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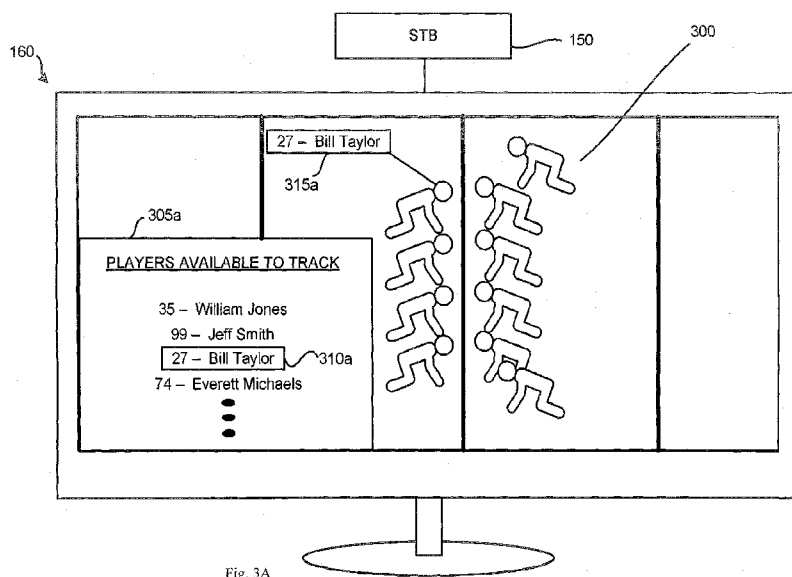


Fig. 3A

(57) Abstract: Systems and methods for tracking items onscreen are described. An exemplary system may include an electronic device configured to receive video data and user inputs. The electronic device may further include one or more processors as well as memory, which when executed by the one or more processors, cause them to receive the user inputs including an instruction to visually track one or more items included in the video data. The one or more processors may further be caused to incorporate a visual marking on each of the items to be visually tracked thereby producing modified video data, and transmit the modified video data to one or more display devices.

IDENTIFICATION AND TRACKING ONSCREEN

TECHNICAL FIELD

[0001] The present technology relates to systems and methods for item tracking. More specifically, the present technology relates to identification and visual tracking of items included in video data.

BACKGROUND

[0002] When watching broadcast sporting events, whether on television, computer, or other media devices, it may be difficult to track a certain competitor. For example, a viewer's favorite competitor may not be identifiable in a group of other competitors being displayed on the broadcast. Additionally, a viewer's favorite competitor may not be the focus of the main video, such as when the main video is focused on a different competitor or aspect of the broadcast. This may result in frustration for users hoping to focus on a single competitor or subset of the competitors.

[0003] Thus, there is a need for improved methods and systems for tracking items on video in a useful way. These and other needs are addressed by the present technology.

SUMMARY

[0004] Systems and methods for tracking items onscreen are described. An exemplary system may include an electronic device configured to receive video data and user inputs. The electronic device may further include one or more processors as well as memory, which when executed by the one or more processors, cause them to receive the user inputs including an instruction to visually track one or more items included in the video data. The one or more processors may further be caused to incorporate a visual marking on each of the items to be visually tracked thereby producing modified video data, and transmit the modified video data to the display device.

[0005] The electronic device may include at least one data input component to receive video data, at least one user input component to receive one or more user inputs, as well as at least one output component communicatively coupled with a display device. In disclosed embodiments, the video data may comprise a sports broadcast, and the one or more items to be visually tracked may include competitors in the sports broadcast. A first user input may provide instruction identifying the

items to be tracked, and a second instruction may identify a type of visual marking to be incorporated for each item being tracked. The visual marking may include highlighting one or more portions of the one or more items, colorizing one or more portions of the one or more items, outlining one or more portions of the one or more items, and/or tagging the one or more items. The electronic device may also display a menu that includes each item in the video data available for visual tracking. When transmitted, the modified video data may be transmitted concurrently with the originally received video data so that the display device displays both the video data and the modified video data.

[0006] Methods for tracking items included in video data are also provided. An exemplary method may include the step of receiving video data at an electronic device, and one or more user inputs. The user inputs may include an instruction to visually track one or more items included in the video data. The method may include incorporating, at the electronic device, a visual marking on each of the one or more items to be visually tracked within the video data in order to produce modified video data. The methods may also include transmitting the modified video data to a display device.

[0007] The methods can include one or more additional features and/or steps. For example, the video data may include a sports broadcast, and the one or more items to be visually tracked may include competitors in the sports broadcast. The methods may include transmitting a menu for display on the display device, and the menu may include a list including each item in the video data available for visual tracking. The electronic device may initially transmit the received video data without modification, and subsequently receive a first user instruction to identify items in the video data available for visual tracking. In response to receiving this instruction, the electronic device may visually identify on the transmitted video a first item in the video data available for visual tracking. The user may be allowed to rotate or otherwise cycle through the next item or items available for visual tracking.

[0008] The methods may also include receiving at the electronic device an instruction to visually track at least two items simultaneously that are included in the video data. Separate visual markings may be incorporated into the video data for each of the items to be visually tracked simultaneously. The visual markings may include highlighting one or more portions of the one or more items, colorizing one or more portions of the one or more items, outlining one or more portions of the one or more items, and tagging the one or more items. The methods may still further

include receiving a user instruction identifying the visual marking to be incorporated for each item to be visually tracked. The methods may also include receiving at the electronic device a user instruction to modify the video data such that the one or more items to be visually tracked are being displayed at all times. The modified video may be transmitted concurrently with the video data such that the display device displays both the video data and the modified video data simultaneously.

[0009] The technology may also include a computer-readable medium with sets of instructions thereon, which when executed by a processor cause the processor to receive one or more user inputs that include an instruction to visually track one or more items included in video data. The processor may further incorporate a visual marking on each of the one or more items to be visually tracked within the video data in order to produce modified video data, and may also transmit the modified video data to a display device.

[0010] Such technology may provide numerous benefits over conventional techniques. For example, a user may not need to strain to continually identify a favorite competitor amongst the other competitors. Additionally, by allowing the user the ability to instruct that the items being visually tracked remain displayed at all times, a user may continue to watch a favorite competitor even when the main broadcast is focused elsewhere. These and other embodiments, along with many of their advantages and features, are described in more detail in conjunction with the below description and attached figures.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] A further understanding of the nature and advantages of the disclosed embodiments may be realized by reference to the remaining portions of the specification and the drawings.

[0012] FIG. 1 shows a simplified media service system that may be used in accordance with embodiments of the present technology.

[0013] FIG. 2 illustrates an exemplary electronic device that may be used in accordance with embodiments of the present technology.

[0014] FIG. 3A illustrates a display device showing an output menu presented in accordance with embodiments of the present technology.

[0015] FIG. 3B illustrates an exemplary display device showing an item being visually tracked in accordance with embodiments of the present technology.

[0016] FIG. 4 shows a simplified flow diagram of a method for visually tracking items included in video according to embodiments of the present technology.

[0017] FIG. 5 shows another simplified flow diagram of a method for visually tracking items included in video data according to embodiments of the present technology.

[0018] FIG. 6 shows a simplified computer system that may be utilized to perform one or more of the operations discussed.

[0019] In the appended figures, similar components and/or features may have the same numerical reference label. Further, various components of the same type may be distinguished by following the reference label by a letter that distinguishes among the similar components and/or features. If only the first numerical reference label is used in the specification, the description is applicable to any one of the similar components and/or features having the same first numerical reference label irrespective of the letter suffix.

DETAILED DESCRIPTION

[0020] The present technology is directed to visually tracking items included with video data for display. The technology can allow users to easily identify individual aspects of a video by providing visual marking of the item for constant tracking and identification. In so doing, improved user experiences may be delivered, along with reducing frustration of personally tracking items that may not always appear on screen. These and other benefits will be explained in detail below.

[0021] Although embodiments detailed herein are directed toward controlling television based equipment, the principles easily can be extended to other types of content and devices, such as video game equipment, computer equipment, handheld electronic devices, and the like. In addition, the terms “television” or “television service” can include traditional television programming, such as linear television programs, as well as other types of audio, video and/or audio/video content, such as on-demand video content, streaming video content and the like delivered via any type of content delivery systems, such as a cable, satellite, cellular/wireless, Internet/IP, and/or any other content delivery technology or system currently known or hereafter developed. Furthermore, embodiments herein describe set-top boxes and/or other devices being connected with a television or other device having an electronic display. However, the electronic device can also be incorporated into or be a part of the device having the display or display device, such as a television with an integrated cable,

satellite or IPTV receiver. The technology discussed herein additionally can be extended to any of a variety of other electronic devices, display devices, or combined devices, such as, for example, computers, tablets, hand-held mobile devices, cell phones, e-readers, personal media players, and the like. A person of ordinary skill in the art will recognize various alterations, additions, omissions, and substitutions.

[0022] FIG. 1 is a simplified illustration of an embodiment of a satellite television distribution system 100. Satellite television distribution system 100 may include: television service provider system 110, satellite transmitter equipment 120, satellites 130, satellite dish 140, set-top box (STB) 150, and television 160. The television 160 can be controlled by a user 153 using a remote control device 155 that can send wireless signals 157 to communicate with the STB 150 and/or television 160. Although discussed as being wireless for user convenience, the technology may additionally include a wired coupling between the remote control device 155 and STB 130 or television 160. Alternate embodiments of the satellite television distribution system 100 may include fewer or greater numbers of components. While only one satellite dish 140, STB 150 and television 160, collectively referred to as user equipment, are illustrated, it should be understood that multiple (tens, thousands, millions, etc.) instances of user equipment may be connected within the data communication network 190.

[0023] Television service provider system 110 and satellite transmitter equipment 120 may be operated by a television service provider. A television service provider may distribute television channels, on-demand programming, programming information, and/or other services to users. Television service provider system 110 may receive feeds of one or more television channels from various sources. Such television channels may include multiple television channels that contain the same content (but may be in different formats, such as high-definition and standard-definition). To distribute such television channels to users, feeds of the television channels may be relayed to user equipment via one or more satellites via transponder streams. Satellite transmitter equipment 120 may be used to transmit a feed of one or more television channels from television service provider system 110 to one or more satellites 130. While a single television service provider system 110 and satellite transmitter equipment 120 are illustrated as part of satellite television distribution system 100, it should be understood that multiple instances of transmitter equipment may be used, possibly scattered geographically to communicate with satellites 130. Such multiple instances of satellite transmitting equipment may communicate with the same or with different satellites. Different

television channels may be transmitted to satellites 130 from different instances of transmitting equipment. For instance, a different satellite dish of transmitting equipment 120 may be used for communication with satellites in different orbital slots.

