

DESCRIPTION

TITLE:

A METHOD AND PROGRAM PRODUCT FOR CONTROLLING A REAL TIME FILMING
5 OF A REMOTE LOCATION

TECHNICAL FIELD

[0001] One or more embodiments of the invention generally relate to a real time filming of a
remote location. More particularly, the invention relates to controlling a real time filming of a
10 remote location and viewing using a communication network.

BACKGROUND ART

[0002] The following background information may present examples of specific aspects of the
prior art (e.g., without limitation, approaches, facts, or common wisdom) that, while expected to
15 be helpful to further educate the reader as to additional aspects of the prior art, is not to be
construed as limiting the present invention, or any embodiments thereof, to anything stated or
implied therein or inferred thereupon.

[0003] It is believed that in many cases people cannot travel to their desired place because of
objective reasons such as, without limitation, age, physical impairments, etc. and thus they
20 cannot benefit from a travel experience, especially the enjoyment of sightseeing of the respective
place such as tourist spots. To see a certain place one has to either physically visit the place or use
pre-recorded films of the respective place. If traveling is not possible, the only way to see the
place is by watching pre-recorded films, on a display. However, this alternative doesn't allow a
person to view the place neither as desired, nor in real time. One has to see views of the place that
25 have already been filmed, in a way somebody else decided how.

[0004] The following is an example of a specific aspect in the prior art that, while expected to be
helpful to further educate the reader as to additional aspects of the prior art, is not to be construed
as limiting the present invention, or any embodiments thereof, to anything stated or implied
therein or inferred thereupon. There are several systems and methods which describe how video
30 data from a filming location is streamed through the internet to a viewing customer, as well as
payment methods. However, in these cases, the viewer cannot control the manner in which the
shooting is performed by the filming person, information flows into one direction, namely from
the shooter to the viewer.

[0005] In view of the foregoing, it is clear that these traditional techniques are not perfect and
35 leave room for more optimal approaches.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] The present invention is illustrated by way of example, and not by way of limitation, in the figures of the accompanying drawings and in which like reference numerals refer to similar elements and in which:

- 40 [0007] FIG. 1 illustrates an exemplary diagram of a basic system, in accordance with an embodiment of the present invention;
- [0008] FIG. 2 illustrates an exemplary diagram of a system, in accordance with an embodiment of the present invention;
- 45 [0009] FIG. 3 illustrates an exemplary operator device, in accordance with an embodiment of the present invention;
- [0010] FIG. 4 illustrates an exemplary display for an operator device, in accordance with an embodiment of the present invention;
- [0011] FIG. 5 illustrates an exemplary display for a client device, in accordance with an embodiment of the present invention;
- 50 [0012] FIGs. 6 A-C illustrate operation of an exemplary negative feedback, in accordance with an embodiment of the present invention;
- [0013] FIG. 7 illustrates exemplary routines of dedicated programs, in accordance with an embodiment of the present invention; and
- [0014] FIG. 8 is a block diagram depicting an exemplary client/server system which may be used
- 55 by an exemplary web-enabled/networked embodiment of the present invention.
- [0015] FIG. 9 illustrates a block diagram depicting a conventional client/server communication system.
- [0016] Unless otherwise indicated illustrations in the figures are not necessarily drawn to scale.

DESCRIPTION OF EMBODYMENTS

- [0017] In many embodiments of the present invention and variations thereof, a system may make it possible for a client to send control information in real time to an operator, so that the filming of a location may be performed in a manner that the client chooses. In the present invention, the client is the person who controls how that filming is performed, and the operator is the person
- 65 who performs a filming. Many embodiments may have a bi-directional communication between the client and the operator, in other words a loop. In many embodiments, the client may control, in real time, a position such as, but not limited to, pan-tilt-zoom of a camera, as well as a behavior of the operator at the other end of the loop, and so the filming is performed as the client desires at that very moment and the next moment. In some embodiments, the client may control the way the
- 70 filming may be performed through a negative feedback closed loop by means of a communication

channel such as, without limitation, the Internet, established between the client and the operator.

[0018] In many embodiments, the result of the filming may be shown on a monitor / display device. The client may see views of the location according to their own will, in real time, as they were at that very place, while physically being at a place of their choice resulting in a truly

75 “virtual trip” experience, without needing to travel physically.

[0019] FIG. 1 illustrates an exemplary diagram of a basic system, in accordance with an embodiment of the present invention. System 100 includes a client device 105, an operator device 110, and a relay device 115. In the present embodiment, relay device 115 may establish a bi-directional communication link 120 between client device 105 and operator device 110.

80 Communication link 120 may include a network channel 125 for information exchange with client device **105** and a network channel **130** for information exchange with operator device **110**. In non-limiting example, a client, controlling client device **105**, may send to an operator, controlling operator device **110**, instructions about the way he/she desires filming to be performed. In turn, the operator may comply with those requests and the result of the filming which may be sent back
85 to the client which thus is able to view the scenes in real time and in the manner he desires. In the present embodiment, client device **105** may include computing device such as, but not limited to, desktop computer, laptop computer, tablet, smartphone, etc. with a network connection. Operator device **110** may include a portable computing device with an associated camera such as, but not limited to, a laptop, tablet, smartphone, etc. In a non-limiting example, the camera may be an
90 external one, connected to operator device **110** through Wi-Fi or by cable, or it may be one embedded in the operator device **110**. In some embodiments, relay device **115** may be configured as a network server. In some alternate embodiments, relay device **115** may be configured as a network router and/or switch. In some other embodiments, system **100** may not include relay **115** where client device **105** and operator device **110** may communicate directly with each other.

95 [0020] FIG. 2 illustrates an exemplary diagram of a system, in accordance with an embodiment of the present invention. System **200** may include a plurality of client devices **205**, a plurality of operator devices **210**, and a relay device **215**. In the present embodiment, each client device **205** may communicate with relay device **215** using a network channel **225**. Each operator device **210** may communicate with relay device **215** with network channel **230**. In the present embodiment, a
100 client controlling one of the client devices **205** may select an operator of one of the operator devices **210** to enter into closed loop through relay **215**. An operator device in a closed loop with a client device may not be available for selection by another client. In some embodiments, multiple operator devices may communicate with a single client device.

[0021] In the present embodiment, operator devices 210 may include a filming device 212 and a portable computing device 214. Filming device 212 may be a device such as, without limitation, a digital video camera being hand-held, or hanging around the neck, or mounted on the shoulder or hips, etc., an action cam that is small camera that may be operated not necessarily by holding it in hand, for example, without limitation, attaching it with a belt to the shoulder, head, other parts of the body, or attaching it to a helmet or vehicle, camera embedded in portable computing device 214, etc. The audio-video data from filming device 212 may be streamed either wireless or through a physical port, such as, without limitation, HDMI. Portable computing device 214 may perform the following functions, in real time: connects to and captures the streamed audio-video data from the filming device 212; sends the audio-video data through the communication network channel 230; receives and displays control information from client 205; and has an electronic compass. Portable computing device 214 may include a dedicated program installed, so that it may perform the above mentioned tasks.

[0022] In the present embodiment, client devices 205 may include a computing device 206, a display device 207, and a control device 208. Computing device 206 may include a portable computing device or a desktop computing device. In an alternate embodiment, computing device 206 may be included in a smart television. Display device 207 may be any display means for presenting the video stream from operator device 210 received by client device 205. Control device 208 may be connected to computing device 206, which may allow the client to input the desired commands regarding how the filming should continue such as, without limitation, parameters controlling the way the filming may be performed, such as, without limitation, shooting direction, camera tilt, zoom, a desired advancing speed, how to turn or when to stop, etc. Control device 208 may be a device such as, without limitation, a pointing device, a joystick, a tracking ball, a keyboard, a touch panel, a remote control, or a method for tracking eyes movements.

[0023] In the present embodiment, relay 215 may include a server 217 that may be connected to communication network channels 225 and 230. Relay 215 may be configured for: providing a bi-directional communication, in real time, between client device 205 and operator device 210 for example, without limitation, forwarding filming control information, chat messages, other data sent by the client to the operator, and sending audio-video data, chat messages and other data sent by the operator to the client; simultaneously connecting to a number of clients and making possible that each client may connect to the operators of their choice; connecting simultaneously to a number of operators; allowing a client to connect in the same time to more operators, each

positioned and filming different locations, so that the client may choose what location to view, from the available ones. In an alternate embodiment, the client may choose to connect to more than one operator at the same location to provide multiple points of view to the location.

140 [0024] In the present embodiment communication network channels 225 and 230 may be, without limitation, the Internet or other private dedicated networks. The physical wireless connection to the network may be made through means such as, but not limited to, mobile networks, Wi-Fi or satellite channels.

