties. A party can include one or more individuals who are at one or more external devices (e.g., **20-60** in FIG. **1**) for video communicating with the user at the display device **10**.

[0092] Thereafter, the communication unit **100** is connected to the video communication apparatus of the other party and the display **143** uses the video communication data transmitted and received through the connected wired/wireless network to display the video communication image (S**230**).

[0093] For example, the communication unit **100** may be connected to the video communication apparatus through the server providing the video communication services, transmit the AV data of the user acquired through the camera **141** and the mike **142** to the server, and receive the AV data of the other party transmitted from the video communication apparatus of the other party through the server.

[0094] Meanwhile, the transmitted and received video communication data, e.g., the AV (Audio and/or Video) data of the user and the AV data of the other party according to the video communication are input to the display unit **143** and the voice output unit **144** via the video communication processor **120** and the AV processor **115**, such that the communication image and voice each may be output.

[0095] Thereafter, when the ending of the video communication is requested from the user (S**240**), the communication unit **100** releases the connection with the video communication apparatus of the other party, e.g., the wired/wireless network connected with the server, thereby ending the video communication services (S**250**).

[0096] The exemplary embodiments of the method for performing the vide communication using the display device or display system will now be described in more detail with reference to FIGS. **4** to **47**.

[0097] The display system according to the exemplary embodiment of the present invention may be configured to include at least one of a network operator, a contents provider (CP), a service provider, and a display device.

[0098] The network operator may provide a basic software necessary to normally operate contents provided to the display device **10** by a contents provider. In addition, the network operator may provide hardware information on the display device **10** necessary to normally execute contents in the display device **10** to the contents provider.

[0099] For example, the network operator may provide a user interface that provides a main screen configured when contents provided by the contents provider is displayed on the display device **10** or allows the user to select contents or input various commands and displays the corresponding outputs. In addition, the network provider may serve to provide information for updating the firmware or software of the display device **10** each time the user interface is needed.

[0100] The contents provider may generate various contents that can be provided on the network and configure them into a format that can be reproduced in the display device **10** and provide the contents according to the request of the display device **10**. The contents may be optional data that may be served through the network.

[0101] The service provider may be an Internet service provider that provides network communication among the network operator, the contents provider, and the display device **10**.

[0102] The display device **10** receives the contents through the service provider in response to the request of the user and reproduces or executes them. For example, the display device **10** may be configured to include a broadcasting receiving apparatus, an optional apparatus mounted with a network module such as a telephone for a network, etc.

[0103] For example, the contents provider may be a provider that produces various contents to be provided to the display device **10**. The contents provider **20** can include a TV broadcasting station, a radio station, a VOD provider, an AOD provider, a game provider, a video communication service provider, a weather information provider, and a photograph-related service provider etc.

[0104] In more detail, the video communication service provider may provide relay services that can serve to perform the video communication with the user of other network TVs through the network.

[0105] The display apparatus **10** can preferably have a network interface accessible to the network, which may be allocated with an IP address to receive and process data packets through the network and may store or reproduce the data packets when the data packets are multimedia data, such as video or an audio data.

[0106] Further, the display device **10** may be operated to transmit the user demands in two ways while processing the multimedia data. To this end, a remote controller for controlling the display device **10** may be provided with buttons for controlling the network TV, e.g., buttons for selecting various menus.

[0107] Referring to FIG. **4**, the menu screen of the display device **10** may include icons **310** to **314** each representing a plurality of contents providers.

[0108] The icons **310** to **314** displayed on the screen **300** may be buttons for accessing the servers of the plurality of contents providers. The user selects one of the icons **310** to **314**, e.g., using a remote controller or mouse, to access the server of the desired contents provider, such that he/she can receive contents services from the server. The icons **310** to **314** also may be selected by a touch by the user, e.g., if the screen is a touch-sensitive screen.

[0109] According to the exemplary embodiment of the present invention, at least one of the plurality of contents providers provides the video communication services, and any one of the icons **310** to **314** displayed on the screen **300** of the display device **10**, for example, the 'video communication' icon **310** may be an icon corresponding to the vide communication service.

[0110] The user may select the "video communication" icon **310** among the icons **310** to **314** displayed on the screen **300** to access the server of the contents provider and thus, receive the video communication services.

[0111] The user input unit **145** may be an input unit for performing the selection operation as described above and may be a remote control apparatus connected with the display device **10** through the wired or wireless communication manner or an apparatus sensing a motion of a portion of a body such as the user's finger or eye, etc.

[0112] For example, the remote control apparatus may be a spatial remote controller or a mouse, etc., that can recognize the operation of the user to transmit the corresponding signals to the contents reproducing apparatus.

[0113] Further, the display device **10** may include a touch panel capable of sensing the positions touched by the specific object or the motion of the touched object, such that the user may touch the screen by using his/her finger or the specific object to perform the above-mentioned selection operation.

[0114] Meanwhile, the display device **10** may include a sensing unit capable of sensing the motion of the user's eye, such that the above-mentioned user input may be received according to the motion of the user's eye.

[0115] Referring to FIG. **4**, a pointer **320** moving corresponding to the motion of the above-mentioned input unit may be displayed on the screen **300**, such that the pointer **320** may display the position/selection pointed by the input unit of the user.

[0116] When the user selects the video communication services, the screen for processing the user log-in may be displayed.

[0117] Referring to FIG. **5**, input windows **330** and **331** capable of inputting a user ID and a password, respectively, are displayed on the screen **300** of the display device **10**

providing the video communication services and the user may input the ID and the password by using a keypad **332** displayed on the specific region of the screen **300**.

[0118] Meanwhile, when the user selects an automatic log-in for the input ID, for example, when the selection is displayed on the region **333** for the automatic log-in, the video communication service may be automatically logged-in by the input ID, e.g., 'Name 1' when turning-on the display device **10**.

[0119] Referring to FIG. **6**, when the display device **10** is turned-on, the log-in work for the ID set to be automatically logged-in is automatically performed and a pop up window **334** may be displayed on the screen **300** indicating that it is logged-in in the video communication services.

[0120] Meanwhile, when there is the video communication service ID previously registered in the display device **10**, the registered IDs may be displayed on the screen **300** in response to the selection of the video communication service of the user.

[0121] For example, referring to FIG. **5**, the user may input the ID and password for the video communication service by using the above-mentioned method to register the video communication service ID in the display device **10** and the user information including the registered ID and password may be stored in the storage unit **130**.

[0122] Referring to FIG. **7**, when the user selects the video communication service, the information on the registered users may be displayed on the screen **300**. For example, the buttons **340** to **344** corresponding to the registered user IDs, e.g., 'name **1**', 'name **2**', 'name **3**', 'name **4**', and 'name **5**' may be displayed on the screen **300** for the video communication service.

[0123] Meanwhile, the currently logged-in ID among the user IDs registered in the display device **10** may be displayed on the screen **300** to be differentiated from the remaining IDs that are not logged-in.

[0124] As shown in FIG. **7**, the button **340** corresponding to the currently logged-in 'name **1**' among the registered user IDs may be displayed to be differentiated from the remaining buttons **341** TO **344**, for example, the button **340** corresponding to the logged-in 'name **1**' may be displayed in color, brightness, or form different from the remaining buttons **341** to **344**.

[0125] When the user selects the button **340** corresponding to the logged-in. ID, e.g., 'name **1**', the plurality of items related to the video communication service as shown in FIG. **8**, for example, the menu screen including 'contact address', 'general telephone', 'using history', 'user information', and 'setting items' may be displayed. For instance, when the current user having 'name **1**' at the display device **10** selects 'name **1**' button, then all information associated with the selected 'name **1**' is discussed. Such information may include contact address (e.g., contact information of all other parties that the 'name **1**' user communicates with).

[0126] Referring to FIG. **8**, the registered contact addresses for the 'name **1**' **357** (selected ID) may be displayed on the screen **300**.

[0127] For example, the contact addresses registered under the 'name **1**', that is, buttons **350**, **351**, **352**, **353**, and **354** each corresponding to 'user **1**', 'user **2**', 'user **3**', 'user **4**', and 'user **5**' (other parties) may be displayed on the screen **300**. These buttons are selectable items.

[0128] Further, an icon **355** for the corresponding contact address may be displayed, where the icon **355** can indicate whether or not that user is logged-in (e.g., filled-out dot indicates that user is currently logged-in), and user information such as the user ID, etc. may be displayed. In more detail, the icon **355** may be set by an image, such as a photograph of the corresponding user's face, or the like, and the setting can be done by the corresponding user.

[0129] Meanwhile, for each contact address, it may be displayed whether the corresponding ID is currently logged-in in the video communication services.

[0130] In the case shown in FIG. **8**, it can be appreciated that the 'user **1**' and 'user **3**' among the users registered in the contact addresses are logged-in in the current video communication service and the 'user **2**', 'user **4**', and 'user **5**' are not currently logged-in. Here, these users would generally be other users at other devices, but can include the current user who may prefer to have multiple user IDs.

[0131] Further, a message **356** set by the user of the corresponding contact address may be displayed on the screen **300**, together with the above-mentioned button **350**. The above-mentioned user icon **355** and message **356** may be changed by the corresponding user.

[0132] When the current user at the display device selects to display his contact addresses, the current user may change the number of contact addresses that are simultaneously displayed on the screen **300** by selecting 'number change' on the bottom portion of the screen **300** as shown in FIG. **9**.

[0133] For example, when the user selects the 'number change', the contact addresses more than those shown in FIG. **8** may be simultaneously displayed on the screen **300**, as shown in FIG. **9**. The user (that is, the current user at the display device **10**) can use the arrow buttons to scroll through his/her contact addresses.

[0134] Further, the registered contact addresses may be aligned according to the specific conditions to be displayed on the screen **300**, by selecting an 'alignment' button displayed on the bottom portion of the screen **300**. Here, the alignment can include a manner in which the contact addresses are displayed. For instance, the alignment can include sorting the contact addresses in a particular manner and display them in that manner.

[0135] Referring to FIG. **10**, each contact address registered in the current screen **300** is currently logged-in and is aligned according to whether they are in an 'on-line state' and the user may move the pointer **320** by using the input unit such as the remote control apparatus, etc., to change the alignment condition of the contact addresses in a 'name' order. Further, the user may select to display the deleted contact addresses on the screen **300**.

[0136] The user selects 'search' on the bottom end of the screen **300** in FIG. **9**, thereby making it possible to search the video communication service ID. For example, the user uses the keypad **332** as shown in FIG. **5** to input IDs or email addresses, etc., and to have them registered as contact addresses and can search the input IDs or email addresses in the server for the video communication service. The user can also search the stored contact addresses to quickly find a desired contact using the 'search' button.

[0137] Meanwhile, when the user selects a particular ID, that is not currently logged-in, among the user IDs registered in the display device **10**, for example, 'name **2**', the input window **331** for inputting the password of the selected 'name **2**' ID may be displayed on the screen **300** as shown in FIG. **11**.

Here, 'name **2**' can be one of the IDs that a current user at the display device **10** decided to use for himself/herself, or can be another user if the current user knows the password for that another user.

[0138] When the user inputs the password to the password input window **331**, the user authentication for the 'name **2**' ID may be performed and the 'name **2**' ID may be logged-in through the password acknowledgement. Here the user authentication can be performed by the display device **10** or by the server communication with the display device **10**.

[0139] As described above, when the log-in for the 'name **2**' ID is completed, the video communication service screen **300** as described with reference to FIGS. **8** to **10** may be displayed.

[0140] Further, when the user selects an 'account additional' button **345** shown in FIG. **7**, a new video communication service ID may be additionally registered in the display device **10**. In that case, referring to FIG. **12**, the user may input a user name, ID, and password that will be additionally registered by using the keypad **332** displayed on the screen **330**.

[0141] In addition, when the user name, ID, and password are input and a 'continue' button is then pressed, the user information, for example, the user interface for inputting email addresses and countries, etc., may be displayed on the screen **300** as shown in FIG. **13**. The user may input email addresses by using the keypad **332** and automatically set countries, referring to countries or using languages, etc., set in the display device **10**.

[0142] As described above, the information on the added user ID may be stored in the storage unit **130** in the display device **10** and the server for the video communication services, respectively.

[0143] Hereinafter, the exemplary embodiment of the video communication method according to the present invention will be described, by way of example, the case of performing the video communication by selecting the currently logged-in user ID, for example, 'user **1**' in the screen **300** shown in FIG. **7**.

[0144] Referring to FIG. **14**, when the user (current user at the display device **10**) selects the 'user **1**' as the other party that he/she wants to have the vide communication with (e.g., video talk/conference/chat), the information on the 'user **1**' and the buttons for selecting the type of communication may be displayed on the screen **300**. Video communication includes video and audio if available, while audio communication preferably includes audio (voice) but not video.

[0145] For example, the icon **355** and the message **356** set by the 'user **1**' that is the other party involved in the communication with the current user identified by the icon **357** is displayed. The user can select the 'video communication' button or the 'audio communication' button, thereby making it possible to request the communication with the 'user **1**'. The user selects the 'video communication' button to request the image communication with the 'user **1**' or selects the 'audio communication' button to request the voice communication with the 'user **1**'.

[0146] Meanwhile, information/icon **357** on the user currently using the video communication service may be displayed on the specific region of the screen **300**, for example, the top portion thereof.

[0147] The user information **357** displayed on the screen **300** may include information on the name, ID, current status, and credit for using video communication service of the corresponding user, etc.

[0148] The user may access the server for the video communication service to charge the credit card and receive the video communication service by using the credit card, wherein the charged amount can be displayed as part of the user information **357**. The charges incurred due to the video communication service can be updated and displayed as updated in real time as part of the user information **357**.

[0149] When the user selects the 'video communication' button, the communication image **360** of the other party at another device and the communication image **361** of the current user at the display device **10** may be displayed on the screen **300** as shown in FIG. **15**.

[0150] Meanwhile, the user selects a 'screen mode' item on the bottom portion of the screen **300**, thereby making it possible to change the type, size, or position in which the communication image **360** of the other party and the communication image **361** of the user are displayed on the user's screen **300**.

[0151] For example, when the user selects the "screen mode', the communication image **360** of the other party is displayed in the entire region (or main region) of the screen and the communication image **361** of the user may be displayed in a specific region of the screen **300** at a size smaller than the size of the communication image **360** of the other party, as shown in FIG. **16**.

[0152] Alternatively, the user may select the 'screen mode' item to display only the communication image **360** of the other party on the user's screen **300**.