[0024] Satellites 130 may be configured to receive signals, such as streams of television channels, from one or more satellite uplinks such as satellite transmitter equipment 120. Satellites 130 may relay received signals from satellite transmitter equipment 120 (and/or other satellite transmitter equipment) to multiple instances of user equipment via transponder streams. Different frequencies may be used for uplink signals 170 from transponder stream 180. Satellites 130 may be in geosynchronous orbit. Each satellite 130 may be in a different orbital slot, such that the signal path between each satellite, transmitter equipment, and user equipment vary. Multiple satellites 130 may be used to relay television channels from television service provider system 110 to satellite dish 140. Different television channels may be carried using different satellites. Different television channels may also be carried using different transponders of the same satellite; thus, such television channels may be transmitted at different frequencies and/or different frequency ranges. As an example, a first and second television channel may be carried on a first transponder of satellite 130a. A third, fourth, and fifth television channel may be carried using a different satellite or a different transponder of the same satellite relaying the transponder stream at a different frequency. A transponder stream transmitted by a particular transponder of a particular satellite may include a finite number of television channels, such as seven. Accordingly, if many television channels are to be made available for viewing and recording, multiple transponder streams may be necessary to transmit all of the television channels to the instances of user equipment.

[0025] Satellite dish 140 may be a piece of user equipment that is used to receive transponder streams from one or more satellites, such as satellites 130. Satellite dish 140 may be provided to a user for use on a subscription basis to receive television channels provided by the television service provider system 110, satellite uplink 120, and/or satellites 130. Satellite dish 140 may be configured to receive transponder streams from multiple satellites and/or multiple transponders of the same satellite. Satellite dish 140 may be configured to receive television channels via transponder streams on multiple frequencies. Based on the characteristics of set-top box (STB) 150 and/or satellite dish 140, it may only be possible to capture transponder streams from a limited number of transponders concurrently. For example, a tuner of STB 150 may only be able to tune to a single transponder stream from a transponder of a single satellite at a time.

[0026] In communication with satellite dish 140, may be one or more sets of receiving equipment. Receiving equipment may be configured to decode signals received from satellites 130 via satellite dish 140 for display on a display device, such as television 160. Receiving equipment may be incorporated as part of a television or may be part of a separate device, commonly referred to as a set-top box (STB). Receiving equipment may include a satellite tuner configured to receive television channels via a satellite. In FIG. 1, receiving equipment is present in the form of set-top box 150. As such, set-top box 150 may decode signals received via satellite dish 140 and provide an output to television 160. FIG. 2 provides additional details of receiving equipment.

[0027] Television 160 may be used to present video and/or audio decoded by set-top box 150. Set-top box 150 may also output a display of one or more interfaces to television 160, such as an electronic programming guide (EPG). In some embodiments, a display device other than a television may be used.

[0028] Uplink signal 170a represents a signal between satellite uplink 120a and satellite 130a. Uplink signal 170b represents a signal between satellite uplink 120b and satellite 130b. Each of uplink signals 170 may contain streams of one or more different television channels. For example, uplink signal 170a may contain a certain group of television channels, while uplink signal 170b contains a different grouping of television channels. Each of these television channels may be scrambled such that unauthorized persons are prevented from accessing the television channels.

[0029] Transponder stream 180a represents a signal between satellite 130a and satellite dish 140. Transponder stream 180b represents a signal path between satellite 130b and satellite dish 140. Each of transponder streams 180 may contain one or more different television channels in the form of transponder streams, which may be at least partially scrambled. For example, transponder stream 180a may include a first transponder stream containing a first group of television channels, while transponder stream 180b may include a second transponder stream containing a different group of television channels. A satellite may transmit multiple transponder streams to user equipment. For example, a typical satellite may relay thirty-two transponder streams via corresponding transponders to user equipment. Further, spot beams are possible. For example, a satellite may be able to transmit a transponder stream to a particular geographic region, e.g., to distribute local television channels to the relevant market. Different television channels may be transmitted using the same frequency of the transponder stream to a different geographic region.

[0030] FIG. 1 illustrates transponder stream 180a and transponder stream 180b being received by satellite dish 140. For a first group of television channels, satellite dish 140 may receive a transponder stream of transponder stream 180a; for a second group of channels, a transponder stream of transponder stream 180b may be received. STB 150 may decode the received transponder stream. As such, depending on which television channel(s) are desired, a transponder stream from a different satellite (or a different transponder of the same satellite) may be accessed and decoded by STB 150. Further, while two satellites are present in satellite television distribution system 100, in other embodiments greater or fewer numbers of satellites may be present for receiving and transmitting transponder streams to user equipment.

[0031] Network 190 may serve as a secondary communication channel between television service provider system 110 and set-top box 150. Via such a secondary communication channel, bidirectional exchange of data may occur. As such, data may be transmitted to television service provider system 110 via network 190. Data may also be transmitted from television service provider system 110 to STB 150 via network 190. Network 190 may be the Internet. While audio and video services may be provided to STB 150 via satellites 130, feedback from STB 150 to television service provider system 110 may be transmitted via network 190.

[0032] FIG. 1 illustrates an example of a satellite-based television channel distribution system. It should be understood, however, that at least some of the aspects of such a system may be similar to a cable television distribution system. For example, in a cable television system, rather than using satellite transponders, multiple RF channels on a cable may be used to transmit streams of television channels. As such, aspects detailed herein may be applicable to cable television distribution systems. It is also to be understood that the technology disclosed herein can be practiced on and by cable, satellite, internet-based, over-the-air, or any other system that distributes video for display.

[0033] FIG. 2 illustrates a block diagram of an embodiment of a set-top box 200. STB 200 may be set-top box 150 of FIG. 1, or may be incorporated as part of a television, such as television 160 of FIG. 1. STB 200 may include: processors 210, tuners 215, network interface 220, non-transitory computer-readable storage medium 225, electronic programming guide (EPG) 230, television interface 235, networking information table (NIT) 240, digital video recorder (DVR) 245, user interface 250, demultiplexer 255, smart card 260, and/or descrambling engine 265. In other embodiments of STB 200, fewer or greater numbers of components may be present. It should be

understood that the various components of STB 200 may be implemented using hardware, firmware, software, and/or some combination thereof. For example, EPG 230 may be executed by processors 210.

[0034] Processors 210 may include one or more general-purpose processors configured to perform processes such as tuning to a particular channel, displaying the EPG, and/or receiving and processing input from a user. Processors 210 may include one or more special purpose processors. For example, processors 210 may include one or more processors dedicated to decoding video signals from a particular format, such as MPEG, for output and display on a television and for performing decryption. It should be understood that the functions performed by various modules of FIG. 2 may be performed using one or more processors. As such, for example, functions of descrambling engine 265 may be performed by processor 210.

[0035] Tuners 215 may include one or more tuners used to tune to television channels, such as television channels transmitted via satellite or cable. Each tuner contained in tuners 215 may be capable of receiving and processing a single stream of data from a satellite transponder (or a cable RF channel) at a given time. As such, a single tuner may tune to a single transponder (or cable RF channel). If tuners 215 include multiple tuners, one tuner may be used to tune to a television channel on a first transponder for display using a television, while another tuner may be used to tune to a television channel on a second transponder for recording and viewing at some other time. Still another tuner may be used to check various television channels to determine if they are available or not. If multiple television channels transmitted on the same transponder stream are desired, a single tuner of tuners 215 may be used to receive the signal containing the multiple television channels for presentation and/or recording.

[0036] Network interface 220 may be used to communicate via an alternate communication channel with a television service provider. For example, the primary communication channel may be via satellite (which may be unidirectional to the STB) and the alternate communication channel (which may be bidirectional) may be via a network, such as the Internet. Referring back to FIG. 1, STB 150 may be able to communicate with television service provider system 110 via a network, such as the Internet. This communication may be bidirectional: data may be transmitted from STB 150 to television service provider system 110 and from television service provider system 110 to STB 150. Referring back to FIG. 2, network interface 220 may be configured to communicate via

one or more networks, such as the Internet, to communicate with television service provider system 110 of FIG 1. Information may be transmitted and/or received via network interface 220.

[0037] Storage medium 225 may represent a non-transitory computer readable storage medium. Storage medium 225 may include memory and/or a hard drive. Storage medium 225 may be used to store information received from one or more satellites and/or information received via network interface 220. Storage medium 225 may store information related to EPG 230, NIT 240, and/or DVR 245. Recorded television programs may be stored using storage medium 225.

[0038] EPG 230 may store information related to television channels and the timing of programs appearing on such television channels. EPG 230 may be stored using non-transitory storage medium 225, which may be a hard drive. EPG 230 may be used to inform users of what television channels or programs are popular and/or provide recommendations to the user. EPG 230 may provide the user with a visual interface displayed by a television that allows a user to browse and select television channels and/or television programs for viewing and/or recording via DVR 245. Information used to populate EPG 230 may be received via network interface 220 and/or via satellites, such as satellites 130 of FIG. 1 via tuners 215. For instance, updates to EPG 230 may be received periodically via satellite. EPG 230 may serve as an interface for a user to control DVR 245 to enable viewing and/or recording of multiple television channels simultaneously.

[0039] Audio/video decoder 233 may serve to convert encoded video and audio into a format suitable for output to a display device. For instance, audio/video decoder 233 may receive MPEG video and audio from storage medium 225 or descrambling engine 265 to be output to a television. Audio/video decoder 233 may convert the MPEG video and audio into a format appropriate to be displayed by a television or other form of display device and audio into a format appropriate to be output from speakers, respectively.

[0040] Television interface 235 may serve to output a signal to a television (or another form of display device) in a proper format for display of video and playback of audio. As such, television interface 235 may output one or more television channels, stored television programming from storage medium 225 (e.g., DVR 245 and/or information from EPG 230) to a television for presentation.

[0041] The network information table (NIT) 240 may store information used by set-top box 200 to access various television channels. NIT 240 may be stored using storage medium 225. Information used to populate NIT 240 may be received via satellite (or cable) through tuners 215

and/or may be received via network interface 220 from the television service provider. As such, information present in NIT 240 may be periodically updated. NIT 240 may be locally-stored by STB 200 using storage medium 225. Information that may be present in NIT 240 may include: television channel numbers, a satellite identifier, a frequency identifier, a transponder identifier, an ECM PID, one or more audio PIDs, and a video PID. A second audio PID of a channel may correspond to a second audio program (SAP), such as in another language. In some embodiments, NIT 240 may be divided into additional tables. For example, rather than the specific audio PIDs and video PIDs being present in NIT 240, a channel identifier may be present within NIT 240 which may be used to lookup the audio PIDs and video PIDs in another table.