[0025] In an exemplary operation of the system the operator films the location remote from the client with the filming device 212. This device may stream the audio-video data to portable
145 computing device 214 which may set a wireless connection with the communication network channel 230 and may send the said audio-visual data through relay 215, to the client device 205. In client device 205, computing device 206 receives the audio-video data from operator device 210, through relay 215 and through the network channel 225 and displays it in real time on
150 display device 207 to which it is connected with, so that the client may see it. Control device 208 connected to computing device 206 may allow the client to input filming control commands regarding how filming should continue next, by modifying parameters such as, but not limited to, shooting direction, camera tilt, zoom, as well as sending operator chat messages or the desired advancing speed, how to turn or when to stop. Computing device 206 sends this filming control
155 information through the communication network channel 225 and through relay 215 to operator device 210 and in the same time it displays this control information on a part of the display device 207, so that the client can check his/her own control actions. The control information may be received and displayed on a display screen of portable computing device 214. As the operator complies and filming is continued in accordance with the client's requirements, the video
160 information sent back to the client becomes proper. The client may confirm the accuracy of filming, which may close the negative feedback loop. Thus, by means of this negative feedback loop, this system may allow the client to view the remote places such as, but not limited, to tourist spots filmed by the operator, in real time, and shot in a manner directly controlled by himself/herself, conferring client a "virtual trip" experience.

165 [0026] **FIG. 3** illustrates an exemplary operator device, in accordance with an embodiment of the present invention. An operator device **310** may include a filming device **313**. In the present embodiment, filming device **313** may include an embedded portable computing and display device in accordance with the teaching herein.

[0027] **FIG. 4** illustrates an exemplary display for an operator device, in accordance with an

embodiment of the present invention. Portable computing device **414** may include a display screen **416**. Display screen **416** may display a keyboard button **418**, a map view button **420**, a menu button **422**, a close program button **424**, a transmission button **426**, a microphone button **428**, a filming direction indicator **430**, a compass indicator **432**, and a chat window **434**. Activation of displayed buttons may typically be accomplished by, without limitation, touch with finger or stylus. Keyboard button **418** may show/hide a keyboard display (not shown) for entering text into chat window **434**. Map view button **420** may show/hide a map of the location of portable computing device **414**. In some embodiments, map information may be obtained using a network connection. In alternate embodiments, the map information may be stored locally on portable computing device **414**. Menu button **422** may display a list of available functions such as, but not limited to, toggle audio sending on/off for video only mode, setting the video resolution in case communication network channel **230** is not fast enough, the video resolution of the filming can be lowered, toggle color/black-white mode, pause/resume function, etc. Close button **424** may exit the running program. Transmission button **426** may start/stop transmission of the audio video stream. Microphone button **428** may turn a microphone of portable computing device **414** on or off. Filming direction indicator **430** shows the direction the filming device **212** may be pointed. Compass indicator **432** points to magnetic north. Chat window **434** may display text during a chat session. In some embodiments, the operator may engage in text messaging with the client. In some other embodiments, the operator may engage in text messaging with an operator of relay device **215**. In some other embodiments, the operator may engage in voice messaging.

[0028] **FIG. 5** illustrates an exemplary display for a client device, in accordance with an embodiment of the present invention. A display for a client device **500** may include a display screen **507**, a main display area **509**, thumbnail displays **511**, a map view button **520**, a menu button **522**, an end button **524**, a microphone button **528**, a filming control panel **529**, a filming direction indicator **530**, a compass indicator **532**, a chat window **534**, an operator's state check button **536**, a share button **542**, a record button **544**, a schedule button **546**, and a filming commands display **548**. Main display area **509** displays the streamed video. Thumbnail displays **511** the filmings from operators available at a certain moment so that they can be chosen from. Map view button **520** may show/hide a map of the location of portable computing device **414**. In some embodiments, map information may be obtained using a network connection. In alternate embodiments, the map information may be stored locally on the client computing device. Settings or Menu button **522** may display a list of available functions such as, but not limited to, setting the IP of the streaming server, choose the file location for when recording the live streaming, set the

IP of other computers that user wants to share the streaming data with. End button **524** may exit the running program. Microphone button **528** may turn a microphone of client computing device

205 **205** on or off. Filming direction indicator **530** shows the direction the filming device **212** may be pointed. Compass indicator **532** points to magnetic north. Chat window **534** may display text during a chat session. In some embodiments, the client may engage in text messaging with the operator. In some other embodiments, the client may engage in text messaging with an operator of relay device **215**. In some other embodiments, the client may engage in voice messaging.

210 Operator's state check button **536** may be activated to show if the selected client device is offline, in standby, or streaming. Share button **542** may allow the client to send the audio-video information to a different computer connected to itself so that a third party can watch the respective audio-video information on their own display, in the same time. The settings regarding the other computer connection credentials, such as, but not limited to, IP address, can be

215 registered through the program, for example, without limitation, using menu button **522**. Record button **544**, may allow recording of the audio-video data on a local mass-storage device, in a predetermined format/codecs. In an alternate embodiment, record button **544** may instruct relay device **215** to record the audio-video data on server **217**. Schedule button **546** may allow scheduling of the next live connection with operators. Filming commands display **548** may

220 display filming control commands inputted from control device **208** such as, but not limited to, tilt, zoom, operator's advancing speed, etc.

[0029] **FIGs. 6 A-C** illustrate operation of an exemplary negative feedback, in accordance with an embodiment of the present invention. In the present embodiment an axis **650** is a longitudinal axis of portable computing device **214** which is generally parallel to a longitudinal axis of filming

225 device **212**. Compass indicator **632** points to magnetic north. A filming direction **630** may rotate as the client manipulates control device **208** and the respective information is received in real time. An angle **652** is an angle made between axis **650** and the North direction **632**, which may be used as a reference direction on portable computing device **214** and may be given by its electronic compass. A program executing on portable computing device **214** may be able to keep track of angle

230 **652**. The North direction may be sent to client's computing device **210** for display as compass indicator **532**. Angle **654** is the current angle made between axis **650** and indicator of filming direction **630** which points the direction that the client wants shooting to be performed next, AS shown in **FIG. 6B**. When there is no command from the client, the default position of filming direction **630** may be upright and angle **654** is 0, as shown in **FIG. 6A**. When The client requests

235 changing the shooting direction with a desired angle, computing device **206** may send the

respective information to portable computing device **214**, which may display it as angle **654**, as shown in **FIG. 6B**. In order to comply with the request, the operator turns to shoot in the direction pointed by filming direction **630**, so axis **650** rotates toward that direction, as shown in **FIG. 6C**, and so angle **652** modifies. In the present embodiment, filming direction **630** may be kept
240 unchanged, relative to the reference North direction **632** during axis **650** rotation, and to achieve that, the program re-calculates in real time the angle **654**, as shown in **FIG. 6C** it decreases angle **654** with the same amount that angle **652** is increased. Portable computing device **214** may send continuously, at small enough time intervals, this angle information back to the client's computing device **206**. Thus, the angle between the indicator of filming direction **530** on display for the client
245 device **500** and the vertical side of the screen is the same as angle **654**, and it changes following the operator's rotation, ensuring that the two filming direction indicators **630** and **530** are essentially parallel, that is, the two arrows keep the same angle with the axis **650** and with the vertical side of client device **500**, respectively. When the operator's position becomes so that angle **654** is essentially zero, the result of client's command may be completed allowing him/her
250 to view the filmed scenes as desired, which concludes the negative feedback loop. Although the most important filming control command may be direction, there may be other control parameters that can be sent by the client, such as tilt, but not limited to, zoom, as well as operator's moving speed or direction, or stop. These may be similarly indicated through predetermined visually graphic indicators, such as, but not limited to, shapes which change size, or color, as well as by
255 text or voice or particular sounds. Similarly, to the direction loop, in all such cases when a command parameter is sent from the client, as the operator may continue filming in a manner complying with these instructions, the negative feedback loop works so that the respective parameters change in a way that makes the filming performed in accordance with client's desire. Visual graphic changing parameters commanded by the client are also displayed on client's
260 display device **207**, so that he/she can see their own commands, too. In a non-limiting example, panning command may be indicated through a changing angel of a circle, between a reference axis such as, without limitation, the vertical direction and the desired direction axis. Tilting may also be indicated similarly through an angle between a reference axis such as, without limitation, horizontal direction and the desired direction axis. Zooming as well as a command for changing
265 the advancing speed may be indicated through either a shape such as, without limitation, a line or a bar or a rectangle changing its length or through a color range. Sound effects with predefined meanings may be optionally added. Commanding by text messages or voice may be another option.