[0153] When the user selects a 'voice stop' item on the bottom portion of the screen **300**, the voice of the user is not transmitted to the other party's device. To this end, the operation of the mike **142** stops or the audio data of the user acquired by the mike **142** may not be transmitted to the video communication apparatus or the server of the other party or the user. In this case, the image indicating that the transmission of the communication voice is stopped may be displayed in the portion of the communication image **361** of the user as shown in FIG. **17**.

[0154] The user may select the 'communication stop' button on the image communication screen **300** to stop or pause the currently progressing video communication for a desired time, as shown in FIGS. **15** to **17**.

[0155] Referring to FIG. **18**, when the user selects the 'communication stop', the communication image **360** of opponent and the communication image **361** of the user are stopped and the image indicating that the communication is stopped may be displayed in each of the communication images **360** and **361**. The communication images in this example or other examples are preferably images of the parties involved in the video communication, which may be real-time image/video of the parties or may be snap shots of the parties previously stored or taken at the beginning of the current video communication.

[0156] In this case, the operations of the camera **141** and the mike **142** may be stopped or the transmission and reception of the video communication data, e.g., transmission/reception of the AV data of the user and the AV data of the other party may be stopped

[0157] Further, the user may select a 'communication resume' button shown in FIG. **18** to start the stopped video communication as described above or to resume the video communication.

[0158] Meanwhile, the user selects the 'audio communication' button on the screen **300** as shown in FIG. **14**, thereby making it possible to perform the voice communication with the 'user **1**'.

[0159] Referring to FIG. **19**, when the user selects the 'audio communication' with the 'user **1**', the selection window **362** capable of selecting the contact address that wants to try the voice communication among the contact addresses related to the 'user **1**' may be displayed on the screen **300**.

[0160] For example, the selection window **362** may include the contact addresses stored in the storage unit **130** corresponding to the 'user **1**', which corresponds to the user ID of the video communication service. In this example, 'Skype', and '+82-XXXXXXXXXX', '+82-YYYYYYYYYY', and '+82-ZZZZZZZZZZ' are displayed as selectable voice telephone numbers associated with the 'user **1**'.

[0161] Meanwhile, the icons **363** corresponding to each of the displayed contact addresses may be displayed on the selection window **362** and the user may easily identify the contact addresses by using the icons **363**.

[0162] When the user selects '+82-YYYYYYYYYY' among the contact addresses, the voice communication is established and connected by the '+82-YYYYYYYYYY' number, thereby making it possible to perform the voice communication with the 'user **1**'.

[0163] Referring to FIG. **20**, the icon **355** corresponding to the other party ('user **1**') involved in the communication, 'and the information window **364** for the currently connected voice telephone number may be displayed on the screen **300** during the voice communication.

[0164] Meanwhile, as shown in FIG. **21**, the image of contents input from an external source or stored in the display device **10**, for example, the image of the broadcasting received through the tuner **105** may be displayed on the screen **300** while the voice communication is progressed.

[0165] For example, when the user selects the 'screen mode' item on the lower portion of the screen **300** shown in FIG. **20**, the voice communication may be progressed by the configuration of the screen **300** as shown in FIG. **21** while the contents image (e.g., broadcasting program or TV program) is displayed on the screen **300**. In this case, the output of the voice of the contents, for example, the voice of the broadcasting received through the tuner may be stopped while the voice communication is performed.

[0166] Further, as shown in FIGS. **22** and **23**, the user selects the 'communication stop' during the voice communication, thereby making it possible to stop or pause the voice communication with the currently communicating 'user **1**' for a predetermined time.

[0167] When the user selects an 'option' item on the screen **300** shown in FIG. **14**, optional operations may be provided as shown in FIG. **24**. For example, the user can select a 'profile view' item among the items displayed on the screen **300**, thereby making it possible to confirm the profile for the 'user **1**', e.g., information such as name, birth date, age, sex, address, and using language, or the like.

[0168] The user can select a 'name change' item, thereby making it possible to change the name of the 'user **1**' displayed on the screen **300**.

[0169] In addition, the user can select a 'deletion' item, thereby making it possible to delete the 'user **1**' from the registered contact addresses and can select an 'interrupt' item, thereby making it possible to interrupt the image/video communication or the voice/audio communication received from the 'user **1**'.

[0170] According to the exemplary embodiment of the present invention, the user can select a 'voice mail' item among the items displayed on the screen **300**, thereby making it possible to transmit the voice mail (voice message) to the 'user **1**'.

[0171] In that example, referring to FIG. **25**, the voice of the user is recorded by the mike **142** to acquire the corresponding audio data and when the user selects a 'send' button, the acquired audio data (e.g., recorded voice message) of the user may be transmitted to the display device or other device of the 'user **1**' through the server.

[0172] The user can select an 'exit' item displayed on the bottom portion of the screen **300**, thereby making it possible to end the video communication services.

[0173] Referring to FIG. **26**, when the user selects the 'exit' button, buttons such as 'hiding', 'yes', and 'no' may be displayed on the screen **300**.

[0174] When the user selects the 'hiding' item, the user ID logged-in in the current video communication service, for example, the communication function for the 'name **1**' is maintained, thereby making it possible to receive the image communication and the voice communication for the 'name **1**'. Thereafter, when the user selects the video communication services of the user, the 'name **1**' may be displayed by the currently logged-in ID as shown in FIG. **7**.

[0175] Meanwhile, when the user selects the 'hiding', the contents image, for example, the broadcasting image received through the tuner **105** may be displayed on the screen **300**, as shown in FIG. **27**.

[0176] In this case, when the communication is received by the 'name **1**' that is currently logged-in, the pop up window **334** informing the reception of communication may be displayed on the screen **300**.

[0177] The user may select any one of the buttons displayed on the pop up window **334**, e.g., 'audio/voice response', 'vide/image response', and 'rejection' and when the user selects the 'rejection', he/she may not respond to the communication received from the 'user **1**'.

[0178] Meanwhile, the user can select the 'audio response', thereby making it possible to perform the voice communication in response to the communication received from the 'user **1**'. For example, when the image communication is received from the 'user **1**', the user selects the 'audio response', thereby making it possible to reject the image communication with the 'user **1**' and communicate with the 'user **1**' by using only the voice or audio.

[0179] Further, the user can select the 'video response', thereby making it possible to perform the image/video communication with the 'user **1**'.

[0180] When the user selects the 'audio response' or 'video response' for the communication received from the 'user **1**' to perform the communication, the user interface provided to the user may be the same as one described with reference to FIGS. **15** to **26**. As such, the user can continue with the communication with the 'user **1**' while viewing the contents image such as broadcast images, downloaded images, online images, videos from DVDs or other storage devices, etc. Further, the contents image can be other images such as documents, texts, pictures, etc.

[0181] Referring to FIG. **28**, the contents image and the communication image, for example, the communication image **360** of the other party may be displayed on the screen **300** together.

[0182] For example, the AV processor **115** may simultaneously process the video communication data input from the video communication processor **120** and the image and audio data of the contents input from the tuner **105**, such that the user can perform the video communication while watching the contents using the same single screen of the display unit **143**.

[0183] As the exemplary embodiment of the present invention, any one of the contents image and the communication image may be displayed on the screen **300** in a picture in picture (PIP) format.

[0184] For example, as shown in FIG. **28**, the contents image, for example, the broadcasting image is displayed on the entire (or main) region of the screen **300** as the main screen and the communication image **360** may be displayed in a part of the screen **300** as the sub screen.

[0185] Alternately, the communication image is displayed in the entire (or main) region of the screen **300** as the main screen and the contents image being watched by the user may be displayed in a part of the screen **300** as the sub screen.

[0186] In another variation, the contents image is displayed in the entire/main region of the screen **300** as the main screen and the communication image **360** of the other party and the communication image **361** of the user may be each displayed as the sub screen.

[0187] Further, the position or size, or the like, in which the contents image or the communication image is displayed may be changed according to the request of the user or the characteristics of the image to be displayed.

[0188] In more detail, the sub screen may be positioned in an empty region of the image displayed on the main screen, for example, a full white or a full black region of the displayed image.

[0189] As described above, when any one of the contents image and the communication image is displayed in a PIP format, the image of the main screen may be covered by the image displayed by the sub screen. In this case, the transparency of the image displayed as the sub screen may be controlled and thus, the contents image and the communication image may be simultaneously displayed in the region of the sub screen, while overlapping with each other. For example, in the case shown in FIG. **28**, the transparency of the communication image **360** displayed in the sub screen may be controlled according to the request of the user and the contents image may be displayed in the main screen while the communication image **360** overlaps with the communication image **360**.

[0190] According to the above-mentioned exemplary embodiment, since the communication image **360** may be displayed transparently over the contents image or may be displayed in a background area of the contents image, the phenomenon that a part of the contents image being watched by the user is not visible due to being covered by the communication image **360** during the video communication can be prevented or minimized.

[0191] Therefore, the user may continuously watch without maximally losing the previously watched contents, while responding to the video communication, even when the video communication is received during the viewing of the contents, such that the viewing of the contents and the video communication may be simultaneously and effectively performed using a single screen or display unit at the same time.

[0192] As another exemplary embodiment of the present invention, the contents image and the communication image may be displayed on the screen **330** in the PIP format. For example, the contents image and the communication image may each be displayed in other regions in which they do not overlap with each other. For example, the contents image is displayed in the first region of the screen **300** and the communication image **360** of the other party may be displayed in the second region that does not overlap with the first region. The first and second regions may not overlap but may touch each other.

[0193] In addition, the communication image **361** of the user may be displayed in a third region that does not overlap with the first and second regions in the screen **300**.

[0194] The size, position, etc., of each of the displayed contents image and communication images **360** and **361** may be changed according to the request of the user.

[0195] Referring to FIG. **29**, when the user selects the 'general phone' among the video communication service items displayed on the screen **300**, he/she can communicate with the other party by inputting the general telephone number of the other party.

[0196] As shown in FIG. **29**, when the user selects the 'general phone', the input windows **333** and **334** for inputting a country and a telephone number, respectively, may be displayed on the screen **300**.

[0197] After the user inputs the country of the other party with whom he/she wants to communicate, the user inputs the desired telephone number by using the keypad **332** and selects the phone button, thereby making it possible to request the communication by the corresponding telephone number. As a result, the user can make general phone calls or video calls using the display device **10**.

[0198] According to an exemplary embodiment of the present invention, the user may perform a conference call with a plurality of users simultaneously by using the display device **10**. Referring to FIG. **30**, when a conference call is received by the 'name **1**' (user) that is currently logged-in, a pop up window **334** informing the call reception (call from 'user **1**') may be displayed on the screen **300**.

[0199] The user may select any one of the buttons displayed on the pop up window **334**, e.g., 'respond' and 'reject' and when the user selects the 'reject', he/she may not respond to the conference call received from the 'user **1**'.

[0200] Meanwhile, the user can instead select the 'respond' item, thereby making it possible to participate in the conference call in response to the conference call received from the 'user **1**'.

[0201] Referring to FIG. **31**, the information on the progressing conference call (on-going conference call) may be displayed on a specific region of the screen **300**, for example, the bottom portion thereof.

[0202] Meanwhile, when the user selects the 'audio stop' button displayed on the bottom portion of the screen **300**, the conference call may be stopped or the audio may be stopped/muted as shown in FIG. **32**, such that the voice of the user may not be transmitted to the other parties and/or the conference call may be stopped. In variations, the 'communication stop' button may be used to stop/pause the audio and video communication, and 'communication end' may be used to end the communication.

[0203] When the user selects a 'participant view' button on the bottom portion of the screen **300**, the information on the other parties participating in the currently progressing conference call, for example, the information on each of the 'user **1**', 'user **2**', 'user **3**', and 'user **4**' and the total number of participants, or the like, may be displayed on the screen **300** as shown in FIG. **33**.

[0204] The information on each of the other parties displayed on the screen **300** may include an icon, a name, a user ID, and a log-in state, or the like, corresponding to the corresponding user.

[0205] In addition, a 'host' holding a conference call among the other parties participating the conference call may be displayed or identified, for example, the 'user **1**' among the other parties may be displayed as a 'host'.

[0206] Referring to FIG. **34**, when the user selects the 'use history' item among the video communication service items displayed on the screen **300**, the information on the video communications recently performed by the user may be displayed on the screen **300**. That is, the information on the history of previous communications may be stored and displayed to the user.

[0207] For instance, when the user selects the 'use history' button, the information on the recently performed receiving communication, originating communication, communication during absence, contact address registering request from the other users, received or originated voice mails, or the like, may be displayed on the screen **300**.

[0208] Meanwhile, each of the communication/usage histories displayed on the screen **300** may include information on the corresponding other party, for example, the user icon, the name, the ID, and the log-in state, or the like.

[0209] The user may select any one of the communication/usage histories displayed on the screen **300** and thus, may be provided with more detailed information for the selected history.

[0210] When the user selects the receiving communication history among the use histories displayed on the screen **300**, for example, when a 'received' item for the 'user **1**' shown in FIG. **34** is selected, the detailed information on the selected history may be displayed on the screen **300** as shown in FIG. **35**. There, the receiving date, time, and communication time, or the like, may be displayed on the screen **300**, together with the log-in state, name, and icon of the originator of the selected history for the 'user **1**'.

[0211] Further, the user may select any one of the 'video communication' (video and audio) button and the 'audio communication' button displayed on the screen **300** to request the communication with the 'user **1**'.

[0212] Returning to FIG. **34**, when the user selects the registration requesting history, for example, when the 'registration request' item shown in FIG. **34** is selected, the detailed information on the selected 'registration request' may be displayed on the screen **300** as shown in FIG. **36**.

[0213] Referring to FIG. **36**, the registration requesting message prepared by the 'user **3**' may be displayed on the screen **300**, together with the current log-in state, name, and icon of the requestor of the selected 'registration request', that is, the 'user **3**'.

[0214] Further, the user may select any one of the 'agree', 'reject', and 'interrupt' buttons displayed on the screen **300** to selectively respond to the registration request from the 'user **1**'.

[0215] Meanwhile, when the user selects the voice mail history, for example, when the 'voice mail' button shown in FIG. **34** is selected, the detailed information on the selected 'voice mail' may be displayed on the screen **300** as shown in FIG. **37**.

[0216] Referring to FIG. **37**, the receiving date, time, and recording time, or the like, of that voice mail may be displayed on the screen **300**, together with the log-in state, name, and icon of the originator of the selected 'voice mail', that is, the 'user **5**'.