[0042] Digital Video Recorder (DVR) 245 may permit a television channel to be recorded for a period of time. DVR 245 may store timers that are used by processors 210 to determine when a television channel should be tuned to and recorded to DVR 245 of storage medium 225. In some embodiments, a limited amount of storage medium 225 may be devoted to DVR 245. Timers may be set by the television service provider and/or one or more users of the STB. DVR 245 may be configured by a user to record particular television programs. Whether a user directly tunes to a television channel or DVR 245 tunes to a first television channel, NIT 240 may be used to determine the satellite, transponder, ECM PID (packet identifier), audio PID, and video PID.

[0043] User interface 250 may include a remote control (physically separate from STB 200) and/or one or more buttons on STB 200 that allows a user to interact with STB 200. User interface 250 may be used to select a television channel for viewing, view EPG 230, and/or program DVR 245.

[0044] Referring back to tuners 215, television channels received via satellite (or cable) may contain at least some scrambled data. Packets of audio and video may be scrambled to prevent unauthorized users (e.g., nonsubscribers) from receiving television programming without paying the television service provider. When a tuner of tuners 215 is receiving data from a particular transponder of a satellite, the transponder stream may be a series of data packets corresponding to multiple television channels. Each data packet may contain a packet identifier (PID), which in combination with NIT 240, can be determined to be associated with a particular television channel. Particular data packets, referred to as entitlement control messages (ECMs) may be periodically transmitted. ECMs may be encrypted; STB 200 may use smart card 260 to decrypt ECMs. Decryption of an ECM may only be possible if the user has authorization to access the particular

television channel associated with the ECM. When an ECM is received by demultiplexer 255 and the ECM is determined to correspond to a television channel being stored and/or displayed, the ECM may be provided to smart card 260 for decryption.

[0045] When smart card 260 receives an encrypted ECM from demultiplexer 255, smart card 260 may decrypt the ECM to obtain some number of control words. In some embodiments, from each ECM received by smart card 260, two control words are obtained. In some embodiments, when smart card 260 receives an ECM, it compares the ECM to the previously received ECM. If the two ECMs match, the second ECM is not decrypted because the same control words would be obtained. In other embodiments, each ECM received by smart card 260 is decrypted; however, if a second ECM matches a first ECM, the outputted control words will match; thus, effectively, the second ECM does not affect the control words output by smart card 260.

[0046] When an ECM is received by smart card 260, it may take a period of time for the ECM to be decrypted to obtain the control words. As such, a period of time, such as 2 seconds, may elapse before the control words indicated by the ECM can be obtained. Smart card 260 may be permanently part of STB 200 or maybe configured to be inserted and removed from STB 200.

[0047] Demultiplexer 255 may be configured to filter data packets based on PIDs. For example, if a transponder data stream includes multiple television channels, data packets corresponding to a television channel that is not desired to be stored or displayed by the user, may be ignored by demultiplexer 255. As such, only data packets corresponding to the one or more television channels desired to be stored and/or displayed may be passed to either descrambling engine 265 or smart card 260, while other data packets may be ignored. For each channel, a stream of video packets, a stream of audio packets and/or a stream of ECM packets may be present, each stream identified by a PID. In some embodiments, a common ECM stream may be used for multiple television channels. Additional data packets corresponding to other information, such as updates to NIT 240, may be appropriately routed by demultiplexer 255.

[0048] Descrambling engine 265 may use the control words output by smart card 260 in order to descramble video and/or audio corresponding to television channels for storage and/or presentation. Video and/or audio data contained in the transponder data stream received by tuners 215 may be scrambled. The video and/or audio may be descrambled by descrambling engine 265 using a particular control word. Which control word output by smart card 260 to be used for

successful descrambling may be indicated by a scramble control identifier present within the data packet containing the scrambled video or audio. Descrambled video and/or audio may be output by descrambling engine 265 to storage medium 225 for storage (via DVR 245) and/or to audio/video decoder 233 for output to a television or other presentation equipment via television interface 235.

[0049] For simplicity, STB 200 of FIG. 2 has been reduced to a block diagram, and commonly known parts, such as a power supply, have been omitted. Further, some routing between the various modules of STB 200 has been illustrated. Such illustrations are for exemplary purposes only. Two modules not being directly or indirectly connected does not indicate the modules cannot communicate. Rather, connections between modules of the STB 200 are intended only to indicate possible common data routing. It should be understood that the modules of STB 200 may be combined into a fewer number of modules or divided into a greater number of modules. Further, the components of STB 200 may be part of another device, such as built into a television. Also, while STB 200 may be used to receive, store, and present television channels received via a satellite, it should be understood that similar components may be used to receive, store, and present television channels via a cable network.

[0050] FIG. 3A is an illustration of an embodiment of imaging shown on the electronic display 300 of a television 160, which may be generated and/or caused to be shown on the electronic display 300 by an STB 150. In this embodiment, the display includes a menu 305a displayed overlaying the imaging content, although techniques provided herein can apply to any of a variety of menus and/or programming guides of the STB 150 shown on the electronic display 300. A direct overlay, transparent overlay, or picture-in-picture style screen modification may be used in various embodiments. For example, unlike the direct overlay shown in FIG. 3A, a transparent overlay which does not block display of the content may be used. The menu 305a, along with guides, may be updated based on locally-gathered information by an STB 150 and/or by information obtained from a remote system, such as television service provider 110 of FIG. 1. The menu 305a may be displayed in response to an instruction from a user requesting identification of items in the video data available for visual tracking.

[0051] When engaged, the menu may include additional operations (not shown) that can be performed in response to additional instructions received from the first electronic device. For example, the menu may further show available options for the type of visual marker to be used to track an item on the screen. The STB, after displaying the menu, may be further configured to

receive a second or subsequent instruction from the user that includes information identifying the type of marker to be used, the degree to which highlighting is applied, etc. As shown in the Figure, the display 305a may include a list, figure, or other representation of the available items for visual tracking on the video. In one non-limiting example, the user may be presently viewing a football game, and decide that he or she wishes to focus on a single competitor. This competitor may be a favorite player of the user, or a player of interest to the user based on collected information. For example, a friend or sportscaster may indicate that a specific player may be on the verge of a milestone of some sort, and the user would like to focus on the player to ensure the milestone is viewed when it occurs.

[0052] As illustrated in FIG. 3A, menu 305a may list all available items for visual tracking in the video. The user may be able to rotate or scroll through the list of items, and highlight 310a each item on the list. The list may be developed based on any useful information available from the provider system, on the STB 150, downloaded from an alternative source through network 190, etc. For example, to provide convenience to the user, and continuing the football example, the menu 305a may be based on a series of sub-menus that list the teams available, offense and defensive players, and then the actual player list, which can increase the likelihood that the user may access the desired item more quickly. Although the example is based on football, any other sporting or other video event may be covered by the disclosed technology. For example, NASCAR, track and field, any Olympic event, basketball, baseball, soccer, etc., may all utilize aspects of the present technology. Although the continuing portions of the disclosure may be based on the football example previously discussed, it is to be understood that this is merely an example, and any aspect of the disclosure may alternatively be based on alternative examples for any other item encompassed by the technology.

[0053] As the user scrolls over available items to track, when each item is highlighted 310a in the menu 305a, a visual marking 315a of some type may be incorporated with the item on the video itself. In this way, if the user is not certain where or what/who the item is for which the user may be looking, this provides another level of convenience for the user. For example, the user may know the position at which the competitor plays, but is not certain of the name. Thus, through either or both of information in the menu 310a, and a visual marking 315a, the user may be able to better identify that which is being sought. The user may additionally or alternatively scroll through the displayed items on screen 300, and the corresponding name, number, or identifying information may

be highlighted 310a in the display menu 305a. Although not shown in the illustration, the user may be able to select multiple competitors to be viewed simultaneously following similar instructions as used for the first item to be tracked.

[0054] STB 150, as previously discussed with respect to FIG. 2, may include at least one data input component configured to receive video data, such as from television service provider 110. Additionally, STB 150 may be configured to receive video data from additional sources accessed via network 190. STB 150 may also include at least one user input component configured to receive one or more user inputs, such as from remote control 155. STB 150 may include at least one output component communicatively coupled with a display device, such as television 160. The STB 150 may be directly coupled with the display device or otherwise in communication with the device such that video data may be transmitted wirelessly, for example. The STB 150 may also be configured with multiple output components, which may be configured to provide video data to multiple display devices. As will be described further below, the STB 150 may send a main video as received from the service provider to the main display device, such as television 160, and also send an additional video data stream to an additional display device, such as a laptop, smartphone, or other device capable of receiving a video display (not shown).

[0055] The STB 150 may include one or more processors, as well as memory, that coordinate to receive the user inputs that may include the instruction to track one or more items in the video. The STB 150 may incorporate a visual marking on each of the one or more items to be tracked, which may produce modified video data. This modified video data may be transmitted from the STB 150 to the display device, such as television 160. Alternatively, the STB 150 may transmit the received video data to a main display, such as television 160, and may transmit the modified video data, which may focus on the item to be visually tracked, to an alternative display device as may be selected by the user. The two transmissions may occur simultaneously. Alternatively, both the received video and the modified video may be transmitted concurrently to the main display device, and may be transmitted concurrently. The user may provide multiple instructions including what items are to be visually tracked in the video data, as well as what type of visual marking to be incorporated with each item being tracked, such as if multiple items are being tracked. Further instructions may be received that cause menu 305a to be displayed, and the menu may include a list or other configuration of each item in the video data available for visual tracking.

[0056] **FIG. 3B** shows another illustration of an embodiment of imaging shown on the electronic display 300 of a television 160 after selection of an item for visual tracking has been made. The user may confirm that a certain competitor, or set of competitors, or item in the video is to be visually tracked. After confirmation has been provided, visual tracking may be performed for the convenience of the user. A visual marking 315b may be maintained at, on, near, over, or around the item to be tracked at all times until further instruction is provided by the user to cease visual tracking. From information provided on the previously discussed menu 305a, the user may have selected the visual marking 315b to be used. The visual marking may include any amount of information such as text, or may be a visual indication alone. The marking may be colorizing of the item or a portion of the item, highlighting of one or more portions of the item, outlining of one or more portions of the item, or tagging the item. If multiple items are being visually tracked, different or similar visual marking may be used for each item. For example, transparent coloring may be placed over the jersey number of the player or over the entire player, or the jersey number may be outlined. Alternatively, the entire competitor may be outlined or highlighted as shown with visual marking 315b of Figure 3B. Multiple levels of visual marking may also be applied. For example, a user may first select that an item from the list 305a is to be transparently colorized, and may then select that the player is to be further colorized red. In this way, a red hue may be applied over the specifically chosen item, through which the features of the competitor may still be viewed. The red colorizing may allow the user to still view all features of the competitor while being provided a convenient way to track the player at all times.

