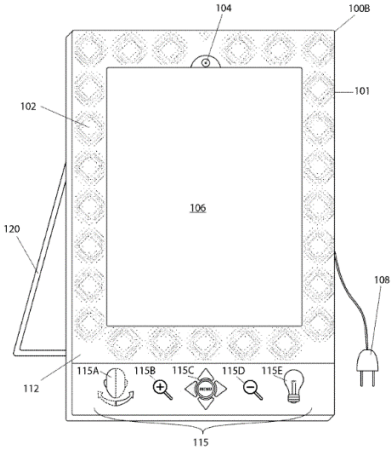
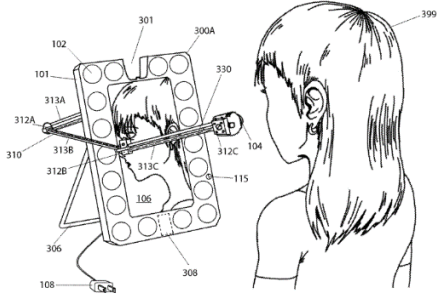
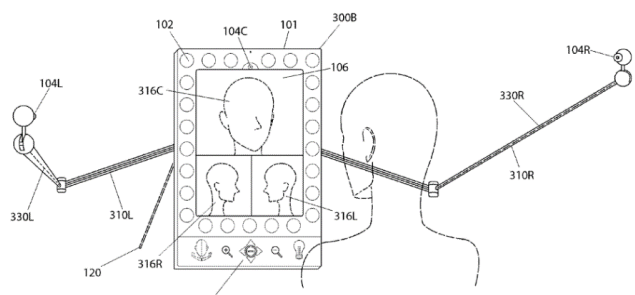


Asserted Claim of the '110 Patent	Exemplary Citations to Rowles
	functions, and power control functions. The menu also allows a user to select and save user preferred settings, such as for lighting, views etc.” See 9:4-9:17.  “The user interface 115 for the portable digital mirror 200A may be a single electro-mechanical button that is responsive to the number of times the button is toggled. For example, depressing the button in rapid succession three times may execute a change in the rotation of the view angle. Alternatively, holding the button down may increase the LED lighting 102 brightness to a peak illumination and then start to decrease the brightness. Once the desired level of brightness is achieved, the user can let go of the button.” See 10:4-12. “Referring now to FIG. 3A, a digital mirror 300A is now illustrated capturing an image of a user 399 that is displayed on the display device 106. The digital mirror 300A is a rechargeable, self standing digital mirror including a pivotal stand 306 and rechargeable batteries 308. The pivotal stand 306 is pivotally coupled to a back side of the enclosure 101 to support the digital mirror on surface.

Asserted Claim of the '110 Patent	Exemplary Citations to Rowles
	The digital mirror 300A further includes a detachable camera 104 that is coupled to the enclosure 101 by an articulating arm 310. The camera 104 is mounted at the distal end of the arm 310. The proximal end of the arm 310 is coupled to the enclosure 101. One or more lights 102 that may be mounted adjacent the camera 104 to provide lighting in front of the digital camera 104 to facilitate the capture of images, such as shown by FIG. 3D. A camera cable 330 may couple the camera 104 to the underlying image processing system (see FIG. 6A) to provide power and control signals and receive pixel data for each image frame captured. Alternatively, wireless transmitter/receivers may be used to send the captured images to the underlying image processing system (see FIG. 6B) mounted in the enclosure 101.” See 10:53-11:6.  Fig. 3A “Referring now to FIG. 3B, a digital mirror 300B is illustrated that includes a plurality of cameras—a left camera 104L, a center camera 140C, and a right camera 104R. The digital mirror 300B is self-supporting including an optional stand 120 and/or means to be wall mounted (e.g. hole 180 or hooks 182A-182B shown in FIG. 1A) so that it can capture images hands-free, without the user having to hold any camera. One or more lights 102 may be mounted adjacent each of the left camera 104L and the right camera 104R, such as shown by FIG. 3D, to provide lighting in front of each and facilitate the capture of images. One or more lights 102 may also be mounted around the display

Asserted Claim of the '110 Patent	Exemplary Citations to Rowles
	device 106 to provide lighting in front of the display device to facilitate the capture of images. The digital mirror 300B includes additional cameras so that the user can concurrently capture and then display images of different views from various fields of view. A digital camera can capture images for display full frame, side-by-side, picture in picture, or in a mosaic on the same display. For example, the left camera 104L may capture a left side view of a user, the center camera 140C may capture a front side view of the user, and the right camera 104R may capture a right side view of the user concurrently. The digital mirror 300B can also concurrently display left side images 316L captured by the left camera 104L, front side images 316C captured by the center camera 140C, and right side images 316R captured by the right camera 104R in a mosaic arrangement on the display device 106, in response to a selection by the user with the user interface 115. The digital mirror 300B can also display these images separately as full frame images on the display device 106, such as shown by FIGS. 1A, 2D, 3A, 4A-4B, and supported by FIGS. 5A-5B and the description thereof, in response to a selection by the user through the user interface 115. The left side images 316L, the front side images 316C, and the right side images 316R displayed in the mosaic arrangement may all be live images continuously captured by the cameras and displayed on the display device 106. Alternatively, one or more of the left side images 316L, the front side images 316C, and the right side images 316R displayed in the mosaic arrangement may be stored images previously captured by the cameras and read out from a storage device. For example, the front side images 316C may be live images while the left side images 316L and the right side images 316R may be stored images read out from the storage device and displayed on the display device. The center camera 104C is mounted to the enclosure 101 adjacent the display device 106 to reduce parallax. The center camera 104C captures a frontal view of the user or alternatively, a back view of the user if the user rotates himself/herself around so his back faces the center camera. For example, the user shown in FIG. 3B facing the camera 104C and the display 106 could turn around so that the back of their head is facing the camera 104C. After capturing and storing a few frames of images of the back of their head, the user can turn back around and select with the user interface 115 to recall the

Asserted Claim of the '110 Patent	Exemplary Citations to Rowles
	captured images of the back of their head for display on the display device 106. Similarly, frames of left and right side images may be captured with the left and right cameras 104L, 104R respectively and stored in a storage device (e.g., see storage device 644 in FIGS. 6A-6B) of the digital mirror. The user can then select through the user interface 115 to recall the captured images of the one more sides of their head for separate or concurrent display on the display device 106 to provide a more complete view of them selves. The left camera 104L and the right camera 104R are respectively mounted to the distal ends of a left articulating arm 310L and a right articulating arm 310R respectively. The proximal ends of the left articulating arm 310L and the right articulating arm 310R are coupled to the left and right of the enclosure 101 respectively. The left camera 104L and the right camera 104R are electrically coupled to the image processing system (See FIGS. 6A-6B) by cables 330 extending through the arms 310L, 310R. The cables 330 may be electrical wire cables or optical fiber cables to couple the cameras 104L, 104R and image processor system electronics together. In an alternate embodiment, the cameras 104L, 104R may be wireless cameras and communicate with a wireless digital mirror base with a wireless communication protocol as described herein.” See 11:44-12:55.  Fig. 3B

Asserted Claim of the '110 Patent	Exemplary Citations to Rowles
	“Referring now to FIG. 4A, in response to true view mode being selected through the view mode selector 115A of the user interface, a true image 406T is displayed by the display device 106 of the digital mirror 100B. A conventional optical mirror does not display the true image 406T if a user stands in front of the optical mirror. The letter B on the necklace in the true image 406T has a proper orientation. FIG. 4B illustrates a mirrored image 406M being displayed in response to the mirror view mode being selected by the user interface view mode selector 115A. A conventional optical mirror may display an image similar to the mirrored image 406M.” <i>See 14:6-17.</i> “Referring now to FIG. 5A, a representation of a single frame of pixel data configured into columns and rows is illustrated. A frame of pixel data is captured by the image capture device 104 and stored in digital format into the memory locations of a frame buffer memory. A frame of data may written into the frame buffer memory and organized as illustrated in FIG. 5A, such as by writing from left to right (pixel P11 to pixel Pm1). In response to user selections (e.g., true view mode or mirror view mode), the pixel data

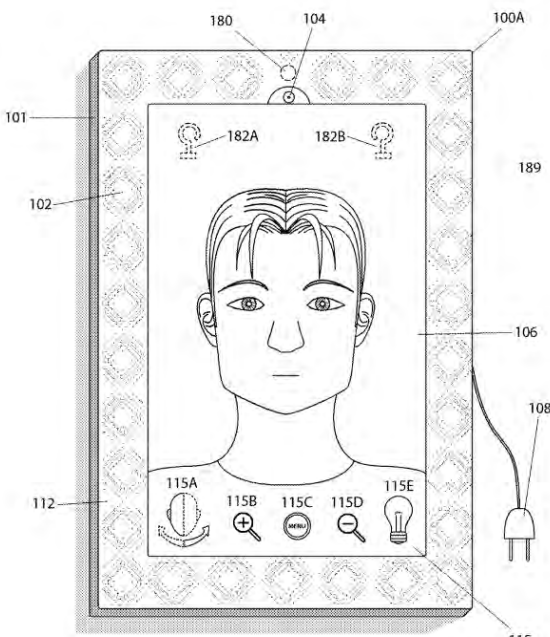
Asserted Claim of the '110 Patent	Exemplary Citations to Rowles
	stored in the frame buffer memory can be readily processed by an image signal processor as desired. In a true view mode, the frame of data may be read out similarly (e.g., from left to right—pixel P11 to pixel Pm1) and displayed on the display device as shown in FIG. 5A. Pixel P11 is displayed in the upper left corner, pixel Pm1 is displayed in the upper right corner, pixel P1n is displayed in the lower left corner, and pixel Pmn is displayed in the lower right corner. In this manner, the pixel data is displayed on the display device of the digital mirror as it was captured by the image capture device. The true view mode displays true images to the user as how third persons see the user, such as shown in FIG. 4A. In a mirror view mode, the frame of pixel data saved into the frame buffer memory is read out differently from how it was written by reversing the addressing of memory locations into the frame buffer memory. The arrangement of the pixel data in the rows and columns is read out of the memory locations in a reverse order (e.g., from right to left—Pm1 to P11) to transpose or horizontally flip the captured image into a horizontally mirrored image. FIG. 5B illustrates how the mirrored image is displayed on the display device 106 of the digital mirror in response to the mirror view mode. For example, pixel Pm1 is now displayed in the upper left corner of the display device, pixel P11 is displayed in the upper right corner of the display device, pixel Pmn is displayed in the lower left corner, and pixel P1n is displayed in the lower right corner. The mirror view mode displays mirror images on the display device to the user, such as shown in FIG. 4B, similar to how an optical mirror does.” See 14:18-56. “The camera module 104, also referred to as an image capture device, may include a lens system, an image sensor, and an optional external Image Signal Processor (ISP). The camera preferably has a high depth of field from any combination of decreased sensor size, decreased aperture size, and/or an Extended Depth of Field technology within the

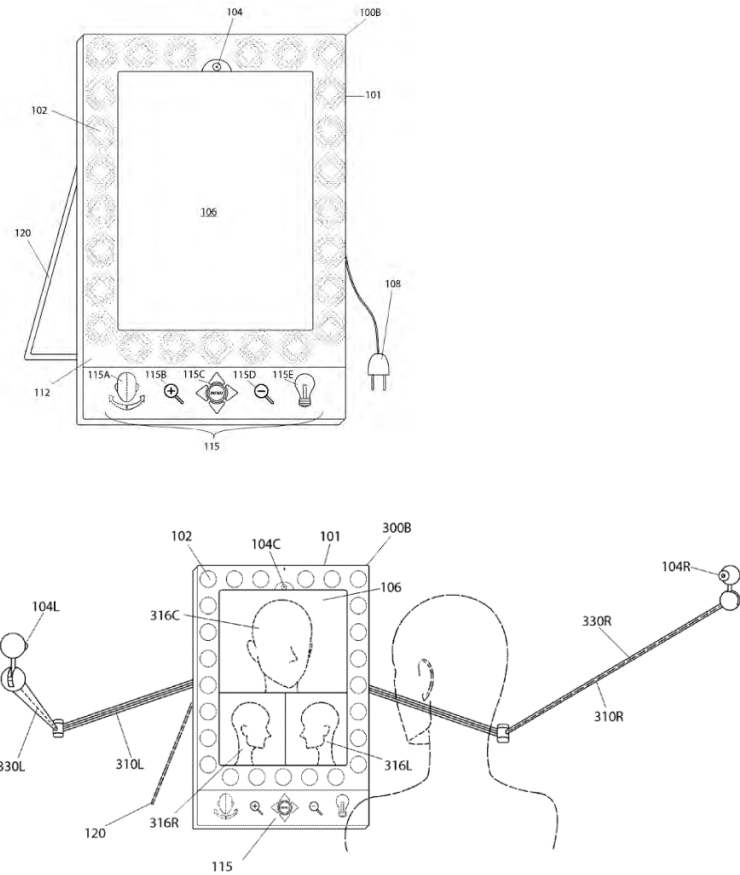
Asserted Claim of the '110 Patent	Exemplary Citations to Rowles
	sensor and image processing system. The image processing may be handled internally on a System-On-Chip (SOC) or on an external ISP.” <i>See</i> 16:24-38. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Rowles alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants’ Invalidity Contentions and Defendants’ other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

Asserted Claim of the '110 Patent	Exemplary Citations to Rowles
Claim 6	
6. The method of claim 5, wherein the processor varies the image magnitude or field-of-view mapping to display a partial or full body of the user in the modified images.	Rowles expressly and/or inherently discloses and/or renders obvious wherein the processor varies the image magnitude or field-of-view mapping to display a partial or full body of the user in the modified images. <i>See, e.g.</i>, disclosures below. “There are a number of different applications for a digital mirror. For example a wall mount digital mirror may be formed of different sizes depending on the user's discretion and interior design preferences. A large digital mirror may be desired for a user to view multiple views. A smaller digital mirror may be desired for smaller spaces and may offer a single view at a time for a quick view or reassurance. The enclosure may also be integral in how the digital mirror may be configured to be compatible with the user's environment. The ability for a digital mirror to either be a focal point for the user's environment or an accessory to the user's environment may determine the style of the enclosure and thus the display size, lighting, number and size of camera as well as the resolution and focus of the camera sensor.” <i>See</i> 3:47-60. “Each camera may have its own lighting sources within its enclosure. Each camera may also provide a light sensor capability to sense the ambient light, the reflected light, and

Asserted Claim of the '110 Patent	Exemplary Citations to Rowles
	auto focus the camera's lenses, if any, in order to produce the user's desired displayed views." See 5:2-6. "The digital mirror includes an image processor that allows the manipulation of captured images for display on the display device. The digital mirror may include a digital zoom to zoom in and zoom out of the captured image. The image processor can further adjust the image displayed by compensating for poor lighting, modifying the image displayed so that a user can make themselves look better or more realistic, or perform any number of digital modifications that are possible in the digital imaging field with an image processor." See 6:7-15. "A digital camera, also referred to as an image capture device, may provide enhanced optics to capture images otherwise not seen by unaided eyes. The image capture device may include an optical lens or a combination of optical lenses with various properties such as: a telephoto lens for a closer view, a wide angle lens to allow a wider view, or an optical zoom lens to provide both. Utilizing a telephoto lens, an optical zoom view is possible without users having to readjust their face closer to the digital mirror. The optical zoom lens may optically zoom in and out on the user to select a frame of for captured images for display on the display device of the digital mirror. A wide-angle lens provides a wide view that can be displayed without the user moving away from the device. The camera may include an auto-focus system to provide sharpness and or resolution, regardless of where the user is positioned relative to the device. The digital mirror is not limited to displaying only one full frame perspective view. Multiple cameras of a digital mirror can concurrently capture more than one perspective view of the user for display on a display device. The additional captured views can provide a more complete view of the user and or their surroundings. Alternatively, additional captured views may be used to provide a side-by-side perspective comparison. The digital camera can capture images for display full frame, side-by-side, picture in picture, or in a mosaic on the same display or on separate displays. With an optical

Asserted Claim of the '110 Patent	Exemplary Citations to Rowles
	mirror, the user previously had to move the mirror or position their own body in order to see a desired viewing angle. With multiple cameras, a user can capture different perspective views all at once.” <i>See</i> 6:33-63. “The image capture device 104 may be an OMNIVISION™ OV3642 three megapixel CAMERACHIP™ sensor with a fixed focal length lens in one embodiment of the invention, for example. In this case, a digital zoom may be used to zoom in and/or zoom out on a portion of an image. Alternatively, a camera module with an optical zoom may be used that mechanically moves lenses in a linear manner back and forth, such as commonly found in point and shoot digital cameras, or a camera module with a more compact zoom may be used such as shown and described in U.S. Patent Application Publication 2006/0216018 filed by Jen Tsorng Chang on Mar. 20, 2006, incorporated herein by reference, for example.” <i>See</i> 7:20-31. “The digital mirror 100A further includes a touchscreen user interface (UI) 115 mounted over the display device 106. The touchscreen UI 115 provides the user the ability to select the preferred image from a user interface menu. The touchscreen UI 115 may use capacitive sensing, surface acoustic wave (SAW), or resistive touchscreen technology. The user interface 115 may include a view mode button 115A, a zoom in button 115B to magnify a portion of the image, a menu selector button 115C, a zoom out button 115D to demagnify a portion of the image, and a light source dimmer/brightness button 115E to manually adjust the light intensity. The view mode button 115A allows a user to select between a true view mode or a mirror view mode and the display of images as either true images or mirrored images, respectively. The menu selector button 115C initiates a menu to be displayed on the display device 106 from which a user can select different control functions, such as camera control functions, display control functions, lighting control functions, and power control functions. A user may pan the image through the touch screen user interface as well. A power on/off switch/button may be included as part of the interface. Alternatively, a sensor may be used to automatically power on and off the digital mirror. While the user interface 115 may be a touchscreen UI as described, other types of user interfaces may be used with a digital mirror such as a gesture recognition user interface, a voice recognition user interface (e.g., microphone, voice

Asserted Claim of the '110 Patent	Exemplary Citations to Rowles
	recognizer/decoder, speaker to question/acknowledge), an electro-mechanical user interface (e.g., buttons, switches, etc.), or a graphical user interface with a pointer, such as a mouse or stylus.” See 8:14-8:43.  Fig. 1A “The user interface 115 provides the user the ability to select a desired view. The user interface 115 may be an electromechanical user interface and include a view mode button 115A, a zoom in button 115B, a menu selector button 115C, a zoom out button 115D, and a light source dimmer/brightness button 115E. The view mode button 115A selects between true view mode and mirror view mode to display images as a true image or a mirror image respectively. The menu selector button 115C initiates a menu to be displayed on the display device 106 from which a user can select different control

Asserted Claim of the '110 Patent	Exemplary Citations to Rowles
	functions, such as camera control functions, display control functions, lighting control functions, and power control functions. The menu also allows a user to select and save user preferred settings, such as for lighting, views etc.” See 9:4-9:17.  Fig. 3B

Asserted Claim of the '110 Patent	Exemplary Citations to Rowles
	This limitation would have been obvious to a person of ordinary skill in the art based on (1) Rowles alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

Asserted Claim of the '110 Patent	Exemplary Citations to Rowles
Claim 10	
10. The method of claim 1, further comprising operating the processor to augment the modified images by overlaying virtual objects on a user's image appearing within the modified images.	Rowles expressly and/or inherently discloses and/or renders obvious operating the processor to augment the modified images by overlaying virtual objects on a user's image appearing within the modified images. <i>See, e.g.</i>, disclosures below. “The digital mirror also provides the ability to view a true non-transposed image of a user. Typical optical mirrors provide a transposed or mirrored image to the viewer such that the left side of an object/user is transposed to the right side of the image and the right side of an object/user is transposed to the left side of the image. A digital mirror can display either view depending on the user's selection through a GUI or an electromechanical user interface. Digital images can also be enhanced through software to change the user's appearance, such as remove wrinkles or age spots or any other variety of commonly undesired user appearance features. Digital imaging software may also manipulate the user's image to add features to the user's image.” <i>See</i> 4:47-54. “In FIG. 1A, the camera 104 can be located just above the display device 106 near a notched out area of the selective lighting 102 and light diffuser 112. To minimize parallax and ensure the user can obtain the desired angle of view, the camera 104 is mounted as close as possible to the display device or under/over the display device. For example, the camera 104 may be centered within the display device 106 in order to minimize parallax. The camera 104 may also be mounted over display device 106, such as shown in FIGS. 3E-3F for example. Alternatively, the camera 104 may be mounted

Asserted Claim of the '110 Patent	Exemplary Citations to Rowles
	under the display device, such as shown in FIG. 3G for example. Digital imaging software may be used to compensate for the pixels in the display device 106 that are covered or interrupted by the camera. The number of pixels covered by the camera may be determined from the size of the camera and depth of field required for the digital mirror 100A. The digital mirror 100A further includes a touchscreen user interface (UI) 115 mounted over the display device 106. The touchscreen UI 115 provides the user the ability to select the preferred image from a user interface menu. The touchscreen UI 115 may use capacitive sensing, surface acoustic wave (SAW), or resistive touchscreen technology. The user interface 115 may include a view mode button 115A, a zoom in button 115B to magnify a portion of the image, a menu selector button 115C, a zoom out button 115D to demagnify a portion of the image, and a light source dimmer/brightness button 115E to manually adjust the light intensity. The view mode button 115A allows a user to select between a true view mode or a mirror view mode and the display of images as either true images or mirrored images, respectively. The menu selector button 115C initiates a menu to be displayed on the display device 106 from which a user can select different control functions, such as camera control functions, display control functions, lighting control functions, and power control functions. A user may pan the image through the touch screen user interface as well. A power on/off switch/button may be included as part of the interface. Alternatively, a sensor may be used to automatically power on and off the digital mirror. While the user interface 115 may be a touchscreen UI as described, other types of user interfaces may be used with a digital mirror such as a gesture recognition user interface, a voice recognition user interface (e.g., microphone, voice recognizer/decoder, speaker to question/acknowledge), an electro-mechanical user interface (e.g., buttons, switches, etc.), or a graphical user interface with a pointer, such as a mouse or stylus.” <i>See</i> 7:65-8:43.

Asserted Claim of the '110 Patent	Exemplary Citations to Rowles
	Fig. 1A This limitation would have been obvious to a person of ordinary skill in the art based on (1) Rowles alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

Asserted Claim of the '110 Patent	Exemplary Citations to Rowles
Claim 11	
11. The method of claim 1, further comprising operating the processor to transmit the modified image over a network.	Rowles expressly and/or inherently discloses and/or renders obvious operating the processor to transmit the modified image over a network. <i>See, e.g.</i>, disclosures below. A wireless interface allows a user to store pictures and or movies on a remote computer system and transmit them to the digital mirror in the form of a stream file. The digital

Asserted Claim of the '110 Patent	Exemplary Citations to Rowles
	mirror may also send pictures back to the remote computer system for archival and or further editing or manipulation.” See 5:19-23. “The wireless digital mirror base 321 may communicate wirelessly with a remote computer system to upload captured images through a similar wireless protocol. Pictures and/or video may be transmitted to/or received from the remote computer system by the wireless digital mirror base 321. The wireless digital mirror base 321 may then be used as a picture frame so that pictures and or video may be displayed at the users discretion. The digital mirror may serve a dual purpose; one for viewing oneself, one of a digital picture frame, and one for saved pictures.” See 13:1-10. “Referring now to FIG. 6B, a second block diagram of an image processing and control system 600B for digital mirrors is shown. The image processing and control system 600B is similar to the image processing and control system 600A illustrated in FIG. 6A but includes a communication link 650 (e.g., wireless router) for a digital mirror base unit to communicate with a detachable camera 304 and/or a remote computer system 670. The description of the common numbered blocks that were described previously are incorporated here by reference.” See 16:48-57. “Alternatively, the primary CPU 612 may connect to a remote computer system 670 to store data at its location. In one embodiment, a digital mirror base may communication wirelessly with the remote computer system or the detachable camera through a transmitter/receiver 630. The remoter computer system 670 includes a transmitter/receiver module 671 to communicate with the digital mirror base or other mobile devices. The remote computer system 670 includes one or more storage devices 675 to provide a significantly larger data capacity to store data. The primary CPU 612 may send data to the remote computer system for storage in its storage devices 675 over a wireless communication link established by the pairs of transmitter/ receivers 630,671. The remote computer system 670 may send/receive instructions and or data from the primary CPU 612 to facilitate the data transfer. Alternatively, the primary CPU 612 may send

Asserted Claim of the '110 Patent	Exemplary Citations to Rowles
	data to the remote computer system 670 by a wire cable, such as a Universal Serial Bus (USB) cable coupled between USB transmitter/receivers using a USB communication protocol.” See 16:66-17:19. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Rowles alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants’ Invalidity Contentions and Defendants’ other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

Asserted Claim of the '110 Patent	Exemplary Citations to Rowles
Claim 12	
12. The method of claim 1, further comprising displaying the modified image on a remote screen for video telepresence.	Rowles expressly and/or inherently discloses and/or renders obvious displaying the modified image on a remote screen for video telepresence. <i>See, e.g.</i>, disclosures below. A wireless interface allows a user to store pictures and or movies on a remote computer system and transmit them to the digital mirror in the form of a stream file. The digital mirror may also send pictures back to the remote computer system for archival and or further editing or manipulation.” See 5:19-23. “The wireless digital mirror base 321 may communicate wirelessly with a remote computer system to upload captured images through a similar wireless protocol. Pictures and/or video may be transmitted to/or received from the remote computer system by the wireless digital mirror base 321. The wireless digital mirror base 321 may then be used as a picture frame so that pictures and or video may be displayed at the users discretion. The digital mirror may serve a dual purpose; one for viewing oneself, one of a digital picture frame, and one for saved pictures.” See 13:1-10.