[0217] The user may select a 'listen' button displayed on the screen **300** to listen thea voice mail received from the 'user **5**'. Further, the user may select any one of the 'video communication' button and the 'audio communication' button displayed on the screen **300** to request the communication with the 'user **5**' originating the voice mail.

[0218] Referring to FIG. **38**, when the user selects the 'user information' button among the video communication service items displayed on the screen **300**, the information on the currently logged-in user may be displayed on the screen **300**.

[0219] As shown in FIG. **38**, when the user selects the 'user information' button, the user information menu items, for example, buttons **380** to **383** corresponding to 'my status', 'my image view', 'my profile', and 'account detailed view' may be displayed on the screen **300** of the display device **10** of the user.

[0220] When the user selects the 'my status' button **380**, current statuses settable by the user, for example, 'online', 'out', 'receiving rejected', and 'hidden' items may be displayed on the screen **300** as shown in FIG. **39**.

[0221] The user may select any one of the 'online', 'out', 'receiving rejected', and 'hidden' item to set his/her current status and the set current status of the user may be displayed in the video communication apparatus of the other party. For instance, when the user sets the current status as the 'out', the current status of the user, i.e., the 'name **1**' may be displayed on the video communication service screen of the 'user **1**' as the 'out' status. The 'on-line' item may indicate that the user is currently on-line or logged-in, the 'receiving rejected' item may indicate that the user is not receiving any communication or contents from the external devices, and the 'hidden' item may indicate that the user is on-line but is hidden (desired not to be detected by others).

[0222] When the user selects "my image view" button **381** in FIG. **38**, the user's image **384** (e.g., user's face) acquired through the camera **141** may be displayed on the screen **300** as shown in FIG. **40**.

[0223] In addition, the user selects the 'option' item on the bottom end of the screen **300**, thereby making it possible to control the image quality of the communication image. For instance, referring to FIG. **41**, when the user selects the 'option' item, a plurality of image quality control items, for example, 'contrast', 'brightness', 'saturation', 'sharpness', 'hue', and 'white balance', etc., may be displayed on the screen **300**.

[0224] For instance, the user can use the user input unit **145** to control or change any of the above-mentioned image quality control items and therefore, the communication image displayed on the screen **300**, i.e., the image quality of the communication image of the user and the communication image of the other party can be controlled. As such, the communication images of the user and/or the other parties can be displayed on the user's device and/or the other party's device in a manner that is preferred by the user.

[0225] Further, the image quality of the user's image currently displayed on the specific region of the screen **300**, for example, the left of the screen **300** may be controlled according to the control values of the image quality control items. For instance, the image **384** of the user currently displayed on the screen may be adjusted (e.g., real time or with some delay) while the user changes the various image quality control items such as 'contrast', 'brightness', 'saturation', 'sharpness', 'hue', and 'white balance', etc. As such, the user can immediately see how his image **384** is changed by the user changing the control values of the image quality control items, and find the desired settings for his image **384** for displaying on the user's screen and the other party's screen. An 'initialization' button may be used to implement the set control values.

[0226] Accordingly, during or before the video communication (e.g., video call or video conference) with one or more other parties, the user can selectively adjust one or more characteristics of the image associated with the user (e.g., the image of the user captured by the camera at the display device **10**) so that the adjusted image associated with the user can be displayed on the user's screen **300** and on the screen of the other parties. For instance, the adjusted image of the user can be transmitted to the screens of the other parties. Similarly, the user can control or adjust one or more characteristics of the image(s) associated with the other parties once the images are received by the display device **10**, so that the images of the other parties are displayed on the user's device in a manner that is desired by the user.

[0227] Further, the user can also control or change the various image quality control items for the contents images displayed on the screen **300** and/or on the screen of the other party.

[0228] In another variation, according to the exemplary embodiment of the present invention, the control of the image quality for the communication image controlled as described above in FIG. **41** may not affect the image quality of the contents image which will be or are displayed. That is, the setting values related to the image quality of the communication image (e.g., image of the user's face) and the setting values related to the image quality of the contents image (e.g., broadcast programs or downloaded web images) displayed on the display device **10** may be controlled or changed independently from each other, and the control values for them may be stored separately in the storage unit **130**. As a variation, however, the same display setting values may be used to control simultaneously both the communication image and the contents image.

[0229] Returning to FIG. **40**, in addition, when the user selects a 'snapshot' item on the bottom end of the screen **300**, the image **384** of the user displayed on the current screen **300** (e.g., a snapshot of the user) may be stored in the storage unit **130** and the stored user image **384** may be set to be tied to the above-mentioned icon, that is, an icon corresponding to the user ('name **1**').

[0230] In FIG. **40**, when the user selects the 'menu screen' item, then the main menu screen (e.g., the screen displaying main menus as shown in FIG. **42**) may be displayed.

[0231] In the main menu screen, when the user selects the 'setting' item among the video communication service items displayed on the screen **300**, the setting items **390**-**394** related to the video communication may be displayed on the screen **300** as shown in FIG. **42**. Examples of the setting items can include the buttons **390** to **394** corresponding to 'notification setting', 'communication delivery/transfer', 'privacy setting', 'video/image setting', and 'password change'.

[0232] When the user selects the 'notification setting' button **390**, alarm items selectable by the user, for example, 'online', 'offline', 'voice', 'mail' and 'registration request' may be displayed on the screen **300** as shown in FIG. **43**.

[0233] The user can select the 'online' item. Then in response, the display device **10** displays the log-in information on the screen **300** by using the popup window **334** when the registered user is logged-in as shown in FIG. **44**, thereby making it possible to notify the user of the log-in information. For instance, the 'online' item under the notification setting is for alerting the user of all online (currently logged-in) parties, and the 'voice mail' item may be for alerting the user if any voice mails are received.

[0234] In the example of FIG. **44**, when the registered user, 'user **1**' is logged-in, the popup window **334** notifying to the user that the 'user **1**' (the other party) is logged-in in the video communication service may be displayed on the screen **300**.

[0235] The user can select the 'offline' item in FIG. **43** to display the log-out information on the screen **300** by using the popup window **334**, whenever the registered user is logged-out, thereby making it possible to notify the user of the log-out information of other parties.

[0236] In addition, the user can select the notification of the "voice mail," which may be set to display the reception of any voice mail on the screen **300** by using the popup window **334** at the time of receiving the voice mail.

[0237] Meanwhile, the user can select the notification of the 'registration request', which may be set to notify the user of the registration request by using the popup window **334** whenever the registration of the contact address is requested from other user(s). For instance, under this setting, referring to FIG. **45**, when the registration of the contact address is requested from the 'user **6**', the popup window **334** notifying the user that the 'user **6**' requests the registration for the user may be displayed on the screen **300** of the user.

[0238] When the user selects the 'view' in FIG. **45**, the screen **300** may be displayed as shown in FIG. **36** and thus, the user may perform agree, reject, or interrupt operations for the registration request.

[0239] Referring to FIG. **46**, when a specific ID for the video communication service is logged-in, the popup window **334** notifying the event occurring for the corresponding ID may be displayed on the screen **300**.

[0240] For example, when the 'name **1**' is logged-in, the information on the registration request (e.g., **3** requests) and an out telephone received as the 'name **1**' may be displayed on the popup window **334** for the period of the log-out state and may be transferred to the user. The 'out telephone' may indicate the number of communications associated with the 'name **1**'.

[0241] The user selects the 'use history view' item to confirm the detailed information on each of the events displayed on the popup window **334** and the method of confirming the use history may be the same as one described with reference to FIGS. **34** to **37**.

[0242] Meanwhile, while the video communication is being performed, the specific function of the display device **10**, when the events are generated according to, for example, a previously set off time, slim timer, or record reservation, or the like, the communication may end to perform the corresponding function. The 'record reservation' preferably can be a function of reserve-recording a content, e.g., reserving a recording of a content according to certain conditions.

[0243] For example, when the previously set record reservation is performed while the video communication is performed, the popup window **334** for receiving a user input indicating whether or not the in-progress communication should end to perform the record reservation, may be displayed on the screen **300** as shown in FIG. **47**.

[0244] When the user selects the "Yes" button displayed on the popup window **334**, the in-progress communication ends and the previously set record reservation function may be performed.

[0245] Meanwhile, when the 'No' button is selected, the communication is continuously progressed and the previously set record reservation function may not be performed.

[0246] According to another exemplary embodiment of the present invention, the record reservation function and the communication function may be simultaneously performed. For example, when the previously set record reservation is performed during the video communication, the broadcasting signal received through the tuner **105** may be stored in the storage unit **130** (e.g., memory, DVD, disc, USB, etc.) during the video communication.

[0247] In addition, when the video communication or the audio communication is received while the user views contents input from the external device using the display device **10**, the contents input during the video/audio communication (e.g., video conference, video call, etc.) in response to the received communication may be stored in the storage unit **130**.

[0248] FIG. **48** is a block diagram showing the configuration of a display device according to a second embodiment of the present invention, in which the display device may include a camera **141**, a face detector **116**, a feature extractor **117**, a storage unit **130**, a user authentication unit **111**, and a display unit **143**. In the display device shown in FIG. **48**, the same or similar components as the ones described with reference to FIG. **2** can be included, which will not be described below. All components of the display device according to this embodiment are operatively coupled and configured.

[0249] Referring to FIG. **48**, the camera **141** photographs a region in which the user is positioned and obtains the corresponding video data, and the face detector **116** uses the acquired video data to detect a face region of the user within the photographed region.

[0250] The display device **10** may include a pre-processor that performs pre-processing, such as improving the image quality of the video data acquired by the camera **141** or adjusting the video data to be suitable to a specific purpose, and outputs them to the face detector **116**. For example, the pre-processor may perform video processing such as contrast readjusting, noise removal, smoothing, sharpening, etc.

[0251] The feature detector **117** may extract features of the detected face region, for example, extract a face feature vector that can differentiate a face difference for each user from the detected face region.

[0252] According to the exemplary embodiment of the present invention, the face detector **116** and the feature extractor **117** may be configured to be included in the AV processor **115** shown in FIG. **2**.

[0253] The storage unit **130** may store information on the registered face region, for example, store the feature information on the face region of various users of the display device **10**.

[0254] In more detail, the image for or of a user is photographed by the camera **141** and the video data acquired by the camera **141** passes through the above-mentioned face detector **116**, and feature extractor **117** to extract the feature information of the face region of the user, which may be in turn stored in the storage unit **130**. The feature information may include specific information on the face features of the user's face captured by the camera **141**. As a variation, instead of the face, another part of the body of the user may be photographed, processed and stored in association with the user for identifying the user.

[0255] The user authentication unit **111** compares the feature information of the face region extracted from the feature extractor **117** with the information stored in the storage unit **130** to perform the user authentication for the detected face region. For example, when the two pieces of information match with each other, the user authentication unit **111** may permit the current user to access the display device **10**, that is, allow a log-in of the user.

[0256] According to the exemplary embodiment of the present invention, the operation of the user authentication unit **111** may be performed by the controller **110** shown in FIG. **2**.

[0257] A user authenticating method according to an exemplary embodiment of the present invention is described hereafter in detail with reference to FIGS. **49** to **58**.

[0258] FIG. **49** is a flow chart of a user authenticating method according to the exemplary embodiment of the present invention, in which the user authenticating method will be described in combination with a block diagram shown in FIG. **48**. The method of FIG. **49** can be implemented in the device of FIG. **48**, **2** or **1**, or can be implemented in other suitable device. Further, any method discussed in the present application may be implemented in any device/system discussed in the present application.

[0259] Referring to FIG. **49**, the face detector **116** receives the video data acquired by the camera **114** (S**400**) and uses the input video data to detect the face region existing in the region in which the video data is acquired (S**410**).

[0260] For example, the face detector **116** segments the input video data into a region for each subject by contour detection, labeling, structure analysis, or the like, and extracts features of each region from the segmented video data to detect the face region by comparing the extracted features with the face feature vector. Meanwhile, the face feature vector may be stored in the storage unit **130**. In order to detect the face region, the face detector **116** applies the mathematical, structural, conversion method, etc., such that it may use feature vectors generated by extracting and processing features such as color, shape, texture, etc. The face detecting: operation used herein can use any known face detecting technique.

[0261] The feature extractor **117** extracts the feature information of the detected face region (S**420**). For example, the feature extractor **117** may generate the face feature vector capable of differentiating the difference in the individual faces from the detected face region and compare the generated face feature vector with the user face feature vector stored and registered in the storage unit **130**.

[0262] For example, the feature extractor **117** extracts the features of the unique face region for each person based on the difference(s) in face for each person. In other words, the feature extractor **117** may extract the features of the corresponding face region, for example, the size or interval of eyes,

the color of pupil, the size or position, length, and with of ears, the shape and size of lip, jaw, the entire contour of face, hair style, etc.

[0263] In extracting the features of the face region, the mathematical model may generate the feature vectors by directly using the numerical values obtained by measuring the entire face or the specific portion or the inter-specific portion interval of the face, etc., or processing them by the statistical process, etc.

[0264] Meanwhile, the feature extractor **117** may extract the feature information of the face region by using Hotelling (or Eigen vector, main component, discontinuous Karhunen-Loeve) transform, Fourier transform, DCT transform, Walsh function transform, Wavelet transform, etc. For example, the above-mentioned method may be used to analyze the texture for the detected face region.

[0265] Further, the feature extractor **117** may use an artificial nerve network such as a self-organized feature mapping (SOFM) network, etc, of Kohonen in order to extract the feature of the face region.

[0266] The SOFM algorithm makes a vector quantizer by adjusting the connection weight value from the input node to the output node. The output node is generally arranged in a two-dimensional lattice shape and may magnify the connection state by locally connecting between neurons upon learning. Therefore, the SOFM algorithm can efficiently convert from a high-dimensional input vector into a low-dimensional feature vector and the output of the artificial nerve network may be as the feature vector of the face region.

[0267] However, the present invention is not limited to the method of detecting the face region and the method of extracting feature information as described above and therefore, other known technologies may be used.

[0268] The user authentication unit **111** compares the feature information of the face region extracted at step S**420** with the pre-registered information stored in the storage unit **130** (S**430**) to confirm whether two pieces of information match or correspond with each other (S**440**).

[0269] For example, the user authentication unit **111** compares the similarity or correlation between the feature information of the extracted face region with the face feature information of the stored registration users to perform the user authentication.