[0057] The specific visual marking may be based on the type of event or number of competitors being visually tracked at one time. For example, if NASCAR is being viewed, the user may be able to select visual tracking for the car being driven by a favorite driver. As another example, if an Olympic event such as a track race is being viewed, a user may wish to visually track all competitors from the user's home country. The information presented in menu 305a may be based on country, for example, and the user may select to visually track all competitors from that country. If the user were to use tagging such as shown in visual marking 315a of FIG. 3A, the benefit may be lost if all competitors from the same country are grouped together during the race, in which case all items may overlap and become indiscernible. Thus, the user may select transparent colorizing of the competitors, and may also choose different colors for each competitor in order to

keep all of them separate. Any number of alternative marking schemes encompassed by the technology may be understood to apply similarly in this or other examples.

[0058] The user may further provide an instruction to maintain viewing of the selected item despite what is being viewed by the main broadcast. Because any number of cameras may be used to capture a broadcast, all aspects of the actual event may be available at all times. However, typically the provider will select the view through a specific camera that is providing a specific view of the action. For example, in a track race the camera may focus on the person in the lead, or in a football match the camera may focus on the player with the ball. The user, on the other hand, may wish to focus on someone who may be off camera from the main view. For example, the user may wish to focus on a particular football player who may be moving downfield to set up a play. The main video may not be focused on that player, but other cameras used to catch the action may be available to maintain a view of the player. If the user has selected to visually track this particular player, the user may further be able to select that this player is shown on the user's display, such as television 160, at all times. This may be provided in multiple ways.

[0059] First, a provider may transmit metadata including multiple camera feeds, and the user may simply be able to manually switch between available cameras to personally maintain viewing of the player being visually tracked. Alternatively, the STB may be able to parse the metadata provided to maintain viewing of the player being visually tracked. Often, a provider system transmits only that portion of the available video data that the provider deems important. In certain aspects of the present technology, the provider system may provide all available metadata to each user's STB 150 for this and other purposes. The STB 150 may include software that may parse all incoming data to determine which camera may be presently showing the item or player the viewer wishes to visually track. The STB 150 may be instructed to only display this video feed that includes the player to be tracked. Alternatively, the STB 150 may be instructed to show both the main view being used by the provider system, and also display the view of the player to be tracked. This may be performed in a picture-in-picture functioning on the display, or in a split screen of some form. In still other alternatives, the user may have a personal device, such as a smartphone, laptop, or personal viewing device that is similarly capable of presenting video. The STB 150 may be instructed to provide the main video provided by the provider system to the television 160, for example, and be instructed to wirelessly or otherwise transmit the video focusing on the item being visually tracked to the user's other video device (not shown). The opposite display of the main video

on the alternate video device may also be performed, with television 160 being used to display the view that focuses on the player being tracked. Accordingly, the views presented on the multiple devices may be similar or different based on whether the player being visually tracked appears on the main video being provided by the service provider. This example may allow the user to maintain viewing of the main action being performed, while still being able to focus on a particular competitor. If multiple competitors are being tracked simultaneously, the user may instruct that one particular competitor is to be tracked via the additionally provided view, such as picture-in-picture or in a video transmission to an additional video display device. However, if the user has multiple such devices, or if the display may have multiple picture-in-picture displays, any number of competitors may be tracked simultaneously and individually displayed at all times.

[0060] The systems and devices previously described may be used in performing various methods. **FIG. 4** illustrates an embodiment of a method 400 for visually tracking items in video. Method 400 may be performed using any of the systems or components previously described. Method 400 may allow for user control or instruction to an STB to enable tracking of one or more items visually that are included in video. Each step of method 400 may be performed at or by a single electronic device, such as an STB or mobile device, or by multiple devices communicating with one another. Means for performing each step of method 400 include an electronic device and/or the various components of an electronic device or distribution system, such as those detailed in relation to FIGS. 1-3. Method 400 may be performed using a computerized device, such as a device incorporating some or all of the components of computer system 600 of FIG. 6.

[0061] At step 410, video data may be received at an electronic device. The video data may be received from a provider, such as television service provider 110, or may be received from an alternative source, such as any source providing video data over a network, such as network 190. The video data may include additional metadata beyond what is to be initially displayed. For example, as discussed above, the video data may include video to be displayed as determined by the provider, as well as video data available from an additional source, such as another camera at the event with which the video data is associated. The provider may send video data from a particular camera as the main video, as well as video data from one or more additional cameras that may be used by the STB as discussed above for displaying additional views and aspects of items being visually tracked. At step 420, the electronic device may receive one or more user inputs. The user inputs may include instruction from a user to visually track one or more items included in the video

data. In one non-limiting example, the video data may include a sports broadcast, and the one or more items to be visually tracked may include competitors in the sports broadcast.

[0062] After the item to be tracked has been identified, a visual marking may be incorporated on each of the one or more items to be visually tracked within the video at step 430 in order to produce modified video data. The electronic device may include software capable of incorporating the visual tracking in the video data to produce the modified video data. When different video feeds are being utilized by the user, such as from different cameras at a single event to maintain display of an item being visually tracked, the electronic device may maintain the visual tracking in a variety of ways. For example, recognition software may be used on identifying features of each item being tracked. Thus, when a different view or additional feed is used to maintain visual tracking, the electronic device may still be able to recognize which item among all items in the video is that which is to be tracked. Additionally, the electronic device may create and/or utilize a grid of some sort developed to facilitate maintenance of visual tracking of items in the video. For example, many sporting events are performed in a determined area, such as a field or track. The area may include grid lines of some sort naturally, such as the lines on a field or lanes on a track, or the electronic device may produce a pattern transposed on the area on which the event is being performed internally. Accordingly, the system may utilize the natural or developed grid to facilitate visual tracking. For example, if the presently utilized video data is based on a particular view of the event area, and then the competitor being visually tracked moves off screen, the electronic device may switch video feeds, or incorporate an additional video feed to maintain visual tracking. This additional feed may be based on a camera positioned orthogonally to the previous view of the event area. If a natural or created grid is enabled and utilized, the electronic device may utilize one or more aspects of the grid to determine the positioning of the item being tracked. Additional computing may be used that incorporates directionality and other movement characteristics such as speed to ensure that the proper item is tracked appropriately in the changing views. A variety of other means for maintaining visual tracking across different feeds as would be understood may similarly be used and are encompassed by the technology. The modified video data may then be transmitted to one or more display devices for viewing at step 440. The STB may be communicatively coupled with the display device, such as television 160, or may communicate with the device wirelessly, such as to a mobile phone, personal computer, tablet, or personal video device.

[0063] FIG. 5 illustrates another embodiment of a method 500 for operating electronic equipment remotely. Method 500 may be performed using any of the systems or components previously described. Method 500 may allow for user control or instruction to an STB, or other component, in order to visually track one or more items included in video data. Each step of method 500 may be performed by an electronic device, such as an STB, or may be performed with more than one device in communication with one another. Means for performing each step of method 500 include a first electronic device and/or the various components of an electronic device or distribution system, such as those detailed in relation to FIGS. 1-3. Method 500 may represent a more detailed embodiment of method 400. Method 500 may be performed using a computerized device, such as a device incorporating some or all of the components of computer system 600 of FIG. 6.

[0064] At step 510, video data may be received at an electronic device such as an STB. The originally received video data may be transmitted to a display device for viewing by a user. The originally received video data may also be altered in one or more ways to produce modified video data that is originally displayed. For example, when video data is received at the STB, an application may be run that identifies each item available for visual tracking in the video data. The items may be collected in a list, or otherwise logged for use as items available for visual tracking. At step 520, a first instruction may be received at the electronic device from a user to identify available items for visual tracking. The STB may transmit a menu for display on the display device at step 530, and the menu may include a list including each item in the video data available for visual tracking. The original video data may be transmitted to the display prior to any identification at the electronic device, but in disclosed embodiments the STB may identify all items available for tracking upon receiving the video, while storing the video, or during transmission of the video to a display device. The first instruction to identify available items for visual tracking may be received subsequently to transmission of the originally received video data. Alternatively, a menu may not be displayed, and the STB may simply visually mark the first item available for visual tracking on the displayed video subsequent to the instruction received at step 520 to identify available items, and the user may scroll or rotate amongst the various items available for visual tracking. At such time as the user determines which item is to be visually tracked based on highlighting the specific item, the user may provide an instruction, such as 'enter,' 'ok,' or some similar functioning key on a remote device to instruct that the presently visually marked item is to be visually tracked.

[0065] As discussed, a menu may be displayed at step 530 listing the items available for visual tracking. The menu may include all items available for visual tracking, and the user may be allowed to scroll or rotate through each item available for visual tracking. As the user scrolls or rotates through the available items for visual tracking, the electronic device may additionally include a tag or other visual marking on the item in the transmitted video, so that the user may further recognize each item in the list. For example, a user may have identified on the transmitted video a particular player he wishes to visually track, but may not be able to identify the player or his number. If the list were to include the name and number of each football player, the user may not be able to determine which player is which. However, while scrolling over the available items or players to be tracked, if the electronic device simultaneously visually marks the corresponding player in the video, the user may quickly identify the player he wishes to track. The user may provide an input identifying one or more items from the list that are to be visually tracked at step 540. Accordingly, in disclosed embodiments, the electronic device may visually identify or mark on the transmitted video data a first item in the video data available for visual tracking, and the user may be allowed to rotate to the next item available for visual tracking via an input command, such as arrow keys on a remote control or personal controlling device such as a mobile phone, for example. The user may select any number of inputs for simultaneous tracking, and in one example may determine to visually track at least two items included in the video data simultaneously.

[0066] Once the user has provided an input identifying items to be visually tracked, the electronic device may incorporate a visual marking at step 550 on each of the one or more items to be visually tracked within the video in order to produce modified video data. If multiple items are being visually tracked, separate visual markings may be incorporated for each of the multiple items to be visually tracked simultaneously. The visual markings may include any of a variety of marking types including highlighting one or more portions of the one or more items, coloring one or more portions of the one or more items, outlining one or more portions of the one or more items, and tagging the one or more items. The visual markings may be determined by the electronic device, or one or more user instructions may be received identifying the visual marking to be incorporated. Similar or different visual markings may be used if more than one item is being visually tracked, and in disclosed embodiments more than one type of marking may be used to differentiate between items being visually tracked. For example, each item may be provided a transparent overlay of color that still allows the viewer to see some, most, or all features of the item being visually tracked.