Asserted Claim of the '110 Patent	Exemplary Citations to Rowles
	“Referring now to FIG. 6B, a second block diagram of an image processing and control system 600B for digital mirrors is shown. The image processing and control system 600B is similar to the image processing and control system 600A illustrated in FIG. 6A but includes a communication link 650 (e.g., wireless router) for a digital mirror base unit to communicate with a detachable camera 304 and/or a remote computer system 670. The description of the common numbered blocks that were described previously are incorporated here by reference.” <i>See</i> 16:48-57. “Alternatively, the primary CPU 612 may connect to a remote computer system 670 to store data at its location. In one embodiment, a digital mirror base may communicate wirelessly with the remote computer system or the detachable camera through a transmitter/receiver 630. The remote computer system 670 includes a transmitter/receiver module 671 to communicate with the digital mirror base or other mobile devices. The remote computer system 670 includes one or more storage devices 675 to provide a significantly larger data capacity to store data. The primary CPU 612 may send data to the remote computer system for storage in its storage devices 675 over a wireless communication link established by the pairs of transmitter/ receivers 630,671. The remote computer system 670 may send/receive instructions and or data from the primary CPU 612 to facilitate the data transfer. Alternatively, the primary CPU 612 may send data to the remote computer system 670 by a wire cable, such as a Universal Serial Bus (USB) cable coupled between USB transmitter/receivers using a USB communication protocol.” <i>See</i> 16:66-17:19. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Rowles alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants’ Invalidity Contentions and Defendants’ other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

Asserted Claim of the '110 Patent	Exemplary Citations to Rowles
Claim 16	
16. The method of claim 1, wherein the processor operates on the images from the camera to generate background segmentation, and replaces segments on the images by replacement segments.	Rowles expressly and/or inherently discloses and/or renders obvious wherein the processor operates on the images from the camera to generate background segmentation, and replaces segments on the images by replacement segments. <i>See, e.g.</i>, disclosures below. “The digital camera 104 can also be mounted under the display device 106 to reduce parallax. Provisional Patent Application No. 61/338,106 filed on Feb. 16, 2010 by John W. Rowles, et al., entitled TECHNIQUES FOR IMAGE CAPTURE THROUGH LIQUID CRYSTAL DISPLAYS, describes how to mount a camera under a liquid crystal display (LCD) device and capture images. The digital camera may be mounted between an LCD pixel panel and a backlighting panel. Alternatively, the camera may replace a few pixels and be interspersed between pixels of the LCD pixel panel. In another embodiment of the invention, the digital camera 104 can also be mounted under an organic light emitting diode (OLED) display device 106 to reduce parallax. Alternatively, the digital camera 104 may replace a few pixels and be interspersed between pixels of the organic light emitting diodes.” <i>See</i> 13:43-58. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Rowles alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants’ Invalidity Contentions and Defendants’ other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

Asserted Claim of the '110 Patent	Exemplary Citations to Rowles
Claim 17	
17. The method of claim 16, wherein the replacement segments comprise virtual	Rowles expressly and/or inherently discloses and/or renders obvious wherein the replacement segments comprise virtual background or background that was captured in

Asserted Claim of the '110 Patent	Exemplary Citations to Rowles
background or background that was captured in a different setting.	a different setting. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Rowles alone; (2) knowledge of a personal of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

**Exhibit B-24: Invalidity of U.S. Patent No. 8,982,110 in view of
U.S. Patent Pub. No. 2010/0226531 (“Goto”)**

This chart is subject to all reservations, objections, and disclaimers in Defendants’ Invalidity Contentions and any amendment, supplement, or modification thereof, which are incorporated herein by reference in their entirety.

Goto was originally filed January 15, 2007 and published on September 9, 2010, and thus is available as prior art to U.S. Patent No. 8,982,110 (the “’110 Patent”) under at least 35 U.S.C. §§ 102(a), (b), and (e).

Goto anticipates the Asserted Claims of the ’110 Patent. To the extent it is found Goto does not expressly disclose certain limitations in the asserted claim, such limitations are at least implicitly or inherently disclosed. Moreover, to the extent it is found that Goto does not anticipate the Asserted Claims, Goto renders obvious the Asserted Claims, either alone or in combination with other prior art identified in the cover pleading or herein, and/or in combination with the general knowledge of a person having ordinary skill in the art.

In these contentions, Defendants have relied in part on Plaintiff’s Infringement Contentions. In those contentions, Plaintiff appears to pursue overly broad claim constructions in an effort to assert infringement where none exists, and to accuse products that do not infringe the claims. Defendants’ assertion that a particular limitation is disclosed by a prior art reference and/or is disclosed in a particular manner may be based in part on Plaintiff’s apparent claim interpretations. In relying on Plaintiff’s apparent claim interpretations, Defendants do not admit that Plaintiff’s apparent claim interpretations are supportable or proper or that the claim limitations in question are definite or otherwise amenable to construction.

Defendants have endeavored to provide as much detail as possible in these contentions and, in doing so, have exceeded the level of detail required. The inclusion of specific details in some areas is not a concession that such details are required or that the omission of similar details in other areas is a defect. These citations to portions of any reference in this chart are exemplary only. Defendants will rely on the entirety of the references cited in this chart to show that the Asserted Claims are invalid.

Asserted Claim of the '110 Patent	Exemplary Citations to Goto
Claim 1	
1[pre]. A computerized method for operating a display system, the display system having a camera, a monitor, and a processor, the method comprising:	To the extent the preamble is limiting, Goto expressly and/or inherently discloses and/or renders obvious this limitation. <i>See, e.g.</i>, disclosures below. “According to the present invention, in order to solve the above-described problems, a makeup simulation system applying makeup to a video having an image of the face of a user captured thereon is characterized by image capturing means for capturing the image of the face of the user and outputting the video, control means for receiving the video output from the image capturing means, performing image processing on the video, and outputting the video; and display means for displaying the video output from the control means, wherein the control means includes face recognition means for recognizing the face of the user from the video based on predetermined tracking points; and makeup processing means for applying a predetermined makeup on the face of the user included in the video based on the tracking points and outputting the video to the display means.” <i>See Goto at para. [0007].</i> “The camera 2 captures an image of a user standing in front of the makeup simulator 1 and outputs a video.” <i>See Goto at para. [0085].</i> “The makeup simulator 1 of FIG. 1 and FIG.2, which is based on a mirror, an item indispensable for makeup, as a concept, has the function of interacting with a user. That is, the makeup simulator 1 has the characteristic of giving a user a natural feeling as if the user were putting on makeup, looking at a mirror.” <i>See Goto at para. [0088].</i> “The makeup simulator 1 performs image processing on a video output from the camera 2 in the control part 8, thereby applying makeup on a user's face included in the image, and displays the video on the monitor 7, which is a digital mirror. The makeup simulator 1 is capable of displaying various merchandise and cosmetic information items and the imaginary image of a user's face with makeup applied on it on the monitor 7.” <i>See Goto at para. [0104].</i>

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	“Proceeding to step S3, the control part 8 starts a makeup simulation based on the Software activated in step S2. At this point, the control part 8 displays the screen image 102 on the monitor 7 and displays the screen image 202 on the operations panel 4. The screen image 102 shows the case of displaying the video of the user's face captured with the camera 2 with a magic mirror-like effect on it. The screen image 202 shows the case of displaying a WELCOME message that moves laterally the same as the screen image 201.” <i>See</i> Goto at [0129]. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Goto alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants’ Invalidity Contentions and Defendants’ other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document
1[a]. operating the camera to generate a stream of images of the user;	Goto expressly and/or inherently discloses and/or renders obvious operating the camera to generate a stream of images of the user. <i>See, e.g.</i>, disclosures below. “According to the present invention, in order to solve the above-described problems, a makeup simulation system applying makeup to a video having an image of the face of a user captured thereon is characterized by image capturing means for capturing the image of the face of the user and outputting the video, control means for receiving the video output from the image capturing means, performing image processing on the video, and outputting the video; and display means for displaying the video output from the control means, wherein the control means includes face recognition means for recognizing the face of the user from the video based on predetermined tracking points; and makeup processing means for applying a predetermined makeup on the face of the user included in the video based on the tracking points and outputting the video to the display means.” <i>See</i> Goto at para. [0007].

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	“The camera 2 captures an image of a user standing in front of the makeup simulator 1 and outputs a video.” <i>See</i> Goto at para. [0085]. “The makeup simulator 1 of FIG. 1 and FIG.2, which is based on a mirror, an item indispensable for makeup, as a concept, has the function of interacting with a user. That is, the makeup simulator 1 has the characteristic of giving a user a natural feeling as if the user were putting on makeup, looking at a mirror.” <i>See</i> Goto at para. [0088]. “The makeup simulator 1 performs image processing on a video output from the camera 2 in the control part 8, thereby applying makeup on a user's face included in the image, and displays the video on the monitor 7, which is a digital mirror. The makeup simulator 1 is capable of displaying various merchandise and cosmetic information items and the imaginary image of a user's face with makeup applied on it on the monitor 7.” <i>See</i> Goto at para. [0104]. “Proceeding to step S3, the control part 8 starts a makeup simulation based on the Software activated in step S2. At this point, the control part 8 displays the screen image 102 on the monitor 7 and displays the screen image 202 on the operations panel 4. The screen image 102 shows the case of displaying the video of the user's face captured with the camera 2 with a magic mirror-like effect on it. The screen image 202 shows the case of displaying a WELCOME message that moves laterally the same as the screen image 201.” <i>See</i> Goto at [0129]. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Goto alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

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1[b]. operating the processor to detect the presence of the user in the stream of image;	Goto expressly and/or inherently discloses and/or renders obvious operating the processor to detect the presence of the user in the stream of image. <i>See, e.g.</i>, disclosures below. “Proceeding to step S1, the control part is continuously determining whether a user's face is included in the received video. The control part 8 repeatedly performs the processing of step S1 (NO in S1) until it recognizes that a user's face is included in the video. If the control part 8 recognizes that a user's face is included in the video (YES in S1), it proceeds to step S2 to activate software containing a makeup simulation program for performing a makeup simulation. At this point, the control part 8 displays the screen image 101 on the monitor 7, and displays the screen image 201 on the operations panel 4. The screen image 101 shows the case of displaying the video of the user's face captured with the camera 2. The screen image 201 shows the case of displaying a WELCOME message that moves laterally.” <i>See</i> Goto at paras. [0126]-[0128]. “A screen image 300 shows the case of displaying the video of a user's face captured with the camera 2. The makeup simulator 1 recognizes the user's face included in the video, and cuts out a still image 301 of the user's face.” <i>See</i> Goto at para. [0141]. “The simulator main application 28 obtains a pre-makeup image by trimming the original image. Further, the simulator main application 28 obtains an image for face recognition by reducing the original image. A face recognition part 33 obtains tracking points 34 for recognizing a user's face as described below from the image for face recognition by FFT (fast Fourier transform).” <i>See</i> Goto at para. [0151]. “FIG. 16 is a screen image diagram showing processing performed by the simulator main application. A screen image 400 shows the case of displaying a pre-makeup image. The screen image 401 shows the case of displaying the tracking points 34 obtained from the image for face recognition over the pre makeup image. Further, the screen image 402

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	shows the case of displaying a post-makeup image where a makeup is applied on the user's face included in the pre-makeup image based on the tracking points 34.” <i>See</i> Goto at para. [0159]. “The shadow processing part 38 included in the simulator main application 28 performs shadow processing, referring to the tracking points 34, three on the eye and one on the eyebrow, for each of the right side and the left side as shown in FIG. 28. FIG. 28 is an image diagram showing the tracking points referred to by the shadow processing.” <i>See</i> Goto at para. [0179]. “Proceeding to the basic outline generation of step S31, the shadow processing part 38 obtains the shape of an eye of the user's face like a partial image 900 from the image for face recognition. FIG. 30 is an image diagram showing the basic outline generation. The shadow processing part 38 searches upward and downward from the center of the eye and recognizes two points of the outline of the eye (upper-side boundary and lower-side boundary) as shown in a partial image 1001 in order to generate an outline to serve as the base of a coloring outline. The shadow processing part 38 adds four points generated by spline interpolation to the four points: the two recognized points of the eye outline, the outer corner of the eye, and the inner corner of the eye, and generates a polygon by the total of eight points like a partial image 1002. Proceeding to the coloring outline generation of step S41, the shadow processing part 38 generates a coloring outline like a partial image 901. FIG. 31 is an image diagram showing the coloring outline generation. The shadow processing part 38 generates a coloring outline based on the outer corner and the inner corner of the eye as shown in a partial image 1101 in order to generate the coloring outline. Parameters may be specified with a GUI for extending the outline or shifting vertexes.” <i>See</i> Goto at paras. [0182]-[0184].

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	This limitation would have been obvious to a person of ordinary skill in the art based on (1) Goto alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.
1[c]. operating the processor to apply adaptive transformation mapping to the stream of images captured by the camera to generate modified images that appear to be captured from a different point of view of the camera's actual point of view; and	Goto expressly and/or inherently discloses and/or renders obvious operating the processor to apply adaptive transformation mapping to the stream of images captured by the camera to generate modified images that appear to be captured from a different point of view of the camera's actual point of view. <i>See, e.g.</i>, disclosures below. “The makeup simulator 1 of FIG. 5 and FIG. 6, which is based on a mirror, an item indispensable for makeup, as a concept, has the function of interacting with a user. That is, the makeup simulator 1 has the characteristic of giving a user a natural feeling as if the user were putting on makeup, looking at a mirror. The makeup simulator 1 performs image processing on a video output from the camera 2 in the control part 8, thereby applying makeup on a user's face included in the image, and displays the video on the monitor 7, which is a digital mirror. The makeup simulator 1 is capable of displaying various merchandise and cosmetic information items and the imaginary image of a user's face with makeup applied on it on the monitor 7.” <i>See Goto</i> at para. [0103]-[0104]. “The makeup simulator 1 of FIG. 7 and FIG. 8, which is based on a mirror, an item indispensable for makeup, as a concept, has the function of interacting with a user. That is, the makeup simulator 1 has the characteristic of giving a user a natural feeling as if the user were putting on makeup, looking at a mirror. The makeup simulator 1 performs image processing on a video output from the camera 2 in the control part 8, thereby applying makeup on a user's face included in the image, and displays the video on the touch panel monitor 15, which is a digital mirror. The makeup simulator 1 is capable of displaying various merchandise and cosmetic

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	information items and the imaginary image of a user's face with makeup applied on it on the touch panel monitor 15.” <i>See</i> Goto at paras. [0108]-[0109]. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Goto alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants’ Invalidity Contentions and Defendants’ other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.
1[d]. displaying the modified images on the monitor;	Goto expressly and/or inherently discloses and/or renders obvious displaying the modified images on the monitor. <i>See, e.g.</i>, disclosures below. “According to the present invention, in order to solve the above-described problems, a makeup simulation system applying makeup to a video having an image of the face of a user captured thereon is characterized by image capturing means for capturing the image of the face of the user and outputting the video, control means for receiving the video output from the image capturing means, performing image processing on the video, and outputting the video; and display means for displaying the video output from the control means, wherein the control means includes face recognition means for recognizing the face of the user from the video based on predetermined tracking points; and makeup processing means for applying a predetermined makeup on the face of the user included in the video based on the tracking points and outputting the video to the display means.” <i>See</i> Goto at para. [0007]. “The camera 2 captures an image of a user standing in front of the makeup simulator 1 and outputs a video.” <i>See</i> Goto at para. [0085]. “The makeup simulator 1 of FIG. 1 and FIG.2, which is based on a mirror, an item indispensable for makeup, as a concept, has the function of interacting with a user. That is, the makeup simulator 1 has the characteristic of giving a user a natural feeling as if the user were putting on makeup, looking at a mirror.” <i>See</i> Goto at para. [0088].

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	“The makeup simulator 1 performs image processing on a video output from the camera 2 in the control part 8, thereby applying makeup on a user's face included in the image, and displays the video on the monitor 7, which is a digital mirror. The makeup simulator 1 is capable of displaying various merchandise and cosmetic information items and the imaginary image of a user's face with makeup applied on it on the monitor 7.” <i>See</i> Goto at para. [0104]. “Proceeding to step S3, the control part 8 starts a makeup simulation based on the Software activated in step S2. At this point, the control part 8 displays the screen image 102 on the monitor 7 and displays the screen image 202 on the operations panel 4. The screen image 102 shows the case of displaying the video of the user's face captured with the camera 2 with a magic mirror-like effect on it. The screen image 202 shows the case of displaying a WELCOME message that moves laterally the same as the screen image 201.” <i>See</i> Goto at [0129]. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Goto alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants’ Invalidity Contentions and Defendants’ other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.
1[e]. wherein the different point of view corresponds to an image taken from a different angle and a different distance than the actual images captured by the camera; and	Goto expressly and/or inherently discloses and/or renders obvious wherein the different point of view corresponds to an image taken from a different angle and a different distance than the actual images captured by the camera. <i>See, e.g.</i>, disclosures below. “The makeup simulator 1 of FIG. 5 and FIG. 6, which is based on a mirror, an item indispensable for makeup, as a concept, has the function of interacting with a user. That is, the makeup simulator 1 has the characteristic of giving a user a natural feeling as if the user were putting on makeup, looking at a mirror. The makeup simulator 1 performs image processing on a video output from the camera 2 in the control part 8, thereby applying makeup on a user's face included in the image,

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	and displays the video on the monitor 7, which is a digital mirror. The makeup simulator 1 is capable of displaying various merchandise and cosmetic information items and the imaginary image of a user's face with makeup applied on it on the monitor 7.” <i>See</i> Goto at para. [0103]-[0104]. “The makeup simulator 1 of FIG. 7 and FIG. 8, which is based on a mirror, an item indispensable for makeup, as a concept, has the function of interacting with a user. That is, the makeup simulator 1 has the characteristic of giving a user a natural feeling as if the user were putting on makeup, looking at a mirror. The makeup simulator 1 performs image processing on a video output from the camera 2 in the control part 8, thereby applying makeup on a user's face included in the image, and displays the video on the touch panel monitor 15, which is a digital mirror. The makeup simulator 1 is capable of displaying various merchandise and cosmetic information items and the imaginary image of a user's face with makeup applied on it on the touch panel monitor 15.” <i>See</i> Goto at paras. [0108]-[0109]. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Goto alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants’ Invalidity Contentions and Defendants’ other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.
1[f]. wherein during mirror tracking mode the processor utilizes the angle of the images captured by the camera and applies parametric input for a mapping transformation that changes imaging perspective of the images captured by the camera.	Goto expressly and/or inherently discloses and/or renders obvious wherein during mirror tracking mode the processor utilizes the angle of the images captured by the camera and applies parametric input for a mapping transformation that changes imaging perspective of the images captured by the camera. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Goto alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants’ Invalidity Contentions and Defendants’

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	other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

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Claim 2	
2. The method of claim 1, wherein the mapping transformation comprises a combination of at least two of the following transformations: vertical flips about a vertical axis, a projection transformation, rotation, resize, two-dimensional offset, optic distortion correction, and polynomial mapping on part or entire captured image.	Goto expressly and/or inherently discloses and/or renders obvious wherein the mapping transformation comprises a combination of at least two of the following transformations: vertical flips about a vertical axis, a projection transformation, rotation, resize, two-dimensional offset, optic distortion correction, and polynomial mapping on part or entire captured image. <i>See, e.g.</i>, disclosures below. “The makeup simulator 1 of FIG. 5 and FIG. 6, which is based on a mirror, an item indispensable for makeup, as a concept, has the function of interacting with a user. That is, the makeup simulator 1 has the characteristic of giving a user a natural feeling as if the user were putting on makeup, looking at a mirror. The makeup simulator 1 performs image processing on a video output from the camera 2 in the control part 8, thereby applying makeup on a user's face included in the image, and displays the video on the monitor 7, which is a digital mirror. The makeup simulator 1 is capable of displaying various merchandise and cosmetic information items and the imaginary image of a user's face with makeup applied on it on the monitor 7.” <i>See Goto</i> at para. [0103]-[0104]. “The makeup simulator 1 of FIG. 7 and FIG. 8, which is based on a mirror, an item indispensable for makeup, as a concept, has the function of interacting with a user. That is, the makeup simulator 1 has the characteristic of giving a user a natural feeling as if the user were putting on makeup, looking at a mirror.

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	The makeup simulator 1 performs image processing on a video output from the camera 2 in the control part 8, thereby applying makeup on a user's face included in the image, and displays the video on the touch panel monitor 15, which is a digital mirror. The makeup simulator 1 is capable of displaying various merchandise and cosmetic information items and the imaginary image of a user's face with makeup applied on it on the touch panel monitor 15.” See Goto at paras. [0108]-[0109]. “FIG. 21 is a flowchart showing the lipstick processing. Broadly speaking, the lipstick processing includes the advance preparation of step S10 and the coloring of step S20. The advance preparation includes the cutting out and rotation of step S11, the creation of an image for outline extraction of step S12, the outline extraction of step S13, the spline curve generation of FIG. 14, the return rotation of step S15, and the coloring map generation of step S16. The coloring includes the coloring-map-based coloring of step S21 and the drawing for debugging and designing of step S22. Proceeding to the cutting out and rotation of step S11, the lipstick processing part 39 cuts out a partial image 500 containing the lips of the user's face from the image for face recognition, and obtains a partial image 501 by rotating the partial image 500 to a position for processing.” See Goto at paras. [0167]-[0168]. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Goto alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants’ Invalidity Contentions and Defendants’ other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

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Claim 3	

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3. The method of claim 1, wherein during idle mode the camera continuously sends captured images to the processor, and the user presence is identified by the processor detecting a body part in the images.	Goto expressly and/or inherently discloses and/or renders obvious wherein during idle mode the camera continuously sends captured images to the processor, and the user presence is identified by the processor detecting a body part in the images. <i>See, e.g.,</i> disclosures below. “The control part 8 is continuously receiving a video captured by the camera 2. At this point, the control part 8 displays the screen image 100 on the monitor 7 and the screen image 200 on the operations panel 4. The screen images 100 and 200 show the case of displaying screen savers.” <i>See</i> Goto at para. [0125]. “Unlike those based on still images or the conventional makeup simulator 1, the makeup simulator 1 of the present invention, which performs a real-time simulation, is capable of instantaneously recognizing tracking points of a face and performing simulation based on the tracking points. Therefore, the makeup simulator 1 enables the following that have not been possible so far. The makeup simulator 1 of the present invention is capable of a real-time simulation. The makeup simulator 1 of the present invention is capable of simulation not only from a full face as conventionally but also from a face in profile. Accordingly, it is easy to view the simulation effect or technique of blusher or the like.” <i>See</i> Goto at paras. [0123]-[0124]. “A screen image 300 shows the case of displaying the video of a user's face captured with the camera 2. The makeup simulator 1 recognizes the user's face included in the video, and cuts out a still image 301 of the user's face.” <i>See</i> Goto at para. [0141]. “The simulator main application 28 obtains a pre-makeup image by trimming the original image. Further, the simulator main application 28 obtains an image for face recognition by reducing the original image. A face recognition part 33 obtains tracking points 34 for recognizing a user's face as described below from the image for face recognition by FFT (fast Fourier transform).” <i>See</i> Goto at para. [0151].