[0270] The user authentication unit **111** compares the face feature vectors to perform the above-mentioned user authentication, e.g., uses the artificial nerve network using a back-porpagation (BP) algorithm to compare and analyze the feature information of the extracted face region with the face feature information of the stored registration user(s).

[0271] Meanwhile, the user authentication unit **111** mathematically calculates the correlation between the feature information of the extracted face region and the face feature information of the stored registration user to determine whether two pieces of information match or correspond with each other according to the calculated results.

[0272] As the determination result, when the feature information of the extracted face region corresponds with the face feature information of the stored registration user, the user authentication unit **111** permit the access of the user corresponding to the detected face region (S**450**). For instance, when the two pieces of information match or correspond with each other, the user authentication unit **111** permits the user to log-in to the display device **10**, for example, executing the application programs for video communication.

[0273] Meanwhile, matching two pieces of information may include the case where the two pieces of information are completely matched to each other as well as the case where they have similarity of preset a reference value or more. Further, the extracted face feature information may be compared with the stored face feature information of the current user (if known) or with all stored face feature information of the all registered users.

[0274] FIG. **50** shows a first exemplary embodiment for the user authentication method, which shows the images acquired by the camera **141** of the display device **10**.

[0275] Referring to FIG. **50**, the entire image **500** corresponding to the image data output from the camera **141** may include the image **510** corresponding to the user and the user is a person wanting to log-in to the display device **10**. For instance, when the user who wants to log-in to the display device **10** is positioned in front of the camera **141** associated with the display device **10**, the camera **141** photographs the user (e.g., user's face or body) and thereby generate the image such as the image **510**.

[0276] The feature detector **116** of the display device **10** uses the video data output from the camera **141** to detect the face region **511** of the user among the videos **500**. The feature detector **117** may extract the feature information from the detected face region **511**, for example, the face feature vector.

[0277] In addition, the user authentication unit **111** compares the feature information of the face region **511** output from the feature extractor **117** with the face region feature information of the user stored and registered in the storage unit **130** to perform the user authentication as described above.

[0278] The storage unit **130** may store the face region feature information for each of the plurality of registered users and the user authentication unit **111** may determine whether any of the stored information matches the feature information of the face region **511**.

[0279] If it is determined that any of the stored information matches the feature information of the face region **511**, the user authentication user **111** permits access of the display device (e.g., for video communication) to the user corresponding to the image **510** existing in the video **500**, e.g., the user wanting to log-in in the current display device **10**, such that the display device **10** may enter a mode in which the display device **10** can perform the video/audio communication for the user.

[0280] Meanwhile, if it is determined that any of the stored information does not match the feature information of the face region **511**, the user authentication unit **111** does not permit the device access by the user and at the same time, may perform an operation for registering the user as a new user.

[0281] Each operation of the face detector **116**, the feature extractor **117**, and the user authentication unit **111** may be the same as one described with reference to FIGS. **48** and **49**.

[0282] In addition, as described above, when the user authentication is completed to permit the access by the user, the camera **141** may perform the photographing base on the face region **511** of the user and the photographed video data (e.g., face image of the user of the device **10**) may be transmitted to the apparatus of the other party through the network for display or other processing.

[0283] According to an exemplary embodiment of the present invention, a plurality of users may be positioned in front of the camera **141** associated with the display device for being photographed by the camera **141**.

[0284] For example, the plurality of users may view the broadcasting by using the display device **10** according to the exemplary embodiment of the present invention and when the users want to perform the video communication when or while they view the broadcasting, the plurality of users may be positioned in the region photographed by the camera **141**.

[0285] In this case, the display device **10** according to the exemplary embodiment of the present invention may perform the user authentication method as described above on each of the plurality of users with reference to FIGS. **48** to **50** and may permit the device access by at least one of the plurality of users according to the user authentication results.

[0286] Hereinafter, a user authentication method according to a second exemplary embodiment of the present invention will be described with reference to FIGS. **51** to **58**.

[0287] Referring to FIG. **51**, at least two users may be positioned at a region photographed by the camera **141** of the display device **10** for user authentication. That is, the entire image **500** according to the video data acquired by the camera may include at least two images **510**, **520**, **530**, **540**, and **550** corresponding to each of at least two users and thus, the face detector **116** may detect two or more face regions **511**, **521**, **531**, **541**, and **551** of the users who desire to log-in or use the display device, e.g., for video communication.

[0288] For example, there may be two or more regions matching the face feature vector stored in the storage unit **130** within the image data acquired by the camera **141**.

[0289] Meanwhile, the feature extractor **117** performs the above-mentioned feature information extracting process on each of the detected at least two face regions **511**, **521**, **531**, **541**, and **551** such that it can extract the face feature vector of each of the face regions **511**, **521**, **531**, **541**, and **551**.

[0290] In addition, the user authentication unit **111** compares the feature information of each face region **511**, **521**, **531**, **541**, **551** output from the feature extractor **117** with the face region feature information of the user(s) stored and registered in the storage unit **130** to perform the user authentication as described above.

[0291] For example, the user authentication unit **511** may determine whether it has the face feature information matching or corresponding to the stored face feature information for each of the plurality of extracted face regions **511**, **521**, **531**, **541**, and **551**.

[0292] If it is determined that there is a face region having the feature information matching the stored information among the detected face regions **511**, **521**, **531**, **541**, and **551**, the user authentication unit **111** permits the device access to that user corresponding to the face region matching the feature information, such that the display device **10** may entry the video communicable mode.

[0293] If it is determined that there is no face region having the feature information matching the stored information among the detected face regions **511**, **321**, **331**, **341**, and **351**, the user authentication unit **111** may not allow access to any of the users.

[0294] The operations of performing the face detector **116**, the feature extractor **117**, and the user authentication unit **111** on the detected face regions **511**, **521**, **531**, **541**, and **551** may be the same as one described with reference to FIGS. **48** and **49**.

[0295] That is, the display device **10** according to the exemplary embodiment of the present invention may repeatedly perform steps S**420** to **450** described with reference to FIG. **49** for each of the plurality of detected face regions **511**, **521**, **531**, **541**, and **551**.

[0296] According to the exemplary embodiment of the present invention, the display unit **143** may display the face region **511** detected by the face detector **116** on the screen.

[0297] Referring to FIG. **52**, when at least face regions **511**, **521**, **531**, **541**, and **551** are detected in the image data acquired by the camera as described above, the display unit **143** may display the detected face regions **511**, **521**, **531**, **541**, and **551** on the screen **560** of the display unit **143** of the display device.

[0298] In addition, the display unit **143** may display the user authentication results performed on each of the detected face regions **511**, **521**, **531**, **541**, and **551** on the screen **560**. For example, the face regions **511**, **521**, **531**, **541**, and **551** displayed on the screen **560** may be represented by being divided into the authenticated user and the unauthenticated user such that the users that can be logged-in and the users that cannot be logged-in among the users positioned in front of the display device **10** (or at a photographing region of the camera **141** associated with the display device) may be easily identified on the screen **560**. The camera **141** may be part (e.g., built-in) of the display device **10** or may be a separate device merely connected to the device **10**.

[0299] Referring to FIG. **53**, the specific shape, for example, the quadrangle may be displayed on the screen **560** in order to correspond to each of the detected face regions **511**, **521**, **531**, **541**, and **551** and the user authentication results may be displayed by the shapes displayed on the screen **560**.

[0300] For example, the face regions **511**, **531**, and **541** represented by a solid-line quadrangle among the face regions **511**, **521**, **531**, **541**, and **551** displayed on the screen **560** are the authenticated users, e.g., a user that can be logged-in according to the user authentication operation as described above and the face regions **521** and **551** represented by a dotted-line quadrangle may be the unauthenticated users, e.g., the user that cannot be logged-in.

[0301] As shown in FIG. **53**, each user uses the information displayed on the screen **560** by the user interface to easily confirm whether the user can be logged-in in his/her own video communication service.

[0302] Meanwhile, the displaying method as shown in FIG. **53** is only an example of the present invention and therefore, the present invention is not limited thereto. In the user authentication method according to the present invention, various methods of dividing and displaying the detected face regions **511**, **521**, **531**, **541**, and **551** according to the user authentication results can be used, other than the method showing in FIG. **53**.

[0303] In addition, the user may select any one of the face regions **511**, **521**, **531**, **541**, and **551** displayed on the screen **560** and perform the process corresponding to the selected face region.

[0304] For example, when any one of the face regions represented by the user that can be logged-in on the screen **560**, for example, the face regions **511**, **531**, and **541** represented by the solid-line quadrangle is selected, the access of the user corresponding to the selected face region to the display device is allowed such that the display device **10** enters the video communicable mode to execute the application programs therefor.

[0305] Meanwhile, when any one of the face regions represented by the user who cannot be logged-in on the screen **560**, for example, the face regions **521** and **551** represented by the dotted line quadrangle is selected, the information that the access to the display device **10** is not permitted and the log-in cannot be made may be displayed on the screen **560**.

[0306] Referring to FIG. **54**, the user uses the key buttons included in the display device **10** or the remote control apparatus (e.g., a TV remote controller) for controlling the same to select the face region **531** represented by the user that can be logged-in on the screen **560** such that the solid-line quadrangle may be displayed in the selected face region **531**.

[0307] In this case, if the access to the display device **10** of the user **3** corresponding to the selected face region **531** is permitted, as shown in FIG. **55**, the information that the user **3** is logged in may be displayed on the screen **560**.

[0308] Thereafter, as shown in FIG. **56**, the camera **141** can photograph the image **500** based on the image **530** corresponding to the logged in user **3** and as described above, the video data acquired based on the user **3** may be transmitted to the other party's device by using the wired/wireless network. For example, the camera **141** can capture the image of the user **3** positioned in front of the camera **141** for transmission to the other party, or the prestored image of the user **3** can be retrieved for transmission to the other party.

[0309] Meanwhile, the display device **10** uses the face region **531** of the logged-in user **3** to change the direction of the camera **141** according to the motion of the user **3** and may further include a camera driver for moving the image capturing direction of the camera **141** under control of the display device **10**.

[0310] For example, the camera driver can receive the image data acquired by the camera **141** to detect the position of the face region **531** in the photographed image **500** and automatically adjust the photographing direction of the camera **141** so that the face region **531** is positioned in the image **500**.

[0311] For instance, when the logged-in user **3** moves in an arrow direction in FIG. **56**, e.g., a right direction while he/she performs the video, communication, the camera driver may move the photographing direction of the camera to the right according to the moving direction of the face region **531** so as to continuously capture the image of the user **3**.

[0312] Meanwhile, as described above, a part of the operations of the camera driver may be performed by the face detector **116**, the feature extractor **117**, or the user authentication unit **111**.

[0313] According to another exemplary embodiment of the present invention, the controller **110** of the display device **10** may collect the information on the video communication history of the logged-in user **3**, for example, communication time point, communication time, or information on the other party and store them in the storage unit **130**.

[0314] As described above, the collected video communication history may be stored in the storage unit **130** to correspond to the corresponding user and the stored video communication history for each user may be used in combination with a business model providing the customized information according to the user, for example, education, goods, or medical information, etc.

[0315] Referring to FIG. **57**, the user may use the key buttons included in the display device **10** or the remote control device/apparatus for controlling the same to select the face region **521** represented by the user who cannot be logged-in on the screen **560**.

[0316] In this case, the user registration process for the user corresponding to the selected face region **521** may be performed, for example, the extracted feature information for the selected face region **521** from the feature extractor **117** may be stored in the storage unit **130**, together with other user information in the storage unit **130**. Therefore, the user may be registered as the user that can be logged-in in the display device **10**.

[0317] Meanwhile, when wanting to register the user for the face region **521** represented by the user who cannot be logged-in, as shown in FIG. **58**, an input of a password may be requested on the screen **560** of the display device **10**.

[0318] According to another exemplary embodiment of the present invention, the display device **10** may transmit the user authentication results acquired according to the user authentication method to the external devices as described above. For example, the display device **10** may transmit the information on the registered users, the users positioned in front of the current display device, the logged in user, and the non-registered users positioned in front of the current display device **10** to the external devices.

[0319] In the case shown in FIG. **54**, the display device **10** may transmit the information that the user **1** (**511**), user **3** (**531**), and user **4** (**541**) among the registered users are positioned in front of the current display device **10** to the external devices.

[0320] Meanwhile, the external device may display the received user authentication results on the screen and the user of the external device may search the users positioned in front of the display device **10**, e.g., the users that can perform the current video communication.

[0321] Therefore, the user of the external device (e.g., other devices of the current user or devices of the other parties) may select any one of the users positioned in front of the display device **10** to try the video communication and at the same time, confirm the position of the specific user.

[0322] The display device **10** may use the method as described with reference to FIGS. **49** to **58** to perform the user authentication and may transmit the user authentication results to the external device, for example, the server or the display device of the other party for the video communication service.

[0323] In more detail, the display device **10** transmits the user authentication results to the server of the contents provider providing the video communication service and the video communication device of the other party may receive the user authentication results for the display device **10** from the server.

[0324] Meanwhile, the video communication device of the other party may display the received user authentication results such that the other party can determine whether the users of the network TV **1 540** can be the video communicator or can determine the position of the users, etc.

[0325] Referring to FIG. **59**, the video communication apparatus of the other party may display the user list window **570** including the information on the user authentication results of the display device **10** on the screen of the display device **10**.

[0326] The information on the users positioned in front of the current display device **10** among the users registered in the display device **10**, e.g., the user **1**, the user **3**, and the user **4** may be displayed on the user list window **570**.

[0327] The user information displayed on the user list window **570** may include the text or the image, in more detail, the ID, on-line ID, icon, etc., of the corresponding user.

[0328] When the display device **10** transmits the detected face region image by the above-mentioned method, the currently photographed face image for the corresponding user may be displayed on the user list window **570**.

[0329] Meanwhile, the images **571** and **572** representing the current state of the user may be displayed on the user list window **570**. For example, as shown in FIG. **60**, the user represented by the first image **571** is positioned in front of the current display device **10** but when he/she is not logged-in, whereas the user represented by the second image **572** is positioned in front of the current display device **10** and is a logged-in user. For example, the user **1**, user **3**, and user **4** are positioned in front of the current display device **10** where the user **3** is logged-in.

[0330] The information on the registered user who is not positioned in front of the current display device **10** and the non-registered user who is positioned in front of the current display device **10** may be displayed on the user list window **570**. For example, the registered user that is not positioned in front of the display device **10** is a user that does not have any detected face region among the registration users, and the non-registration user that is positioned in front of the current display device **10** may be the user that is not authenticated among the users of which the face region is detected.