[0030] **FIG. 7** illustrates exemplary routines of dedicated programs, in accordance with an

embodiment of the present invention. In the present embodiment, client computing device **206**, relay server **217**, and operator portable computing device **214** may have dedicated programs for enabling the teachings of the present invention. In the present embodiment, a dedicated program **705** installed on client computing device **206** may, in real time, connect to the communication network channel **225**, and through this network connect to operator's portable computing device **214**. In a process step **707**, program **705** may receive the stream of audio-video data from portable computing device **214**, decode it as necessary by means such as, but not limited to, codecs and display it on a display device **207**. In a process step **709**, program **705** may capture commands from the control device **208** and send them in a predefined manner through network channel **225** to operator's portable computing device **214**.

[0031] In the present embodiment, the dedicated program **710** installed on portable computing device **214** may, in real time, recognize the filming device **212** and receive from this the audio-video data input. Program **710** may connect to the communication network channel **230**. In a non-limiting example, as the IP of relay **215** may be known, it may be able to connect to relay server program **715** through a commonly agreed protocol and be able to send and receive data to and from relay **215**. During capturing of audio-video data from filming device **212**, program **710** may encode or compress the audio-video data before sending it, by means such as, but not limited to, codecs in a process step **714**. In a process step **716**, program **710** may send the data through communication network channel **230**, to relay server **217**, live, using streaming protocols such as, but not limited to RTSP, RTMP, MMS, HTTP, RTP, and UDP. In a process step **712**, program **710** may display, in a predetermined manner, the instructions sent by the client, and received through server **217**, about how filming should be continued next.

[0032] In other embodiments, program **710** may additionally compress the streamed data with an audio-video codec before sending it further, so that it may save bandwidth and/or gain speed. In other embodiments, program **710** may additionally encrypt audio-video data, for security reasons.

In some other embodiments, program **710** may additionally, if GPS function is available, display the map at the current location by feeding the current coordinates to a map service provided by third parties. The map view on display **416** may be toggled on/off with map view button **420**. The map coordinates may also be sent at determined time intervals to the client computing device **206**, so that the client can see the map too, on his display device **207**. In other embodiments, program **710** may additionally enable the chat function for text and voice messaging.

[0033] In the present embodiment, the dedicated program **715** installed on relay server **217** may

receive the audio-video data as well as positioning information from portable computing devices **214** and forward it to the corresponding client computing devices **206** in a process step **719**. In a process step **717** the program **715** receives filming control information such as, but not limited to, shooting direction, tilt, zoom, advancing speed, etc. from client computing device **206** and forwards it to the corresponding operator portable computing devices **214**.

[0034] In other embodiments, program **715** may additionally provide and maintain the functionality of the system as a service, offered to clients. In other embodiments, program **715** may maintain a database on server **217**, storing all clients' and operators' information and allow secure login for all parties, before matching each client with the proper operator and the effective start of service. In other embodiments, program **715** may, while relaying the audio-video data received from the operator to the client, the media server program can in the same time make possible recording the data, on a mass storage device. In some other embodiments, program **715** may toggle data encryption on/off. In some other embodiments, program **715** may insert subtitles with explanations about the scenes filmed by and received from the operator, during relaying the respective data to the client. In other embodiments, program **715** may provide translation for the chat communication (written or voice) between the client and the operator (in such cases when these do not share a common language), or other necessary translations (related to on-site situations), during relaying the respective data to the client. In some embodiments, program **715** may add optional audio or video editing in real time such as, but not limited to, cut audio or video noise, sharpen/blur video, add/lessen contrast, add/lessen color saturation, etc.

[0035] In alternative embodiments, if the filming device **212**, has the capability of compressing and/or encoding the data stream, then portable computing device **214** may not have to perform these tasks. In another alternative embodiment, filming device **212** may have an embedded a vertical tilt sensor. In this embodiment, client's controlling of the vertical tilt may be done in a similar way with the direction control, already described, that is filming device **212** becomes capable of sending in real time the tilt information (the angle formed by said filming device's axis and the horizontal plane), back to the client computing device **206**.

[0036] In other alternate embodiments, filming device **212** may embed all the necessary functions performed by portable computing device **214**, as described above. Thus, the two devices merge into one single device **313**, which suffices to perform all the tasks, see **FIG. 3**. In this embodiment, it may be easier to ensure that axis **650** and the filming device **212** longitudinal axis are kept parallel.

[0037] In yet some other alternate embodiments, filming device **212** may be attached to a

335 remotely controlled vehicle such as, but not limited to, a Segway type device or a drone where the operator may control the vehicle according to the client's instructions.

[0038] In still another alternate embodiment, the operator may provide a running commentary during the video where the commentary may be on a sub-audio channel selectable by the client.

[0039] In other embodiments, teachings of the present invention may be applied to medical
340 applications. In a non-limiting example, doctors may check on patients with diseases such as, without limitation, nervous system diseases where the doctor may command the patient from distance what to do and see if they respond properly. In other embodiments, teachings of the present invention may be applied in the lab work and the field work. In a non-limiting example, people working in a dedicated place such as, without limitation, a laboratory may command other
345 operators which are in the field and feedback visual data, if it is difficult to go there by themselves. This may include, without limitation, situations when the work in the field is dangerous for unprepared people.

[0040] Those skilled in the art will readily recognize, in light of and in accordance with the teachings of the present invention, that any of the foregoing steps and/or system modules may be
350 suitably replaced, reordered, removed and additional steps and/or system modules may be inserted depending upon the needs of the particular application, and that the systems of the foregoing embodiments may be implemented using any of a wide variety of suitable processes and system modules, and is not limited to any particular computer hardware, software, middleware, firmware, microcode and the like. For any method steps described in the present application that can be
355 carried out on a computing machine, a typical computer system can, when appropriately configured or designed, serve as a computer system in which those aspects of the invention may be embodied.

[0041] **FIG. 8** is a block diagram depicting an exemplary client/server system which may be used by an exemplary web-enabled/networked embodiment of the present invention.

360 [0042] A communication system **800** includes a multiplicity of clients with a sampling of clients denoted as a client **802** and a client **804**, a multiplicity of local networks with a sampling of networks denoted as a local network **806** and a local network **808**, a global network **810** and a multiplicity of servers with a sampling of servers denoted as a server **812** and a server **814**.

[0043] Client **802** may communicate bi-directionally with local network **806** via a communication
365 channel **816**. Client **804** may communicate bi-directionally with local network **808** via a communication channel **818**. Local network **806** may communicate bi-directionally with global network **810** via a communication channel **820**. Local network **808** may communicate

bi-directionally with global network **810** via a communication channel **822**. Global network **810** may communicate bi-directionally with server **812** and server **814** via a communication channel **824**. Server **812** and server **814** may communicate bi-directionally with each other via communication channel **824**. Furthermore, clients **802**, **804**, local networks **806**, **808**, global network **810** and servers **812**, **814** may each communicate bi-directionally with each other.

[0044] In one embodiment, global network **810** may operate as the Internet. It will be understood by those skilled in the art that communication system **800** may take many different forms.

Non-limiting examples of forms for communication system **800** include local area networks (LANs), wide area networks (WANs), internet service providers (ISPs), network access points (NAPs), wired telephone networks, wireless networks, or any other network supporting data communication between respective entities.

[0045] Clients **802** and **804** may take many different forms. Non-limiting examples of clients **802** and **804** include personal computers, personal digital assistants (PDAs), cellular phones and smartphones.

[0046] Client **802** includes a CPU **826**, a pointing device **828**, a keyboard **830**, a microphone **832**, a printer **834**, a memory **836**, a mass memory storage **838**, a GUI **840**, a video camera **842**, an input/output interface **844** and a network interface **846**.

[0047] CPU **826**, pointing device **828**, keyboard **830**, microphone **832**, printer **834**, memory **836**, mass memory storage **838**, GUI **840**, video camera **842**, input/output interface **844** and network interface **846** may communicate in a unidirectional manner or a bi-directional manner with each other via a communication channel **848**. Communication channel **848** may be configured as a single communication channel or a multiplicity of communication channels.

[0048] CPU **826** may be comprised of a single processor or multiple processors. CPU **826** may be of various types including micro-controllers (e.g., with embedded RAM/ROM) and microprocessors such as programmable devices (e.g., RISC or SISC based, or CPLDs and FPGAs) and devices not capable of being programmed such as gate array ASICs (Application Specific Integrated Circuits) or general purpose microprocessors.

[0049] As is well known in the art, memory **836** is used typically to transfer data and instructions to CPU **826** in a bi-directional manner. Memory **836**, as discussed previously, may include any suitable computer-readable media, intended for data storage, such as those described above excluding any wired or wireless transmissions unless specifically noted. Mass memory storage **838** may also be coupled bi-directionally to CPU **826** and provides additional data storage capacity and may include any of the computer-readable media described above. Mass memory

storage **838** may be used to store programs, data and the like and is typically a secondary storage medium such as a hard disk. It will be appreciated that the information retained within mass memory storage **838**, may, in appropriate cases, be incorporated in standard fashion as part of memory **836** as virtual memory.