Different color overlays may be used for each item being tracked, and alternatively the same color may be used in multiple instances. The modified video data may be transmitted to a display device at step 560. The display device may be any display device in communication with the electronic device. The display may include a television, computer, mobile phone, or any type of LCD, LED, plasma, or other screen technology.

[0067] User inputs may also be provided instructing that the video data displayed as the modified video data includes the one or more items being visually tracked at all times. This can be performed in multiple ways. For example, the modified video may be transmitted concurrently with the video data to a display device, such that the display device displays both the video data and the modified video data. This may occur as a split screen or picture-in-picture in disclosed embodiments. Alternatively, only the modified video may be displayed based on the instruction of the user. The user may toggle between differing views, if available, to ensure viewing of desirable content. For example, if the user is viewing the visually tracked item at all times, such as a particular football player, if that player is substituted out of the game, the user may wish to toggle to a different view in order to view an active portion of the game. In still other embodiments, multiple views may be transmitted by the electronic device simultaneously. The originally received video data may be displayed on one display device, and modified video data, such as an alternate camera view for example, may be displayed on a second display device. The user may alternate views between the devices, or switch views on any device during the event. In this way, the user is in control of what is displayed on each device at all times. Such a feature may be enabled by the reception of detailed metadata that includes multiple viewing angles, such as from multiple cameras being used at a single broadcasting event, and may allow a user to maintain viewing of a favorite player while the main display provided by the provider is focusing on alternative portions of the event.

[0068] FIG. 6 illustrates an embodiment of a computer system 600. A computer system 600 as illustrated in FIG. 6 may be incorporated into devices such as an STB, a first electronic device, DVR, television, media system, personal computer, and the like. Moreover, some or all of the components of the computer system 600 may also be incorporated into a portable electronic device, mobile phone, or other device as described herein. FIG. 6 provides a schematic illustration of one embodiment of a computer system 600 that can perform some or all of the steps of the methods provided by various embodiments. It should be noted that FIG. 6 is meant only to provide a

generalized illustration of various components, any or all of which may be utilized as appropriate. FIG. 6, therefore, broadly illustrates how individual system elements may be implemented in a relatively separated or relatively more integrated manner.

[0069] The computer system 600 is shown comprising hardware elements that can be electrically coupled via a bus 605 (or may otherwise be in communication, as appropriate). The hardware elements may include one or more processors 610, including without limitation one or more general-purpose processors and/or one or more special-purpose processors (such as digital signal processing chips, graphics acceleration processors, and/or the like); one or more input devices 615, which can include without limitation a mouse, a keyboard, a camera, and/or the like; and one or more output devices 620, which can include without limitation a display device, a printer, and/or the like.

[0070] The computer system 600 may further include (and/or be in communication with) one or more non-transitory storage devices 625, which can comprise, without limitation, local and/or network accessible storage, and/or can include, without limitation, a disk drive, a drive array, an optical storage device, a solid-state storage device, such as a random access memory ("RAM"), and/or a read-only memory ("ROM"), which can be programmable, flash-updateable, and/or the like. Such storage devices may be configured to implement any appropriate data stores, including without limitation, various file systems, database structures, and/or the like.

[0071] The computer system 600 might also include a communications subsystem 630, which can include without limitation a modem, a network card (wireless or wired), an infrared communication device, a wireless communication device, and/or a chipset (such as a Bluetooth™ device, an 802.11 device, a WiFi device, a WiMax device, cellular communication facilities, etc.), and/or the like. The communications subsystem 630 may include one or more input and/or output communication interfaces to permit data to be exchanged with a network (such as the network described below, to name one example), other computer systems, television, and/or any other devices described herein. Depending on the desired functionality and/or other implementation concerns, a portable electronic device (or similar device) may communicate image and/or other information via the communications subsystem 630. In other embodiments, a portable electronic device, e.g. the first electronic device, may be incorporated into the computer system 600, e.g., STB, as an input device 615. In many embodiments, the computer system 600 will further comprise a working memory 635, which can include a RAM or ROM device, as described above.

[0072] The computer system 600 also can comprise software elements, shown as being currently located within the working memory 635, including an operating system 640, device drivers, executable libraries, and/or other code, such as one or more application programs 645, which may comprise computer programs provided by various embodiments, and/or may be designed to implement methods, and/or configure systems, provided by other embodiments, as described herein. Merely by way of example, one or more procedures described with respect to the methods discussed above, such as those described in relation to FIGS. 4 and 5, might be implemented as code and/or instructions executable by a computer (and/or a processor within a computer); in an aspect, then, such code and/or instructions can be used to configure and/or adapt a general purpose computer (or other device) to perform one or more operations in accordance with the described methods.

[0073] A set of these instructions and/or code might be stored on a non-transitory computer-readable storage medium, such as the storage device(s) 625 described above. In some cases, the storage medium might be incorporated within a computer system, such as computer system 600. In other embodiments, the storage medium might be separate from a computer system (e.g., a removable medium, such as a compact disc), and/or provided in an installation package, such that the storage medium can be used to program, configure, and/or adapt a general purpose computer with the instructions/code stored thereon. These instructions might take the form of executable code, which is executable by the computer system 600 and/or might take the form of source and/or installable code, which, upon compilation and/or installation on the computer system 600 (e.g., using any of a variety of generally available compilers, installation programs, compression/decompression utilities, etc.), then takes the form of executable code.

[0074] It will be apparent to those skilled in the art that substantial variations may be made in accordance with specific requirements. For example, customized hardware might also be used, and/or particular elements might be implemented in hardware, software (including portable software, such as applets, etc.), or both. Further, connection to other computing devices such as network input/output devices may be employed.

[0075] As mentioned above, in one aspect, some embodiments may employ a computer system (such as the computer system 600) to perform methods in accordance with various embodiments of the technology. According to a set of embodiments, some or all of the procedures of such methods are performed by the computer system 600 in response to processor 610 executing

one or more sequences of one or more instructions (which might be incorporated into the operating system 640 and/or other code, such as an application program 645) contained in the working memory 635. Such instructions may be read into the working memory 635 from another computer-readable medium, such as one or more of the storage device(s) 625. Merely by way of example, execution of the sequences of instructions contained in the working memory 635 might cause the processor(s) 610 to perform one or more procedures of the methods described herein. Additionally or alternatively, portions of the methods described herein may be executed through specialized hardware.

[0076] The terms “machine-readable medium” and “computer-readable medium,” as used herein, refer to any medium that participates in providing data that causes a machine to operate in a specific fashion. In an embodiment implemented using the computer system 600, various computer-readable media might be involved in providing instructions/code to processor(s) 610 for execution and/or might be used to store and/or carry such instructions/code. In many implementations, a computer-readable medium is a physical and/or tangible storage medium. Such a medium may take the form of a non-volatile media or volatile media. Non-volatile media include, for example, optical and/or magnetic disks, such as the storage device(s) 625. Volatile media include, without limitation, dynamic memory, such as the working memory 635.

[0077] Common forms of physical and/or tangible computer-readable media include, for example, a floppy disk, a flexible disk, hard disk, magnetic tape, or any other magnetic medium, a CD-ROM, any other optical medium, punchcards, papertape, any other physical medium with patterns of holes, a RAM, a PROM, EPROM, a FLASH-EPROM, any other memory chip or cartridge, or any other medium from which a computer can read instructions and/or code.

[0078] Various forms of computer-readable media may be involved in carrying one or more sequences of one or more instructions to the processor(s) 610 for execution. Merely by way of example, the instructions may initially be carried on a magnetic disk and/or optical disc of a remote computer. A remote computer might load the instructions into its dynamic memory and send the instructions as signals over a transmission medium to be received and/or executed by the computer system 600.

[0079] The communications subsystem 630 (and/or components thereof) generally will receive signals, and the bus 605 then might carry the signals (and/or the data, instructions, etc.

carried by the signals) to the working memory 635, from which the processor(s) 610 retrieves and executes the instructions. The instructions received by the working memory 635 may optionally be stored on a non-transitory storage device 825 either before or after execution by the processor(s) 610.

[0080] The methods, systems, and devices discussed above are examples. Various configurations may omit, substitute, or add various procedures or components as appropriate. For instance, in alternative configurations, the methods may be performed in an order different from that described, and/or various stages may be added, omitted, and/or combined. Also, features described with respect to certain configurations may be combined in various other configurations. Different aspects and elements of the configurations may be combined in a similar manner. Also, technology evolves and, thus, many of the elements are examples and do not limit the scope of the disclosure or claims.

[0081] Specific details are given in the description to provide a thorough understanding of exemplary configurations (including implementations). However, configurations may be practiced without these specific details. For example, well-known circuits, processes, algorithms, structures, and techniques have been shown without unnecessary detail in order to avoid obscuring the configurations. This description provides example configurations only, and does not limit the scope, applicability, or configurations of the claims. Rather, the preceding description of the configurations will provide those skilled in the art with an enabling description for implementing described techniques. Various changes may be made in the function and arrangement of elements without departing from the spirit or scope of the disclosure.

[0082] Also, configurations may be described as a process which is depicted as a flow diagram or block diagram. Although each may describe the operations as a sequential process, many of the operations can be performed in parallel or concurrently. In addition, the order of the operations may be rearranged. A process may have additional steps not included in the figure. Furthermore, examples of the methods may be implemented by hardware, software, firmware, middleware, microcode, hardware description languages, or any combination thereof. When implemented in software, firmware, middleware, or microcode, the program code or code segments to perform the necessary tasks may be stored in a non-transitory computer-readable medium such as a storage medium. Processors may perform the described tasks.

[0083] Having described several example configurations, various modifications, alternative constructions, and equivalents may be used without departing from the spirit of the disclosure. For example, the above elements may be components of a larger system, wherein other rules may take precedence over or otherwise modify the application of the technology. Also, a number of steps may be undertaken before, during, or after the above elements are considered. Accordingly, the above description does not bound the scope of the claims.

[0084] As used herein and in the appended claims, the singular forms “a”, “an”, and “the” include plural references unless the context clearly dictates otherwise. Thus, for example, reference to “a switch” includes a plurality of such switches, and reference to “the processor” includes reference to one or more processors and equivalents thereof known to those skilled in the art, and so forth.

[0085] Also, the words “comprise”, “comprising”, “contains”, “containing”, “include”, “including”, and “includes”, when used in this specification and in the following claims, are intended to specify the presence of stated features, integers, components, or steps, but they do not preclude the presence or addition of one or more other features, integers, components, steps, acts, or groups.