[0331] The information may be included in the user authentication results transmitted from the display device **10**.

[0332] Referring to FIG. **60**, the user represented by the third image **573** is a non-registered user who is positioned in front of the current display device **10** and the user represented by the fourth image **574** may be the registered user who is not positioned in front of the current display device **10**. As a result, the user(s) at the display device **10** can know the status of other users.

[0333] Further, the other party can use the user list window **570** to confirm that the users **1** to **5** are positioned in front of the current display device **10** and the users **1**, **3**, and **4** are the registered users, the user **3** is currently registered, and the registered user, the user **6** is not positioned in front of the current display device **10**. For instance, the other party's device can display the user list window **570** on its screen. Therefore, the other party may select any one or more the registered users positioned in front of the current display device **10** to try the video communication with the selected user(s).

[0334] In addition, the video communication device of the other party may receive the user authentication results for each of the plurality of display devices and display the transmitted user list for the plurality of display devices together. Referring to FIG. **61**, the video communication apparatus TV **2** of the other party receives information on the plurality of display devices, for example, the user authentication results for each TV **1**, TV **3**, and TV **4** and display the user list for each display device. For instance, the user list window **570** includes sub lists **580**, **590**, and **595** corresponding to each of the display devices and each sub list may display the user authentication results of the corresponding display device.

[0335] For example, the sub list **580** for the TV **1** may represent the user **1**, **3**, and **4** are positioned in the current TV **1** among the registered users to perform the video communication, the user **3** is logged-in, and the user **6** is not positioned in front of the current TV **1**.

[0336] In addition, the sub list **590** for the TV **3** may represent that the users A and B among the registered users are positioned in front of the current TV **3** to perform the video communication, the user B is logged-in, and the user C is not positioned in front of the current TV **3**.

[0337] Meanwhile, the sub list **595** for the TV **4** may represent that the users D, E, and C among the registered users are positioned in front of the current TV **4** to perform the video communication and the users E and C are logged-in.

[0338] As shown in FIG. **61**, the user at the TV **2** (which displays the user list of FIG. **61**) can easily determine the position of the users of each TV and whether the video communication can be performed by using the user list window **570**.

[0339] For example, when the user of the TV **2** wants to perform the video communication, with the user C, the user at the TV **2** can confirm that the user C is not positioned in front of the current TV **3** and is positioned in front of the TV **4** by using the user list window **570** such that the user at the TV **2** can select the user C **731** of the TV **4** to try the video communication with.

[0340] Although the exemplary embodiments describe the performance of the user authentication by detecting the face region of the user, the user authentication method according to the exemplary embodiments of the present invention may be similarly performed by photographing other body portions of the user, the user identifiable portions, such as, for example, fingerprint or iris, etc.

[0341] FIG. **62** shows a flow chart of the video account management method according to the exemplary embodiment of the present invention and the video communication account management method shown will be described in combination with block diagram shown in FIG. **2**.

[0342] Referring to FIG. **62**, the controller **110** logs-in a plurality of accounts for video communication by dividing the users of the display device **10** into main user(s) and sub-user(s). For example, the controller **110** logs-in to the registration accounts stored in the storage unit **130** together and can manage them in an on-line state capable of receiving the video communication or message.

[0343] For example, the communication unit **100** receives the control of the controller **110** to confirm the video communication or the message received for each of the plurality of accounts in the on-line state by being logged-in.

[0344] Meanwhile, the plurality of accounts may be divided into the main user account and the sub-user account (s), for example, one of the plurality of accounts is set as the main user account and the remaining accounts may be set as the sub-user accounts.

[0345] In addition, the storage unit **130** may store whether or not an account for each of the plurality of accounts is a main user account or a sub-user account and the controller **110** divides and logs-in the plurality of registered user accounts into the main user account(s) and the sub-user account(s) by using the account information, which may be managed by different priority or use limited conditions. As a result, different users of the display device **10** (e.g., various family members) may be registered into the display device, and can be set up as main and sub users of the display device **10**. As a

variation, a single person (user) can have multiple user accounts which can be divided into main and sub user accounts according to the person's preference.

[0346] According to an exemplary embodiment of the present invention, it is possible to respond to the video communication received by the user account logged-in as the main user and to confirm the reception for the video communication received as the user account logged in as the sub-user.

[0347] According to one example, both the reception of the video communication and the corresponding reception notification can be made for each of the plurality of logged-in accounts, without the main user or the sub-user, but performing the actual video communication with the other party in response to the received video communication can be made by the main user account.

[0348] According to another example, other response to the received video communication, other functions, for example, the confirmation of the received message, etc., can be made only for the main user account and may be limited for the remaining sub-user account.

[0349] Returning to FIG. **62**, when the communication unit **100** receives a video communication from the other party, the controller **110** confirms whether the received video communication is called for the main user account or for the sub-user account (S**610**).

[0350] If the video communication is directed to the sub-user account (e.g., user **4**), the controller **110** receives from the current user whether the user **4** needs to be designated as the main user account of the display device through the user input unit **145** (S**620**). In other words, as described above, in the case of the video communication called by the sub-user account, the reception can be made through the communication **100** but the performance of the video communication with the other party may be limited in response to the received video communication,

[0351] Therefore, when the video communication is received by the sub-user account, the controller **110** notifies the user of the reception of the video communication and changes the sub-user account receiving the video communication as the current main user account of the display device **10** according to the user request/input, so as to control the display unit **143** or the user input unit **145**, or the like, to respond to the video communication.

[0352] As described above, when the user changes the sub-user account receiving the video communication through the user input unit **145** into the main user account, he/she can respond to the received video communication in view of the account change and perform the actual video communication received by the sub-user account through the above-mentioned process. As a result, by changing the account status from being the sub-user account to be the main user account, the video communication can be carried out.

[0353] Hereinafter, the method for managing the video communication account according to the exemplary embodiment of the present invention will be described in more detail with reference to FIGS. **63** to **73**.

[0354] FIG. **63** show a flow chart of a method for managing a video communication account according to another exemplary embodiment of the present invention. The description of the same contents as described with reference to FIG. **62** among the method shown in FIG. **63** will be described below.

[0355] Referring to FIG. **63**, the controller **110** logs-in the plurality of accounts registered for the video communication (S**700**).

[0356] As described above, the plurality of accounts managed by the controller **110** in the on-line state by being logged-in may be configured to include the main user account and the remaining sub-user accounts. The method for setting the main user account may be as follows.

[0357] For example, when the account registered for the video communication is one, the account is set as the main user account and logged-in.

[0358] In addition, when the account registered for the video communication is two or more, the account last set as the main user account at the time of the previous operation of the display device **10** among the accounts may be designated continuously as the main user account.

[0359] Meanwhile, the controller **110** may select the account to be set as the main user among the plurality of registered accounts based on the user input through the menu for setting the main user account.

[0360] Referring to FIG. **64**, the controller **110** may display a screen **800** for setting the main user account through the display unit **143**.

[0361] For example, the information on the plurality of registered user accounts, in more detail, the name or ID of each account, etc., may be displayed on the screen **800** and the account (for example, user **1**) set as the current main user account may be displayed thereon.

[0362] The user selects any one of the plurality of accounts displayed on the screen **800** and then selects the change button **810**, thereby making it possible to change the main user account into the desired account.

[0363] Referring to FIG. **65**, when wanting to change the main user account into the user **3**, the user selects the user **3** among the plurality of accounts displayed on the screen **800** and then, presses the change button **810**, thereby making it possible to change the main user account.

[0364] Therefore, the user **3** is set as the main user account among the plurality of accounts and the remaining accounts, e.g., the user **1**, **2**, **4**, and **5** accounts are set as the sub-user account and may be managed by the controller **110**.

[0365] Whether or not each of the plurality of accounts is the main user account or the sub-user account may be stored in the storage unit **130**.

[0366] Meanwhile, as described above, in order to manage the plurality of accounts together through the log-in, the controller **110** can separately generate 'main user account task' for managing the main user account and 'sub-user account task' for managing the sub-user accounts, such that each task may process the log in of each account and the management, etc. thereby processing the log-in of accounts and the corresponding management.

[0367] For example, after the 'main user account task' first performs the log-in of the main user account, the status information of the main user account may be confirmed. Next, after the 'sub-user account task' performs the log in of the sub-user accounts, the current status of the sub-user accounts can be confirmed.

[0368] The status of the account may be information related to the corresponding account stored in the storage unit **130**, for example, may includes the communication history, incoming or outgoing communication and message, friend list, etc.

[0369] As described above, referring to FIG. **63**, when all the plurality of accounts are logged in at the display device **10** (S**700**), the controller **110** confirms whether the video communication is received through the communication unit **100** (S**710**). For example, the controller **110** can confirm whether or not the video communication or the message is periodically received for each of the logged-in main user account and the sub-user accounts, and can first confirm and process whether the main user account receives the communication than whether the sub-user account receives the communication.

[0370] In more detail, the controller **110** receives and confirms the video communication or message for the main user account by using the 'main user account task' and since the process for the video communication or message for the main user account has a highest priority, when the event is generated, the controller **110** may first perform the event.

[0371] When the video communication or the message receiving event for the main user account is not generated, the 'main user account task' confirms whether or not the status information on the main user account needs to be changed to update the status information.

[0372] When the event for the above-mentioned main user account is not generated, the controller **110** uses the 'sub-user account task' to confirm the reception of the video communication or the message for the sub-user account by using the 'sub-user account task'.

[0373] The controller **110** may periodically repeatedly perform the task confirming whether the video communication for each of the main user account and the sub-user accounts is received according to the priority.

[0374] When the video communication is received, the controller **110** confirms whether the received video communication calls for any of the main user accounts and the sub-user accounts (S**720**).

[0375] When the account receiving the video communication is the main user account, the controller **110** responds to the received video communication (S**750**). For example, the controller **110** determines whether or not to respond to the received video communication based on the user's input from the user input unit **145** and when the user requests the video communication response, the controller **110** may transmit and receive the AV data with the other party's video communication device through the communication unit **100** and thereby carry out the video communication (e.g., video conference).

[0376] In more detail, the controller **110** acquires the AV data corresponding to the image and voice of the user by using the camera **141** and the mike **142** of the display device and then transmits it to the other party's video communication device through the communication unit **110**, and receives the AV data transmitted from the video communication device of the other party through the communication **100** and then may output the image and voice of the other party through the display unit **143** and the audio output unit **144** of the display device **10** and may perform the received video communication between the users.

[0377] Referring to FIG. **66**, when the video communication is received for the main user account, the display unit **143** may display that the main user account, for example, the video communication directed to the user **1** as the current main user on the screen **800**

[0378] In addition, the display unit **143** may confirm whether or not to respond to the video communication received for the main user account on the screen **800**, such that the user may select whether or not to respond to the video communication through the user input unit **145**.

[0379] For example, if the user selects the Yes button **820** through the user input unit **145**, the user's image **830** and the other party's image **840** may be displayed on the screen **800** of the user's display device **10** and the video communication may be performed between the user and the other party.

[0380] Meanwhile, when the user selects the No button **825**, the response to the received video communication may be rejected (e.g., the video communication is declined) and the rejected communication is processed as the 'out communication' to the corresponding information, for example, receiving date, time, originator information, etc., in the storage unit **130**.

[0381] Returning to FIG. **63**, when the account receiving the video communication is the sub-user account at step S**720**, the controller **110** notifies the user of the reception of the video communication of the sub-user account (S**730**).

[0382] For example, the controller **110** displays that the video communication calling the sub-user account through the display unit **143**, or the like is received and thereby notifies the user of it.

[0383] In more detail, when the video communication calling the sub-user account is received, the 'sub-user account task' transfers the message notifying the reception of the video communication of the sub-user account to the 'main user account task' and the 'sub-user account task' may allow the display unit **143** to display the popup window notifying the reception of the video communication of the sub-user account

[0384] Thereafter, the controller **110** confirms whether the main user account needs to be changed (S**740**) and when the called sub-user account is changed into the main user account, the controller **110** responds to the received video communication (S**750**). If not, the method proceeds to step S**760** where the controller **110** can perform an out communication process, e.g., indicate the communication is not possible since the user is not available (S**760**).

[0385] As described above, since the video communication response (e.g., accepting the request for video communication) is allowed by the main user account (and may not be allowed by the sub-user account, e.g.), the called sub-user account should be changed into the main user account in order to respond to the received video communication.

[0386] Therefore, the controller **110** may request the user if the change of the main user account is desired through the user input unit **145** in order to respond to the received video communication.

[0387] Referring to FIG. **68**, when the video communication is received by the sub-user account, the display unit **143** receives the control of the controller **110** to display on the screen **800** that the sub-user account, for example, the video communication calling the user **3** is received.

[0388] In addition, the display unit **143** may confirm whether or not to change the main user into the user **3** in order to respond to the received video communication on the screen **800** for the user, such that the user may select whether or not to change the main user through the user input unit **145**.

[0389] For example, when the user selects the Yes button **850** through the user input unit **145**, the controller **110** may change the user **3** into the main user account and change the

previous main user account, the user **1** into the sub-user account. As described above, the information on the changed main user account may be stored in the storage unit **130**.

[0390] Meanwhile, according to an embodiment, when the user requests the change of the main user, the controller **110** may perform the authentication for the change of the main user account. For example, when the user inputs the encryption corresponding to the main user account and the input encryption matches the encryption stored in the storage unit **130**, the change of the requested main user account may be performed.

[0391] Referring to FIG. **69**, when the user changes the user **3** into the main user account and responds to the received video communication, a window for inputting a password for the user **3** can be displayed on the screen **800**.

[0392] When the user inputs the correct password for the user **3** through the user input unit **145**, the video call with the other party by the user **3** on the display device **10** can be started in response to the received video communication.

[0393] Meanwhile, when the main user account is not changed, the controller **110** processes the received communication as a missed call or the like. For example, when the user changes the called sub-user account into the main user account and does not want to respond to the video communication or the password input for changing the main user does not correct match the stored password, the received video communication may be rejected and the rejected received communication is processed as a 'missed call', such that the corresponding information, for example, the received data and time, and the sender information, can be stored in the storage unit **130**.

[0394] Meanwhile, the contents of the received call that has been processed as a 'missed call' as described above can be provided for the corresponding user, after the corresponding sub-user account is changed into the main user account.