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	“FIG. 16 is a screen image diagram showing processing performed by the simulator main application. A screen image 400 shows the case of displaying a pre-makeup image. The screen image 401 shows the case of displaying the tracking points 34 obtained from the image for face recognition over the pre makeup image. Further, the screen image 402 shows the case of displaying a post-makeup image where a makeup is applied on the user's face included in the pre-makeup image based on the tracking points 34.” <i>See Goto at para. [0159].</i> “The shadow processing part 38 included in the simulator main application 28 performs shadow processing, referring to the tracking points 34, three on the eye and one on the eyebrow, for each of the right side and the left side as shown in FIG. 28. FIG. 28 is an image diagram showing the tracking points referred to by the shadow processing.” <i>See Goto at para. [0179].</i> “Proceeding to the basic outline generation of step S31, the shadow processing part 38 obtains the shape of an eye of the user's face like a partial image 900 from the image for face recognition. FIG. 30 is an image diagram showing the basic outline generation. The shadow processing part 38 searches upward and downward from the center of the eye and recognizes two points of the outline of the eye (upper-side boundary and lower-side boundary) as shown in a partial image 1001 in order to generate an outline to serve as the base of a coloring outline. The shadow processing part 38 adds four points generated by spline interpolation to the four points: the two recognized points of the eye outline, the outer corner of the eye, and the inner corner of the eye, and generates a polygon by the total of eight points like a partial image 1002. Proceeding to the coloring outline generation of step S41, the shadow processing part 38 generates a coloring outline like a partial image 901. FIG. 31 is an image diagram showing the coloring outline generation. The shadow processing part 38 generates a coloring outline based on the outer corner and the inner corner of the eye as shown in a partial image 1101 in order to generate the coloring outline. Parameters may be specified

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	with a GUI for extending the outline or shifting vertexes.” <i>See</i> Goto at paras. [0182]-[0184]. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Goto alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants’ Invalidity Contentions and Defendants’ other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

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Claim 4	
4. The method of claim 3, wherein the body part comprises one of legs, face, eyes, and hands.	Goto expressly and/or inherently discloses and/or renders obvious wherein the body part comprises one of legs, face, eyes, and hands. <i>See, e.g.</i>, disclosures below. “Proceeding to step S1, the control part is continuously determining whether a user's face is included in the received video. The control part 8 repeatedly performs the processing of step S1 (NO in S1) until it recognizes that a user's face is included in the video. If the control part 8 recognizes that a user's face is included in the video (YES in S1), it proceeds to step S2 to activate software containing a makeup simulation program for performing a makeup simulation. At this point, the control part 8 displays the screen image 101 on the monitor 7, and displays the screen image 201 on the operations panel 4. The screen image 101 shows the case of displaying the video of the user's face captured with the camera 2. The screen image 201 shows the case of displaying a WELCOME message that moves laterally.” <i>See</i> Goto at paras. [0126]-[0128].

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	“A screen image 300 shows the case of displaying the video of a user's face captured with the camera 2. The makeup simulator 1 recognizes the user's face included in the video, and cuts out a still image 301 of the user's face.” <i>See Goto</i> at para. [0141]. “The simulator main application 28 obtains a pre-makeup image by trimming the original image. Further, the simulator main application 28 obtains an image for face recognition by reducing the original image. A face recognition part 33 obtains tracking points 34 for recognizing a user's face as described below from the image for face recognition by FFT (fast Fourier transform).” <i>See Goto</i> at para. [0151]. “FIG. 16 is a screen image diagram showing processing performed by the simulator main application. A screen image 400 shows the case of displaying a pre-makeup image. The screen image 401 shows the case of displaying the tracking points 34 obtained from the image for face recognition over the pre makeup image. Further, the screen image 402 shows the case of displaying a post-makeup image where a makeup is applied on the user's face included in the pre-makeup image based on the tracking points 34.” <i>See Goto</i> at para. [0159]. “The shadow processing part 38 included in the simulator main application 28 performs shadow processing, referring to the tracking points 34, three on the eye and one on the eyebrow, for each of the right side and the left side as shown in FIG. 28. FIG. 28 is an image diagram showing the tracking points referred to by the shadow processing.” <i>See Goto</i> at para. [0179]. “Proceeding to the basic outline generation of step S31, the shadow processing part 38 obtains the shape of an eye of the user's face like a partial image 900 from the image for face recognition. FIG. 30 is an image diagram showing the basic outline generation. The shadow processing part 38 searches upward and downward from the center of the eye and recognizes two points of the outline of the eye (upper-side boundary and lower-side boundary) as shown in a partial image 1001 in order to generate an outline to serve as the base of a coloring outline. The shadow processing part 38 adds four points

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	generated by spline interpolation to the four points: the two recognized points of the eye outline, the outer corner of the eye, and the inner corner of the eye, and generates a polygon by the total of eight points like a partial image 1002. Proceeding to the coloring outline generation of step S41, the shadow processing part 38 generates a coloring outline like a partial image 901. FIG. 31 is an image diagram showing the coloring outline generation. The shadow processing part 38 generates a coloring outline based on the outer corner and the inner corner of the eye as shown in a partial image 1101 in order to generate the coloring outline. Parameters may be specified with a GUI for extending the outline or shifting vertexes.” <i>See Goto</i> at paras. [0182]-[0184]. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Goto alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants’ Invalidity Contentions and Defendants’ other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

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Claim 5	
5. The method of claim 1, further comprising receiving user input and operating the processor to vary image magnitude or field-of-view of the modified images according to the user input.	Goto expressly and/or inherently discloses and/or renders obvious receiving user input and operating the processor to vary image magnitude or field-of-view of the modified images according to the user input. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Goto alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants’ Invalidity Contentions and Defendants’ other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

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Claim 6	
6. The method of claim 5, wherein the processor varies the image magnitude or field-of-view mapping to display a partial or full body of the user in the modified images.	Goto expressly and/or inherently discloses and/or renders obvious wherein the processor varies the image magnitude or field-of-view mapping to display a partial or full body of the user in the modified images. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Goto alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

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Claim 10	
10. The method of claim 1, further comprising operating the processor to augment the modified images by overlaying virtual objects on a user's image appearing within the modified images.	Goto expressly and/or inherently discloses and/or renders obvious operating the processor to augment the modified images by overlaying virtual objects on a user's image appearing within the modified images. <i>See, e.g.</i>, disclosures below. "The makeup simulator 1 performs image processing on a video output from the camera 2 in the control part 8, thereby applying makeup on a user's face included in the image, and displays the video on the monitor 7, which is a digital mirror. The makeup simulator 1 is capable of displaying various merchandise and cosmetic information items and the imaginary image of a user's face with makeup applied on it on the monitor 7." <i>See Goto at para. [0104].</i> "The touch panel monitor 15 displays an operation image and outputs operation information in response to reception of an operation from a user. The touch panel monitor 15 displays an operation image output from the control part 8 and outputs

Asserted Claim of the '110 Patent	Exemplary Citations to Goto
	operation information to the control part 8 in response to reception of an operation from a user. The touch panel monitor 15 displays a video (main image) output from the control part 8. The control part 8 receives a video output from the camera 2, applies makeup on a user's face included in the video by performing image processing on the video as described below, and outputs the video to the touch panel monitor 15.” <i>See Goto</i> at para. [0107]. “The screen image 101 shows the case of displaying the video of the user's face captured with the camera 2. The screen image 201 shows the case of displaying a WELCOME message that moves laterally. Proceeding to step S3, the control part 8 starts a makeup simulation based on the software activated in step S2. At this point, the control part 8 displays the screen image 102 on the monitor 7 and displays the screen image 202 on the operations panel 4. The screen image 102 shows the case of displaying the video of the user's face captured with the camera 2 with a magic mirror-like effect on it. The screen image 202 shows the case of displaying a WELCOME message that moves laterally the same as the screen image 201.” <i>See Goto</i> at paras. [0128]-[0129]. “FIG. 16 is a screen image diagram showing processing performed by the simulator main application. A screen image 400 shows the case of displaying a pre-makeup image. The screen image 401 shows the case of displaying the tracking points 34 obtained from the image for face recognition over the pre makeup image. Further, the screen image 402 shows the case of displaying a post-makeup image where a makeup is applied on the user's face included in the pre-makeup image based on the tracking points 34.” <i>See Goto</i> at para. [0159]. “Proceeding to the deformed eyebrow pasting of step S90, the eyebrow processing part 37 obtains a post-makeup image by pasting the deformed eyebrow to a pre-makeup image.” <i>See Goto</i> at para. [0204].

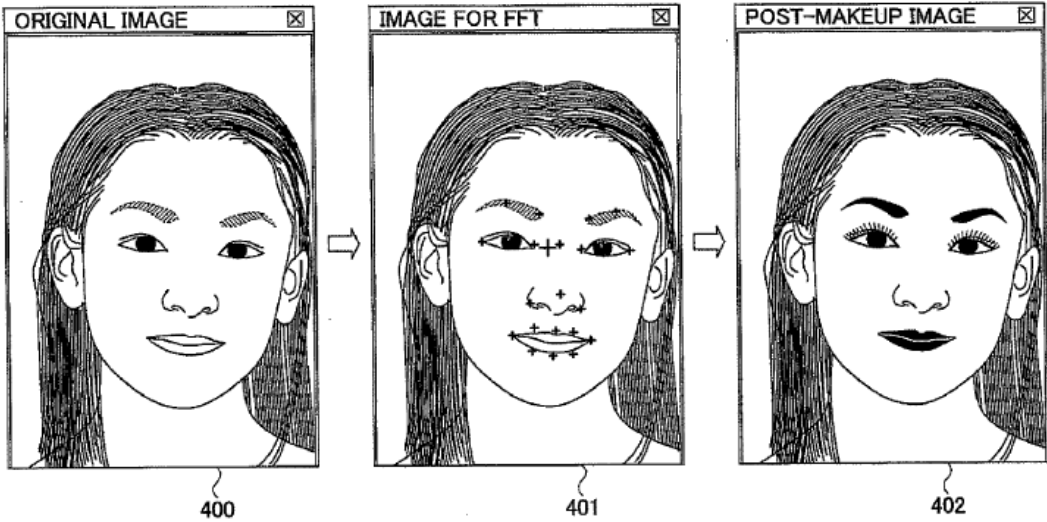
Asserted Claim of the '110 Patent	Exemplary Citations to Goto
	FIG.16  The diagram illustrates a process for applying makeup to a face image. It consists of three sequential images: 400 (ORIGINAL IMAGE), 401 (IMAGE FOR FFT), and 402 (POST-MAKEUP IMAGE). Image 400 shows a woman's face. Image 401 shows the same face with crosshairs indicating feature points. Image 402 shows the face with applied makeup. Arrows indicate the flow from 400 to 401 to 402.

FIG.37

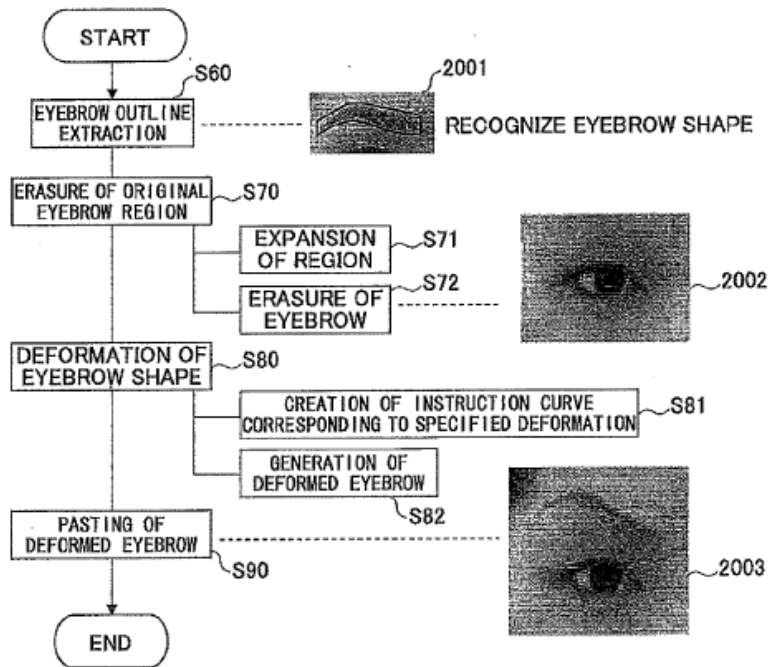
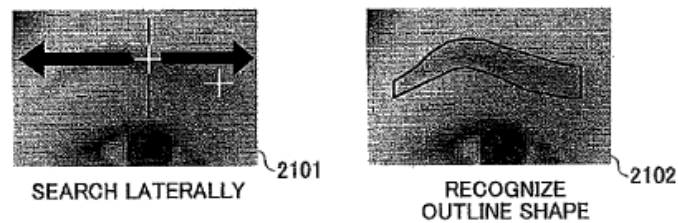


FIG.38



Asserted Claim of the '110 Patent	Exemplary Citations to Goto
	<i>See Goto at FIGS. 16, 37-38.</i> This limitation would have been obvious to a person of ordinary skill in the art based on (1) Goto alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

Asserted Claim of the '110 Patent	Exemplary Citations to Goto
Claim 11	
11. The method of claim 1, further comprising operating the processor to transmit the modified image over a network.	Goto expressly and/or inherently discloses and/or renders obvious operating the processor to transmit the modified image over a network. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Goto alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

Asserted Claim of the '110 Patent	Exemplary Citations to Goto
Claim 12	
12. The method of claim 1, further comprising displaying the modified image on a remote screen for video telepresence.	Goto expressly and/or inherently discloses and/or renders obvious displaying the modified image on a remote screen for video telepresence. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Goto alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity

Asserted Claim of the '110 Patent	Exemplary Citations to Goto
	Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

Asserted Claim of the '110 Patent	Exemplary Citations to Goto
Claim 16	
16. The method of claim 1, wherein the processor operates on the images from the camera to generate background segmentation, and replaces segments on the images by replacement segments.	Goto expressly and/or inherently discloses and/or renders obvious wherein the processor operates on the images from the camera to generate background segmentation, and replaces segments on the images by replacement segments. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Goto alone; (2) knowledge of a personal of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

Asserted Claim of the '110 Patent	Exemplary Citations to Goto
Claim 17	
17. The method of claim 16, wherein the replacement segments comprise virtual background or background that was captured in a different setting.	Goto expressly and/or inherently discloses and/or renders obvious wherein the replacement segments comprise virtual background or background that was captured in a different setting. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Goto alone; (2) knowledge of a personal of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

Exhibit B-25: Invalidity of U.S. Patent No. 8,982,110 in view of Shiseido Augmented Reality Cosmetic Mirror System Art (“Shiseido”)

This chart is subject to all reservations, objections, and disclaimers in Defendants’ Invalidity Contentions and any amendment, supplement, or modification thereof, which are incorporated herein by reference in their entirety.

The Shiseido System expressly and/or inherently discloses and/or renders obvious the Asserted Claims of U.S. Patent No. 8,982,110 (the “’110 Patent”), as set forth in the chart below. On information and belief, Shiseido is described at least in the following documents:

- U.S. Patent Pub. No. 2010/0226531 to Yasuo Goto (“Goto”), published on September 9, 2010.
- *Shiseido Makeup Mirror Lets You Try on Cosmetics With Augmented Reality*, Trend Hunter, 6 February 2010, <https://www.trendhunter.com/trends/shiseido-makeup-mirror> (“Trend Hunter”).
- *Try Out Dozens of Looks In Minutes And Wipe Them Off At The Push Of A Button With The Magic Make-Up Mirror*, Daily Mail, 28 March 2011, <https://www.dailymail.co.uk/femail/article-1370892/Shiseidos-magic-make-mirror-try-dozens-looks.html> (“Daily Mail”).
- *Shiseido: Augmented Reality Cosmetic Mirror*, uploaded by PSVParis, 6 December 2010, <https://www.youtube.com/watch?v=n8Jp1LuQByg> (“YouTube”).

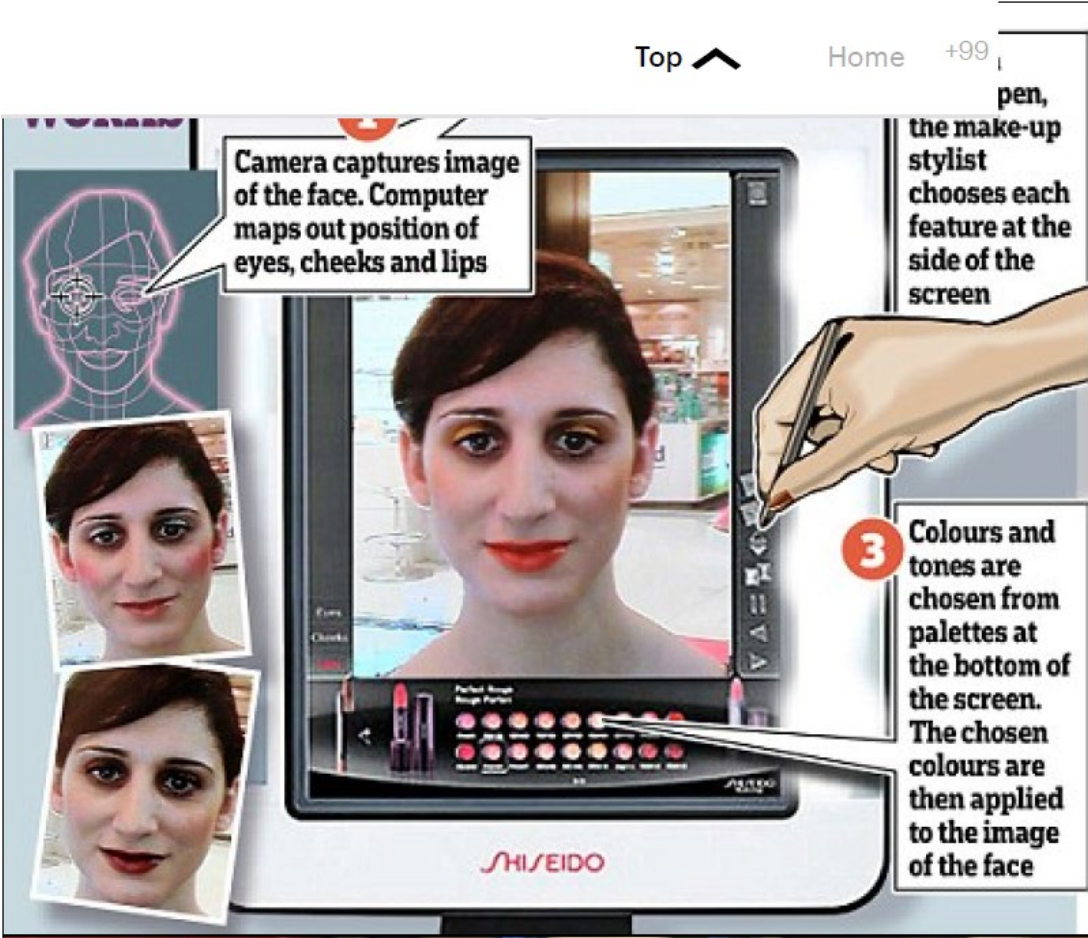
Shiseido anticipates the Asserted Claims of the ’110 Patent. To the extent it is found Shiseido does not expressly disclose certain limitations in the Asserted Claims, such limitations are at least implicitly or inherently disclosed. Moreover, to the extent it is found that Shiseido does not anticipate the Asserted Claims, Shiseido renders obvious the Asserted Claims, either alone or in combination with other prior art identified in the cover pleading or herein, and/or in combination with the general knowledge of a person having ordinary skill in the art.

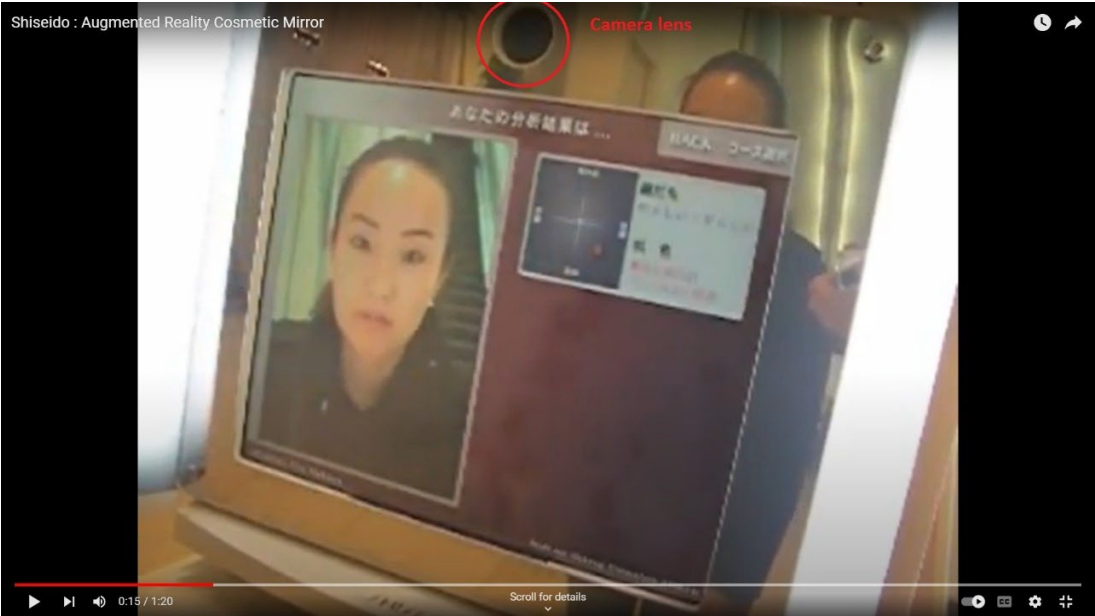
In these contentions, Defendants have relied in part on Plaintiff’s Infringement Contentions. In those contentions, Plaintiff appears to pursue overly broad claim constructions in an effort to assert infringement where none exists, and to accuse products that do not infringe the claims. Defendants’ assertion that a particular limitation is disclosed by a prior art reference and/or is disclosed in a particular manner may be based in part on Plaintiff’s apparent claim interpretations. In relying on Plaintiff’s apparent claim interpretations, Defendants do not admit that Plaintiff’s apparent claim interpretations are supportable or proper or that the claim limitations in question are definite or otherwise amenable to construction.

Defendants have endeavored to provide as much detail as possible in these contentions and, in doing so, have exceeded the level of detail required. The inclusion of specific details in some areas is not a concession that such details are required or that the omission of similar details in other areas is a defect. These citations to portions of any reference in this chart are exemplary only. Defendants will rely on the entirety of the references cited in this chart to show that the asserted claims are invalid.