405 [0050] CPU **826** may be coupled to GUI **840**. GUI **840** enables a user to view the operation of computer operating system and software. CPU **826** may be coupled to pointing device **828**.

Non-limiting examples of pointing device **828** include computer mouse, trackball and touchpad. Pointing device **828** enables a user with the capability to maneuver a computer cursor about the viewing area of GUI **840** and select areas or features in the viewing area of GUI **840**. CPU **826**

410 may be coupled to keyboard **830**. Keyboard **830** enables a user with the capability to input alphanumeric textual information to CPU **826**. CPU **826** may be coupled to microphone **832**.

Microphone **832** enables audio produced by a user to be recorded, processed and communicated by CPU **826**. CPU **826** may be connected to printer **834**. Printer **834** enables a user with the capability to print information to a sheet of paper. CPU **826** may be connected to video camera

415 **842**. Video camera **842** enables video produced or captured by user to be recorded, processed and communicated by CPU **826**.

[0051] CPU **826** may also be coupled to input/output interface **844** that connects to one or more input/output devices such as such as CD-ROM, video monitors, track balls, mice, keyboards, microphones, touch-sensitive displays, transducer card readers, magnetic or paper tape readers, 420 tablets, styluses, voice or handwriting recognizers, or other well-known input devices such as, of course, other computers.

[0052] Finally, CPU **826** optionally may be coupled to network interface **846** which enables communication with an external device such as a database or a computer or telecommunications or internet network using an external connection shown generally as communication channel **816**, 425 which may be implemented as a hardwired or wireless communications link using suitable conventional technologies. With such a connection, CPU **826** might receive information from the network, or might output information to a network in the course of performing the method steps described in the teachings of the present invention.

[0053] **FIG. 9** illustrates a block diagram depicting a conventional client/server communication 430 system.

[0054] A communication system **900** includes a multiplicity of networked regions with a sampling of regions denoted as a network region **902** and a network region **904**, a global network **906** and a multiplicity of servers with a sampling of servers denoted as a server device **908** and a

server device **910**.

[0055] Network region **902** and network region **904** may operate to represent a network contained within a geographical area or region. Non-limiting examples of representations for the geographical areas for the networked regions may include postal zip codes, telephone area codes, states, counties, cities and countries. Elements within network region **902** and **904** may operate to communicate with external elements within other networked regions or within elements contained within the same network region.

[0056] In some implementations, global network **906** may operate as the Internet. It will be understood by those skilled in the art that communication system **900** may take many different forms. Non-limiting examples of forms for communication system **900** include local area networks (LANs), wide area networks (WANs), wired telephone networks, cellular telephone networks or any other network supporting data communication between respective entities via hardwired or wireless communication networks. Global network **906** may operate to transfer information between the various networked elements.

[0057] Server device **908** and server device **910** may operate to execute software instructions, store information, support database operations and communicate with other networked elements.

Non-limiting examples of software and scripting languages which may be executed on server device **908** and server device **910** include C, C++, C# and Java.

[0058] Network region **902** may operate to communicate bi-directionally with global network **906** via a communication channel **912**. Network region **904** may operate to communicate bi-directionally with global network **906** via a communication channel **914**. Server device **908** may operate to communicate bi-directionally with global network **906** via a communication channel **916**. Server device **910** may operate to communicate bi-directionally with global network **906** via a communication channel **918**. Network region **902** and **904**, global network **906** and server devices **908** and **910** may operate to communicate with each other and with every other networked device located within communication system **900**.

[0059] Server device **908** includes a networking device **920** and a server **922**. Networking device **920** may operate to communicate bi-directionally with global network **906** via communication channel **916** and with server **922** via a communication channel **924**. Server **922** may operate to execute software instructions and store information.

[0060] Network region **902** includes a multiplicity of clients with a sampling denoted as a client **926** and a client **928**. Client **926** includes a networking device **934**, a processor **936**, a GUI **938** and an interface device **940**. Non-limiting examples of devices for GUI **938** include monitors,

televisions, cellular telephones, smartphones and PDAs (Personal Digital Assistants).

Non-limiting examples of interface device **940** include pointing device, mouse, trackball, scanner and printer. Networking device **934** may communicate bi-directionally with global network **906**

470 via communication channel **912** and with processor **936** via a communication channel **942**. GUI **938** may receive information from processor **936** via a communication channel **944** for presentation to a user for viewing. Interface device **940** may operate to send control information to processor **936** and to receive information from processor **936** via a communication channel **946**.

Network region **904** includes a multiplicity of clients with a sampling denoted as a client **930** and
475 a client **932**. Client **930** includes a networking device **948**, a processor **950**, a GUI **952** and an interface device **954**. Non-limiting examples of devices for GUI **938** include monitors, televisions, cellular telephones, smartphones and PDAs (Personal Digital Assistants). Non-limiting examples of interface device **940** include pointing devices, mouse, trackballs, scanners and printers.

Networking device **948** may communicate bi-directionally with global network **906** via
480 communication channel **914** and with processor **950** via a communication channel **956**. GUI **952** may receive information from processor **950** via a communication channel **958** for presentation to a user for viewing. Interface device **954** may operate to send control information to processor **950** and to receive information from processor **950** via a communication channel **960**.

[0061] For example, consider the case where a user interfacing with client **926** may want to
485 execute a networked application. A user may enter the IP (Internet Protocol) address for the networked application using interface device **940**. The IP address information may be communicated to processor **936** via communication channel **946**. Processor **936** may then communicate the IP address information to networking device **934** via communication channel **942**. Networking device **934** may then communicate the IP address information to global network **906** via communication channel **912**. Global network **906** may then communicate the IP address information to networking device **920** of server device **908** via communication channel **916**.

490 Networking device **920** may then communicate the IP address information to server **922** via communication channel **924**. Server **922** may receive the IP address information and after processing the IP address information may communicate return information to networking device **920** via communication channel **924**. Networking device **920** may communicate the return information to global network **906** via communication channel **916**. Global network **906** may communicate the return information to networking device **934** via communication channel **912**. Networking device **934** may communicate the return information to processor **936** via communication channel **942**. Processor **996** may communicate the return information to GUI **998**

500 via communication channel **944**. User may then view the return information on GUI **938**.

[0062] All the features disclosed in this specification, including the accompanying abstract and drawings, may be replaced by alternative features serving the same, equivalent or similar purpose, unless expressly stated otherwise. Thus, unless expressly stated otherwise, each feature disclosed is one example only of a generic series of equivalent or similar features.

505 [0063] Having fully described at least one embodiment of the present invention, other equivalent or alternative methods of implementing a real time filming of a remote location according to the present invention will be apparent to those skilled in the art. Various aspects of the invention have been described above by way of illustration, and the specific embodiments disclosed are not intended to limit the invention to the particular forms disclosed. The particular implementation of
510 the real time filming of a remote location may vary depending upon the particular context or application. By way of example, and not limitation, the real time filming techniques of a remote location may be applied to controlling a remote filming device without an operator, which implementations of the present invention are contemplated as within the scope of the present invention. The invention is thus to cover all modifications, equivalents, and alternatives falling
515 within the spirit and scope of the following claims. It is to be further understood that not all of the disclosed embodiments in the foregoing specification will necessarily satisfy or achieve each of the objects, advantages, or improvements described in the foregoing specification.

[0064] All claims are set forth as a coherent, cooperating set of limitations that work in functional
520 combination to achieve a useful result as a whole. Accordingly, for any claim having functional limitations interpreted under 35 USC §112 (6) where the embodiment in question is implemented as a client-server system with a remote server located outside of the USA, each such recited function is intended to mean the function of combining, in a logical manner, the information of that claim limitation with at least one other limitation of the claim. For example, in client-server
525 systems where certain information claimed under 35 USC §112 (6) is/(are) dependent on one or more remote servers located outside the USA, it is intended that each such recited function under 35 USC §112 (6) is to be interpreted as the function of the local system receiving the remotely generated information required by a locally implemented claim limitation, wherein the structures and or steps which enable, and breathe life into the expression of such functions claimed under 35
530 USC §112 (6) are the corresponding steps and/or means located within the jurisdiction of the USA that receive and deliver that information to the client (e.g., without limitation, client-side processing and transmission networks in the USA). When this application is prosecuted or

patented under a jurisdiction other than the USA, then “USA” in the foregoing should be replaced with the pertinent country or countries or legal organization(s) having enforceable patent
535 infringement jurisdiction over the present application, and “35 USC §112 (6)” should be replaced with the closest corresponding statute in the patent laws of such pertinent country or countries or legal organization(s).