WHAT IS CLAIMED IS:

1. An electronic device comprising:
at least one data input component configured to receive video data;
at least one user input component configured to receive one or more user inputs;
at least one output component communicatively coupled with at least one display device,
wherein the at least one output component is configured to transmit the video data to the at least one display device;
one or more processors; and
memory communicatively coupled with and readable by the one or more processors and having stored therein processor-readable instructions, which when executed by the one or more processors cause the one or more processors to:
receive the one or more user inputs, wherein the one or more user inputs include an instruction to visually track one or more items included in the video data,
incorporate a visual marking on each of the one or more items to be visually tracked within the video data to produce modified video data, and
transmit the modified video data to the at least one display device.
2. The electronic device of claim 1, wherein the video data comprises a sports broadcast, and the one or more items to be visually tracked comprises competitors in the sports broadcast.
3. The electronic device of claim 1, wherein the one or more user inputs comprises at least two inputs, and wherein one of the at least two inputs comprises an instruction to visually track one or more items included in the video data, and one of the at least two inputs comprises identification of a type of visual marking to be incorporated.
4. The electronic device of claim 3, wherein the type of visual marking to be incorporated includes at least one marking selected from the group consisting of highlighting one or more portions of the one or more items, colorizing one or more portions of the one or more items, outlining one or more portions of the one or more items, and tagging the one or more items.
5. The electronic device of claim 1, wherein the processor-readable instructions, when executed by the one or more processors, further cause the processors to display a menu on the output device, wherein the menu comprises a list including each item in the video data available for visual tracking.

6. The electronic device of claim 1, wherein the modified video data is transmitted concurrently with the video data such that the display device displays both the video data and the modified video data.

7. A method for tracking items included in video data, the method comprising:
receiving, at an electronic device, video data;
receiving, at the electronic device, one or more user inputs that include an instruction to visually track one or more items included in the video data;
incorporating, at the electronic device, a visual marking on each of the one or more items to be visually tracked within the video data to produce modified video data; and
transmitting the modified video data to a display device.

8. The method of claim 7, wherein the video data comprises a sports broadcast, and the one or more items to be visually tracked comprises competitors in the sports broadcast.

9. The method of claim 7, further comprising transmitting a menu for display on the display device, wherein the menu comprises a list including each item in the video data available for visual tracking.

10. The method of claim 7, wherein the electronic device transmits the received video data, and subsequently receives a first instruction to identify items in the video data available for visual tracking.

11. The method of claim 10, wherein, in response to receiving the first instruction, the electronic device visually identifies on the transmitted video data a first item in the video data available for visual tracking, and allows the user to rotate to the next item available for visual tracking.

12. The method of claim 7, further comprising receiving, at the electronic device, an instruction to visually track at least two items included in the video data simultaneously.

13. The method of claim 12, wherein separate visual markings are incorporated for each of the at least two items to be visually tracked simultaneously.

14. The method of claim 7, wherein the visual marking to be incorporated includes at least one marking selected from the group consisting of highlighting one or more portions of the one or more items, colorizing one or more portions of the one or more items, outlining one or more portions of the one or more items, and tagging the one or more items.

15. The method of claim 14, further comprising receiving, at the electronic device, a user instruction identifying the visual marking to be incorporated.

16. The method of claim 7, further comprising receiving, at the electronic device, a user instruction to transmit the video data or modified video data such that the one or more items to be visually tracked are being displayed at all times.

17. The method of claim 7, wherein the modified video data is transmitted concurrently with the video data such that the display device displays both the video data and the modified video data.

18. A computer readable medium with sets of instructions thereon, which when executed by a processor cause the processor to:

receive one or more user inputs that include an instruction to visually track one or more items included in video data;

incorporate a visual marking on each of the one or more items to be visually tracked within the video data to produce modified video data; and

transmit the modified video data to a display device.

19. The computer-readable medium of claim 18, wherein the processor-readable instructions, when executed by the processor, further cause the processor to transmit a menu for display on the display device, wherein the menu comprises a list including each item in the video data available for visual tracking.

20. The computer-readable medium of claim 18, wherein the processor-readable instructions, when executed by the processor, further cause the processor to transmit the modified video data concurrently with the received video data such that the display device displays both the received video data and the modified video data.

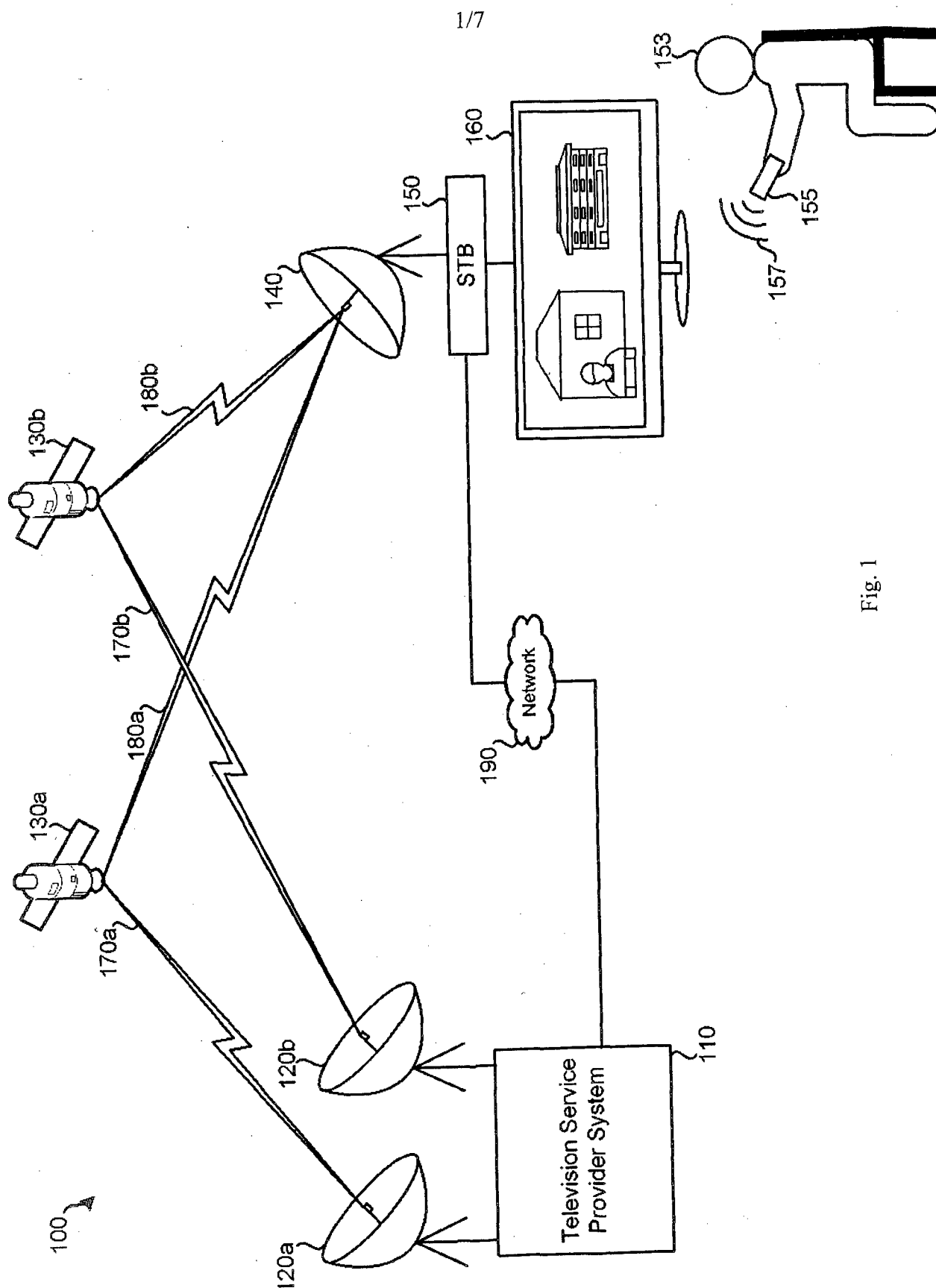


Fig. 1

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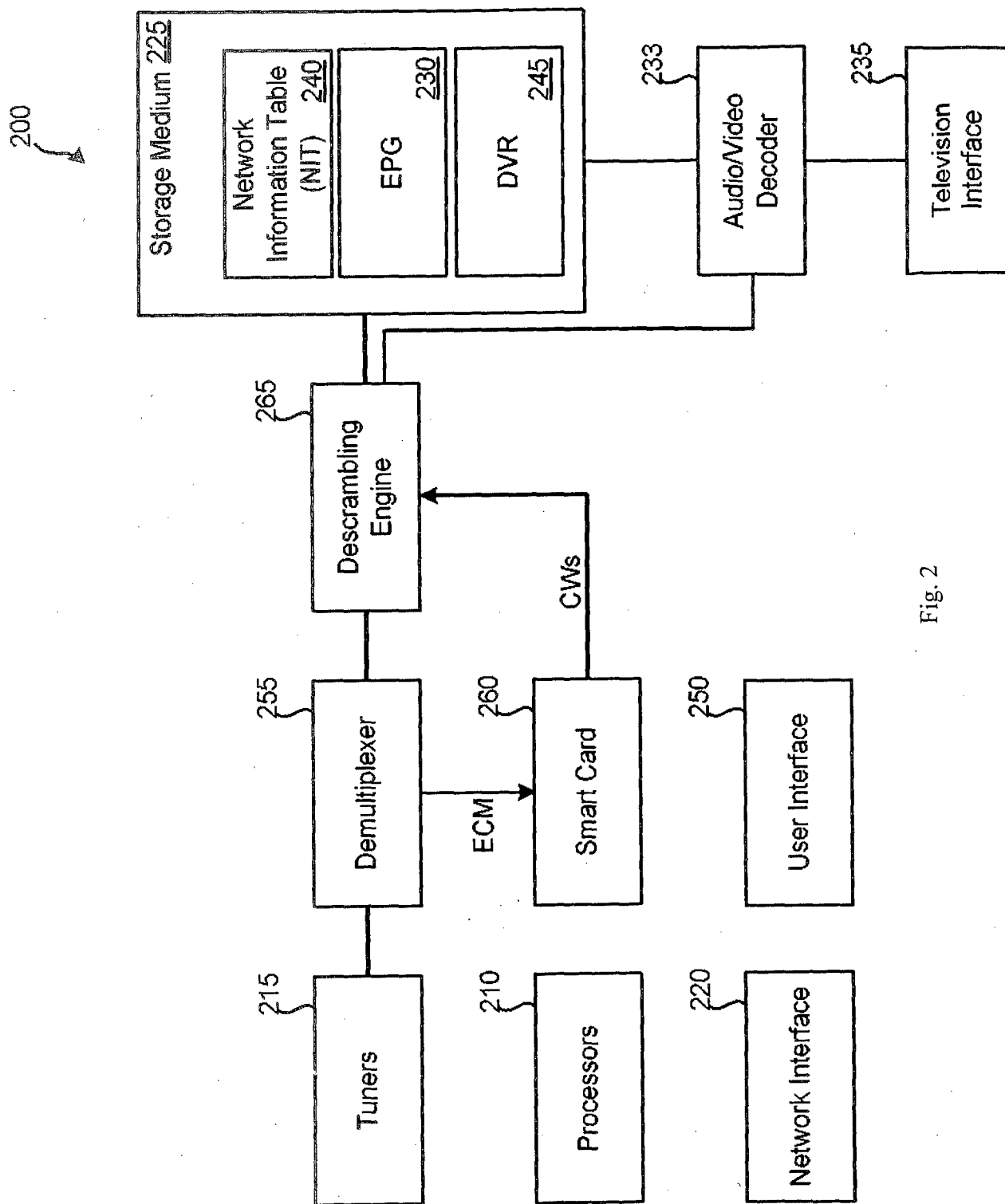