Asserted Claim of the '110 Patent	Exemplary Citations to Shiseido
Claim 1	
1[pre]. A computerized method for operating a display system, the display system having a camera, a monitor, and a processor, the method comprising:	To the extent the preamble is limiting, Shiseido expressly and/or inherently discloses and/or renders obvious this limitation. <i>See, e.g.</i>, disclosures below. “According to the present invention, in order to solve the above-described problems, a makeup simulation system applying makeup to a video having an image of the face of a user captured thereon is characterized by image capturing means for capturing the image of the face of the user and outputting the video, control means for receiving the video output from the image capturing means, performing image processing on the video, and outputting the video; and display means for displaying the video output from the control means, wherein the control means includes face recognition means for recognizing the face of the user from the video based on predetermined tracking points; and makeup processing means for applying a predetermined makeup on the face of the user included in the video based on the tracking points and outputting the video to the display means.” <i>See Goto at para. [0007].</i> “The camera 2 captures an image of a user standing in front of the makeup simulator 1 and outputs a video.” <i>See Goto at para. [0085].</i> “The makeup simulator 1 of FIG. 1 and FIG.2, which is based on a mirror, an item indispensable for makeup, as a concept, has the function of interacting with a user. That is, the makeup simulator 1 has the characteristic of giving a user a natural feeling as if the user were putting on makeup, looking at a mirror.” <i>See Goto at para. [0088].</i> “The makeup simulator 1 performs image processing on a video output from the camera 2 in the control part 8, thereby applying makeup on a user's face included in the image, and displays the video on the monitor 7, which is a digital mirror. The makeup simulator 1 is capable of displaying various merchandise and cosmetic information items and the imaginary image of a user's face with makeup applied on it on the monitor 7.” <i>See Goto at para. [0104].</i>

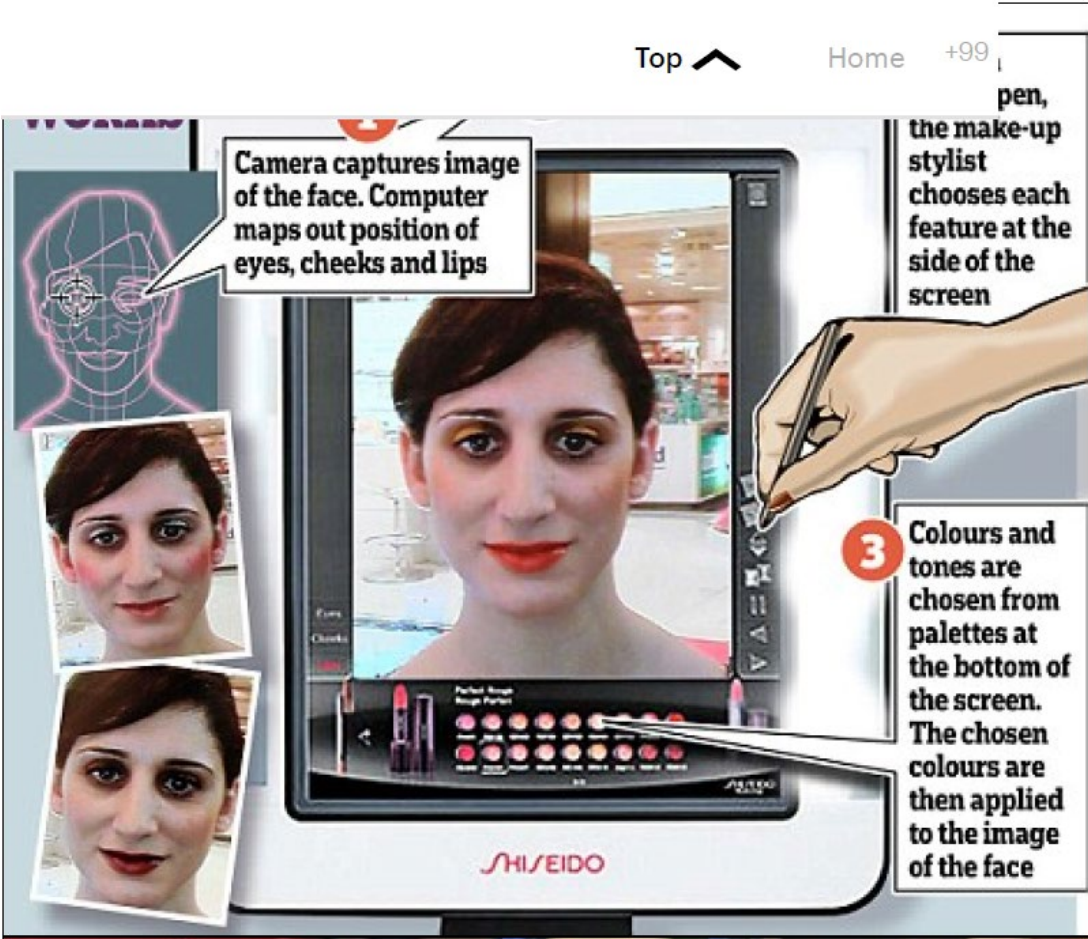
Asserted Claim of the '110 Patent	Exemplary Citations to Shiseido
	“Proceeding to step S3, the control part 8 starts a makeup simulation based on the Software activated in step S2. At this point, the control part 8 displays the screen image 102 on the monitor 7 and displays the screen image 202 on the operations panel 4. The screen image 102 shows the case of displaying the video of the user's face captured with the camera 2 with a magic mirror-like effect on it. The screen image 202 shows the case of displaying a WELCOME message that moves laterally the same as the screen image 201.” <i>See Goto at para. [0129].</i> “Created by Japanese beauty brand Shiseido, the simulator allows users to virtually apply make-up to eyes, lips and cheeks. ... A camera on the device captures your face and works out where your eyes, nose and mouth are. ... The image you see is a perfect mirror image. If you squint to take a closer look at the eyeshadow you just 'applied', you'll see it on the screen; turn your head slightly to see how that blusher looks and your mirror image will do likewise.” <i>See Daily Mail at 2.</i>

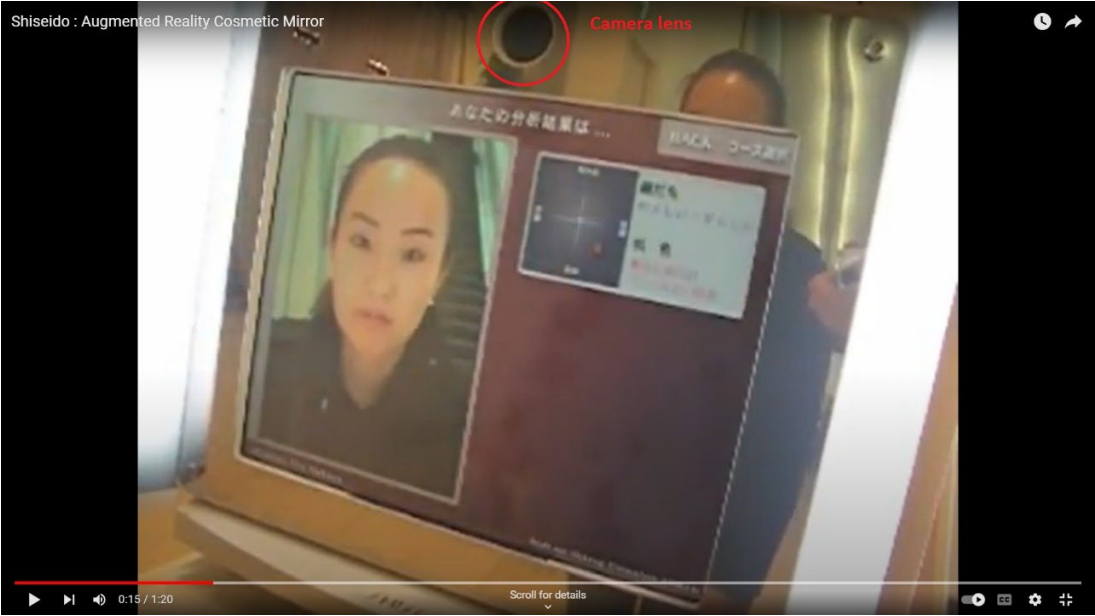
Asserted Claim of the '110 Patent	Exemplary Citations to Shiseido
	 Top ^ Home +99 pen, the make-up stylist chooses each feature at the side of the screen Camera captures image of the face. Computer maps out position of eyes, cheeks and lips 3 Colours and tones are chosen from palettes at the bottom of the screen. The chosen colours are then applied to the image of the face SHISEIDO See Daily Mail at 3.

Asserted Claim of the '110 Patent	Exemplary Citations to Shiseido
	“If I was a woman or a man who wore makeup, I would flip over this augmented reality Shiseido makeup mirror. ... The augmented reality Shiseido makeup mirror is pretty simple. Just sit down in front of the mirror and let the camera take a picture of your face. After that, you can easily see what the latest cosmetic products would look on your face.” See Trend Hunter at 2.  See YouTube at 0:015. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Shiseido alone; (2) knowledge of a personal of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of

Asserted Claim of the '110 Patent	Exemplary Citations to Shiseido
	Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document
1[a]. operating the camera to generate a stream of images of the user;	Shiseido expressly and/or inherently discloses and/or renders obvious operating the camera to generate a stream of images of the user. <i>See, e.g.</i>, disclosures below. “According to the present invention, in order to solve the above-described problems, a makeup simulation system applying makeup to a video having an image of the face of a user captured thereon is characterized by image capturing means for capturing the image of the face of the user and outputting the video, control means for receiving the video output from the image capturing means, performing image processing on the video, and outputting the video; and display means for displaying the video output from the control means, wherein the control means includes face recognition means for recognizing the face of the user from the video based on predetermined tracking points; and makeup processing means for applying a predetermined makeup on the face of the user included in the video based on the tracking points and outputting the video to the display means.” <i>See Goto at para. [0007].</i> “The camera 2 captures an image of a user standing in front of the makeup simulator 1 and outputs a video.” <i>See Goto at para. [0085].</i> “The makeup simulator 1 of FIG. 1 and FIG.2, which is based on a mirror, an item indispensable for makeup, as a concept, has the function of interacting with a user. That is, the makeup simulator 1 has the characteristic of giving a user a natural feeling as if the user were putting on makeup, looking at a mirror.” <i>See Goto at para. [0088].</i> “The makeup simulator 1 performs image processing on a video output from the camera 2 in the control part 8, thereby applying makeup on a user's face included in the image, and displays the video on the monitor 7, which is a digital mirror. The makeup simulator 1 is capable of displaying various merchandise and cosmetic information items and the

Asserted Claim of the '110 Patent	Exemplary Citations to Shiseido
	imaginary image of a user's face with makeup applied on it on the monitor 7.” <i>See</i> Goto at para. [0104]. “Proceeding to step S3, the control part 8 starts a makeup simulation based on the Software activated in step S2. At this point, the control part 8 displays the screen image 102 on the monitor 7 and displays the screen image 202 on the operations panel 4. The screen image 102 shows the case of displaying the video of the user's face captured with the camera 2 with a magic mirror-like effect on it. The screen image 202 shows the case of displaying a WELCOME message that moves laterally the same as the screen image 201.” <i>See</i> Goto at [0129]. “A camera on the device captures your face and works out where your eyes, nose and mouth are.” <i>See</i> Daily Mail at 2. “Once you find a look you like, you can take a still image. The machine can store a few of these, giving you an opportunity to compare different looks.” <i>See</i> Daily Mail at 3.

Asserted Claim of the '110 Patent	Exemplary Citations to Shiseido
	 See Daily Mail at 3.

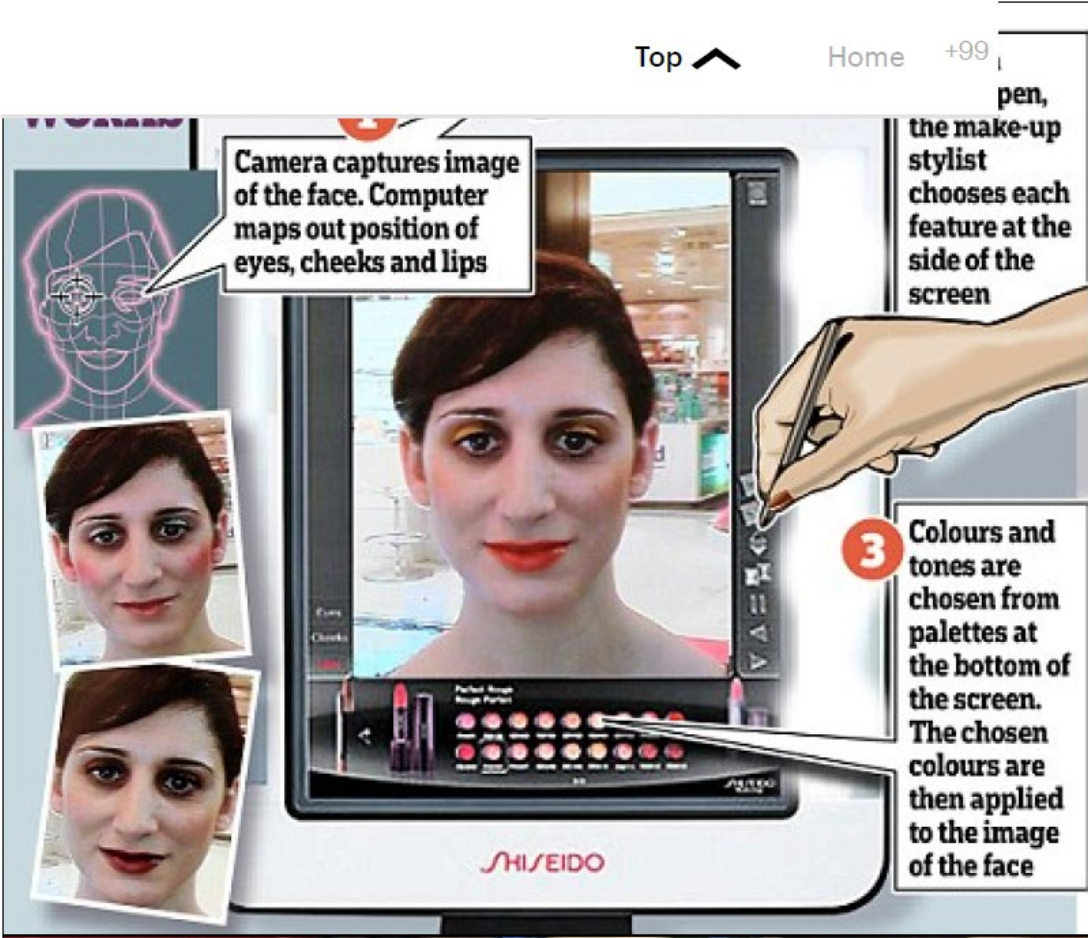
Asserted Claim of the '110 Patent	Exemplary Citations to Shiseido
	“The augmented reality Shiseido makeup mirror is pretty simple. Just sit down in front of the mirror and let the camera take a picture of your face. After that, you can easily see what the latest cosmetic products would look on your face.” <i>See</i> Trend Hunter at 2.  <i>See</i> YouTube at 0:015. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Shiseido alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants’ Invalidity Contentions and Defendants’ other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

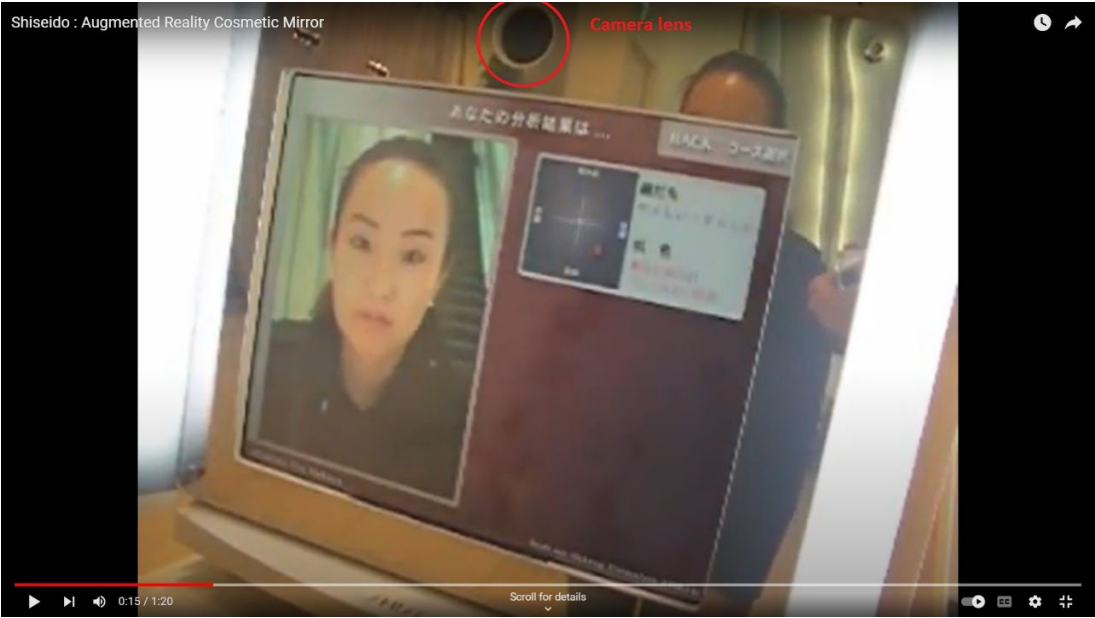
Asserted Claim of the '110 Patent	Exemplary Citations to Shiseido
1[b]. operating the processor to detect the presence of the user in the stream of image;	Shiseido expressly and/or inherently discloses and/or renders obvious operating the processor to detect the presence of the user in the stream of image. <i>See, e.g.</i>, disclosures below. “Proceeding to step S1, the control part is continuously determining whether a user's face is included in the received video. The control part 8 repeatedly performs the processing of step S1 (NO in S1) until it recognizes that a user's face is included in the video. If the control part 8 recognizes that a user's face is included in the video (YES in S1), it proceeds to step S2 to activate software containing a makeup simulation program for performing a makeup simulation. At this point, the control part 8 displays the screen image 101 on the monitor 7, and displays the screen image 201 on the operations panel 4. The screen image 101 shows the case of displaying the video of the user's face captured with the camera 2. The screen image 201 shows the case of displaying a WELCOME message that moves laterally.” <i>See</i> Goto at paras. [0126]-[0128]. “A screen image 300 shows the case of displaying the video of a user's face captured with the camera 2. The makeup simulator 1 recognizes the user's face included in the video, and cuts out a still image 301 of the user's face.” <i>See</i> Goto at para. [0141]. “The simulator main application 28 obtains a pre-makeup image by trimming the original image. Further, the simulator main application 28 obtains an image for face recognition by reducing the original image. A face recognition part 33 obtains tracking points 34 for recognizing a user's face as described below from the image for face recognition by FFT (fast Fourier transform).” <i>See</i> Goto at para. [0151]. “FIG. 16 is a screen image diagram showing processing performed by the simulator main application. A screen image 400 shows the case of displaying a pre-makeup image. The screen image 401 shows the case of displaying the tracking points 34 obtained from the image for face recognition over the pre makeup image. Further, the screen image 402

Asserted Claim of the '110 Patent	Exemplary Citations to Shiseido
	shows the case of displaying a post-makeup image where a makeup is applied on the user's face included in the pre-makeup image based on the tracking points 34.” <i>See</i> Goto at para. [0159]. “The shadow processing part 38 included in the simulator main application 28 performs shadow processing, referring to the tracking points 34, three on the eye and one on the eyebrow, for each of the right side and the left side as shown in FIG. 28. FIG. 28 is an image diagram showing the tracking points referred to by the shadow processing.” <i>See</i> Goto at para. [0179]. “Proceeding to the basic outline generation of step S31, the shadow processing part 38 obtains the shape of an eye of the user's face like a partial image 900 from the image for face recognition. FIG. 30 is an image diagram showing the basic outline generation. The shadow processing part 38 searches upward and downward from the center of the eye and recognizes two points of the outline of the eye (upper-side boundary and lower-side boundary) as shown in a partial image 1001 in order to generate an outline to serve as the base of a coloring outline. The shadow processing part 38 adds four points generated by spline interpolation to the four points: the two recognized points of the eye outline, the outer corner of the eye, and the inner corner of the eye, and generates a polygon by the total of eight points like a partial image 1002. Proceeding to the coloring outline generation of step S41, the shadow processing part 38 generates a coloring outline like a partial image 901. FIG. 31 is an image diagram showing the coloring outline generation. The shadow processing part 38 generates a coloring outline based on the outer corner and the inner corner of the eye as shown in a partial image 1101 in order to generate the coloring outline. Parameters may be specified with a GUI for extending the outline or shifting vertexes.” <i>See</i> Goto at paras. [0182]-[0184].

Asserted Claim of the '110 Patent	Exemplary Citations to Shiseido
	This limitation would have been obvious to a person of ordinary skill in the art based on (1) Shiseido alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.
1[c]. operating the processor to apply adaptive transformation mapping to the stream of images captured by the camera to generate modified images that appear to be captured from a different point of view of the camera's actual point of view; and	Shiseido expressly and/or inherently discloses and/or renders obvious operating the processor to apply adaptive transformation mapping to the stream of images captured by the camera to generate modified images that appear to be captured from a different point of view of the camera's actual point of view. <i>See, e.g.</i>, disclosures below. “The makeup simulator 1 of FIG. 5 and FIG. 6, which is based on a mirror, an item indispensable for makeup, as a concept, has the function of interacting with a user. That is, the makeup simulator 1 has the characteristic of giving a user a natural feeling as if the user were putting on makeup, looking at a mirror. The makeup simulator 1 performs image processing on a video output from the camera 2 in the control part 8, thereby applying makeup on a user's face included in the image, and displays the video on the monitor 7, which is a digital mirror. The makeup simulator 1 is capable of displaying various merchandise and cosmetic information items and the imaginary image of a user's face with makeup applied on it on the monitor 7.” <i>See Goto</i> at para. [0103]-[0104]. “The makeup simulator 1 of FIG. 7 and FIG. 8, which is based on a mirror, an item indispensable for makeup, as a concept, has the function of interacting with a user. That is, the makeup simulator 1 has the characteristic of giving a user a natural feeling as if the user were putting on makeup, looking at a mirror. The makeup simulator 1 performs image processing on a video output from the camera 2 in the control part 8, thereby applying makeup on a user's face included in the image, and displays the video on the touch panel monitor 15, which is a digital mirror. The makeup simulator 1 is capable of displaying various merchandise and cosmetic

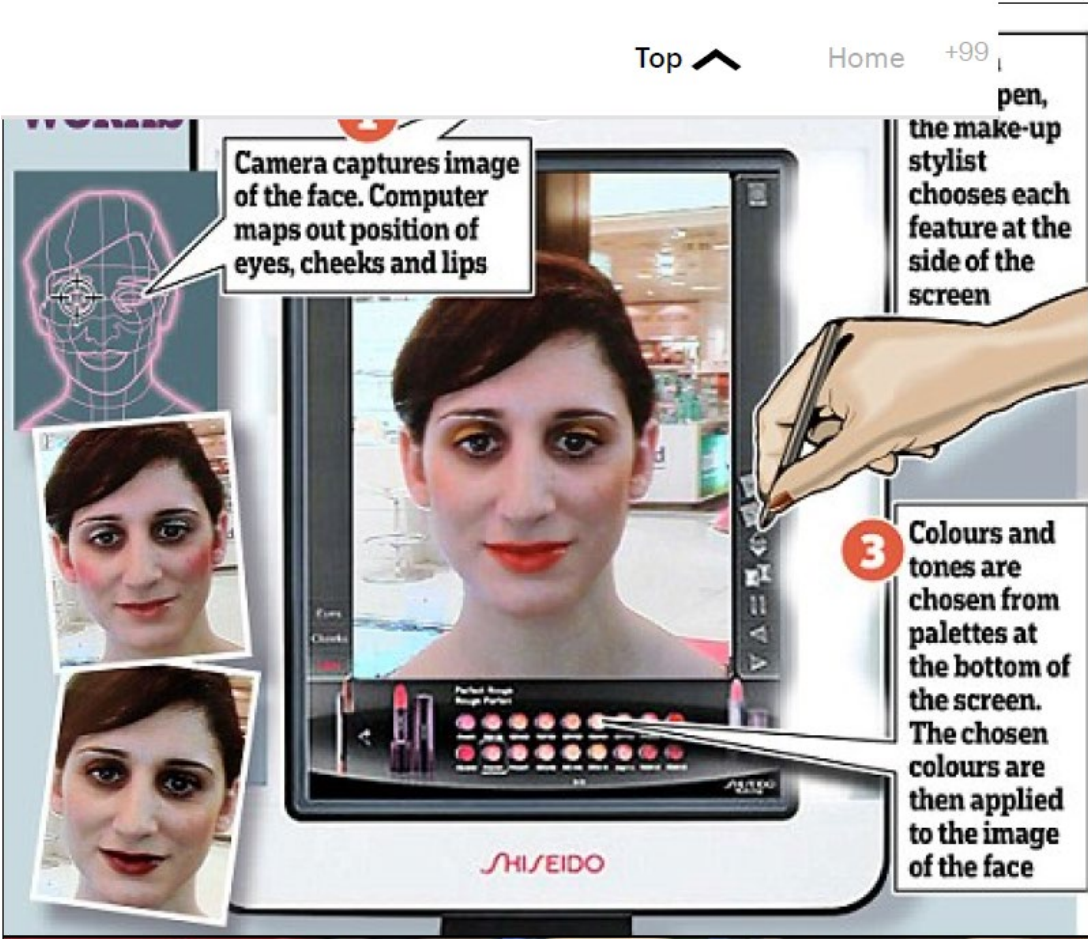
Asserted Claim of the '110 Patent	Exemplary Citations to Shiseido
	information items and the imaginary image of a user's face with makeup applied on it on the touch panel monitor 15.” <i>See</i> Goto at paras. [0108]-[0109]. “Created by Japanese beauty brand Shiseido, the simulator allows users to virtually apply make-up to eyes, lips and cheeks. ... A camera on the device captures your face and works out where your eyes, nose and mouth are. ... The image you see is a perfect mirror image. If you squint to take a closer look at the eyeshadow you just 'applied', you'll see it on the screen; turn your head slightly to see how that blusher looks and your mirror image will do likewise.” <i>See</i> Daily Mail at 2.