CLAIMS

1. A method comprising the steps of:

establishing, with client device, a real time bi-directional communication channel with a remote filming system via a relay device, wherein a server of said relay device is configured to forward at least a filming control information to a portable computing device of said remote filming system and send at least one of an audio data and a video data to a computing device of said client device; inputting, on a control device connected to said client computing device, said filming control information;

communicating, with said client computing device, said filming control information via said relay device, in which said filming control information comprising at least one command to said remote filming system, wherein said relay device server is configured to capture said filming control information from said client control device and send said filming control information to said portable computing device, the command at least comprising an instructions for conducting a remote filming, wherein said remote filming instructions is displayable on said remote filming system;

receiving, with said client computing device, at least a current position data of said remote filming system and a real time stream of said remote filming via said relay device, wherein said relay device server is configured to receive said current position data and real time stream from said remote filming system and forward to said client computing device;

displaying, with a display screen of said client device, said current position and real time stream of said remote filming, in which said real time stream comprising at least an audio and video data of said remote filming; and

communicating at least an additional command to said remote filming system, wherein said additional command comprise a negative feedback loop during said remote filming.

2. The method as recited in claim 1, further comprising engaging, with a chat window of said client device, a text or voice messaging with said remote filming system.

3. The method as recited in claim 1, in which said communicating of said additional command comprises communicating a directional indicator configured to change a filming direction of said

remote filming system, wherein said directional indicator is displayed on a display screen of said filming system relative to a compass indicator.

4. The method as recited in claim 3, in which said directional indicator comprise a predetermined angle between said compass indicator as a reference point and an axis of said directional indicator.

5. The method as recited in claim 1, in which said additional commands further comprise a predetermined rate of an advancing speed of said remote filming system.

6. The method as recited in claim 1, in which said additional commands further comprise a predetermined tilt of said remote filming system.

7. The method as recited in claim 4, further comprising receiving a change of said filming direction of said remote filming system via said relay device.

8. The method as recited in claim 7, further comprising displaying said change of said filming direction of said remote filming system, in which said change of filming direction is displayed relative to a magnetic north indicator and a filming direction indicator of said client device.

9. The method as recited in claim 1, further comprising instructing said relay device to record said audio and video data on said relay device server, in which said instructing comprises activating a record button of said client device.

10. The method as recited in claim 8, further comprising concluding said negative feedback loop when an angle between said magnetic north indicator and said filming direction indicator of said client device is approximately less than a predetermined angle.

11. The method as recited in claim 1, in which said relay device server is further operable for processing and storing the streaming of remote filming before relaying said at least a filming control information to said portable computing device of said remote filming system and said at least one of an audio data and a video data to said client computing device.

12. A method comprising:

steps for establishing, with client device, a bi-directional communication channel with a filming system, via a relay device, wherein a server of said relay device is configured to forward at least a filming control information to a portable computing device of said remote filming system and send at least one of an audio data and a video data to a computing device of said client device;

inputting, on a control device connected to said client computing device, said filming control information;

steps for communicating, with said client computing device, said filming control information, in which said filming control information comprising instructions for conducting a filming via said relay device, wherein said relay device server is configured to capture said filming control information from said client control device and send said filming control information to said portable computing device;

steps for receiving, with said client computing device, at least a current position data of said filming system and an audio and video data of said filming via said relay device;

steps for communicating a directional indicator configured to change a filming direction of said filming system, wherein said directional indicator is displayed on a display screen of said filming system relative to a compass indicator as part of a negative feedback loop during the filming; and concluding said negative feedback loop when an angle between a magnetic north indicator and a filming direction indicator of said client device is approximately less than a predetermined angle.

13. The method as recited in claim 12, further comprising steps for engaging a messaging with said filming system.

14. A non-transitory computer-readable storage medium with an executable program stored thereon, wherein the program instructs one or more processors to perform the following steps:

establishing, with client device, a bi-directional communication channel with a filming system via a relay device, wherein a server of said relay device is configured to forward at least a filming control information to a portable computing device of said remote filming system and send at least one of an audio data and a video data to a computing device of said client device;

communicating at least one command to said filming system, the command at least comprising instructions for conducting a filming, wherein the instructions are displayable on said filming system;

receiving at least a real time stream of the filming via said relay device, wherein said real time stream comprising at least an audio and video data of said filming;

displaying, with a display screen of said client device, said audio and video data of said remote filming;

communicating at least an additional command to said filming system during said receiving, wherein said additional command comprise a negative feedback loop during said filming.

15. The program instructing the one or more processors as recited in claim 14, further comprising engaging a messaging with said filming system.

16. The program instructing the one or more processors as recited in claim 14, in which said additional command comprising a directional indicator of said filming system.

17. The program instructing the one or more processors as recited in claim 16, in which said additional commands further comprise a predetermined angle relative to the directional indicator.

18. The program instructing the one or more processors as recited in claim 14, in which said additional commands further comprise a predetermined rate of an advancing speed of said filming system.

19. The program instructing the one or more processors as recited in claim 14, in which said additional commands further comprise a desired tilt of said filming system.

20. The program instructing the one or more processors as recited in claim 17, in which said directional indicator comprises a magnetic north indicator of a location of said filming system and a pointing indicator of said filming system.

21. The program instructing the one or more processors as recited in claim 20, further displaying, on a display screen of said client device, said predetermined angle relative to a magnetic north indicator and a pointing indicator of said client device display screen.

22. The program instructing the one or more processors as recited in claim 14, further concluding said negative feedback loop when an angle between a magnetic north indicator and a filming direction indicator of said client device is approximately less than a predetermined angle.

ABSTRACT OF THE DISCLOSURE

A method and program product includes establishing a bi-directional communication channel with an operator's filming system. At least one command is communicated to the operator's filming system. The command at least includes instructions for conducting a filming, wherein the

5 instructions are displayable on the operator's filming system. At least a real time stream of the filming is received. At least additional commands are communicated to the operator's filming system during the receiving, wherein the communicating, the receiving and the communicating during the receiving comprise a negative feedback loop during the filming.