[0395] For example, when the user selects the NO button **855** on the screen **800** shown in FIG. **68**, the received video communication is processed as a 'missed call' and the corresponding information is stored in the storage unit **130**. Thereafter, when the user **3** is changed into the main user account, as shown in FIG. **73**, information on the 'missed call' for the user **3** can be displayed on the screen **800**.

[0396] In other words, referring to FIG. **70**, when the user **3** is changed into the main user account, the controller **110** reads out the account information stored in the storage unit **130** in connection with the user **3** and can control the display unit **143** to display the information of the 'missed call' previously received, for example, the received data and time, and the sender information, on the screen **800**, on the basis of the read-out account information on the user **3**, to inform the user.

[0397] Meanwhile, when the user selects the OK/confirm button **857** on the screen **800** displaying the list of missed calls, the 'missed call' information on the user **3** stored in the storage unit **130** can be deleted.

[0398] According to another embodiment of the present invention, the method of managing a user communication account, as described above with reference to FIGS. **63** to **70**, can be performed in the same way for a received message as well as the video communication. In other words, the communication unit **100** can receive messages for a plurality of log-in accounts, but confirming the received messages is possible only for the main user account.

[0399] Referring to FIG. **71**, when a message is received to the main user account, for example, the user **1**, the controller **110** controls the display unit to display that a message has been received to the main user account (user **1**) on the screen **800** to inform the user, and receives a confirmation for the received message from the user.

[0400] When the user selects the 'YES' button **860**, the message received to the main user account (user **1**) can be directly displayed on the screen **800**.

[0401] On the other hand, when the user selects the 'NO' button **865**, the message received to the main user account (user **1**) is processed as a 'missed message', and the information on the received message, for example, the received date and time, the sender, and the contents of the message, can be stored in the storage unit **130**.

[0402] Referring to FIG. **72**, when a message is received to the sub-user account, for example, the user **3**, the controller **110** controls the display unit to display that a message has been received to the sub-user account (user **3**) on the screen **800** to inform the user.

[0403] Further, the display unit **143** can confirm the user whether to change the main user to the user **3** in order to confirm/access the received message on the screen **800**, and accordingly, the user can select whether or not to change the main user account through the user input unit **145**.

[0404] For example, when the user selects the YES button **870** through the user input unit, the controller **110** can change the user **3** into the main user account and the user **1** that is the former main user can be changed into the sub-user account. Information on the main user account change as described above can be stored in the storage unit **130**.

[0405] Meanwhile, according to an embodiment of the present invention, when the user requests for changing the main user, as described with reference to FIG. **69**, the controller can perform authentication for changing the main user account.

[0406] When the user **3** is changed into the main user account, the message received to the user **3** can be displayed on the screen **800**.

[0407] Meanwhile, when the user **3** is not changed to be the main user account, the controller can process the received message as a missed message. For example, when the user does not change the sub-user account receiving the message into the main user account or a password for changing the main user account is input incorrectly, the received message is processed as a 'missed message' and the corresponding information, for example, the received data and time, the sender, and the contents of the message can be stored in the storage unit **130**.

[0408] Meanwhile, the contents of the received message that has been processed as a 'missed message' as described above can be provided for the corresponding user, after the corresponding sub-user account is changed into the main user account.

[0409] For example, when the user selects the NO button **875** on the screen **800** shown in FIG. **72**, the received message is processed as a 'missed message' and the corresponding information is stored in the storage unit **130**. Thereafter, when the user **3** is changed into the main user account, as shown in FIG. **73**, a list of 'missed messages' for the user **3** can be displayed on the screen **800**.

[0410] In other words, referring to FIG. **73**, when the user **3** is changed into the main user account, the controller **110** reads out the account information stored in the storage unit

130 in connection with the user **3** and can control the display unit **143** to display the information of the 'missed message' previously received, for example, the received data and time, the sender, and the contents of the message, on the screen **800**, on the basis of the read-out account information on the user **3**, to inform the user.

[0411] FIG. **74** is a block diagram illustrating the configuration of a video communication system according to another embodiment of the present invention.

[0412] Referring to FIG. **74**, the second display device **80** may be a digital TV that allows a user to make video communication and the first display device **70** may be a digital TV that allows the other party to make video communication.

[0413] Meanwhile, the external device **90** is another device that can make video communication, and according to an embodiment of the present invention, the external device **90** can receive vide communication switched from the first display apparatus **70** to the second display apparatus **80** or vice versa. Each of the devices **70**, **80**, **90** can have the configurations of the display device discussed in any other embodiment. All components of the system are operatively coupled and configured.

[0414] For example, the second display device **80** can switch video communication received from the first display device **70** to the external device **90**, in accordance with a user's request, such that the user can make video communication with the counterpart of the first display apparatus **70**. That is, in this embedment, the second display device **80** is where the current user is at, and the first display device **70** is where the other party for the video communication with the current user is at. The external device **90** is another device of the current user and is configured to communicate with the second display device **80**. As a result, when the first display device **70** sends a video communication request to the second displayed evict **80**, the video communication can be routed to the external device **90** as needed. For instance, the user can pre-set up so that any communication directed to the second display device **80** is routed to the external device **90**.

[0415] In more detail, the second display apparatus **80** can be requested for switching the video communication to the external device **90**, configure connection for transmitting/receiving data to/from the external device **90** in accordance with the request, and transmit/receive the user's video/voice data and the other party's video/voice data to/from the external device **90**, using the configured connection.

[0416] The first display apparatus **70**, the second display device **80**, and the external device **90**, as described with reference to FIG. **1**, may be various devices that can make video communication, such as a mobile phone, a PDA or a notebook computer, a PC or a display apparatus.

[0417] The communication unit **100** of the second display device **80** can transmit a transmission stream including AV data corresponding to the user's video and voice to an external device, for example, the first display device **70** of the other party, through a wire/wireless network. The communication unit **100** can also receive a reception stream including AV data corresponding to the counterpart's video and voice in the visual communication, from the first display apparatus **70**.

[0418] For example, the communication unit **100** of the second display device **80** is connected with the first display device **70** by Ethernet or wire/wireless network, such as IEEE **802.3**, IEEE **802.11** and can transmit/receive video communication data to/from the first display apparatus **70**. Further, the communication unit **100** of the second display device **80** can be connected with the external device **90** by a wire/wireless network and transmit/receive the AV data to/from the external device **90** through the wire/wireless network, when it is requested to switch the video communication.

[0419] For example, the communication unit **100** of the second display device **80** and the external device **90** can transmit/receive the AV data, using wireless communication standards, such as WiHD (Wireless HD), WHDi (Wireless Home Digital Interface) or WiFi (Wireless Lan). In more detail, as it is requested to switch the video communication to the external device **90**, the communication unit **100** can transmit AV data corresponding to the video and voice of the other party which are received from the first display apparatus **70** to the external device **90**, while it can receive AV data corresponding to the video and voice of the user from the external device **90**.

[0420] Meanwhile, the AV data of the user received from the external device **90** can be transmitted to the first display device **70** through the communication unit **100** of the second display device **80**.

[0421] Although the configuration of a display apparatus according to an embodiment of the present invention was described by exemplifying when the communication **100** is connected with the first display device **700** and the external device **90**, the communication **100** may be divided into a first communication unit connected with the first display device **70** and a second communication unit connected with the external device **90**.

[0422] Hereafter, a method for connecting video communication according to an embodiment of the present invention is described in detail with reference to FIGS. **75** to **87**.

[0423] FIG. **75** is a flowchart showing a method for connecting video communication according to a first exemplary embodiment of the present invention, the method for connecting video communication is described in connection with the block diagram shown in FIGS. **2** and **74**.

[0424] Referring to FIG. **75**, the communication unit **100** of the second display device **80** receives video communication from the first display device **70** (S**900**).

[0425] Thereafter, the communication unit **100** of the second display device **80** is requested to switch the video communication to the external device **90** (S**910**). For example, the second display device **80** may be a digital TV in the dining room of the user and the external device **90** may be a portable terminal of the user. In this case, the user receives video communication from the other party through the TV at the dining room and can set up to switch the received video communication to his/her portable terminal so that the user may receive the video communication in another room in the house.

[0426] The switching of the video communication implements switching the video communication received by the second display device **80** to another communication apparatus, e.g., the external device **90** such that the user (who has moved to another location) can perform the received video communication with the external device **90**.

[0427] In step S**910**, the user can request for switching the video communication to the external device **90**, by using the second display device **80**, or request for switching the video communication, by using the external device **90**, which is the desired destination of that video communication.

[0428] The communication unit **100** transmits video communication data of the video communication to the external device **90** in response to the request for switching (S**920**). For

example, the communication unit **100** of the second display device **80** can configure network connections for transmitting/receiving data to/from the external device **90** by control of the controller, and can transmit/receive video communication data to/from the external device **90**, using the connected network. In other words, the communication unit **100** can allow the user to watch and listen to the video and the voice of the other party (from the first display device **70**) at the external device **90** by transmitting the video communication data received from the video communication apparatus of the other party, that is, the first display device **70**.

[0429] Meanwhile, the communication unit **100** of the second display device **80** receives video communication data of the video communication (e.g., the user's video and voice) from the external device **90**, and the communication unit **100** can transmit the video communication data received from the external device **90** to the first display device **70**, and accordingly, the other party can watch and listen to the video and voice of the user.

[0430] FIG. **76** is a flowchart illustrating a method of connecting video communication according to a second embodiment of the present invention and, in the method illustrated in FIG. **76**, the same portions as those described in connection with FIGS. **74** and **75** are not described below.

[0431] Referring to FIG. **76**, when a video communication is received from the other party (S**1000**), the communication unit **100** configures connection with the external device **90** (S**1010**) and transmits the received video communication data to the external device **90**, using the configured connection (S**1020**).

[0432] For example, the controller **110** can controls the communication unit **100** such that the network connection for transmitting/receiving the video communication data to/from the external device **90** can be configured, when the video communication is received even before it is requested to switch the video communication to the external device **90**.

[0433] Meanwhile, the step of configuration the connection with the external device **90** may include a step of requesting connection to the external device **90** from the communication unit **100** and a step of asking for approval of the requested connection from the external device **90**.

[0434] Further, the controller **110** can control the communication unit **100** to transmit the vide communication data received from the first display device **70** of the other party to the external device **90**, using the configured network connection.

[0435] As described above, it is possible to rapidly switch the video communication to the external device upon receiving the request for switching, by configuring the connection with the external device **90** in advance before the user requests for switching the video communication and transmitting the video communication data received from the first display device **70** to the external device **90**, such that it is possible to provide video communication service without disconnection.

[0436] However, in one example, the external device **90** may not produce AV data included in the received video communication data, before switching is requested. In other words, the external device **90** only receives the AV data from the second display device **80**, not produces the AV data, before the user requests for switching the video communication to the external device **90**, such that the user may not watch and listen to the video and voice of the other party with the external device **90** before the switching is requested. In such a case, the video communication switching for the second display device **80** is possible to the external device **90** (or any other external device) since the external device has already been registered with the second display device **80** to be able to perform the video switching. The device registration process is discussed in more detail referring to FIG. **77**.

[0437] FIG. **77** is a flowchart showing an embodiment of a method for registering external devices, in which the communication unit **100** of the second display device **80** searches for connectable peripheral external devices (S**1100**).

[0438] For example, the controller **110** can control the communication unit **100** to search for possible external devices that can be connected in wired/wireless networks through multicasting or broadcasting of periodical search signals.

[0439] In more detail, the second display device **80** sends out a search signal including its own address information in multicasting or broadcasting and the external device **90** (or any other external device) receiving the search signal can respond by transmitting a signal including its own address information.

[0440] After an external device to be registered in the searched external devices is detected and selected (S**1110**), the controller **110** registers the selected external device (S**1120**). Here, if multiple external devices are detected, the user can select one or more external devices among the detected external devices for the registration. In this regard, if desired, the second display device **80** may route the video communication data of a video communication to one or more registered external devices, simultaneously.

[0441] As a variation, the user can directly specify the external device to register, by directly inputting the address of the external device **90** to register through the second display device **80**.

[0442] In the step of registering the external device, the second display device **80** can request device information from the external device **90** and the external device **90** can transmit the device information to the second display device **80** in response to the request. Further, the display device **80** can transmit configuration information to the external device **90** and the external device **90** can select a configuration relating to the connection in accordance with the configuration information.

[0443] For example, the device information of the external device **90** can include information, such as AV codec, buffer size, and data bit rate, and the configuration information is information on the available configuration relating to the connection with the second display device **80**, and for example, may include priority, whether there is only voice, and whether to permit multi-connection etc.

[0444] Further, the controller **110** can store the register-related items of the external device **90**, as described above, in the storage unit **130** of the second display device **80**.

[0445] Meanwhile, the external device **90** may be unregistered (or removed from the registered list) by a user's request through the second display device **80** and the external device **90**, and accordingly, the register-related items of the external device **90** stored in the storage unit **130** may be deleted.

[0446] Returning to FIG. **76**, after the connection with the external device **90** is configured as described above in step S**1020**, the controller **110** confirms whether there is a request for switching video communication to the external device **90** (S**1030**).

[0447] The communication unit **100** can continue with transmitting the AV data received from the first display device **70** to the external device **90** by using the configured connection, even before the user requests for switching the video communication.

[0448] Meanwhile, when it is requested to switch the video communication, the controller **110** ends the user input/output at the second display device **80** (S**1040**). When the user requests for switching the video communication to the external device **90**, the second display device **80**, in more detail, the display unit **143** of the second display device can display information that the video communication is requested to be switched to the external device **90** on the screen **1200**.

[0449] Referring to FIG. **78**, the video of the user and the other party is displayed on the screen **1200** of the second display device **80**, and when the device switching is requested, a sentence saying that it has been requested to switch the video communication to the external device **90** can be displayed on the screen **1200**.

[0450] For example, when video communication is received to the 'dining room TV' that is the second display device **80**, the user can request for switching the received video communication to his/her: mobile phone that is the external device **90**, by using the mobile phone **90**.

[0451] In this case, information on his/her mobile phone (the external device **90**) that has been requested to receive the video communication is displayed on the screen **1200** of the second display device **80** that has been received the video communication, as shown in FIG. **78**, and it is possible to select whether to permit the requested switching, using the key buttons.

[0452] Further, as described above, when the user requests the device switching for the video communication to the external device **90**, the controller **100** can finish/end the input of the user's video and voice using the camera **141** and the microphone **142** of the second display device **80**, and end the output of the other party's video and voice using the display unit **143** and the voice output unit **144** (S**1040**).