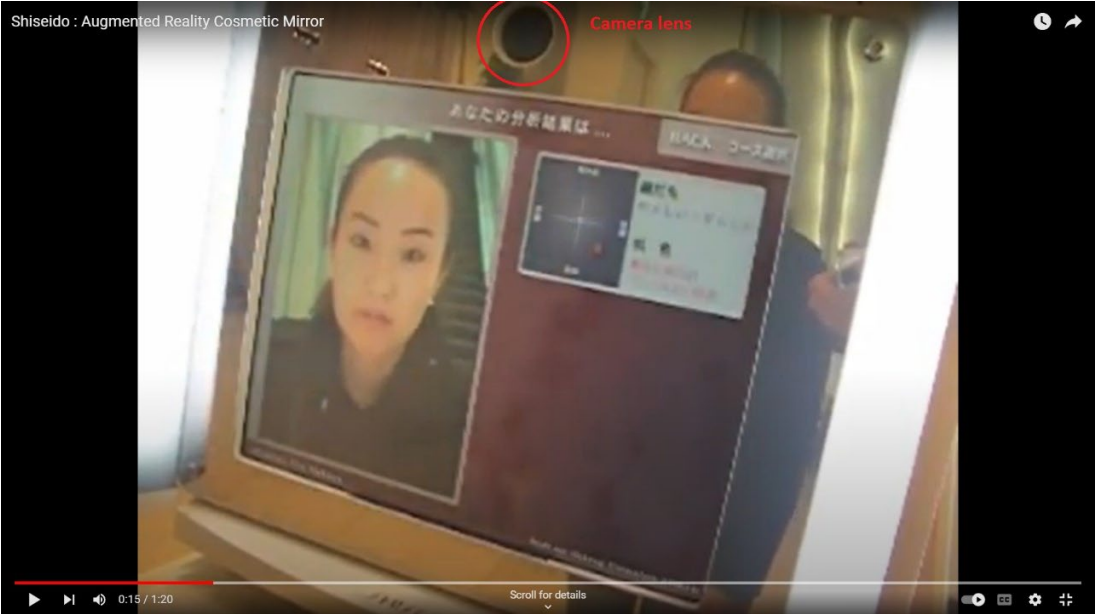
Asserted Claim of the '110 Patent	Exemplary Citations to Shiseido
	 Top ^ Home +99 pen, the make-up stylist chooses each feature at the side of the screen Camera captures image of the face. Computer maps out position of eyes, cheeks and lips 3 Colours and tones are chosen from palettes at the bottom of the screen. The chosen colours are then applied to the image of the face SHISEIDO See Daily Mail at 3.

Asserted Claim of the '110 Patent	Exemplary Citations to Shiseido
	“If I was a woman or a man who wore makeup, I would flip over this augmented reality Shiseido makeup mirror. . . . The augmented reality Shiseido makeup mirror is pretty simple. Just sit down in front of the mirror and let the camera take a picture of your face. After that, you can easily see what the latest cosmetic products would look on your face.” See Trend Hunter at 2.  See YouTube at 0:015.

Asserted Claim of the '110 Patent	Exemplary Citations to Shiseido
	This limitation would have been obvious to a person of ordinary skill in the art based on (1) Shiseido alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.
1[d]. displaying the modified images on the monitor;	Shiseido expressly and/or inherently discloses and/or renders obvious displaying the modified images on the monitor. <i>See, e.g.</i>, disclosures below. “According to the present invention, in order to solve the above-described problems, a makeup simulation system applying makeup to a video having an image of the face of a user captured thereon is characterized by image capturing means for capturing the image of the face of the user and outputting the video, control means for receiving the video output from the image capturing means, performing image processing on the video, and outputting the video; and display means for displaying the video output from the control means, wherein the control means includes face recognition means for recognizing the face of the user from the video based on predetermined tracking points; and makeup processing means for applying a predetermined makeup on the face of the user included in the video based on the tracking points and outputting the video to the display means.” <i>See Goto at para. [0007].</i> “The camera 2 captures an image of a user standing in front of the makeup simulator 1 and outputs a video.” <i>See Goto at para. [0085].</i> “The makeup simulator 1 of FIG. 1 and FIG.2, which is based on a mirror, an item indispensable for makeup, as a concept, has the function of interacting with a user. That is, the makeup simulator 1 has the characteristic of giving a user a natural feeling as if the user were putting on makeup, looking at a mirror.” <i>See Goto at para. [0088].</i> “The makeup simulator 1 performs image processing on a video output from the camera 2 in the control part 8, thereby applying makeup on a user's face included in the image, and displays the video on the monitor 7, which is a digital mirror. The makeup simulator

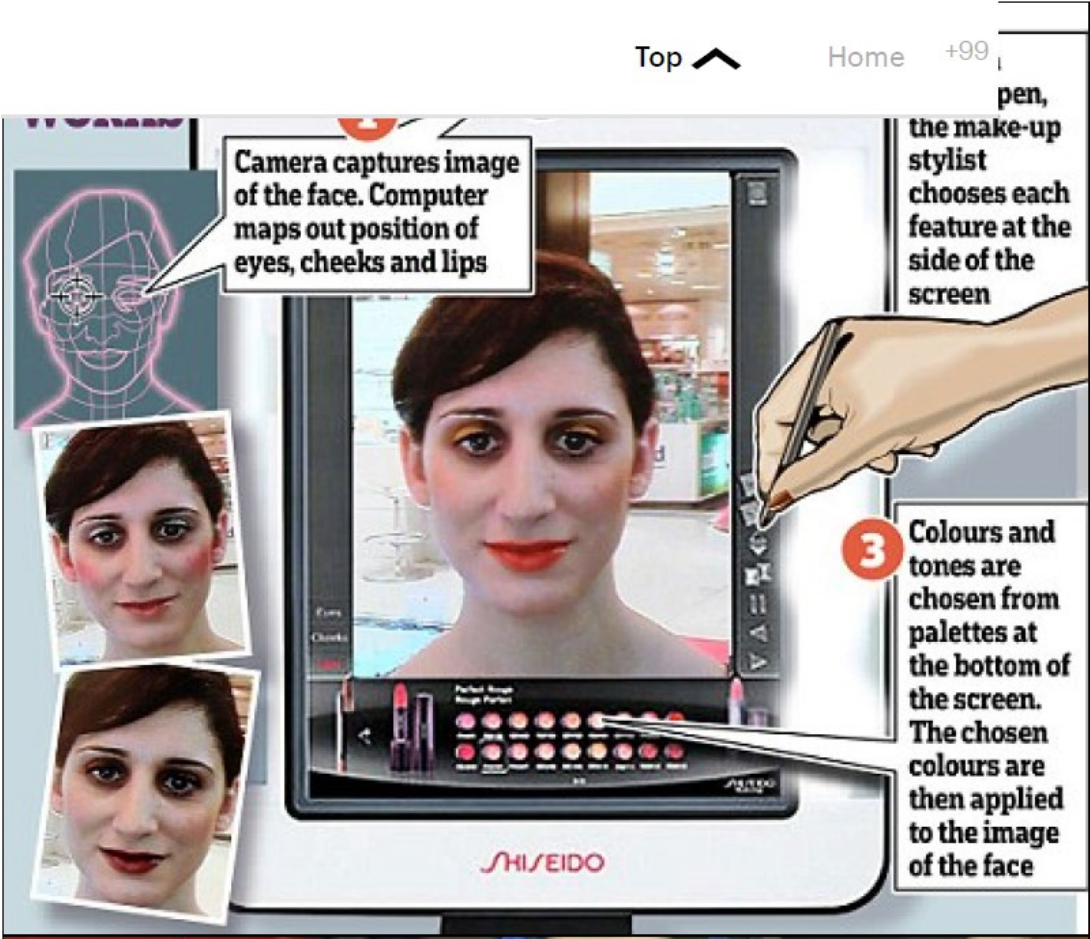
Asserted Claim of the '110 Patent	Exemplary Citations to Shiseido
	1 is capable of displaying various merchandise and cosmetic information items and the imaginary image of a user's face with makeup applied on it on the monitor 7.” <i>See</i> Goto at para. [0104]. “Proceeding to step S3, the control part 8 starts a makeup simulation based on the Software activated in step S2. At this point, the control part 8 displays the screen image 102 on the monitor 7 and displays the screen image 202 on the operations panel 4. The screen image 102 shows the case of displaying the video of the user's face captured with the camera 2 with a magic mirror-like effect on it. The screen image 202 shows the case of displaying a WELCOME message that moves laterally the same as the screen image 201.” <i>See</i> Goto at [0129]. “The image you see is a perfect mirror image. If you squint to take a closer look at the eyeshadow you just 'applied', you'll see it on the screen; turn your head slightly to see how that blusher looks and your mirror image will do likewise.” <i>See</i> Daily Mail at 2.

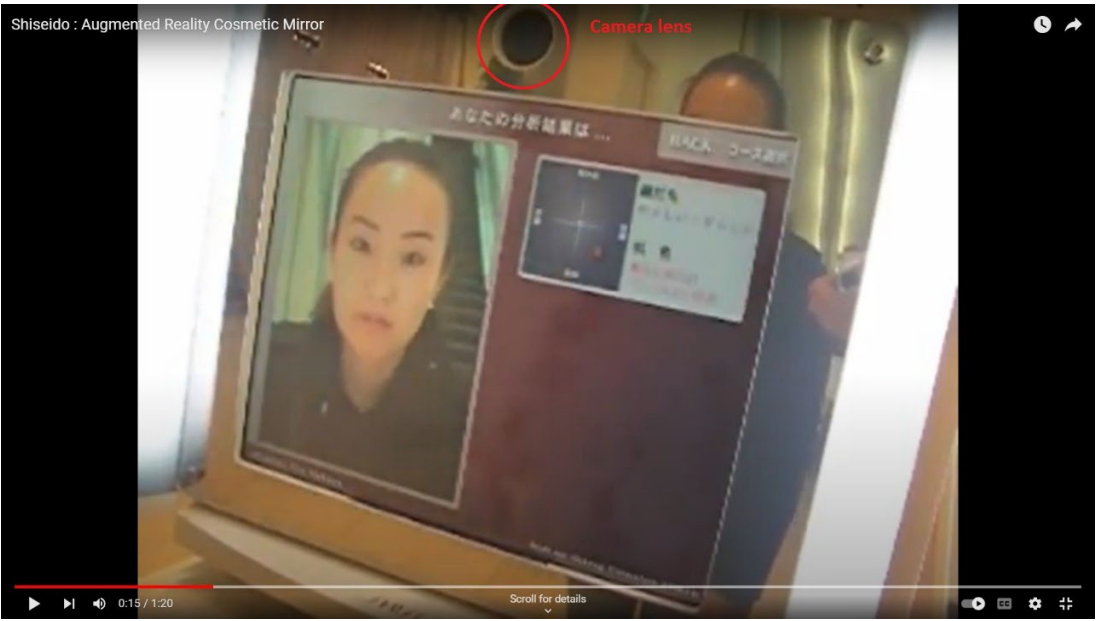
Asserted Claim of the '110 Patent	Exemplary Citations to Shiseido
	 See Daily Mail at 3.

Asserted Claim of the '110 Patent	Exemplary Citations to Shiseido
	“The augmented reality Shiseido makeup mirror is pretty simple. Just sit down in front of the mirror and let the camera take a picture of your face. After that, you can easily see what the latest cosmetic products would look on your face.” <i>See</i> Trend Hunter at 2.  <i>See</i> YouTube at 0:015. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Shiseido alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants’ Invalidity Contentions and Defendants’ other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.
1[e]. wherein the different point of view corresponds to an image taken from a	Shiseido expressly and/or inherently discloses and/or renders obvious wherein the different point of view corresponds to an image taken from a different angle and a

Asserted Claim of the '110 Patent	Exemplary Citations to Shiseido
different angle and a different distance than the actual images captured by the camera; and	different distance than the actual images captured by the camera. <i>See, e.g.</i>, disclosures below. “The makeup simulator 1 of FIG. 5 and FIG. 6, which is based on a mirror, an item indispensable for makeup, as a concept, has the function of interacting with a user. That is, the makeup simulator 1 has the characteristic of giving a user a natural feeling as if the user were putting on makeup, looking at a mirror. The makeup simulator 1 performs image processing on a video output from the camera 2 in the control part 8, thereby applying makeup on a user's face included in the image, and displays the video on the monitor 7, which is a digital mirror. The makeup simulator 1 is capable of displaying various merchandise and cosmetic information items and the imaginary image of a user's face with makeup applied on it on the monitor 7.” <i>See Goto</i> at para. [0103]-[0104]. “The makeup simulator 1 of FIG. 7 and FIG. 8, which is based on a mirror, an item indispensable for makeup, as a concept, has the function of interacting with a user. That is, the makeup simulator 1 has the characteristic of giving a user a natural feeling as if the user were putting on makeup, looking at a mirror. The makeup simulator 1 performs image processing on a video output from the camera 2 in the control part 8, thereby applying makeup on a user's face included in the image, and displays the video on the touch panel monitor 15, which is a digital mirror. The makeup simulator 1 is capable of displaying various merchandise and cosmetic information items and the imaginary image of a user's face with makeup applied on it on the touch panel monitor 15.” <i>See Goto</i> at paras. [0108]-[0109]. “Created by Japanese beauty brand Shiseido, the simulator allows users to virtually apply make-up to eyes, lips and cheeks. ...

Asserted Claim of the '110 Patent	Exemplary Citations to Shiseido
	A camera on the device captures your face and works out where your eyes, nose and mouth are. ... The image you see is a perfect mirror image. If you squint to take a closer look at the eyeshadow you just 'applied', you'll see it on the screen; turn your head slightly to see how that blusher looks and your mirror image will do likewise.” <i>See Daily Mail</i> at 2.

Asserted Claim of the '110 Patent	Exemplary Citations to Shiseido
	 See Daily Mail at 3.

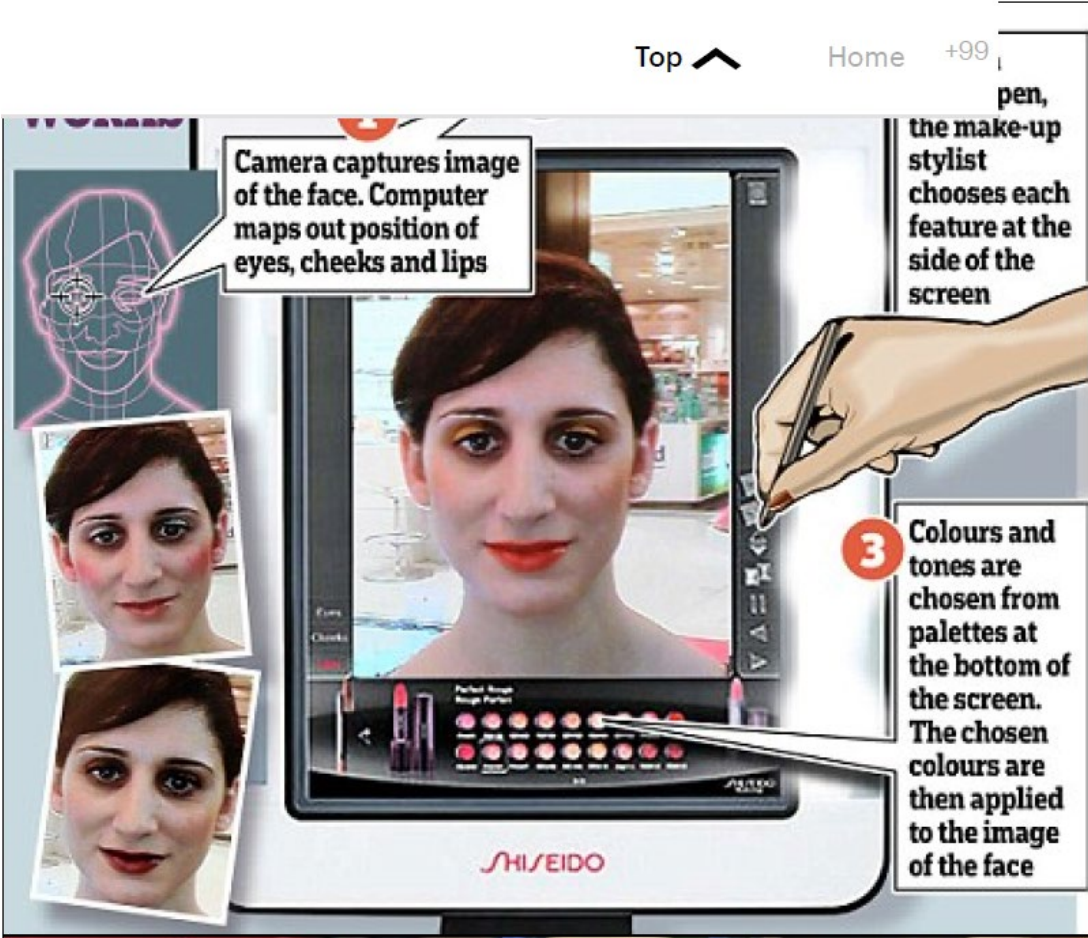
Asserted Claim of the '110 Patent	Exemplary Citations to Shiseido
	“If I was a woman or a man who wore makeup, I would flip over this augmented reality Shiseido makeup mirror. . . . The augmented reality Shiseido makeup mirror is pretty simple. Just sit down in front of the mirror and let the camera take a picture of your face. After that, you can easily see what the latest cosmetic products would look on your face.” See Trend Hunter at 2.  See YouTube at 0:015.

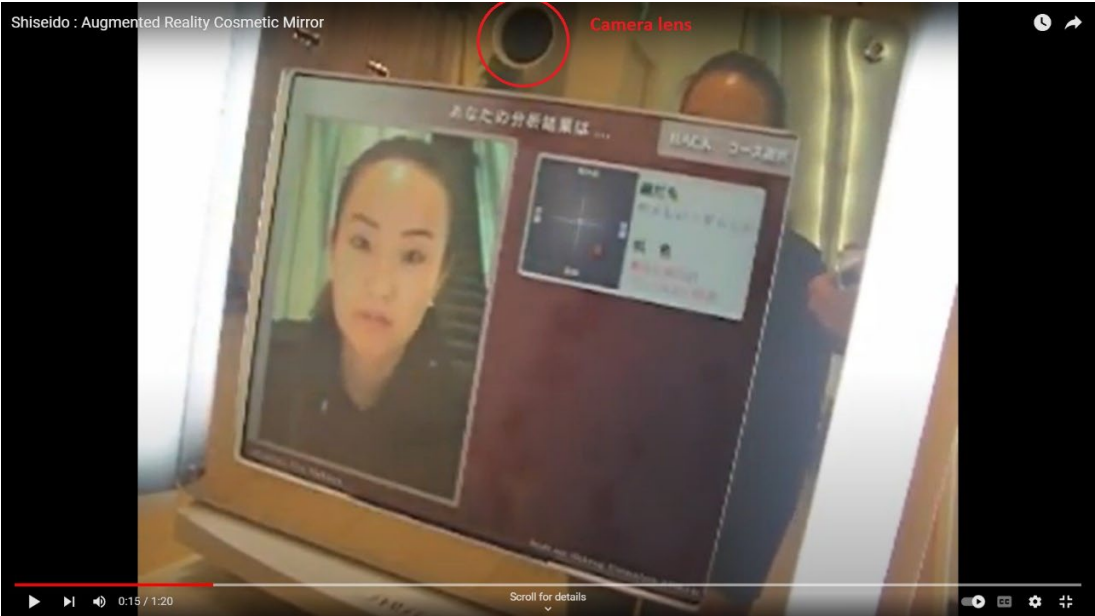
Asserted Claim of the '110 Patent	Exemplary Citations to Shiseido
	This limitation would have been obvious to a person of ordinary skill in the art based on (1) Shiseido alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.
1[f]. wherein during mirror tracking mode the processor utilizes the angle of the images captured by the camera and applies parametric input for a mapping transformation that changes imaging perspective of the images captured by the camera.	Shiseido expressly and/or inherently discloses and/or renders obvious wherein during mirror tracking mode the processor utilizes the angle of the images captured by the camera and applies parametric input for a mapping transformation that changes imaging perspective of the images captured by the camera. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Shiseido alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

Asserted Claim of the '110 Patent	Exemplary Citations to Shiseido
Claim 2	
2. The method of claim 1, wherein the mapping transformation comprises a combination of at least two of the following transformations: vertical flips about a vertical axis, a projection transformation, rotation, resize, two-dimensional offset, optic distortion correction, and polynomial mapping on part or entire captured image.	Shiseido expressly and/or inherently discloses and/or renders obvious wherein the mapping transformation comprises a combination of at least two of the following transformations: vertical flips about a vertical axis, a projection transformation, rotation, resize, two-dimensional offset, optic distortion correction, and polynomial mapping on part or entire captured image. <i>See, e.g.</i>, disclosures below. "The makeup simulator 1 of FIG. 5 and FIG. 6, which is based on a mirror, an item indispensable for makeup, as a concept, has the function of interacting with a user. That is, the makeup simulator 1 has the characteristic of giving a user a natural feeling as if the user were putting on makeup, looking at a mirror.

Asserted Claim of the '110 Patent	Exemplary Citations to Shiseido
	The makeup simulator 1 performs image processing on a video output from the camera 2 in the control part 8, thereby applying makeup on a user's face included in the image, and displays the video on the monitor 7, which is a digital mirror. The makeup simulator 1 is capable of displaying various merchandise and cosmetic information items and the imaginary image of a user's face with makeup applied on it on the monitor 7.” <i>See Goto</i> at para. [0103]-[0104]. “The makeup simulator 1 of FIG. 7 and FIG. 8, which is based on a mirror, an item indispensable for makeup, as a concept, has the function of interacting with a user. That is, the makeup simulator 1 has the characteristic of giving a user a natural feeling as if the user were putting on makeup, looking at a mirror. The makeup simulator 1 performs image processing on a video output from the camera 2 in the control part 8, thereby applying makeup on a user's face included in the image, and displays the video on the touch panel monitor 15, which is a digital mirror. The makeup simulator 1 is capable of displaying various merchandise and cosmetic information items and the imaginary image of a user's face with makeup applied on it on the touch panel monitor 15.” <i>See Goto</i> at paras. [0108]-[0109]. “FIG. 21 is a flowchart showing the lipstick processing. Broadly speaking, the lipstick processing includes the advance preparation of step S10 and the coloring of step S20. The advance preparation includes the cutting out and rotation of step S11, the creation of an image for outline extraction of step S12, the outline extraction of step S13, the spline curve generation of FIG. 14, the return rotation of step S15, and the coloring map generation of step S16. The coloring includes the coloring-map-based coloring of step S21 and the drawing for debugging and designing of step S22. Proceeding to the cutting out and rotation of step S11, the lipstick processing part 39 cuts out a partial image 500 containing the lips of the user's face from the image for face recognition, and obtains a partial image 501 by rotating the partial image 500 to a position for processing.” <i>See Goto</i> at paras. [0167]-[0168].