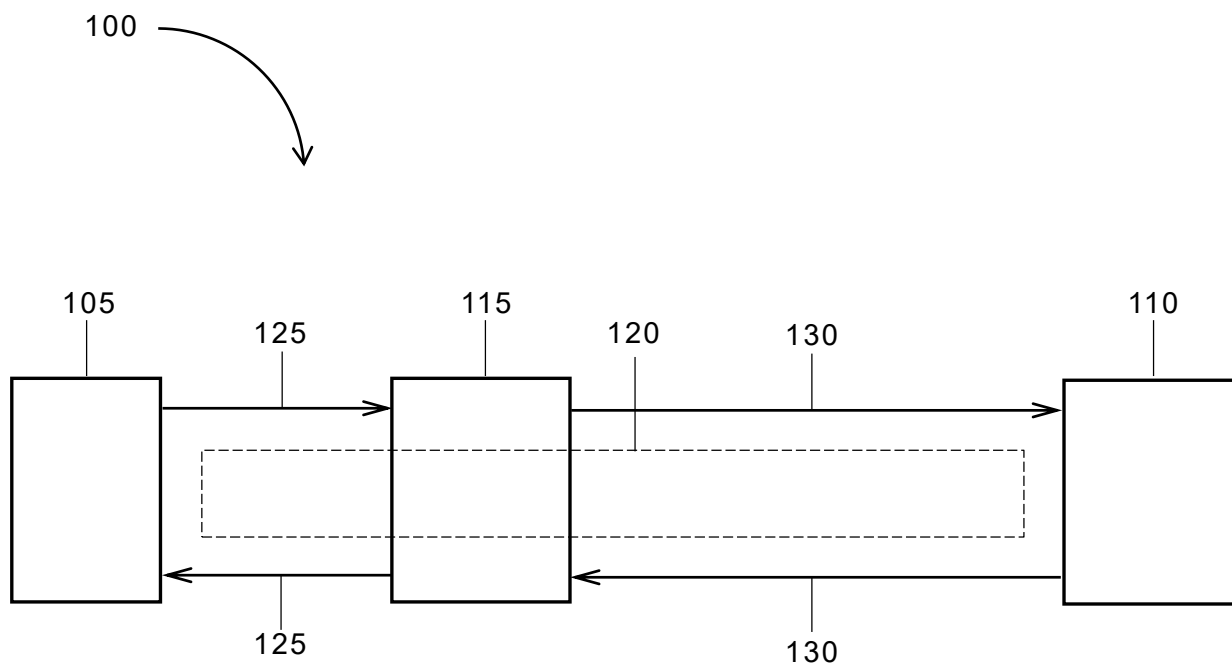


FIG. 1

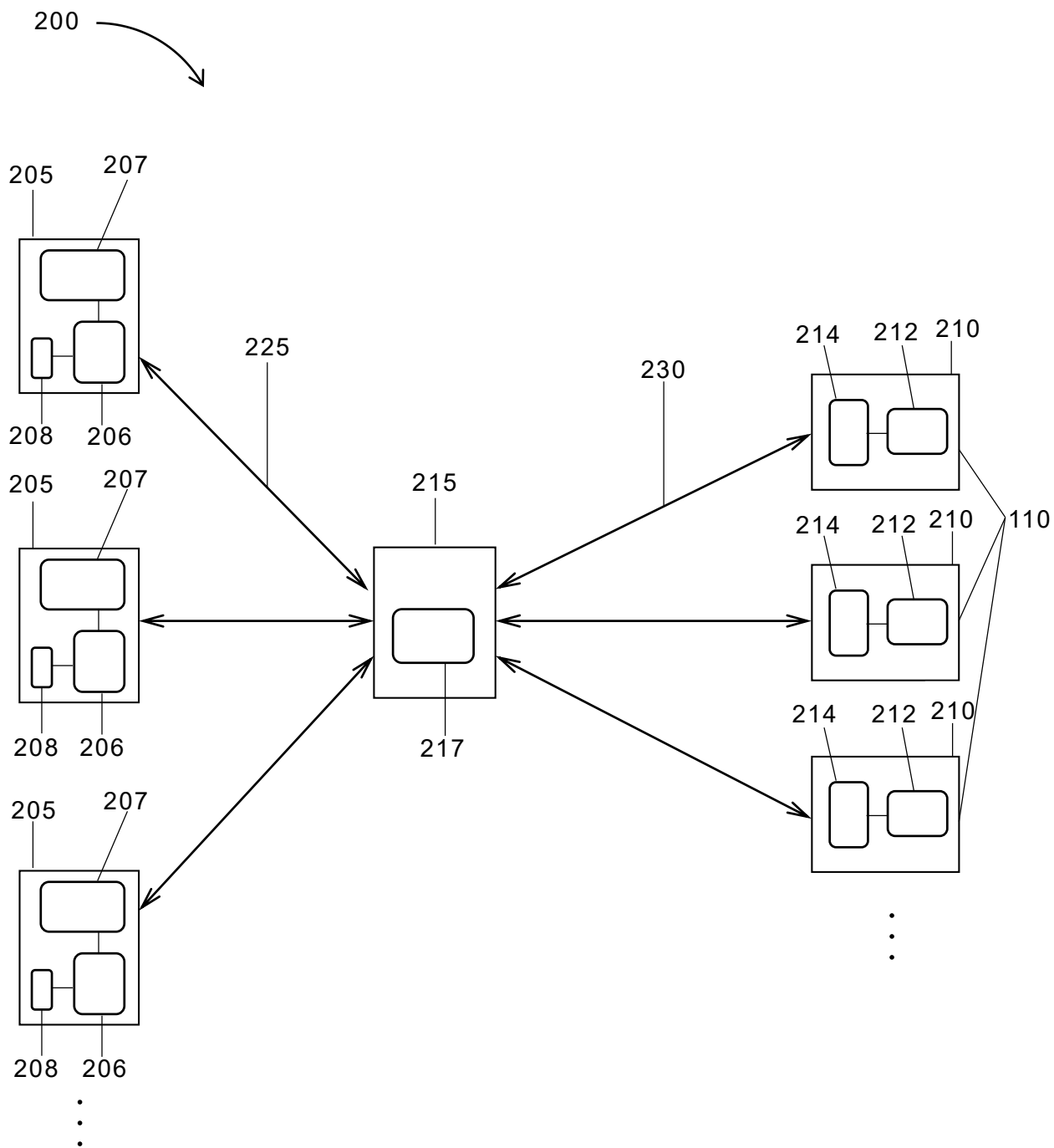


FIG. 2

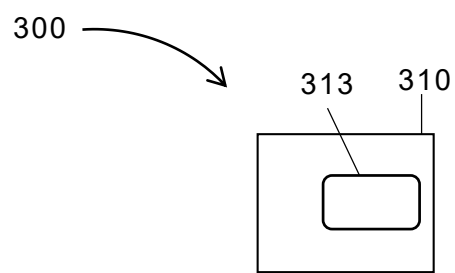


FIG. 3

400

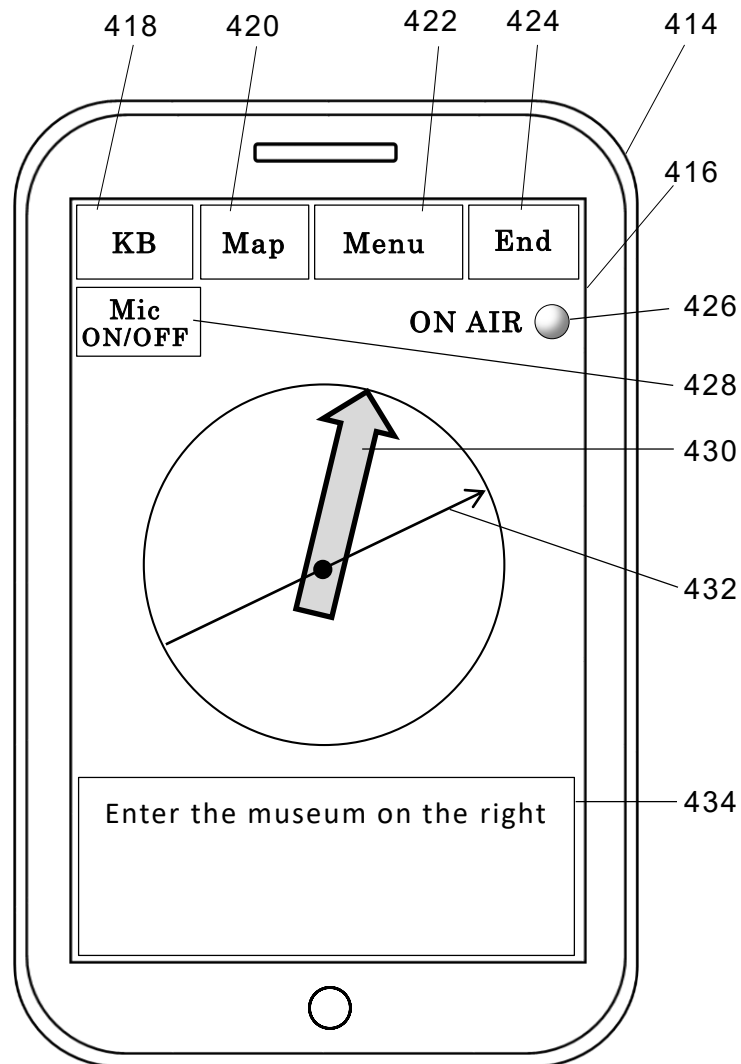