Fig. 2

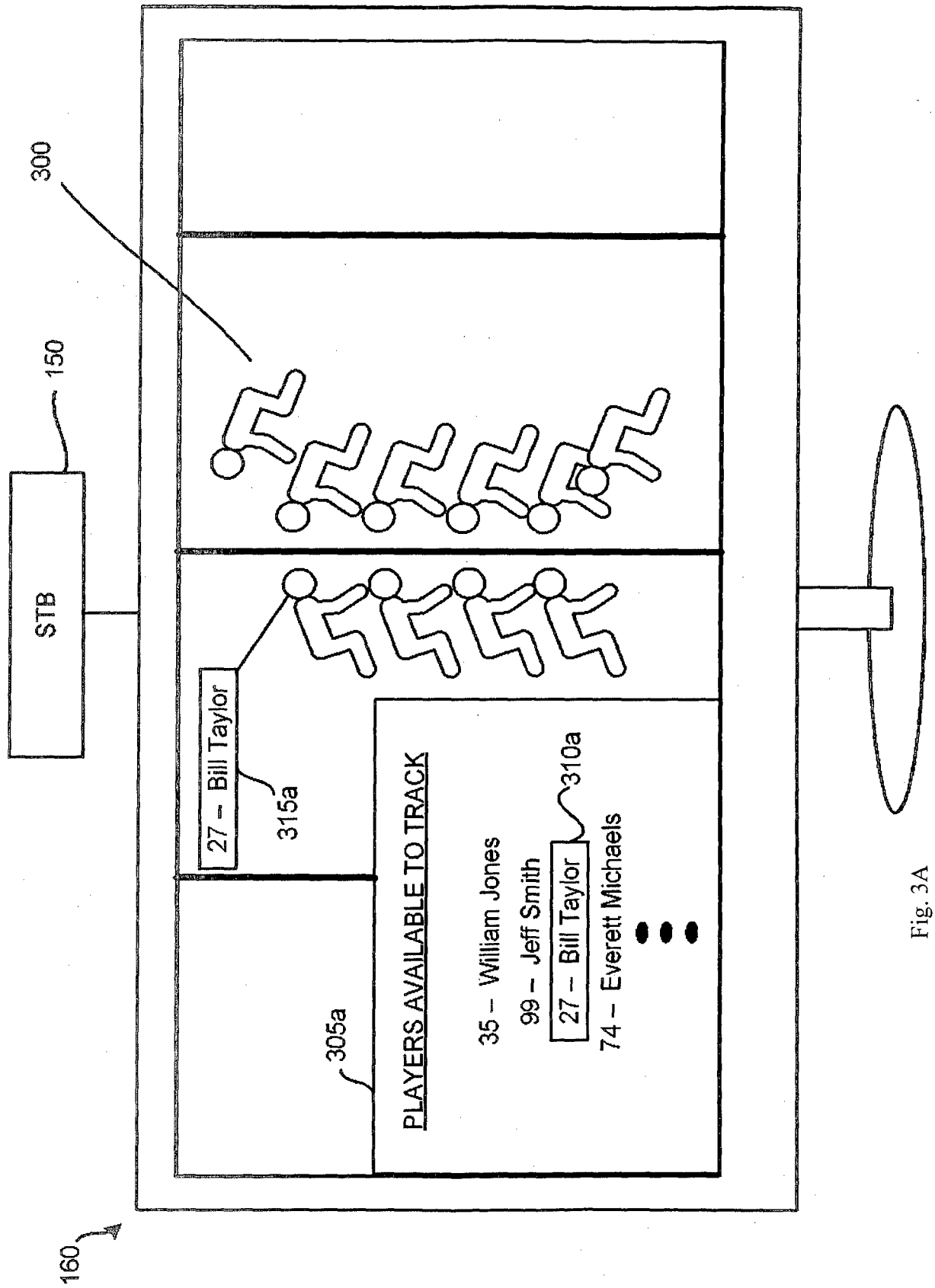


Fig. 3A

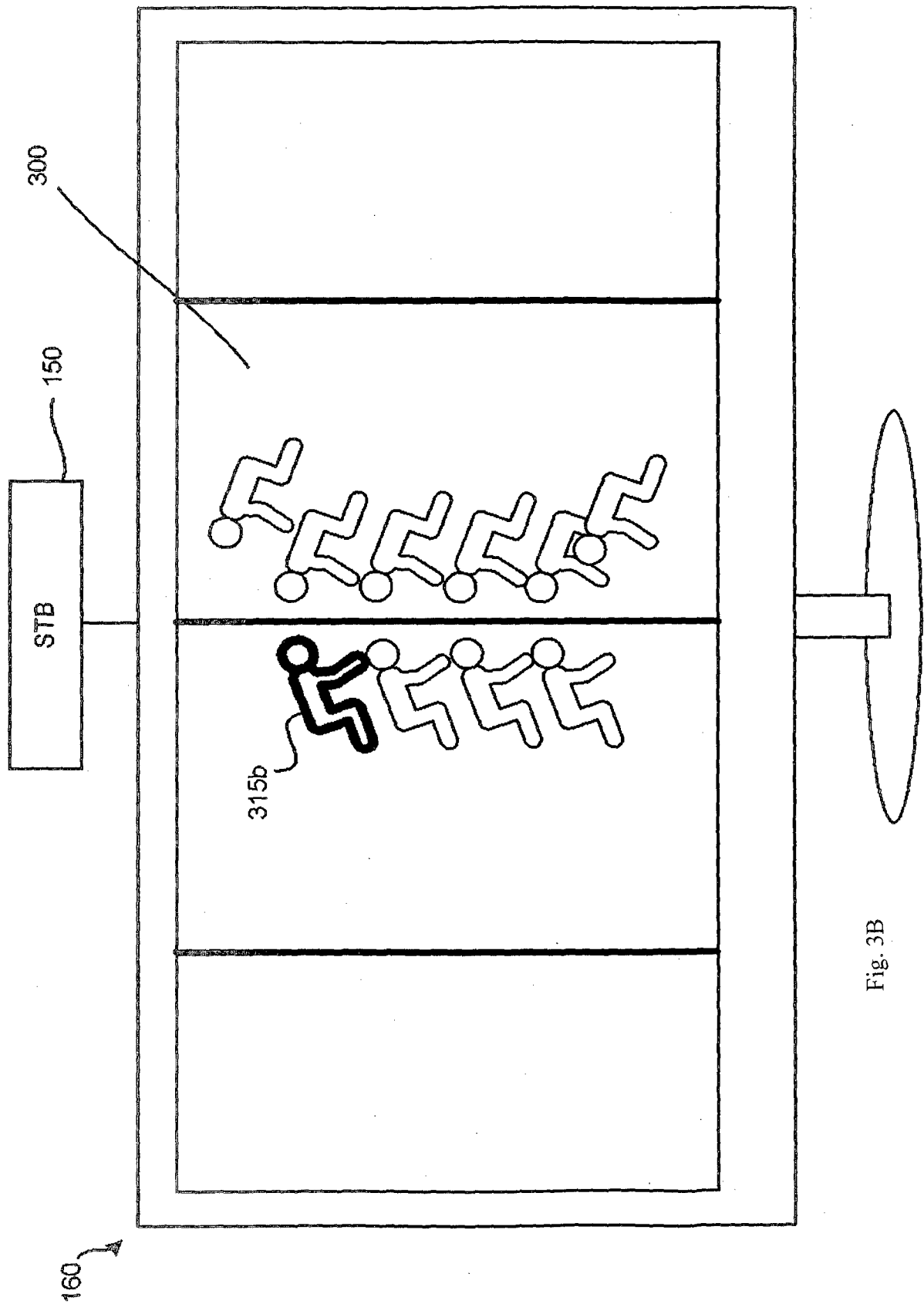


Fig. 3B

400

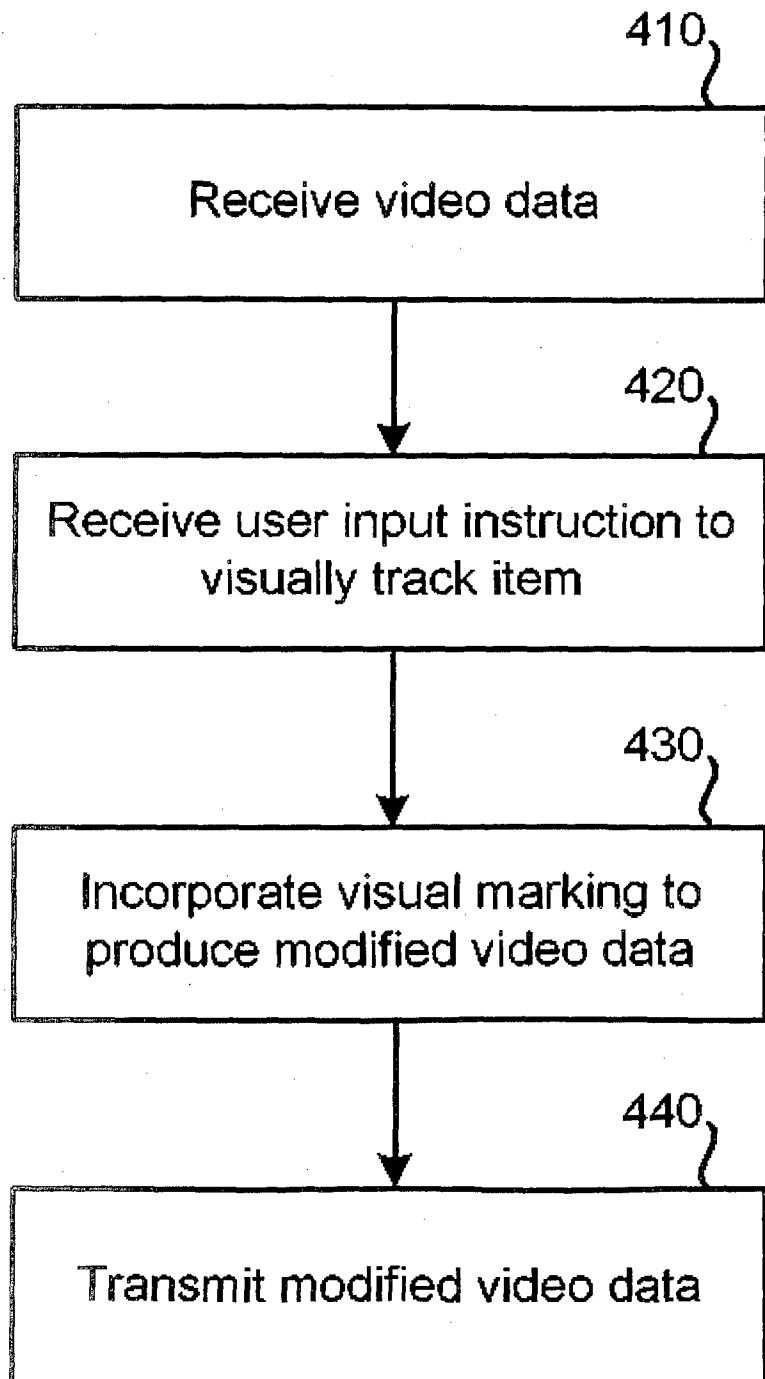


Fig. 4

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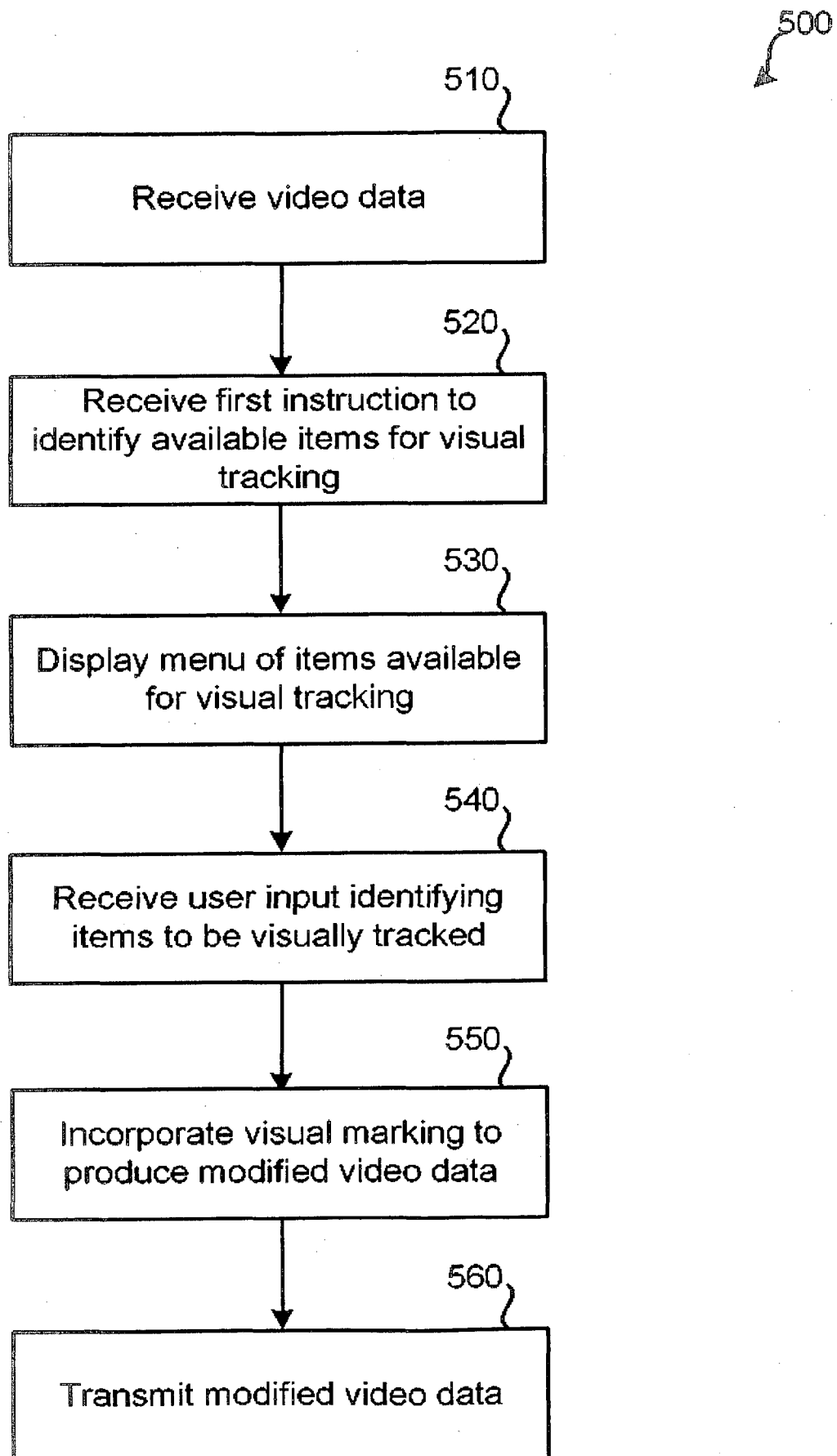


Fig. 5

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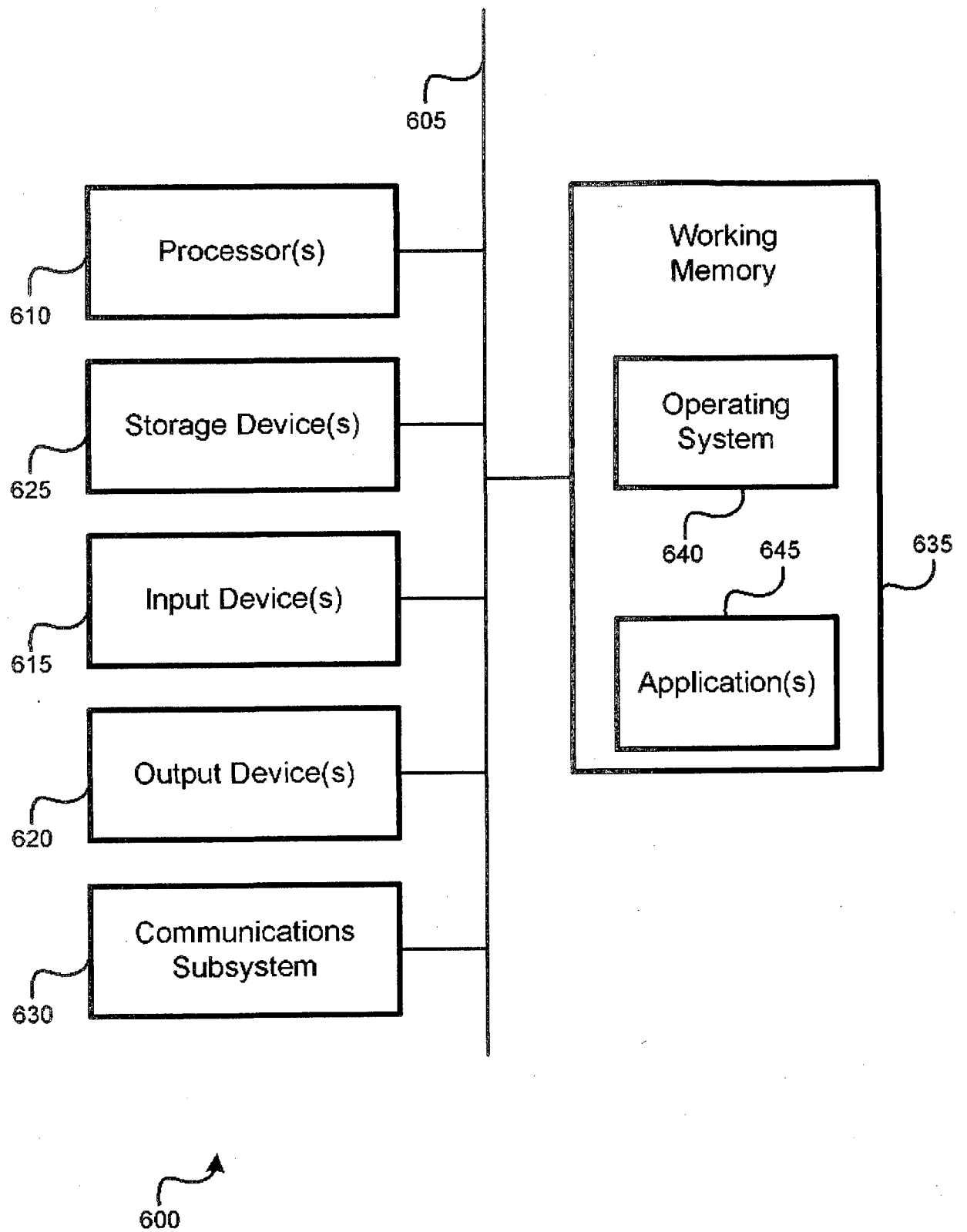


Fig. 6

INTERNATIONAL SEARCH REPORT

International application No
PCT/UA2012/000117

A. CLASSIFICATION OF SUBJECT MATTER

INV. G06T7/20 H04N5/262 H04N5/445 H04N21/4728
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

G06T H04N

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

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

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 95/10915 A1 (ORAD INC [US]) 20 April 1995 (1995-04-20) page 22, line 6 - line 20; figures 2, 3A, 3B -----	1-20
X	US 2010/092155 A1 (INAGAKI TAKEO [JP] ET AL INAGAKI TAKEO [JP]) 15 April 2010 (2010-04-15) paragraph [0120] - paragraph [0122]; figure 9 -----	1-20



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

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"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

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"&" document member of the same patent family

Date of the actual completion of the international search

11 July 2013

Date of mailing of the international search report

25/07/2013

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/UA2012/000117

Patent document cited in search report		Publication date		Patent family member(s)		Publication date
WO 9510915	A1	20-04-1995	AU	7975094 A		04-05-1995
			US	5923365 A		13-07-1999
			WO	9510915 A1		20-04-1995

US 2010092155	A1	15-04-2010	CN	101686352 A		31-03-2010
			JP	4591586 B2		01-12-2010
			JP	2010074775 A		02-04-2010
			US	2010092155 A1		15-04-2010