Asserted Claim of the '110 Patent	Exemplary Citations to Shiseido
	“Created by Japanese beauty brand Shiseido, the simulator allows users to virtually apply make-up to eyes, lips and cheeks. ... A camera on the device captures your face and works out where your eyes, nose and mouth are. ... The image you see is a perfect mirror image. If you squint to take a closer look at the eyeshadow you just 'applied', you'll see it on the screen; turn your head slightly to see how that blusher looks and your mirror image will do likewise.” <i>See Daily Mail</i> at 2.

Asserted Claim of the '110 Patent	Exemplary Citations to Shiseido
	 Top ^ Home +99 pen, the make-up stylist chooses each feature at the side of the screen Camera captures image of the face. Computer maps out position of eyes, cheeks and lips 3 Colours and tones are chosen from palettes at the bottom of the screen. The chosen colours are then applied to the image of the face SHISEIDO See Daily Mail at 3.

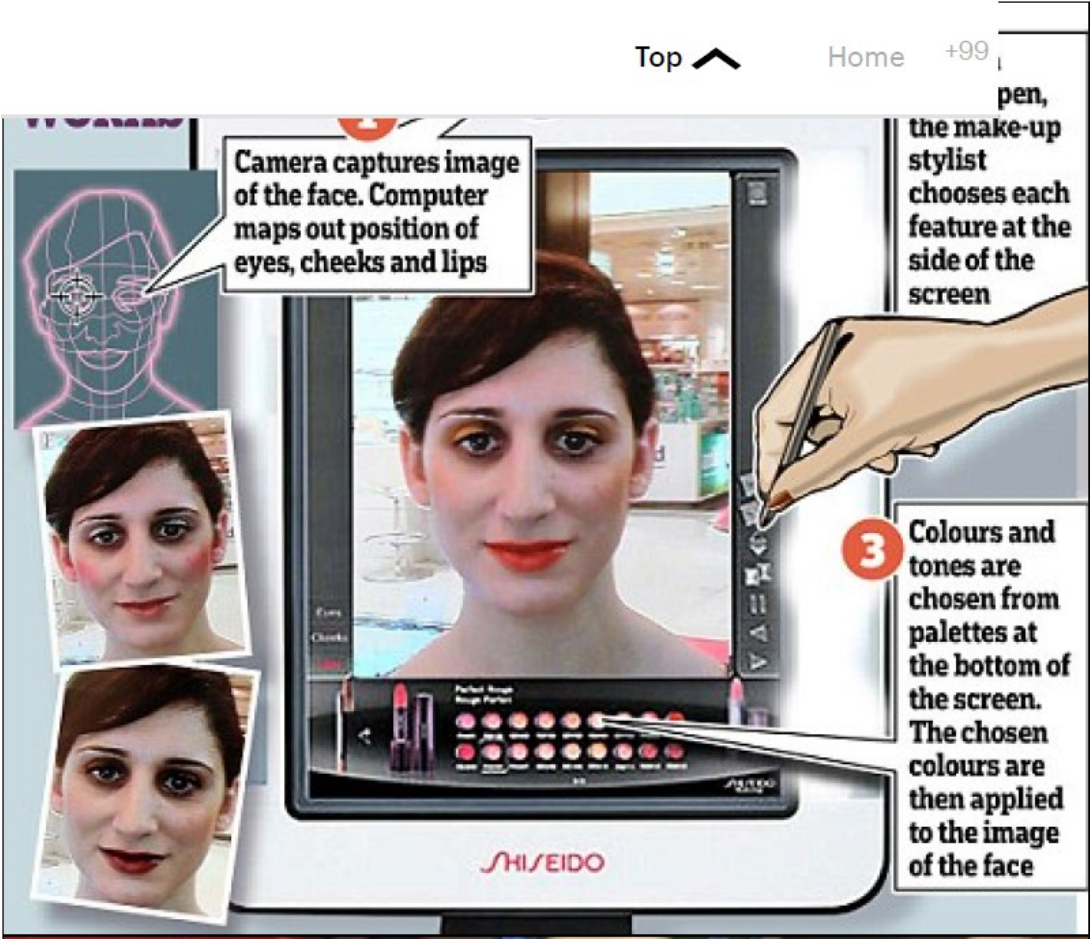
Asserted Claim of the '110 Patent	Exemplary Citations to Shiseido
	“If I was a woman or a man who wore makeup, I would flip over this augmented reality Shiseido makeup mirror. ... The augmented reality Shiseido makeup mirror is pretty simple. Just sit down in front of the mirror and let the camera take a picture of your face. After that, you can easily see what the latest cosmetic products would look on your face.” See Trend Hunter at 2.  See YouTube at 0:015. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Shiseido alone; (2) knowledge of a personal of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of

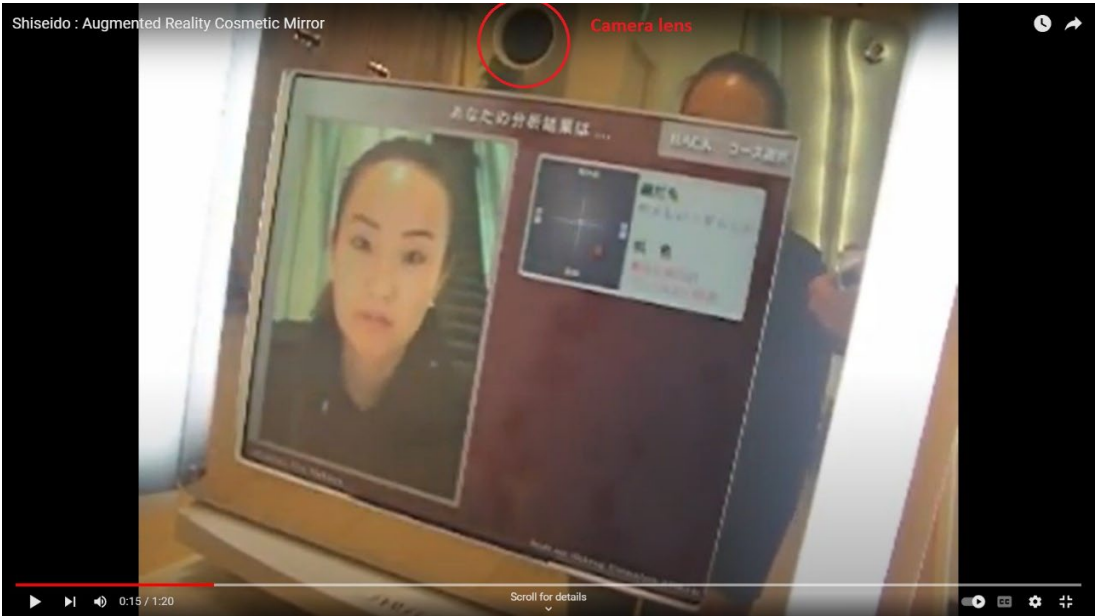
Asserted Claim of the '110 Patent	Exemplary Citations to Shiseido
	Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

Asserted Claim of the '110 Patent	Exemplary Citations to Shiseido
Claim 3	
3. The method of claim 1, wherein during idle mode the camera continuously sends captured images to the processor, and the user presence is identified by the processor detecting a body part in the images.	Shiseido expressly and/or inherently discloses and/or renders obvious wherein during idle mode the camera continuously sends captured images to the processor, and the user presence is identified by the processor detecting a body part in the images. <i>See, e.g.</i>, disclosures below. “The control part 8 is continuously receiving a video captured by the camera 2. At this point, the control part 8 displays the screen image 100 on the monitor 7 and the screen image 200 on the operations panel 4. The screen images 100 and 200 show the case of displaying screen savers.” <i>See Goto at para. [0125].</i> “Unlike those based on still images or the conventional makeup simulator 1, the makeup simulator 1 of the present invention, which performs a real-time simulation, is capable of instantaneously recognizing tracking points of a face and performing simulation based on the tracking points. Therefore, the makeup simulator 1 enables the following that have not been possible so far. The makeup simulator 1 of the present invention is capable of a real-time simulation. The makeup simulator 1 of the present invention is capable of simulation not only from a full face as conventionally but also from a face in profile. Accordingly, it is easy to view the simulation effect or technique of blusher or the like.” <i>See Goto at paras. [0123]-[0124].</i>

Asserted Claim of the '110 Patent	Exemplary Citations to Shiseido
	“A screen image 300 shows the case of displaying the video of a user's face captured with the camera 2. The makeup simulator 1 recognizes the user's face included in the video, and cuts out a still image 301 of the user's face.” <i>See</i> Goto at para. [0141]. “The simulator main application 28 obtains a pre-makeup image by trimming the original image. Further, the simulator main application 28 obtains an image for face recognition by reducing the original image. A face recognition part 33 obtains tracking points 34 for recognizing a user's face as described below from the image for face recognition by FFT (fast Fourier transform).” <i>See</i> Goto at para. [0151]. “FIG. 16 is a screen image diagram showing processing performed by the simulator main application. A screen image 400 shows the case of displaying a pre-makeup image. The screen image 401 shows the case of displaying the tracking points 34 obtained from the image for face recognition over the pre makeup image. Further, the screen image 402 shows the case of displaying a post-makeup image where a makeup is applied on the user's face included in the pre-makeup image based on the tracking points 34.” <i>See</i> Goto at para. [0159]. “The shadow processing part 38 included in the simulator main application 28 performs shadow processing, referring to the tracking points 34, three on the eye and one on the eyebrow, for each of the right side and the left side as shown in FIG. 28. FIG. 28 is an image diagram showing the tracking points referred to by the shadow processing.” <i>See</i> Goto at para. [0179]. “Proceeding to the basic outline generation of step S31, the shadow processing part 38 obtains the shape of an eye of the user's face like a partial image 900 from the image for face recognition. FIG. 30 is an image diagram showing the basic outline generation. The shadow processing part 38 searches upward and downward from the center of the eye and recognizes two points of the outline of the eye (upper-side boundary and lower-side boundary) as shown in a partial image 1001 in order to generate an outline to serve as the base of a coloring outline. The shadow processing part 38 adds four points

Asserted Claim of the '110 Patent	Exemplary Citations to Shiseido
	generated by spline interpolation to the four points: the two recognized points of the eye outline, the outer corner of the eye, and the inner corner of the eye, and generates a polygon by the total of eight points like a partial image 1002. Proceeding to the coloring outline generation of step S41, the shadow processing part 38 generates a coloring outline like a partial image 901. FIG. 31 is an image diagram showing the coloring outline generation. The shadow processing part 38 generates a coloring outline based on the outer corner and the inner corner of the eye as shown in a partial image 1101 in order to generate the coloring outline. Parameters may be specified with a GUI for extending the outline or shifting vertexes.” <i>See Goto</i> at paras. [0182]-[0184]. “A camera on the device captures your face and works out where your eyes, nose and mouth are. ... The image you see is a perfect mirror image. If you squint to take a closer look at the eyeshadow you just 'applied', you'll see it on the screen; turn your head slightly to see how that blusher looks and your mirror image will do likewise.” <i>See Daily Mail</i> at 2.

Asserted Claim of the '110 Patent	Exemplary Citations to Shiseido
	 See Daily Mail at 3.

Asserted Claim of the '110 Patent	Exemplary Citations to Shiseido
	“The augmented reality Shiseido makeup mirror is pretty simple. Just sit down in front of the mirror and let the camera take a picture of your face. After that, you can easily see what the latest cosmetic products would look on your face.” <i>See</i> Trend Hunter at 2.  <i>See</i> YouTube at 0:015. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Shiseido alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants’ Invalidity Contentions and Defendants’ other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

Asserted Claim of the '110 Patent	Exemplary Citations to Shiseido
Claim 4	
4. The method of claim 3, wherein the body part comprises one of legs, face, eyes, and hands.	Shiseido expressly and/or inherently discloses and/or renders obvious wherein the body part comprises one of legs, face, eyes, and hands. <i>See, e.g.</i>, disclosures below. “Proceeding to step S1, the control part is continuously determining whether a user's face is included in the received video. The control part 8 repeatedly performs the processing of step S1 (NO in S1) until it recognizes that a user's face is included in the video. If the control part 8 recognizes that a user's face is included in the video (YES in S1), it proceeds to step S2 to activate software containing a makeup simulation program for performing a makeup simulation. At this point, the control part 8 displays the screen image 101 on the monitor 7, and displays the screen image 201 on the operations panel 4. The screen image 101 shows the case of displaying the video of the user's face captured with the camera 2. The screen image 201 shows the case of displaying a WELCOME message that moves laterally.” <i>See Goto</i> at paras. [0126]-[0128]. “A screen image 300 shows the case of displaying the video of a user's face captured with the camera 2. The makeup simulator 1 recognizes the user's face included in the video, and cuts out a still image 301 of the user's face.” <i>See Goto</i> at para. [0141]. “The simulator main application 28 obtains a pre-makeup image by trimming the original image. Further, the simulator main application 28 obtains an image for face recognition by reducing the original image. A face recognition part 33 obtains tracking points 34 for recognizing a user's face as described below from the image for face recognition by FFT (fast Fourier transform).” <i>See Goto</i> at para. [0151]. “FIG. 16 is a screen image diagram showing processing performed by the simulator main application. A screen image 400 shows the case of displaying a pre-makeup image. The screen image 401 shows the case of displaying the tracking points 34 obtained from the image for face recognition over the pre makeup image. Further, the screen image 402

Asserted Claim of the '110 Patent	Exemplary Citations to Shiseido
	shows the case of displaying a post-makeup image where a makeup is applied on the user's face included in the pre-makeup image based on the tracking points 34.” <i>See</i> Goto at para. [0159]. “The shadow processing part 38 included in the simulator main application 28 performs shadow processing, referring to the tracking points 34, three on the eye and one on the eyebrow, for each of the right side and the left side as shown in FIG. 28. FIG. 28 is an image diagram showing the tracking points referred to by the shadow processing.” <i>See</i> Goto at para. [0179]. “Proceeding to the basic outline generation of step S31, the shadow processing part 38 obtains the shape of an eye of the user's face like a partial image 900 from the image for face recognition. FIG. 30 is an image diagram showing the basic outline generation. The shadow processing part 38 searches upward and downward from the center of the eye and recognizes two points of the outline of the eye (upper-side boundary and lower-side boundary) as shown in a partial image 1001 in order to generate an outline to serve as the base of a coloring outline. The shadow processing part 38 adds four points generated by spline interpolation to the four points: the two recognized points of the eye outline, the outer corner of the eye, and the inner corner of the eye, and generates a polygon by the total of eight points like a partial image 1002. Proceeding to the coloring outline generation of step S41, the shadow processing part 38 generates a coloring outline like a partial image 901. FIG. 31 is an image diagram showing the coloring outline generation. The shadow processing part 38 generates a coloring outline based on the outer corner and the inner corner of the eye as shown in a partial image 1101 in order to generate the coloring outline. Parameters may be specified with a GUI for extending the outline or shifting vertexes.” <i>See</i> Goto at paras. [0182]-[0184]. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Shiseido alone; (2) knowledge of a personal of ordinary skill in the art, and/or (3) the

Asserted Claim of the '110 Patent	Exemplary Citations to Shiseido
	teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

Asserted Claim of the '110 Patent	Exemplary Citations to Shiseido
Claim 5	
5. The method of claim 1, further comprising receiving user input and operating the processor to vary image magnitude or field-of-view of the modified images according to the user input.	Shiseido expressly and/or inherently discloses and/or renders obvious further comprising receiving user input and operating the processor to vary image magnitude or field-of-view of the modified images according to the user input. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Shiseido alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

Asserted Claim of the '110 Patent	Exemplary Citations to Shiseido
Claim 6	
6. The method of claim 5, wherein the processor varies the image magnitude or field-of-view mapping to display a partial or full body of the user in the modified images.	Shiseido expressly and/or inherently discloses and/or renders obvious wherein the processor varies the image magnitude or field-of-view mapping to display a partial or full body of the user in the modified images. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Shiseido alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and

Asserted Claim of the '110 Patent	Exemplary Citations to Shiseido
	Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

Asserted Claim of the '110 Patent	Exemplary Citations to Shiseido
Claim 10	
10. The method of claim 1, further comprising operating the processor to augment the modified images by overlaying virtual objects on a user's image appearing within the modified images.	Shiseido expressly and/or inherently discloses and/or renders obvious operating the processor to augment the modified images by overlaying virtual objects on a user's image appearing within the modified images. <i>See, e.g.</i>, disclosures below. “The makeup simulator 1 performs image processing on a video output from the camera 2 in the control part 8, thereby applying makeup on a user's face included in the image, and displays the video on the monitor 7, which is a digital mirror. The makeup simulator 1 is capable of displaying various merchandise and cosmetic information items and the imaginary image of a user's face with makeup applied on it on the monitor 7.” <i>See Goto</i> at para. [0104]. “The touch panel monitor 15 displays an operation image and outputs operation information in response to reception of an operation from a user. The touch panel monitor 15 displays an operation image output from the control part 8 and outputs operation information to the control part 8 in response to reception of an operation from a user. The touch panel monitor 15 displays a video (main image) output from the control part 8. The control part 8 receives a video output from the camera 2, applies makeup on a user's face included in the video by performing image processing on the video as described below, and outputs the video to the touch panel monitor 15.” <i>See Goto</i> at para. [0107].

Asserted Claim of the '110 Patent	Exemplary Citations to Shiseido
	“The screen image 101 shows the case of displaying the video of the user's face captured with the camera 2. The screen image 201 shows the case of displaying a WELCOME message that moves laterally. Proceeding to step S3, the control part 8 starts a makeup simulation based on the software activated in step S2. At this point, the control part 8 displays the screen image 102 on the monitor 7 and displays the screen image 202 on the operations panel 4. The screen image 102 shows the case of displaying the video of the user's face captured with the camera 2 with a magic mirror-like effect on it. The screen image 202 shows the case of displaying a WELCOME message that moves laterally the same as the screen image 201.” <i>See Goto at paras. [0128]-[0129].</i> “FIG. 16 is a screen image diagram showing processing performed by the simulator main application. A screen image 400 shows the case of displaying a pre-makeup image. The screen image 401 shows the case of displaying the tracking points 34 obtained from the image for face recognition over the pre makeup image. Further, the screen image 402 shows the case of displaying a post-makeup image where a makeup is applied on the user's face included in the pre-makeup image based on the tracking points 34.” <i>See Goto at para. [0159].</i> “Proceeding to the deformed eyebrow pasting of step S90, the eyebrow processing part 37 obtains a post-makeup image by pasting the deformed eyebrow to a pre-makeup image.” <i>See Goto at para. [0204].</i>

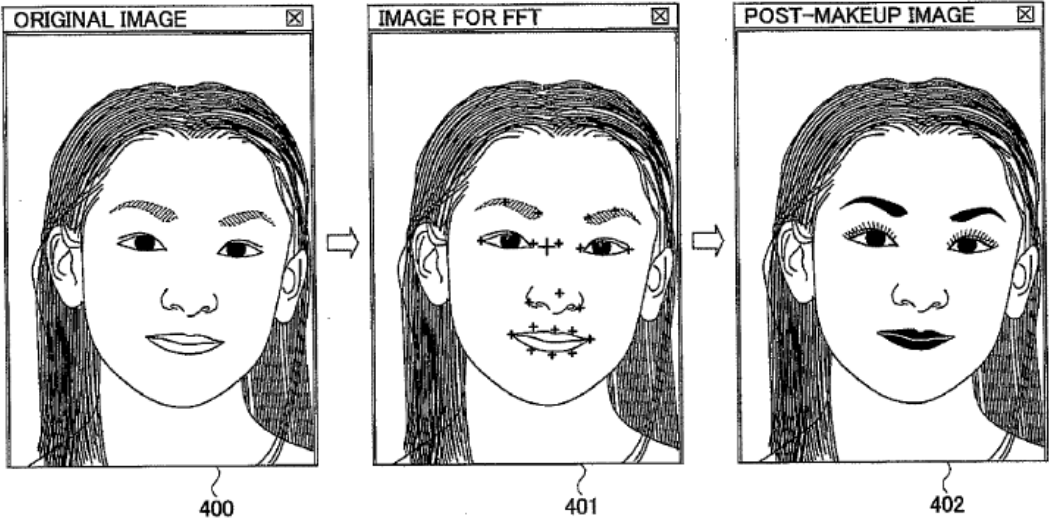
Asserted Claim of the '110 Patent	Exemplary Citations to Shiseido
	FIG.16  The diagram illustrates a three-step process for digital makeup application. Step 1 (400) shows the 'ORIGINAL IMAGE' of a woman's face. Step 2 (401) shows the 'IMAGE FOR FFT' (Fast Fourier Transform), where the face is marked with crosshairs to identify key features like the eyes, nose, and mouth. Step 3 (402) shows the 'POST-MAKEUP IMAGE', where digital makeup has been applied to the identified features. The images are presented in a sequence with arrows indicating the flow from the original image to the feature-mapped image, and finally to the post-makeup image.

FIG.37

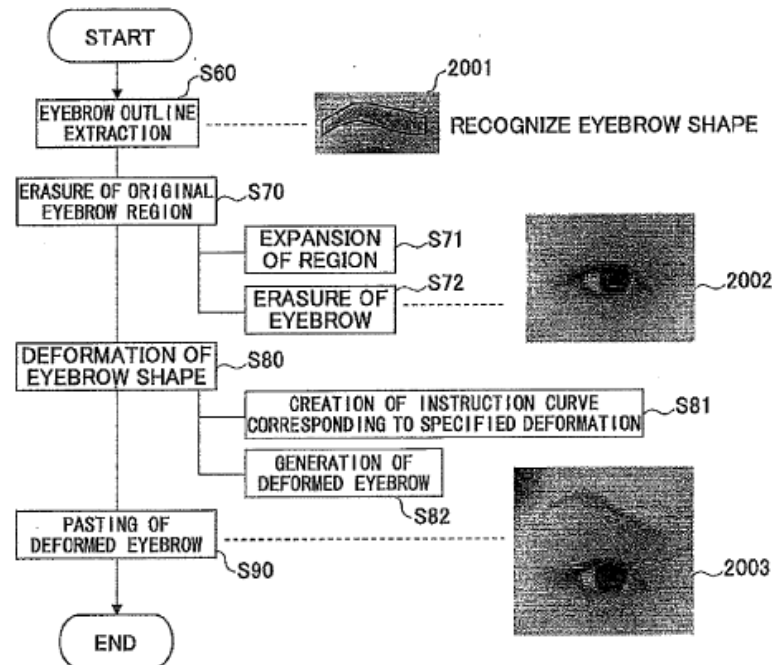
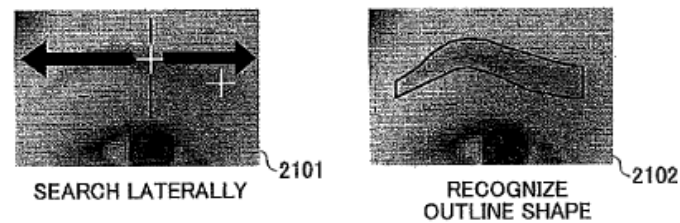
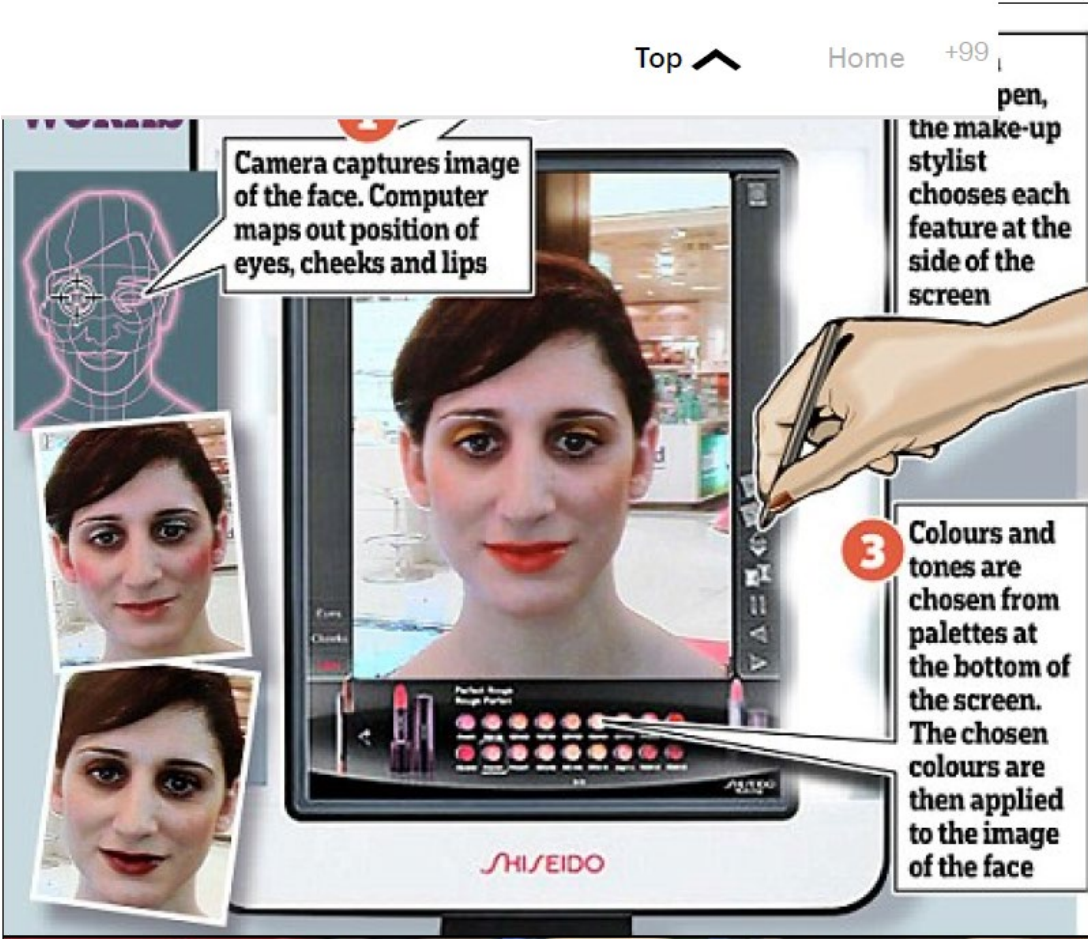


FIG.38



Asserted Claim of the '110 Patent	Exemplary Citations to Shiseido
	<i>See Goto at FIGS. 16, 37-38.</i> “Created by Japanese beauty brand Shiseido, the simulator allows users to virtually apply make-up to eyes, lips and cheeks. ... A camera on the device captures your face and works out where your eyes, nose and mouth are. ... The image you see is a perfect mirror image. If you squint to take a closer look at the eyeshadow you just 'applied', you'll see it on the screen; turn your head slightly to see how that blusher looks and your mirror image will do likewise.” <i>See Daily Mail at 2.</i>

Asserted Claim of the '110 Patent	Exemplary Citations to Shiseido
	 See Daily Mail at 3.