[0453] Accordingly, the video and audio according to the vide communication are not input/output any more in the second display device **80**, but can be input/output by the external device **90**, after the device switching.

[0454] Referring to FIG. **79**, when it is requested to switch the video communication to the external device **90**, it can be displayed on the screen **1200** of the second display device **80** that the video communication has been switched to the external device **90** and the video communication is now currently performed on 'my mobile phone' (external device **90**).

[0455] Meanwhile, according to an embodiment, only the user input/output operation described above is ended when there is a request for switching the video communication, and the second display device **80** can continue with receiving the video communication data from the first display device **70** and transmitting the data to the external device **90**.

[0456] Returning to FIG. **76**, when the user input/output is finished at the second display device **80**, as described above, the communication unit **100** notifies the external device **90** that the switching of the video communication has been completed (S**1050**).

[0457] Meanwhile, the external device **90** that has been notified that the switching has been completed produces the AV data (of the other party) received from the second display device **80**, and accordingly, the user at the external device **90** can now watch and listen to the video and voice of the other party through the external device **90**.

[0458] During the video communication, the communication unit **100** of the second display device **80** receives the AV data (e.g., AV data of the user) from the external device **90** (S**1060**) and then transmits the received AV data to the video communication apparatus of the other party (first display device **70**) (S**1070**) such that the video communication between the first display device **70** and the external device **90** is carried out through the second display device **80** functioning as a router.

[0459] For example, the external device **90** having been notified that the switching has been completed can generate AV data corresponding to the user's video and voice by using the camera and the microphone of the external device **90** and then transmit the generated AV data to the second display device **80**.

[0460] Therefore, the other party of the first display device **70** can watch and listen to the video and voice of the user which were acquired through the external device **90**, such that the user and the other party can have video communication, using the first display device **70** and the external device **90**.

[0461] FIG. **80** is a flowchart showing a method for connecting video communication according to a third exemplary embodiment of the present invention, in which an embodiment of a method for connecting video communication which is performed in the external device **90** is shown. The same features in the method for connecting video communication shown in FIG. **80** as those described with reference to FIGS. **74** to **79** may not be described hereafter.

[0462] Referring to FIG. **80**, the external device **90** is requested for connection from the video communication device (S**1300**) and configures connection with the video communication device (S**1310**).

[0463] For example, when the video communication is received to the second display device **80** which in this example is the video communication device of the user, the external device **90** registered in the second display device can configure a wire/wireless network for data transmission/reception in accordance with a request from the second display device **80**.

[0464] Thereafter, the external device **90** receives AV data (e.g., AV data of the video communication from the other party) from the video communication device (second display device **80**), using the configured connection (S**1320**). As described above, before the user's request for switching the video communication, the external device **90** can receive the AV data received from the first display device in the video communication, through the second display device **80**, by configuring the connection with the second display device **80**.

[0465] However, the external device **90** may not reproduce the received AV data (e.g., output it to the user), before switching is requested.

[0466] In other words, the external device **90** only receives the AV data from the second display device **80**, and may not reproduce the AV data at the external device **90**, before the user requests switching of the video communication to the external device **90**, such that the user may not watch and listen to the video and voice of the other party with the external device **90** before the switching is requested.

[0467] Meanwhile, before switching of the video communication to the external device **90** is requested, the external device **90** may not transmit the AV data (e.g., AV data of the user such as the real-time image of the user at the external device **90**) to the second display device **80** by using the configured connection.

[0468] In more detail, the external device **90** temporarily stores the AV data received from the second display device **80** in a buffer and decodes the temporarily stored AV data, but it may not reproduce it, and can delete the temporarily stored AV data in a FIFO (First Input First Output) way in order to prevent the overflow of the buffer of the external device **90**.

[0469] When the user requests for switching of the video communication (S**1330**), the external device **90** transmits the request for switching to the video communication device (second display device **80**) (S**1340**).

[0470] For example, the external device **90** can request for switching the video communication to the second display device **80**, reproduce the AV data according to the video communication, and perform operations for the user input/output acquiring the user's video and voice.

[0471] Referring to FIG. **81**, the user at the external device **90** (e.g., mobile phone) can request for switching of the video communication received from the second display device **80** (e.g., the dining room TV), such that sentences and buttons for requesting the switching of the video communication can be displayed on the screen **1210** of the user's mobile phone (external device **90**).

[0472] When being notified that the switching has been completed from the video communication device (second display device **80**) in response to the request for switching (S**1350**), the external device **90** reproduces the received AV data of the video communication (S**1360**).

[0473] For example, the external device **90** plays the AV data, which has been received, e.g., the video and voice data of the other party which are received through the second display device **80** such that the user can watch it, after being notified that the switching of the video communication has been completed from the second display device **80**.

[0474] In other words, after being notified that the switching has been completed, the external device **90** decodes the AV data received from the second display device **80** and temporarily stored in the buffer and can output the decoded data by using the display module and the voice output module of the external device **90**.

[0475] In step S**1360**, referring to FIG. **82**, the user can be provided with the video of the other party and the video of himself/herself for video communication through the screen of the external device **90**, for example, 'my mobile phone'.

[0476] Meanwhile, the external device **90** transmits AV data according to the user input to the video communication device (second display device **80**) (S**1370**). For example, after being notified that the switching has been completed, the external device **90** can generate AV data corresponding to the user's video and voice by using the camera and the microphone of the external device **90** and then transmit the generated AV data to the second display device **80**. Then, the AV data transmitted from the external device **90** to the second display device **80** can be transmitted and reproduced at the first display device **70** of the other party.

[0477] Although it was described that the connection between the second display device **80** and the external device **90** is configured before the user's request for device switching, with reference to FIGS. **76** to **82**, the present invention is not limited thereto. For example, the second display device **80** may transmit/receive the video communication data by configuring connection with the external device **90** after the user's request for device switching.

[0478] In more detail, the connection between the second display device **80** and the external device **90** may be configured, after the user's requests for device switching, in consideration of signal transmission/reception performance or interference at the frequency band for transmitting/receiving data between the second display device **80** and the external device **90** or power consumed by the device.

[0479] FIG. **83** is a flowchart of an embodiment of a method of transmitting video communication calls to an external device, in which the method of transmitting calls will be described in combination with the block diagrams shown in FIGS. **3** and **74**.

[0480] Referring to FIG. **83**, the communication unit **100** of the second display device **80** receives a video communication call from the first display device **70** of the other party (S**1400**) and transmits (routes) the received call to the external device **90** (S**1410**).

[0481] For example, the user can set in advance a transmission of a video communication call to the external device **90**, and accordingly, the video communication call received by the second display device **80** can be set up to be transmitted to the external device **90**.

[0482] In more detail, the controller **110** of the second display device **80** can store information on the external device **90** to which the call is to be transferred in accordance with the setting-up of call transmission into the storage unit **130**, and can transmit/route the call to the external device **90** by using the information stored in the storage unit **130** when a video communication call is received.

[0483] The external device **90** that has received the video communication call then can inform the user at the external device **90** that the video communication call has been received from the first display device **70**.

[0484] Thereafter, the controller **110** of the second display device **80** determines whether or not there has been a request from the external device for switching the video communication (S**1420**).

[0485] Referring to FIG. **84**, 'my mobile phone' (the external device **90**) that has received the video communication call can display that the video communication call has been received on the screen **1210** of the mobile phone, and can receive a selection about whether to receive the video communication switched from the 'dining room TV' (the second display device **80**) by the user.

[0486] When there is a request for device switching, the communication unit **100** receives the AV data from the first display device **70** (S**1430**) and connects to the external device **90** to transmit the received AV data to the external device **90** (S**1440**).

[0487] The process in steps S**1430** and S**1440** after the request for switching may be the same as (or similar to) those described with reference to FIGS. **76** to **82**.

[0488] FIG. **85** is a flowchart illustrating an embodiment of a method of ending a video communication.

[0489] Referring to FIG. **85**, the communication unit **100** of the second display device **80** is requested to end a currently active video communication from the external device **90** (S**1500**) and in response, the communication unit **100** ends the connection with the first display device **70** of the other party (S**1510**). For example, the controller **110** ends the data transmission/reception with the first display device **70** for the video communication in accordance with the request for ending the video communication and returns the sources, thereby ending the connection with the first display device **70**.

[0490] Thereafter, the communication unit **100** notifies that the connection with the first display device **70** (e.g., video communication with the first display device **70**) has been terminated, to the external device **90** (S**1520**).

[0491] FIG. **86** is a block diagram illustrating the configuration of a video communication system according to another embodiment of the present invention, in which the same description in the configuration of the system in FIG. **86** as that provided with reference to FIGS. **1** to **85** may not provided below. In this example, multiple external devices for the device switching are involved.

[0492] Referring to FIG. **86**, the second display device of the user can be connected with a plurality of external devices **90** and **95**, and accordingly, video communication received to the second display device **80** can be switched to at least one of the plurality of external devices **90** and **95**.

[0493] A method of switching the video communication received by the second display device **80** to the first external device **90** or the second external device **95** is the same as that described with reference to FIGS. **75** to **85** and the detailed description may not be repeated.

[0494] According to an embodiment of the present invention, the video communication apparatus (e.g., the second display device **80**) can be connected simultaneously with a plurality of external devices, and accordingly, received video communications can be switched to the plurality of external devices simultaneously, sequentially or in any desired order.

[0495] For example, the second display device **80**, in more detail, the communication unit **100** of the second display device **80** is connected with the first external device **90** and the second external device **95** at the same time, and can transmit the AV data received from the first display device **70** to the first and second external devices **90** and **95** and can also transmit the AV data received from the first and second external device **90** and **95** to the first display device **70**. Although the discussion here involves two external devices **90** and **95**, any other number of external devices are possible.

[0496] In this case, the second display device **80** can synchronize the AV data received from the first external device **90** with the AV data received from the second external device **95** and transmit it to the first display device **70**.

[0497] For example, the controller **110** of the second display device can synchronizes the AV data by performing drop of delay data or combining the same time data by using a time stamp etc. of the AV data received from the first and second external devices **90** and **95**.

[0498] Therefore, it is possible to easily switch the video communication received by the second display device **80** to the plurality of external devices **90** and **95**, such that two or more users at different external devices can participate in the video communication.

[0499] FIG. **87** is a flowchart showing a method for connecting video communication according to a fourth exemplary embodiment of the present invention. The method for connecting video communication will be described in combination with the block diagram shown in FIG. **86**. Meanwhile, the same features in the method for connecting video communication shown in FIG. **87** as those described with reference to FIGS. **75** to **86** may not be described hereafter.

[0500] Referring to FIG. **87**, a second display device is requested to switch the video communication to a second external device **95** (S**1600**).

[0501] For example, the second display device **80** may route the video communication to a first external device **90** in accordance with a user's request, and the user who is having the video communication at the first external device **90** can request to the second display device **80** that the video communication be switched to the second external device **95**, which is another external device.

[0502] According to the switch request, the second display device **80** ends the AV data transmission to the first external device **90** and requests the end of input/output of the user at the first external device **90**.

[0503] Accordingly, the first external device **90** acquires the user input/output, for example, video and voice of the user, using the camera or the microphone and stops generation of the AV data, and notifies the end of the user input/output at the first external device **90** to the second display device **80**, after the AV data transmission to the second display device **80** ends (S**1630**).

[0504] When receiving the end notification from the first external device **90**, the second display device **80** then transmit the AV data received from the first display device **70** to the second external device **95** (S**1640**).

[0505] Further, the second display device **80** receives the AV data from the second external device **95** (S**1650**) and transmits the received AV data to the first display device **70**.

[0506] The connection for transmission/reception of the AV data between the second display device **80** and the second external device **95** can be configured before the switch to the second external device **95** is requested, as described above with reference to FIG. **76**, or may be configured after the switch request in step S**1500** or after the end notification in step S**1630**.

[0507] FIG. **88** shows a flowchart showing a method for connecting video communication according to an exemplary embodiment of the present invention. The method for connecting video communication shown in FIG. **88** will be described in combination with the block diagram shown in FIG. **2**.

[0508] Referring to FIG. **88**, the communication unit **100** of the second display device **80** receives information on users that watch the same contents as contents currently produced in the display unit **143** of the second display device **80** (S**1700**). For instance, the user at the second display device **80** can view a specific program and while viewing the program, the user can know other users at other devices who are currently viewing the same program.

[0509] The contents may be a plurality of contents such as real-time broadcast, COD (Contents on Demand), game, news, etc. To this end, the display device **80** may receive signals corresponding to the plurality of contents using a wired/wireless network.

[0510] Meanwhile, there may be content providers corresponding to the contents. In this case, the display device may be connected to the content providers according to a request by the user, thereby receiving a variety of contents such as real-time broadcast, COD, game, moving image, photograph, weather information, news, etc., provided by the content providers.

[0511] According to an exemplary embodiment of the present invention, the contents produced in the display unit **143** may be an image of a certain broadcast channel selected by the user. To this end, the display device may comprise a tuner that selects and receives a broadcast signal of a certain broadcast channel through an antenna or a cable.

[0512] Also, in step S**1700**, the communication unit **100** may receive the information on the users that watch the same contents as the currently produced contents from the server. The server may be a server that provides a video communication service or a server that provides a messenger service, for example.

[0513] The display unit **143** displays the users that watch the same contents using the received information (S**1710**), and the user input unit **145** receives a selection for at least one of the displayed users that watch the same contents (S**1720**).

[0514] Then, the communication unit **100** connects the video communication with the selected user (S**1730**).

[0515] For instance, referring to FIG. **89**, the display unit **143** of the second display device **80** may simultaneously display first contents as well as other users that are viewing the first contents, e.g., user A, user B, and user C on the screen **1800** of the second display device **80**.

[0516] For example, a user information display window **1810** for displaying the other users that view the same contents may be displayed on a certain area of the screen **1800** of the second display device **80**, and information on the other users that watch the same contents as well as the currently produced first contents may be displayed on the user information display window **1810**. It can determined that the other users are viewing the same program if the same program is displayed on the devices of the other users.

[0517] Also, the user at the second display device **80** may select the other user(s) to make a video communication with the other user(s) displayed on the user information display window **1810** using the user input unit **145**. For example, in the case where the user selects the user B among the users that watch the same contents, a communication window **1820** for video communication is displayed on the screen **1800** as shown in FIG. **90**, and the user may perform the video communication with the selected user B using the communication window **1820**. As a result, the user may discuss the program being viewed or any other matter.