FIG. 4

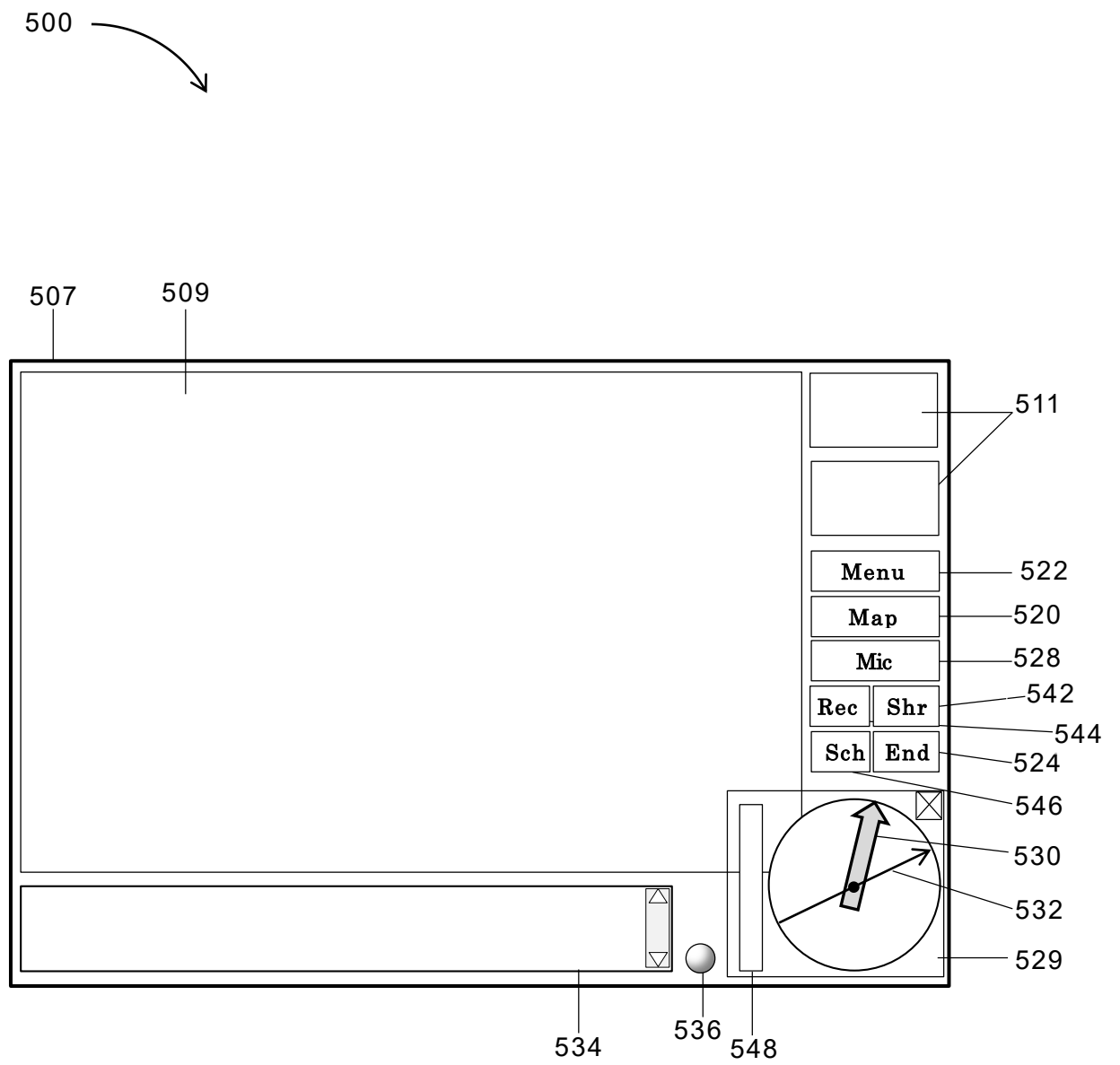


FIG. 5

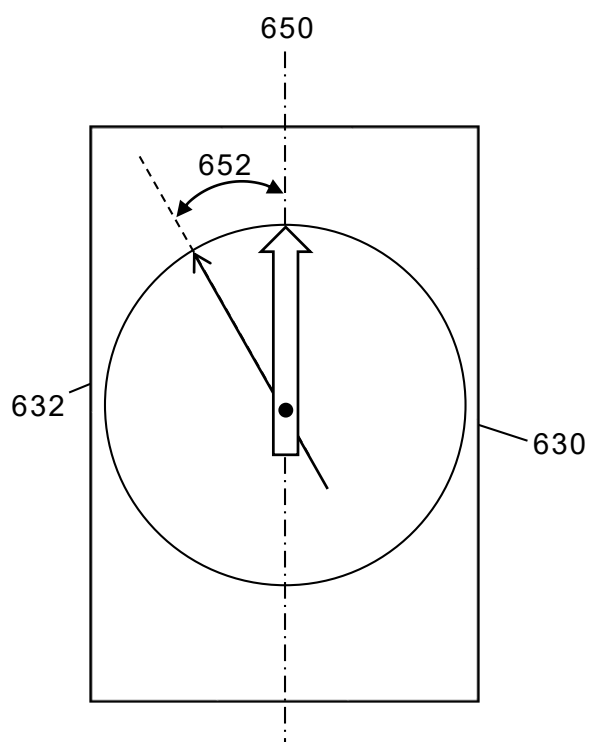


FIG. 6A

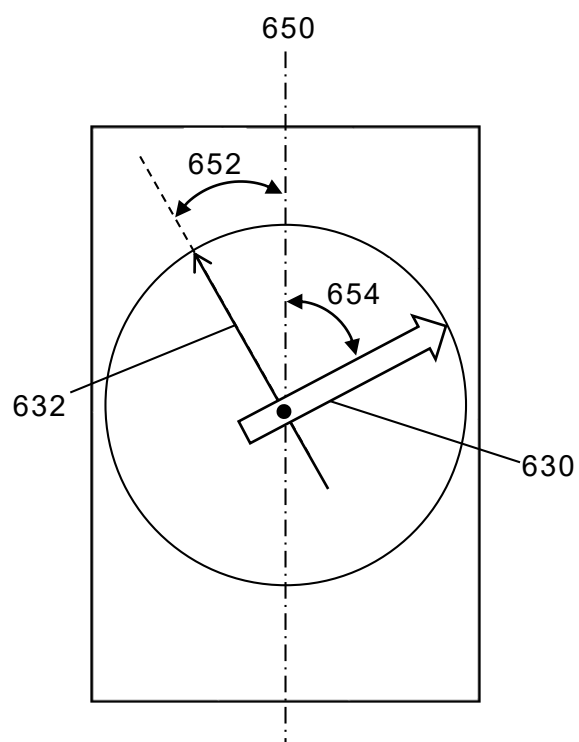


FIG. 6B