Asserted Claim of the '110 Patent	Exemplary Citations to Shiseido
	“If I was a woman or a man who wore makeup, I would flip over this augmented reality Shiseido makeup mirror. ... The augmented reality Shiseido makeup mirror is pretty simple. Just sit down in front of the mirror and let the camera take a picture of your face. After that, you can easily see what the latest cosmetic products would look on your face.” <i>See</i> Trend Hunter at 2. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Shiseido alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants’ Invalidity Contentions and Defendants’ other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

Asserted Claim of the '110 Patent	Exemplary Citations to Shiseido
Claim 11	
11. The method of claim 1, further comprising operating the processor to transmit the modified image over a network.	Shiseido expressly and/or inherently discloses and/or renders obvious operating the processor to transmit the modified image over a network. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Shiseido alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants’ Invalidity Contentions and Defendants’ other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

Asserted Claim of the '110 Patent	Exemplary Citations to Shiseido
Claim 12	
12. The method of claim 1, further comprising displaying the modified image on a remote screen for video telepresence.	Shiseido expressly and/or inherently discloses and/or renders obvious displaying the modified image on a remote screen for video telepresence. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Shiseido alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

Asserted Claim of the '110 Patent	Exemplary Citations to Shiseido
Claim 16	
16. The method of claim 1, wherein the processor operates on the images from the camera to generate background segmentation, and replaces segments on the images by replacement segments.	Shiseido expressly and/or inherently discloses and/or renders obvious wherein the processor operates on the images from the camera to generate background segmentation, and replaces segments on the images by replacement segments. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Shiseido alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

Asserted Claim of the '110 Patent	Exemplary Citations to Shiseido
Claim 17	
17. The method of claim 16, wherein the replacement segments comprise virtual	Shiseido expressly and/or inherently discloses and/or renders obvious wherein the replacement segments comprise virtual background or background that was captured in a different setting. This limitation would have been obvious to a person of ordinary skill

Asserted Claim of the '110 Patent	Exemplary Citations to Shiseido
background or background that was captured in a different setting.	in the art based on (1) Shiseido alone; (2) knowledge of a personal of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

Exhibit B-26: Invalidity of U.S. Patent No. 8,982,110 in view of Human-Computer Interface System (“Francois III”)

This chart is subject to all reservations, objections, and disclaimers in Defendants’ Invalidity Contentions and any amendment, supplement, or modification thereof, which are incorporated herein by reference in their entirety.

The Human-Computer Interface System (“Francois III”) expressly and/or inherently discloses and/or renders obvious the Asserted Claims of U.S. Patent No. 8,982,110 (the “’110 Patent”), as set forth in the chart below. On information and belief, Francois III is described at least in the following documents:

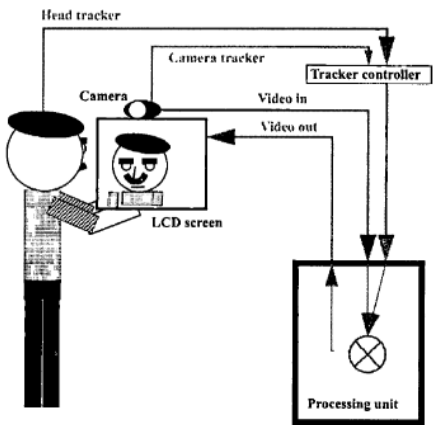
- (i) *A Handheld Mirror Simulation*, Francois et al. (2003);
- (ii) Integrated Media Systems Center, Alexandre R.J. Francois et al., *A Handheld Virtual Mirror* (2002)

Francois III anticipates the Asserted Claims of the ’110 Patent. To the extent it is found Francois III does not expressly disclose certain limitations in the Asserted Claims, such limitations are at least implicitly or inherently disclosed. Moreover, to the extent it is found that Francois III does not anticipate the Asserted Claims, Francois III renders obvious the asserted claim, either alone or in combination with other prior art identified in the cover pleading or herein, and/or in combination with the general knowledge of a person having ordinary skill in the art. Further, to the extent relevant, this chart herein incorporates by reference and in its entirety the chart for *A Handheld Virtual Mirror*, Francois et al.; *A Handheld Mirror Simulation*, Francois et al.; *Mirror symmetry -> 2-view stereo geometry*, Francois et al.; *Software Architecture for Computer Vision: Beyond Pipes and Filters*, Francois; *Software Architecture for Immersipresence*, Francois; *An Architectural Framework for the Design, Analysis and Implementation of Interactive Systems*, Francois (“Francois II”), (Exhibit B-03) for the ’110 Patent.

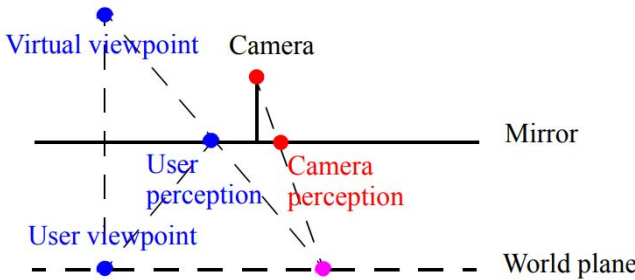
In these contentions, Defendants have relied in part on Plaintiff’s Infringement Contentions. In those contentions, Plaintiff appears to pursue overly broad claim constructions in an effort to assert infringement where none exists, and to accuse products that do not infringe the claims. Defendants’ assertion that a particular limitation is disclosed by a prior art reference and/or is disclosed in a particular manner may be based in part on Plaintiff’s apparent claim interpretations. In relying on Plaintiff’s apparent claim interpretations, Defendants do not admit that Plaintiff’s apparent claim interpretations are supportable or proper or that the claim limitations in question are definite or otherwise amenable to construction.

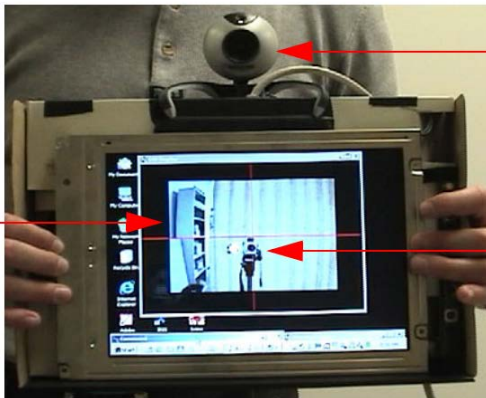
Defendants have endeavored to provide as much detail as possible in these contentions and, in doing so, have exceeded the level of detail required. The inclusion of specific details in some areas is not a concession that such details are required or that the omission of similar details in other areas is a defect. These citations to portions of any reference in this chart are exemplary only. Defendants will rely on the entirety of the references cited in this chart to show that the Asserted Claims are invalid.

Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
Claim 1	
1[pre]. A computerized method for operating a display system, the display system having a camera, a monitor, and a processor, the method comprising:	To the extent the preamble is limiting, Francois III expressly and/or inherently discloses and/or renders obvious this limitation. <i>See, e.g.</i>, disclosures below. “We present the design and construction of a handheld mirror simulation device. The perception of the world reflected through a mirror depends on the viewer’s position with respect to the mirror and the 3-D geometry of the world. In order to simulate a real mirror on a computer screen, images of the observed world, consistent with the viewer’s position, must be synthesized and displayed in realtime. Our system is build [sic] around a LCD screen manipulated by the user, a single camera fixed on the screen, and a tracking device. The continuous input video stream and tracker data is used to synthesize, in real-time, a continuous video stream displayed on the LCD screen. The synthesized video stream is a close approximation of what the user would see on the screen surface if it were a real mirror. Our system provides a generic interface for applications involving rich, first-person interaction, such as the Virtual Daguerreotype.” <i>See A Handheld Mirror Simulation</i>, Francois et al. (2003), Abstract, page 745. “We present the design and construction of a handheld mirror simulation device. Rather than attempting to solve the difficult vision problem of a general, exact mirror simution [sic], our focus is on the design and construction of a first person Human-Computer Interface (HCI) to be used in new interactive experiments and applications. While remaining simple, our first prototype must provide a better experience to the user than the traditional fixed camera / fixed display / horizontal image flip mirror setting. A major novelty in our approach is the hands-on aspect, which requires a more elaborate model to convincingly reproduce the interaction between the user and the mirror as an object. One important clue is the evolution of the user’s field of view in the mirror as her position with respect to the mirror changes. Furthermore, our goal is to produce a working but extensible system, to serve as a platform for future enhancements to the HCI device subsystem itself, as well as to allow easy integration in applications

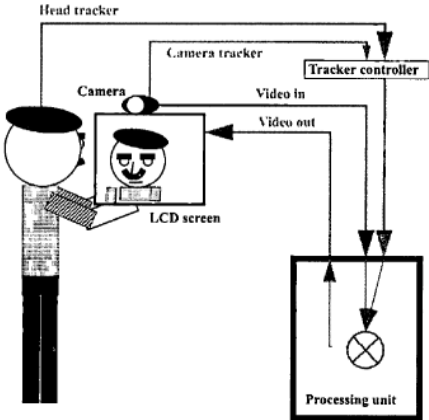
Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
	Our system is composed of a handheld LCD screen manipulated by the user, a single camera fixed on the screen, and two 6 degrees of freedom trackers giving in real time the positions and orientations of the camera and the user's head. The major system components and their relations are illustrated in figure 1. The user sees on the screen what they would see on a real mirror. The perception of the world reflected through a mirror depends on the viewer's position with respect to the mirror and the 3-D geometry of the world. In order to simulate a real mirror on a computer screen, images of the observed world, consistent with the viewer's position, must be synthesized and displayed in real-time. The continuous input video stream and tracker data is used to synthesize, in real-time, a continuous video stream displayed on the LCD screen. The synthesized video stream is a close approximation of what the user would see on the screen surface if it were a real mirror." See <i>A Handheld Mirror Simulation</i>, Francois et al. (2003), 1.INTRODUCTION, page 745.  Figure 1. Handheld mirror simulation system. See <i>A Handheld Mirror Simulation</i>, Francois et al. (2003), Fig. 1.

Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
	“This sketch presents the design and construction of a handheld virtual mirror device. The perception of the world reflected through a mirror depends on the viewer's position with respect to the mirror and the 3-D geometry of the world. In order to simulate a real mirror on a computer screen, images of the observed world, consistent with the viewer's position, must be synthesized and displayed in real-time. Our system is build around a flat LCD screen manipulated by the user, a single camera fixed on the screen, and a tracking device. The continuous input video stream and tracker data is used to synthesize, in real-time, a continuous video stream displayed on the LCD screen. The synthesized video stream is a close approximation of what the user would see on the screen surface if it were a real mirror.” See <i>A Handheld Virtual Mirror</i> (2002), at the introductory paragraph. “When a person looks into a mirror, they see what they would see from the symmetrical (virtual) point of view (figure 1). A camera whose position and orientation are fixed with respect to the mirror produces a video stream that corresponds to this particular viewpoint. In order to synthesize the images corresponding to the user's viewpoint from the images captured by the camera, we must relate them geometrically. Such a transform cannot be formulated without assumptions or knowledge about the world geometry. In our case, the focus of attention is the user's own reflection in the mirror. We thus model the world as a plane parallel to the mirror, at the user's distance from the mirror. We have shown that under these assumptions, the transform relating the camera view and the user view depends only on the relative positions of the user viewpoint and the camera center, and is reduced to a scaling and a translation. The transform is exact when the user viewpoint lies on the camera axis. This model provides a straightforward and efficient way of synthesizing the viewer's image stream from the camera stream, and provides a good approximation when the viewer's position remains close to the camera axis.” See Integrated Media Systems Center, Alexandre R.J. Francois II et al., <i>A Handheld Virtual Mirror</i> (2002), at Section 1.Problem formulation and geometric analysis. “We have implemented the mirror image transform as a module in the Modular Flow Scheduling Middleware [François 2001], the open source implementation of IMSC's software architecture for Integrated Media Systems. It is specifically designed for

Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
	parallel processing of concurrent data streams in real-time, and its modularity dramatically reduces development and integration time. The actual handheld virtual mirror system is composed of a handheld 10" LCD flat screen fitted with a camera and a magnetic tracker sensor (figure 2), a fixed processing unit, a fixed magnetic tracker transmitter, and a second magnetic tracker sensor placed on the user. Real-time camera and tracker inputs are used to synthesize the virtual mirror stream and display it in real-time on the LCD screen. The result is a very convincing handheld mirror simulation.” See Integrated Media Systems Center, Alexandre R.J. Francois II et al., <i>A Handheld Virtual Mirror</i> (2002), at Section 2.2.System integration. “The design and construction of realistic virtual mirrors represents an original experiment in Human-Computer Interface, that opens the door to various interactive experiments in entertainment, arts and communication. Use of video analysis and graphics techniques will allow to explore and interfere with what has always been a private, solitary act of a person looking in a mirror.” See Integrated Media Systems Center, Alexandre R.J. Francois II et al., <i>A Handheld Virtual Mirror</i> (2002), at Section 3.Perspectives. See <i>A Handheld Virtual Mirror</i> (2002), at Figure 1:  Figure 1. Basic mirror geometry.

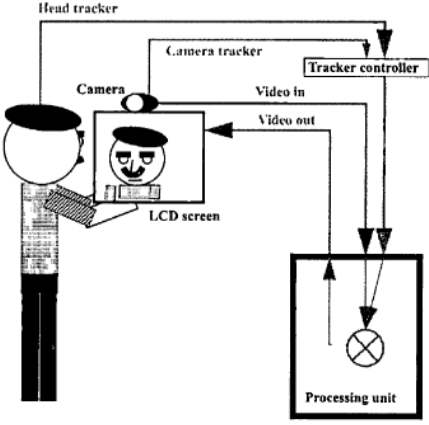
Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
	<i>See A Handheld Virtual Mirror (2002), at Figure 2:</i>  Figure 2. Handheld virtual mirror device. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Francois III alone; (2) knowledge of a personal of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.
1[a]. operating the camera to generate a stream of images of the user;	To the extent the preamble is limiting, Francois III expressly and/or inherently discloses and/or renders obvious obtaining a digital image from a camera. <i>See, e.g.</i>, disclosures below. “We present the design and construction of a handheld mirror simulation device. The perception of the world reflected through a mirror depends on the viewer’s position with respect to the mirror and the 3-D geometry of the world. In order to simulate a real mirror on a computer screen, images of the observed world, consistent with the viewer’s

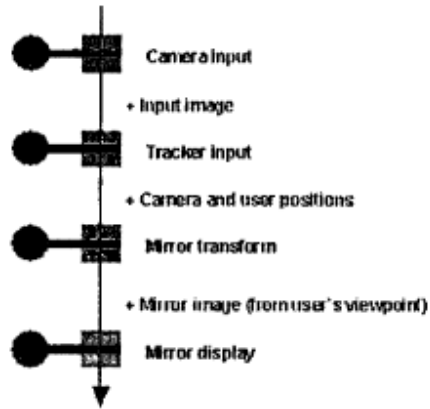
Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
	position, must be synthesized and displayed in realtime. Our system is build [sic] around a LCD screen manipulated by the user, a single camera fixed on the screen, and a tracking device. The continuous input video stream and tracker data is used to synthesize, in real-time, a continuous video stream displayed on the LCD screen. The synthesized video stream is a close approximation of what the user would see on the screen surface if it were a real mirror. Our system provides a generic interface for applications involving rich, first-person interaction, such as the Virtual Daguerreotype.” See <i>A Handheld Mirror Simulation</i>, Francois et al. (2003), Abstract, page 745. “We present the design and construction of a handheld mirror simulation device. Rather than attempting to solve the difficult vision problem of a general, exact mirror simution [sic], our focus is on the design and construction of a first person Human-Computer Interface (HCI) to be used in new interactive experiments and applications. While remaining simple, our first prototype must provide a better experience to the user than the traditional fixed camera / fixed display / horizontal image flip mirror setting. A major novelty in our approach is the hands-on aspect, which requires a more elaborate model to convincingly reproduce the interaction between the user and the mirror as an object. One important clue is the evolution of the user’s field of view in the mirror as her position with respect to the mirror changes. Furthermore, our goal is to produce a working but extensible system, to serve as a platform for future enhancements to the HCI device subsystem itself, as well as to allow easy integration in applications Our system is composed of a handheld LCD screen manipulated by the user, a single camera fixed on the screen, and two 6 degrees of freedom trackers giving in real time the positions and orientations of the camera and the user’s head. The major system components and their relations are illustrated in figure 1. The user sees on the screen what they would see on a real mirror. The perception of the world reflected through a mirror depends on the viewer’s position with respect to the mirror and the 3-D geometry of the world. In order to simulate a real mirror on a computer screen, images of the observed world, consistent with the viewer’s position, must be synthesized and displayed in real-time. The continuous input video

Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
	stream and tracker data is used to synthesize, in real-time, a continuous video stream displayed on the LCD screen. The synthesized video stream is a close approximation of what the user would see on the screen surface if it were a real mirror.” See <i>A Handheld Mirror Simulation</i>, Francois et al. (2003), 1.INTRODUCTION, page 745.  Figure 1. Handheld mirror simulation system. See <i>A Handheld Mirror Simulation</i>, Francois et al. (2003), Fig. 1. “In order to simulate a real mirror on a computer screen, images of the observed world, consistent with the viewer's position, must be synthesized and displayed in real-time. Our system is build around a flat LCD screen manipulated by the user, a single camera fixed on the screen, and a tracking device.” See Integrated Media Systems Center, Alexandre R.J. Francois II et al., <i>A Handheld Virtual Mirror</i> (2002), at the introductory paragraph. “A camera whose position and orientation are fixed with respect to the mirror produces a video stream that corresponds to this particular viewpoint. In order to synthesize the images corresponding to the user's viewpoint from the images captured by the camera,

Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
	we must relate them geometrically.” See Integrated Media Systems Center, Alexandre R.J. Francois II et al., <i>A Handheld Virtual Mirror</i> (2002), at Section 1.Problem formulation and geometric analysis. “The actual handheld virtual mirror system is composed of a handheld 10" LCD flat screen fitted with a camera and a magnetic tracker sensor (figure 2), a fixed processing unit, a fixed magnetic tracker transmitter, and a second magnetic tracker sensor placed on the user. Real-time camera and tracker inputs are used to synthesize the virtual mirror stream and display it in real-time on the LCD screen. The result is a very convincing handheld mirror simulation.” See Integrated Media Systems Center, Alexandre R.J. Francois II et al., <i>A Handheld Virtual Mirror</i> (2002), at Section 2.2.System integration. “The design and construction of realistic virtual mirrors represents an original experiment in Human-Computer Interface, that opens the door to various interactive experiments in entertainment, arts and communication. Use of video analysis and graphics techniques will allow to explore and interfere with what has always been a private, solitary act of a person looking in a mirror.” See Integrated Media Systems Center, Alexandre R.J. Francois II et al., <i>A Handheld Virtual Mirror</i> (2002), at Section 3.Perspectives. See <i>A Handheld Virtual Mirror</i> (2002), at Figure 1:

Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
	Figure 1. Basic mirror geometry. <i>See A Handheld Virtual Mirror (2002), at Figure 2:</i> Figure 2. Handheld virtual mirror device. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Francois III alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of

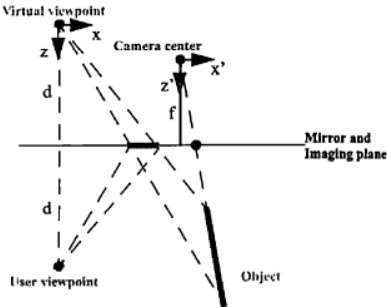
Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
	Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.
1[b]. operating the processor to detect the presence of the user in the stream of image;	Francois III expressly and/or inherently discloses and/or renders obvious operating the processor to detect the presence of the user in the stream of image. <i>See, e.g.</i>, disclosures below. “Our system is composed of a handheld LCD screen manipulated by the user, a single camera fixed on the screen, and two 6 degrees of freedom trackers giving in real time the positions and orientations of the camera and the user's head. The major system components and their relations are illustrated in figure 1. The user sees on the screen what they would see on a real mirror.” <i>See A Handheld Mirror Simulation</i>, Francois et al. (2003), 1.INTRODUCTION, page 745.  Figure 1. Handheld mirror simulation system. <i>See A Handheld Mirror Simulation</i>, Francois et al. (2003), Fig. 1 “The only parameters are f, d and $[txtytz]$. The theoretical focal length of the camera can be obtained by various calibration methods. The positions and orientations of the user's

Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
	viewpoint and the camera center provided by the tracking devices, allow to compute both the distance d and the change of referential translation parameters.” See <i>A Handheld Mirror Simulation</i>, Francois et al. (2003), 3.SYSTEM INTEGRATION, page 747.  Figure 6. Mirror simulation application graph. See <i>A Handheld Mirror Simulation</i>, Francois et al. (2003), Fig. 6. “In order to simulate a real mirror on a computer screen, images of the observed world, consistent with the viewer's position, must be synthesized and displayed in real-time. Our system is build around a flat LCD screen manipulated by the user, a single camera fixed on the screen, and a tracking device.” See Integrated Media Systems Center, Alexandre R.J. Francois II et al., <i>A Handheld Virtual Mirror</i> (2002), at the introductory paragraph. “A camera whose position and orientation are fixed with respect to the mirror produces a video stream that corresponds to this particular viewpoint. In order to synthesize the images corresponding to the user's viewpoint from the images captured by the camera, we must relate them geometrically.” See Integrated Media Systems Center, Alexandre