[0518] According to an exemplary embodiment of the present invention, a step of displaying the other users that watch the same contents on the screen **1800** as described above may be performed by a request by the user, for example, by a selection of "the same contents watching user view" button by the user.

[0519] Meanwhile, according to another embodiment of the present invention, the step of displaying the other users that watch the same contents may be performed by a contents information display request by the user.

[0520] Referring to FIG. **91**, the user may request the information on currently produced contents, and a contents information window **1830** including information on the requested first contents may be displayed on a certain area of the screen **1800**, accordingly.

[0521] Meanwhile, the information window **1830** may include information on the other users watching the same contents as the currently produced contents. For example, a user A, a user B, and a user C who are other users watching the first contents may be displayed on the contents information window **1830** of the user's screen.

[0522] Also, the user may select one or more of the other user A, B, and C displayed on the contents information window **1830** to connect a video communication with the other user(s) as described above.

[0523] When the video communication is connected with the other user watching the same contents as the currently produced contents, all the users who are viewing the same contents may talk about the contents which they are currently watching, for example, the first contents as a common interest.

[0524] Hereinafter, a method for connecting video communication according to the embodiment of the present invention will be described in more detail with reference to FIGS. **92** to **96**.

[0525] As described with reference to FIGS. **88** to **91**, the other user watching the same contents displayed on the screen **1800** may be other users previously registered with the user of the display device as interested users.

[0526] For example, the user, may register other users as the interested users, and information on the interested users may be stored in the server corresponding to the user.

[0527] In this case, the server may collect the information on each of the registered interested users, more specifically, contents which each of the registered interested users is watching, for example, the information on the broadcast channel which each of the registered interested users is watching, and send the information on the other users watching the same contents as the same contents currently produced in the display device among the interested users to the display device using the collected information.

[0528] Meanwhile, the display device may display the users watching the same contents as the currently produced contents among the interested users on the screen **1800** using the information received from the server.

[0529] According to an exemplary embodiment of the present invention, the user of the display device may register desired other users as a 'friend', and the information on the other user registered as the 'friend' may be stored in the server that provides the video communication server or the server that provides the messenger service.

[0530] Meanwhile, the video communication server or the messenger server may obtain the information on the broadcast channel which the user of the display device and each of the other users registered as the 'friend' currently views or is interested in. For example, the server may receive the information on the viewing channel corresponding to each of the users from the display device.

[0531] Then, the server may confirm the other users viewing the same broadcast channel as the broadcast channel currently produced in the display device among the other users registered as the 'friend' using the obtained information, and send information on the other users registered as the 'friend' watching the same broadcast channel to the display device of the user according to the result of the confirmation.

[0532] Meanwhile, the server may send the viewing channel information on each of the other users registered as the 'friend' to the display device of the user.

[0533] The display device receiving the information from the server may display the other users watching the same broadcast channel among the other users registered as the 'friend' on the screen **1800** using the received information.

[0534] Referring to FIG. **92**, the display unit **143** of the user displays an image of 'CH. **1**' which is the broadcast channel currently selected by the user or displyed on the screen **1800** of the user. At the same time, the 'friends' watching the same broadcast channel as 'CH. **1**' which is the current broadcast channel may be displayed on a certain area of the screen **1800**.

[0535] For example, a friend information display window **1840** for displaying information on the other users registered as the 'friend' on the screen **1800** may be displayed, and 'Friend **1**' and 'Friend **3**' watching the same broadcast channel as the broadcast channel currently watched by the user, e.g., 'CH. **1**', may be displayed on the friend information display window **1840** of the user's scren **1800**.

[0536] The user may select one of the current channel friends displayed on the friend information display window **1840** and then request a video communication with the selected friend(s), thereby connecting the video communication with the selected friend(s).

[0537] For example, in the case where the user selects 'Friend **1**' among the current channel friends displayed on the friend information display window **1840** and presses a video communication button, the communication window **1820** for a video communication is displayed on the screen **1800** and the user may make a video communication with the selected 'Friend **1**' using the communication window **1820**, as shown in FIG. **93**.

[0538] Meanwhile, the user may select 'all friend view' in the friend information display window **1840**, and all users registered as the 'friend' may be displayed on the friend information display window **1840** as shown in FIG. **94**, accordingly.

[0539] Referring to FIG. **94**, all the other users registered as the 'friend' may be divided into 'current channel friend(s)' watching the same broadcast channel as the broadcast channel currently watched by the user and 'different channel friend(S)' watching different broadcast channel(s) from the current broadcast channel program, as displayed on the friend information display window **1840**.

[0540] For example, 'Friend **1**' and 'Friend **3**' watching 'CH. **1**' currently produced in the display device of the user are displayed as the 'current channel friend' and 'Friend **2**' and 'Friend **5**' watching different channels from the 'CH. **1**' are displayed as the 'different channel friend', on the friend information display window **1840**.

[0541] Meanwhile, as shown in FIG. **94**, for each of the other users displayed as the 'different channel friend', the broadcast channel which the corresponding other user currently watches may be displayed together.

[0542] Also, if the user selects 'all friend view', the channels which each of all users registered as the 'friend' is currently watching and whether or not each of all the users registered as the 'friend' has been logged-in may be displayed on the friend information display window **1840** as shown in FIG. **95**.

[0543] For instance, referring to FIG. **95**, assume that users **1** to **6** are registered as the 'friend' of the user, and friends **1**, **2**, **3** and **5** are currently logged-in so that they are watching the broadcast channel, and friends **4** and are currently not logged-in. Such infomration may be displayed on the friend information display window **1840**.

[0544] Meanwhile, for each of the 'friends' watching the broadcast channel, the broadcast channel which the corresponding user currently watches may be displayed together as shown in FIG. **95**.

[0545] The user may select any one of the users registered as the 'friend' in the friend information display window **1840** as shown in FIG. **94** or FIG. **95** to connect a video communication with the selected friend. For example, the user may select any one of the users included in the 'current channel friend' as well as the users included in the 'different channel friend' to request the video communication with the selected friend(s).

[0546] Referring to FIG. **96**, the user may request a display of information on a broadcast channel which he is currently watching, for example, 'CH. **1**' and a program information window **1850** including the information on the program broadcast in the 'CH. **1**' may be displayed on a certain area of the screen **1800**, accordingly.

[0547] Meanwhile, the program information window **1850** may include information on 'friends' watching the same broadcast channel as the currently produced broadcast channel. For example, 'Friend **1**' and 'Friend **3**' may be displayed as 'current channel friend' watching the 'CH. **1**' on the program information window **1850**.

[0548] Also, the user may receive a friend list as shown in FIG. **94** or FIG. **95** through the screen **1800** using 'all friend view' displayed on the program information window **1850**.

[0549] FIG. **97** shows an exemplary embodiment of a method for displaying channel information and in particular, an exemplary embodiment of a configuration of a channel browser displayed on a screen.

[0550] Referring to FIG. **97**, the channel browser including thumbnail images corresponding to each of a plurality of broadcast channels capable of being received at a display device may be displayed on the screen **1800** of the display device of the user.

[0551] As such, since the channel browser includes the thumbnail images corresponding to each of the plurality of channels, the user may intuitively recognize contents broadcast in the plurality of channels.

[0552] Meanwhile, the channel browser displayed on the display unit may further include an editing menu. The editing menu may include a "locking" item performing a locking function in order to be unable to edit a selected thumbnail image, an "editing" item editing the selected thumbnail image, an "arranging" item arranging and displaying the thumbnail image, a "previous" item displaying a previous thumbnail image other than the displayed thumbnail image, a "next" item displaying a next thumbnail image other than the displayed thumbnail image, and an "exit' item performing movement from an "image channel list" to other menu items, etc.

[0553] Meanwhile, the thumbnail images displayed in the channel browser may be a still image or a moving image, and may be an image of contents currently received in a corresponding channel or an image of pre-stored contents.

[0554] Meanwhile, the thumbnail images may be images processed and output from a channel browsing processor of the display device.

[0555] If any one of a plurality of displayed thumbnail images is selected in the state where the channel browser is displayed, a broadcast signal image of a channel corresponding to the selected thumbnail image may be displayed on the screen **1800**.

[0556] Also, the thumbnail images displayed within the channel browser may be arranged according to any one of channel number, preset preferred channel, recently watched channel, and preset deleted channel.

[0557] According to another embodiment of the present invention, for a plurality of broadcast channels included in the channel browser, it is possible to display information on 'Friend' currently watching each channel.

[0558] As shown in FIG. **97**, it is possible to display 'Friends' currently watching 'CH. **1**' to be corresponded to the thumbnail image of the 'CH. **1**', e.g., 'Friend **1**' and 'Friend **3**', display 'Friend **2**' currently watching 'CH **3**' to be corresponded to the thumbnail image of the 'CH **3**', and display 'Friend **5**' currently watching 'CH **4**' to be corresponded to the thumbnail image of the 'CH **4**'.

[0559] Meanwhile, the user may connect a video communication with a desired friend using the watching channel information of 'Friend' displayed on the channel browser as described above. For example, the user may select the 'Friend **1**' displayed corresponding to the thumbnail image of the 'CH. **1**' to connect a video communication with the 'Friend **1**' currently watching the 'CH. **1**', and obtain more specific information on the program of the 'CH. **1**' through the video communication.

[0560] Thus, the user may obtain objective program information displayed on a channel browser, e.g., program information provided from a broadcaster as well as information such as subjective evaluation of 'Friend' on the program, etc. Therefore, it is possible to easily select the channel.

[0561] The video communication methods according to the embodiments of the present invention may be produced as one or more software programs to be run in the computer(s) and/or other devices and may be stored in one or morecomputer-readable recording media. Examples of the computer-readable recording medium includes Read Only Memory, Random Access Memory, Compact Disc Read Only Memory, magnetic tape, floppy disc, optical data storage, etc., as well as those implemented in a form of carrier wave (for example, transmission through the Internet).

[0562] The computer-readable recording medium can be distributed over a computer system connected to a network so that a code capable of being read by a computer may be stored and run in a distributed manner. And, functional programs, codes, and code segments for implementing the video communication method may easily be inferred by programmers in the art to which the present invention pertains.

[0563] Although preferable embodiments of the present invention have been illustrated and described, the present invention is not limited to the above-mentioned specific embodiments. Various modifications thereof may be made by those skilled in the art without departing from the gist of the present invention claimed in the claims. These modifications should not be understood separately from technical idea or view of the present invention.

What is claimed is:

1. A digital TV (DTV) for a video call operation using a camera associated with the DTV, the DTV comprising:

a display unit; and

at least one processor configured to:

display simultaneously, on the display unit, (a) an image received from the camera for a video call operation, and (b) a plurality of different image setting items for controlling characteristics of the image received from the camera;

adjust at least one of the characteristics of the image based on a user's control of at least one of the plurality of different image setting items;

display, on the display unit, the image having the at least one adjusted characteristic based on the user's control; and

perform the video call operation with another party using the image having the at least one adjusted characteristic.

2. The DTV according to claim **1**, wherein the image received from the camera is an image of a user at the DTV.

3. The DTV according to claim **1**, the at least one processor further configured to:

control, on the display unit, a displaying of an image of the another party, independent from adjusting the at least one of the characteristics of the image received from the camera.

4. The DTV according to claim **3**, wherein the image received from the camera and the image of the another party as adjusted are simultaneously displayed on the display unit.

5. The DTV according to claim **1**, the at least one processor further configured to:

control, on the display unit, a displaying of an image of the another party, wherein the image of the another party is adjusted in a same manner as the image received from the camera.

6. The DTV according to claim **5**, wherein the image received from the camera and the image of the another party as adjusted are simultaneously displayed on the display unit.

7. The DTV according to claim **1**, wherein the image received from the camera as adjusted is displayed in a picture in picture (PIP) or a picture out-of picture (POP) format.

8. The DTV according to claim **1**, wherein the plurality of different image setting items for controlling the characteristics of the image include selectable items for controlling at least two of the following:

(a) a contrast of the image,

(b) a brightness of the image,

(c) a saturation of the image,

(d) a sharpness of the image,

(e) a hue of the image, and

(f) a white balance of the image.

9. The DTV according to claim **1**, wherein the display unit displays in real time the image as being adjusted based on the user's control.

10. The DTV according to claim **1**, wherein during the video call operation, the at least one processor is further configured to adjust the characteristics of the image using the plurality of different image setting items.

11. A method for controlling a digital TV (DTV) for a video call operation using a camera associated with the DTV, the DTV including a display unit and at least one processor, the method comprising:

displaying simultaneously, on the display unit, (a) an image received from the camera for a video call operation, and (b) a plurality of different image setting items for controlling characteristics of the image received from the camera;

adjusting, by the at least one processor, at least one of the characteristics of the image based on a user's control of at least one of the plurality of different image setting items;

displaying, on the display unit, the image having the at least one adjusted characteristic based on the user's control; and

performing, by the at least one processor, the video call operation with another party using the image having the at least one adjusted characteristic.

12. The method according to claim **11**, wherein the image received from the camera is an image of a user at the DTV.

13. The method according to claim **11**, further comprising:
controlling, on the display unit, a displaying of an image of the another party, independent from adjusting the at least one of the characteristics of the image received from the camera.

14. The method according to claim **13**, wherein the image received from the camera and the image of the another party as adjusted are simultaneously displayed on the display unit.

15. The method according to claim **11**, further comprising:
controlling, on the display unit, a displaying of an image of the another party, wherein the image of the another party is adjusted in a same manner as the image received from the camera.

16. The method according to claim **15**, wherein the image received from the camera and the image of the another party as adjusted are simultaneously displayed on the display unit.

17. The method according to claim **11**, wherein the image received from the camera as adjusted is displayed in a picture in picture (PIP) or a picture out-of picture (POP) format.

18. The method according to claim **11**, wherein the plurality of different image setting items for controlling the characteristics of the image include selectable items for controlling at least two of the following:
(a) a contrast of the image,
(b) a brightness of the image,
(c) a saturation of the image,
(d) a sharpness of the image,
(e) a hue of the image, and
(f) a white balance of the image.

19. The method according to claim **11**, wherein the displaying step displays in real time the image as being adjusted based on the user's control.

20. The method according to claim **11**, wherein during the video call operation, the method further includes adjusting the characteristics of the image using the plurality of different image setting items.

* * * * *