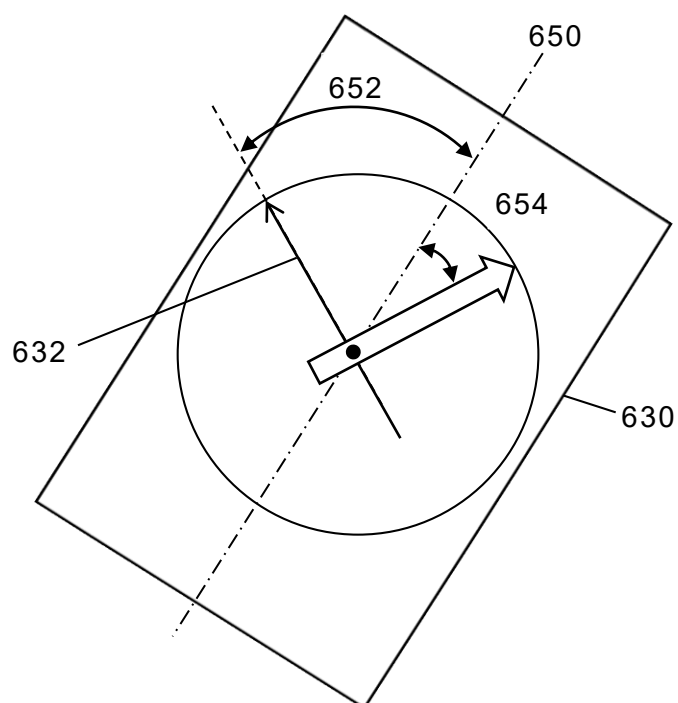


FIG. 6C

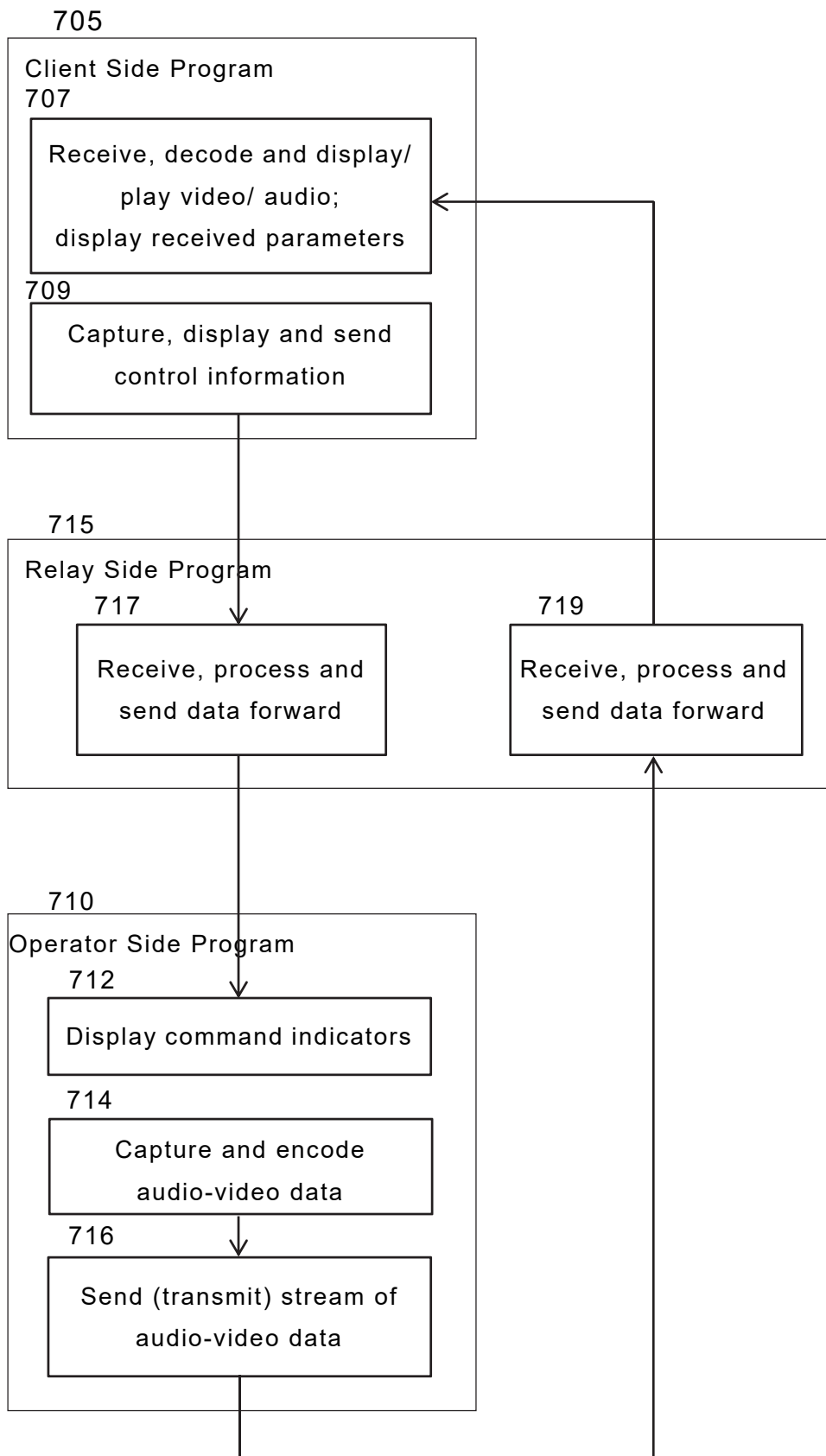


FIG. 7

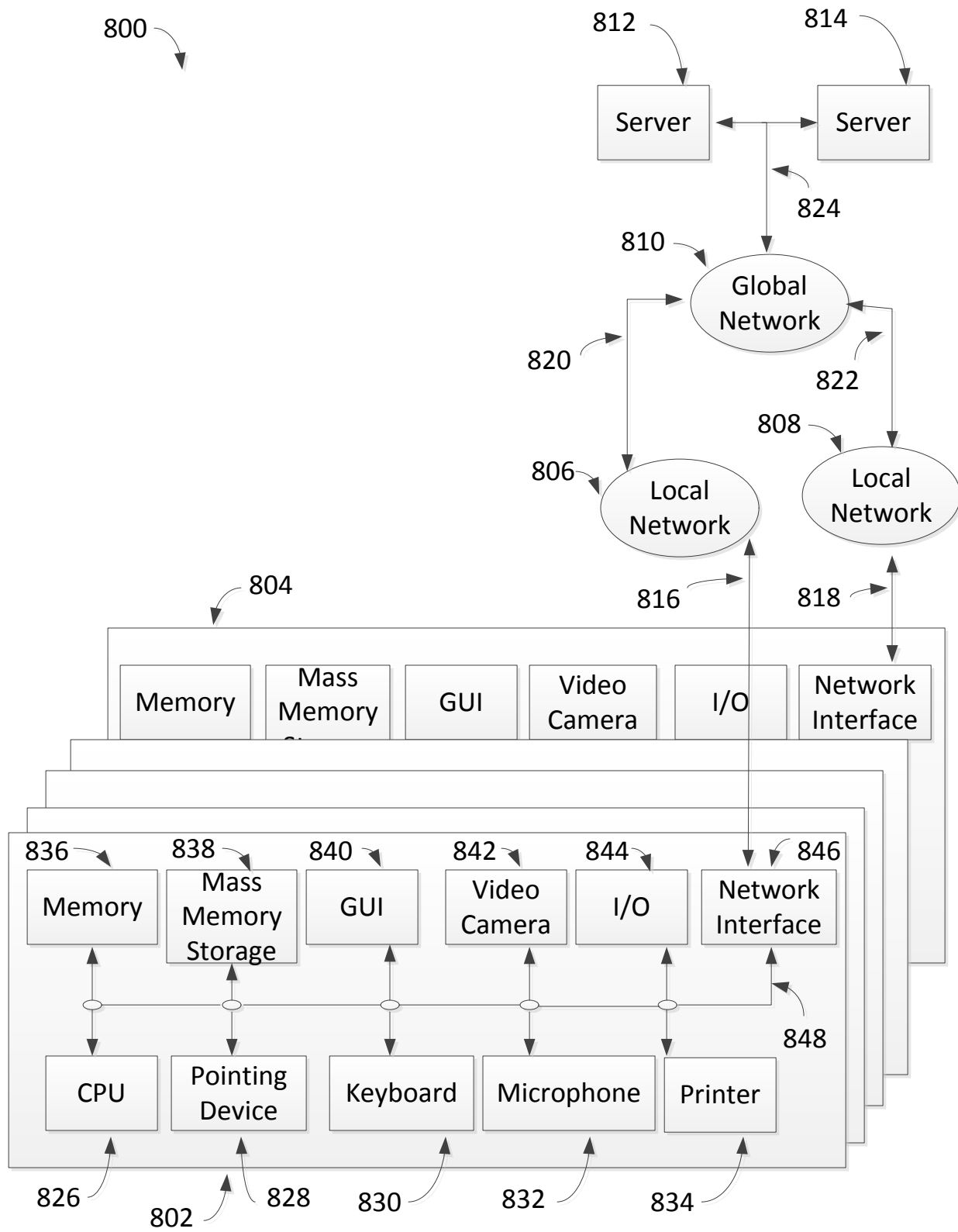


FIG. 8

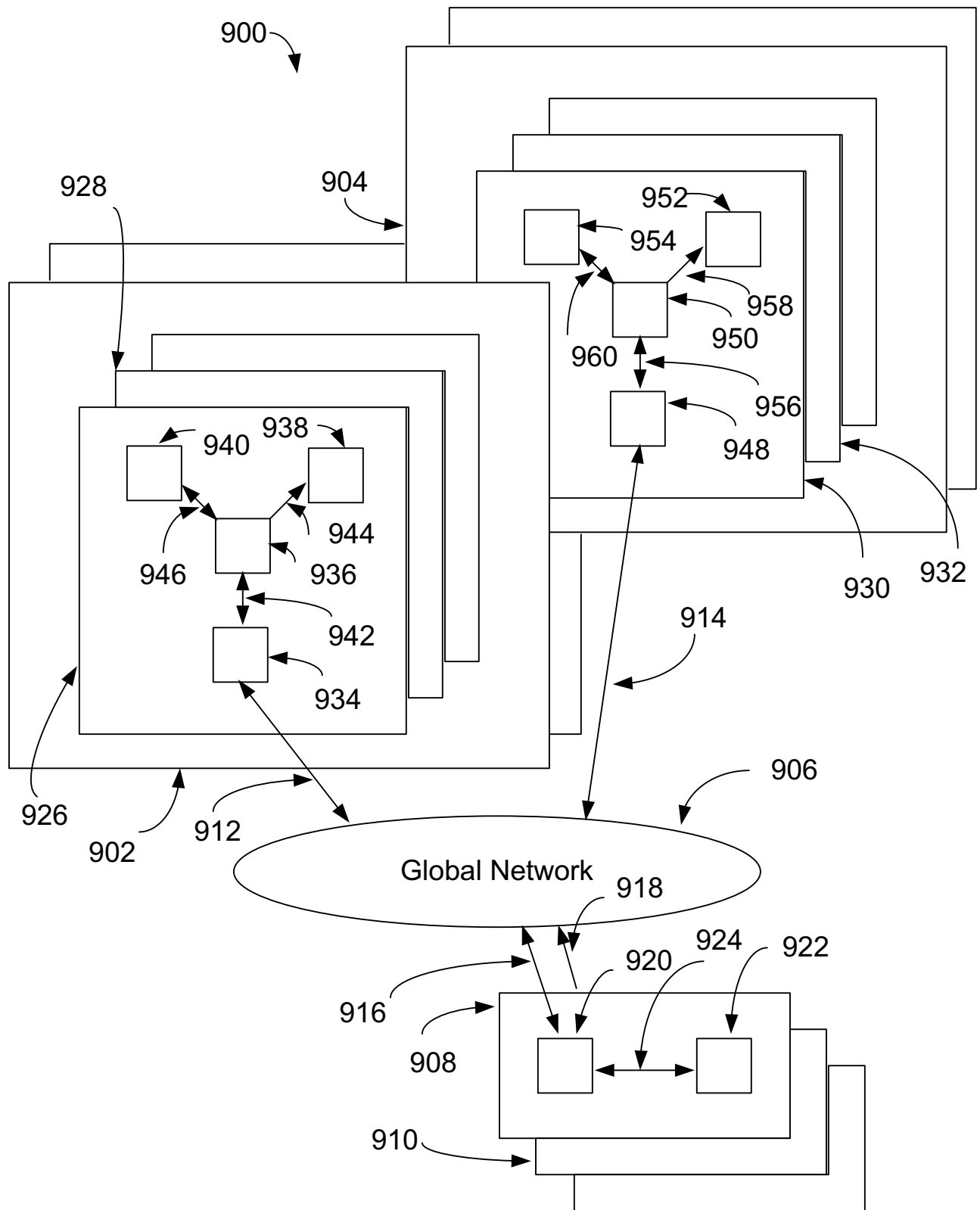


FIG. 9