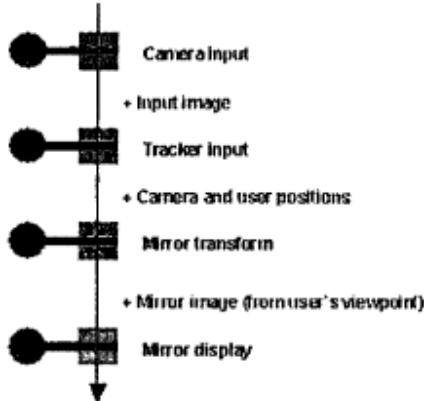
Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
	R.J. Francois II et al., <i>A Handheld Virtual Mirror</i> (2002), at Section 1.Problem formulation and geometric analysis. “The actual handheld virtual mirror system is composed of a handheld 10" LCD flat screen fitted with a camera and a magnetic tracker sensor (figure 2), a fixed processing unit, a fixed magnetic tracker transmitter, and a second magnetic tracker sensor placed on the user. Real-time camera and tracker inputs are used to synthesize the virtual mirror stream and display it in real-time on the LCD screen. The result is a very convincing handheld mirror simulation.” See Integrated Media Systems Center, Alexandre R.J. Francois II et al., <i>A Handheld Virtual Mirror</i> (2002), at Section 2.2.System integration. “The design and construction of realistic virtual mirrors represents an original experiment in Human-Computer Interface, that opens the door to various interactive experiments in entertainment, arts and communication. Use of video analysis and graphics techniques will allow to explore and interfere with what has always been a private, solitary act of a person looking in a mirror.” See Integrated Media Systems Center, Alexandre R.J. Francois II et al., <i>A Handheld Virtual Mirror</i> (2002), at Section 3.Perspectives. See <i>A Handheld Virtual Mirror</i> (2002), at Figure 1:

Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
	Figure 1. Basic mirror geometry. <i>See A Handheld Virtual Mirror (2002), at Figure 2:</i> Figure 2. Handheld virtual mirror device. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Francois III alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of

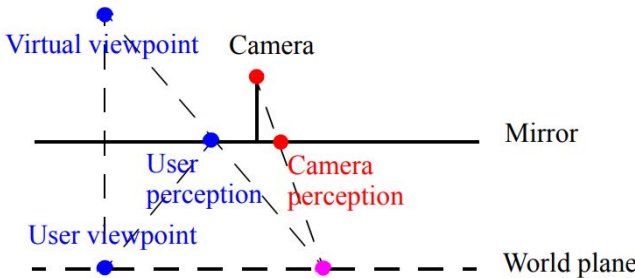
Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
	Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.
1[c]. operating the processor to apply adaptive transformation mapping to the stream of images captured by the camera to generate modified images that appear to be captured from a different point of view of the camera's actual point of view; and	Francois III expressly and/or inherently discloses and/or renders obvious operating the processor to apply adaptive transformation mapping to the stream of images captured by the camera to generate modified images that appear to be captured from a different point of view of the camera's actual point of view. <i>See, e.g.</i>, disclosures below. “This paper is organized as follows. In section 2, we outline the geometric analysis of mirror and camera imaging, leading to the image transform for mirror simulation, based on the flat world assumption. In section 3, we briefly explain the software and hardware design of our prototype. In section 4, we relate our work to other mirror experiments, and to upcoming applications. Finally, we conclude the paper in section 5.” <i>See A Handheld Mirror Simulation</i>, Francois et al. (2003), 1.INTRODUCTION, page 745. “In order to synthesize the images corresponding to the user’s viewpoint from the images captured by the camera, we must relate them geometrically, i.e. express x_p and y_p in terms of x'_p and y'_p.

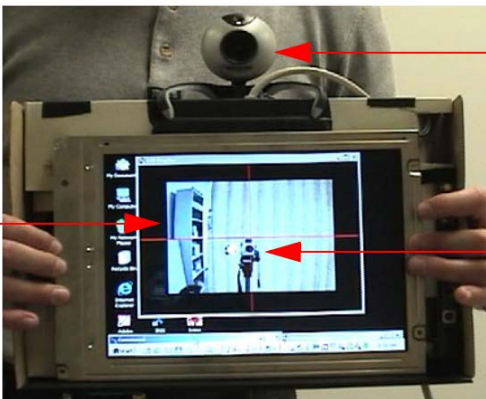
Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
	$\begin{bmatrix} x \\ y \\ z \\ 1 \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 & t_x \\ 0 & 1 & 0 & t_y \\ 0 & 0 & 1 & t_z \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} x' \\ y' \\ z' \\ 1 \end{bmatrix}$ The mirror projection equations become: $\begin{bmatrix} U_p \\ V_p \\ W_p \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 & t_x \\ 0 & 1 & 0 & t_y \\ 0 & 0 & 1/d & t_z/d \end{bmatrix} \begin{bmatrix} x' \\ y' \\ z' \\ 1 \end{bmatrix} \quad \begin{aligned} x_p &= d(x' + t_x)/(z' + t_z) \\ y_p &= d(y' + t_y)/(z' + t_z) \end{aligned}$  Figure 4. An underconstrained problem. Express x_p and y_p in terms of $x'p$ and $y'p$ thus requires to recover the actual 3-D position of each point from its image projection. This is obviously an underconstrained problem, as an image pixel might potentially be the projection of any world point on a ray passing through the camera center and the pixel, as illustrated in figure 4. Various computer vision techniques could be used to attempt to recover the 3-D geometry of the world from images in some cases. Another solution would be to use a 3-D model of the environment, if available. For our first prototype, we followed a simpler approximate approach. Since we are designing our mirror as a first person interaction tool, we assume that the center of interest is the user himself, and that the background is of lesser

Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
	importance. We thus model the world as a plane parallel to the mirror/imaging plane, at the same distance as the user's viewpoint (see figure 5). The z' component of each world point is thus fixed to $z' = f + d$ in the camera centered coordinate system. We can now inverse the camera projection equations: $x'_p = fx' / (f + d) \Leftrightarrow x' = (f + d)x'_p / f$ $y'_p = fy' / (f + d) \Leftrightarrow y' = (f + d)y'_p / f$ The transformation equations that relate the user's view to the camera image are thus: $x_p = d((f + d)x'_p / f + t_x) / ((f + d) + t_z)$ $y_p = d((f + d)y'_p / f + t_y) / ((f + d) + t_z)$ The only parameters are f, d and $[t_x t_y t_z]$. The theoretical focal length of the camera can be obtained by various calibration methods. The positions and orientations of the user's viewpoint and the camera center provided by the tracking devices, allow to compute both the distance d and the change of referential translation parameters. Note that under our assumptions, the transform relating the user's view to the camera view is reduced to a scaling and a translation. This model provides a straightforward and efficient way of synthesizing the viewer's image stream from the camera stream, while remaining a reasonable approximation for a large class of applications. The major field-of-view variations occurring when varying the angle of view and the distance to the mirror, are convincingly simulated." See <i>A Handheld Mirror Simulation</i>, Francois et al. (2003), 2.3 User view synthesis, pages 746-47.

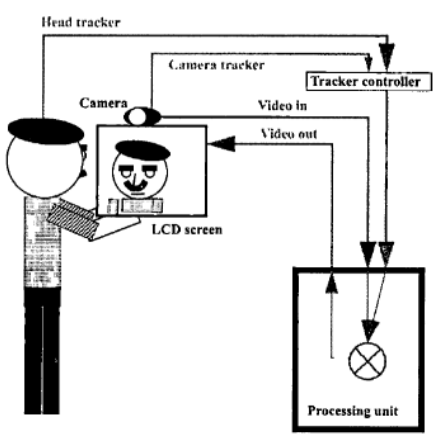
Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
	 Figure 6. Mirror simulation application graph. <i>A Handheld Mirror Simulation</i>, Francois et al. (2003), Fig. 6. “This sketch presents the design and construction of a handheld virtual mirror device. The perception of the world reflected through a mirror depends on the viewer's position with respect to the mirror and the 3-D geometry of the world. In order to simulate a real mirror on a computer screen, images of the observed world, consistent with the viewer's position, must be synthesized and displayed in real-time. Our system is build around a flat LCD screen manipulated by the user, a single camera fixed on the screen, and a tracking device. The continuous input video stream and tracker data is used to synthesize, in real-time, a continuous video stream displayed on the LCD screen. The synthesized video stream is a close approximation of what the user would see on the screen surface if it were a real mirror.” See Integrated Media Systems Center, Alexandre R.J. Francois II et al., <i>A Handheld Virtual Mirror</i> (2002), at the introductory paragraph. “When a person looks into a mirror, they see what they would see from the symmetrical (virtual) point of view (figure 1). A camera whose position and orientation are fixed with

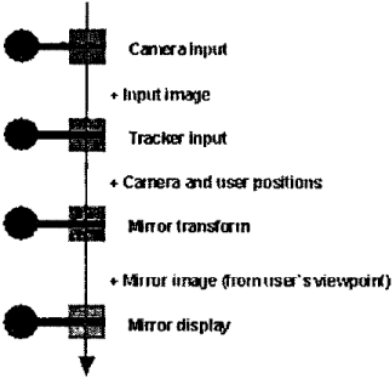
Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
	respect to the mirror produces a video stream that corresponds to this particular viewpoint. In order to synthesize the images corresponding to the user's viewpoint from the images captured by the camera, we must relate them geometrically. Such a transform cannot be formulated without assumptions or knowledge about the world geometry. In our case, the focus of attention is the user's own reflection in the mirror. We thus model the world as a plane parallel to the mirror, at the user's distance from the mirror. We have shown that under these assumptions, the transform relating the camera view and the user view depends only on the relative positions of the user viewpoint and the camera center, and is reduced to a scaling and a translation. The transform is exact when the user viewpoint lies on the camera axis. This model provides a straightforward and efficient way of synthesizing the viewer's image stream from the camera stream, and provides a good approximation when the viewer's position remains close to the camera axis." See Integrated Media Systems Center, Alexandre R.J. Francois II et al., <i>A Handheld Virtual Mirror</i> (2002), at Section 1.Problem formulation and geometric analysis. "We have implemented the mirror image transform as a module in the Modular Flow Scheduling Middleware [François 2001], the open source implementation of IMSC's software architecture for Integrated Media Systems. It is specifically designed for parallel processing of concurrent data streams in real-time, and its modularity dramatically reduces development and integration time. The actual handheld virtual mirror system is composed of a handheld 10" LCD flat screen fitted with a camera and a magnetic tracker sensor (figure 2), a fixed processing unit, a fixed magnetic tracker transmitter, and a second magnetic tracker sensor placed on the user. Real-time camera and tracker inputs are used to synthesize the virtual mirror stream and display it in real-time on the LCD screen. The result is a very convincing handheld mirror simulation." See Integrated Media Systems Center, Alexandre R.J. Francois II et al., <i>A Handheld Virtual Mirror</i> (2002), at Section 2.2.System integration. "The design and construction of realistic virtual mirrors represents an original experiment in Human-Computer Interface, that opens the door to various interactive experiments in entertainment, arts and communication. Use of video analysis and graphics techniques will allow to explore and interfere with what has always been a

Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
	private, solitary act of a person looking in a mirror.” See Integrated Media Systems Center, Alexandre R.J. Francois II et al., <i>A Handheld Virtual Mirror</i> (2002), at Section 3.Perspectives. See <i>A Handheld Virtual Mirror</i> (2002), at Figure 1:  Figure 1. Basic mirror geometry. See <i>A Handheld Virtual Mirror</i> (2002), at Figure 2:

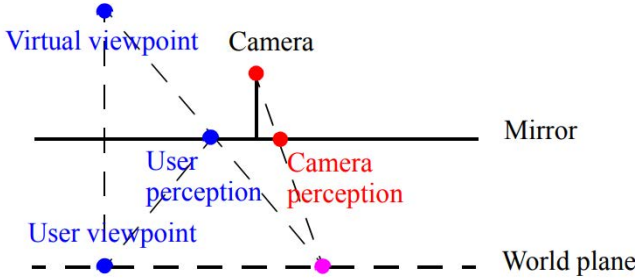
Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
	 Figure 2. Handheld virtual mirror device. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Francois III alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.
1[d]. displaying the modified images on the monitor;	To the extent the preamble is limiting, Francois III expressly and/or inherently discloses and/or renders obvious displaying the modified images on the monitor. <i>See, e.g.</i>, disclosures below. “We present the design and construction of a handheld mirror simulation device. The perception of the world reflected through a mirror depends on the viewer's position with respect to the mirror and the 3-D geometry of the world. In order to simulate a real mirror on a computer screen, images of the observed world, consistent with the viewer's position, must be synthesized and displayed in realtime. Our system is build around a LCD screen manipulated by the user, a single camera fixed on the screen, and a tracking device. The continuous input video stream and tracker data is used to synthesize, in real-time, a continuous video stream displayed on the LCD screen. The synthesized video

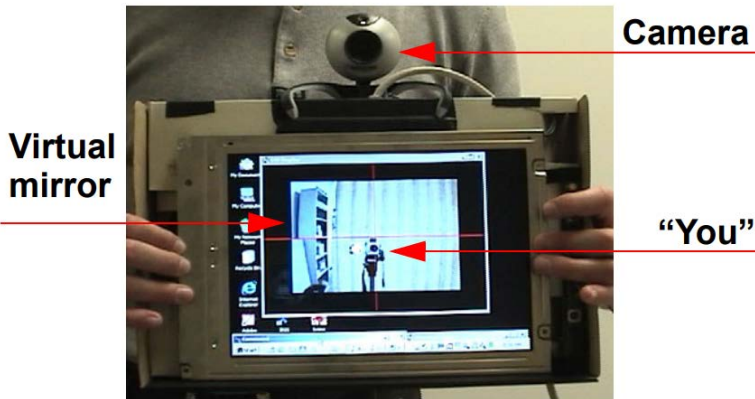
Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
	stream is a close approximation of what the user would see on the screen surface if it were a real mirror. Our system provides a generic interface for applications involving rich, first-person interaction, such as the Virtual Daguerreotype.” <i>See A Handheld Mirror Simulation</i>, Francois et al. (2003), Abstract, page 745. “We present the design and construction of a handheld mirror simulation device. Rather than attempting to solve the difficult vision problem of a general, exact mirror simulation, our focus is on the design and construction of a first person Human-Computer Interface (HCI) to be used in new interactive experiments and applications. While remaining simple, our first prototype must provide a better experience to the user than the traditional fixed camera / fixed display / horizontal image flip mirror setting. A major novelty in our approach is the hands-on aspect, which requires a more elaborate model to convincingly reproduce the interaction between the user and the mirror as an object. One important clue is the evolution of the user's field of view in the mirror as her position with respect to the mirror changes. Furthermore, our goal is to produce a working but extensible system, to serve as a platform for future enhancements to the HCI device subsystem itself, as well as to allow easy integration in applications Our system is composed of a handheld LCD screen manipulated by the user, a single camera fixed on the screen, and two 6 degrees of freedom trackers giving in real time the positions and orientations of the camera and the user's head. The major system components and their relations are illustrated in figure 1. The user sees on the screen what they would see on a real mirror. The perception of the world reflected through a mirror depends on the viewer's position with respect to the mirror and the 3-D geometry of the world. In order to simulate a real mirror on a computer screen, images of the observed world, consistent with the viewer's position, must be synthesized and displayed in real-time. The continuous input video stream and tracker data is used to synthesize, in real-time, a continuous video stream displayed on the LCD screen. The synthesized video stream is a close approximation of

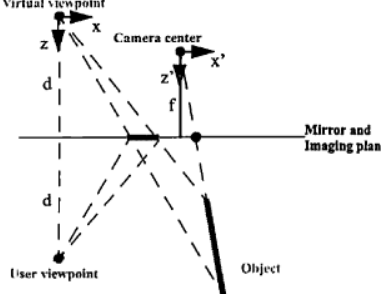
Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
	what the user would see on the screen surface if it were a real mirror.” <i>See A Handheld Mirror Simulation</i>, Francois et al. (2003), 1.INTRODUCTION, page 745.  Figure 1. Handheld mirror simulation system. <i>See A Handheld Mirror Simulation</i>, Francois et al. (2003), Fig. 1. “The application graph for the mirror simulation is presented in figure 6. Generic modules such as video capture and display were already available. Note that thanks to the modularity of the framework, any processing can be carried on the images before or after the mirror transform. The prototype system is composed of a handheld 10" LCD screen fitted with a camera and a magnetic tracker sensor (see figure 7), a fixed processing unit, a fixed magnetic tracker transmitter, and a second magnetic tracker sensor placed on the user. Real-time camera and tracker inputs are used to synthesize the mirror image stream and display it in real-time on the LCD screen. The result is a convincing handheld mirror simulation, in spite of the inherent limitations of our mirror transform model.” <i>See A Handheld Mirror Simulation</i>, Francois et al. (2003), 3.SYSTEM INTEGRATION, page 747.

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	 Figure 6. Mirror simulation application graph. <i>See A Handheld Mirror Simulation</i>, Francois et al. (2003), Fig. 6. “This sketch presents the design and construction of a handheld virtual mirror device. The perception of the world reflected through a mirror depends on the viewer's position with respect to the mirror and the 3-D geometry of the world. In order to simulate a real mirror on a computer screen, images of the observed world, consistent with the viewer's position, must be synthesized and displayed in real-time. Our system is build around a flat LCD screen manipulated by the user, a single camera fixed on the screen, and a tracking device. The continuous input video stream and tracker data is used to synthesize, in real-time, a continuous video stream displayed on the LCD screen. The synthesized video stream is a close approximation of what the user would see on the screen surface if it were a real mirror.” <i>See Integrated Media Systems Center, Alexandre R.J. Francois II et al., A Handheld Virtual Mirror</i> (2002), at the introductory paragraph. “When a person looks into a mirror, they see what they would see from the symmetrical (virtual) point of view (figure 1). A camera whose position and orientation are fixed with respect to the mirror produces a video stream that corresponds to this particular

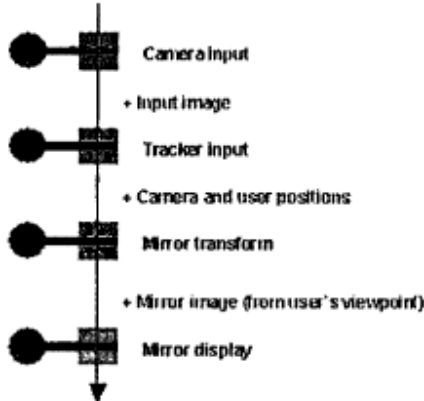
Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
	viewpoint. In order to synthesize the images corresponding to the user's viewpoint from the images captured by the camera, we must relate them geometrically. Such a transform cannot be formulated without assumptions or knowledge about the world geometry. In our case, the focus of attention is the user's own reflection in the mirror. We thus model the world as a plane parallel to the mirror, at the user's distance from the mirror. We have shown that under these assumptions, the transform relating the camera view and the user view depends only on the relative positions of the user viewpoint and the camera center, and is reduced to a scaling and a translation. The transform is exact when the user viewpoint lies on the camera axis. This model provides a straightforward and efficient way of synthesizing the viewer's image stream from the camera stream, and provides a good approximation when the viewer's position remains close to the camera axis." See Integrated Media Systems Center, Alexandre R.J. Francois II et al., <i>A Handheld Virtual Mirror</i> (2002), at Section 1.Problem formulation and geometric analysis. "We have implemented the mirror image transform as a module in the Modular Flow Scheduling Middleware [François 2001], the open source implementation of IMSC's software architecture for Integrated Media Systems. It is specifically designed for parallel processing of concurrent data streams in real-time, and its modularity dramatically reduces development and integration time. The actual handheld virtual mirror system is composed of a handheld 10" LCD flat screen fitted with a camera and a magnetic tracker sensor (figure 2), a fixed processing unit, a fixed magnetic tracker transmitter, and a second magnetic tracker sensor placed on the user. Real-time camera and tracker inputs are used to synthesize the virtual mirror stream and display it in real-time on the LCD screen. The result is a very convincing handheld mirror simulation." See Integrated Media Systems Center, Alexandre R.J. Francois II et al., <i>A Handheld Virtual Mirror</i> (2002), at Section 2.2.System integration. "The design and construction of realistic virtual mirrors represents an original experiment in Human-Computer Interface, that opens the door to various interactive experiments in entertainment, arts and communication. Use of video analysis and graphics techniques will allow to explore and interfere with what has always been a private, solitary act of a person looking in a mirror." See Integrated Media Systems

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	Center, Alexandre R.J. Francois II et al., <i>A Handheld Virtual Mirror</i> (2002), at Section 3.Perspectives. See <i>A Handheld Virtual Mirror</i> (2002), at Figure 1:  Figure 1. Basic mirror geometry. See <i>A Handheld Virtual Mirror</i> (2002), at Figure 2:

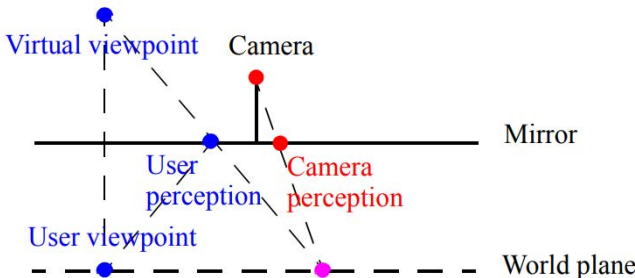
Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
	 Figure 2. Handheld virtual mirror device. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Francois III alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.
1[e]. wherein the different point of view corresponds to an image taken from a different angle and a different distance than the actual images captured by the camera; and	Francois III expressly and/or inherently discloses and/or renders obvious wherein the different point of view corresponds to an image taken from a different angle and a different distance than the actual images captured by the camera. <i>See, e.g.</i>, disclosures below. “In order to synthesize the images corresponding to the user's view point from the images captured by the camera, we must relate them geometrically, i.e. express x_p and y_p in terms of x'_p and y'_p.

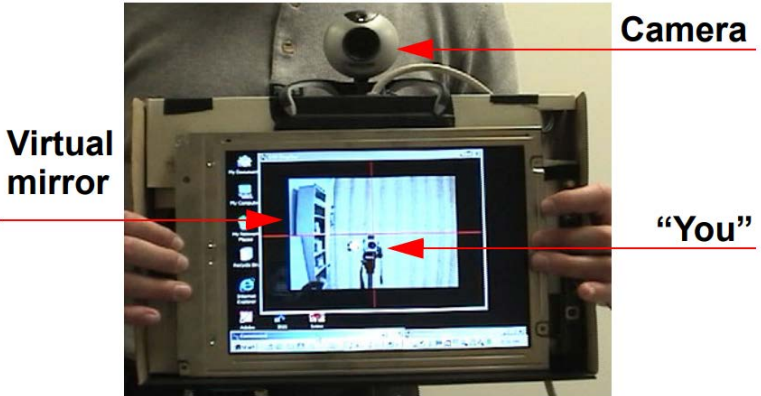
Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
	$\begin{bmatrix} x \\ y \\ z \\ 1 \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 & t_x \\ 0 & 1 & 0 & t_y \\ 0 & 0 & 1 & t_z \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} x' \\ y' \\ z' \\ 1 \end{bmatrix}$ The mirror projection equations become: $\begin{bmatrix} U_p \\ V_p \\ W_p \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 & t_x \\ 0 & 1 & 0 & t_y \\ 0 & 0 & 1/d & t_z/d \end{bmatrix} \begin{bmatrix} x' \\ y' \\ z' \\ 1 \end{bmatrix} \quad \begin{aligned} x_p &= d(x' + t_x)/(z' + t_z) \\ y_p &= d(y' + t_y)/(z' + t_z) \end{aligned}$  Figure 4. An underconstrained problem. Express x_p and y_p in terms of x'_p and y'_p thus requires to recover the actual 3-D position of each point from its image projection. This is obviously an underconstrained problem, as an image pixel might potentially be the projection of any world point on a ray passing through the camera center and the pixel, as illustrated in figure 4. Various computer vision techniques could be used to attempt to recover the 3-D geometry of the world from images in some cases. Another solution would be to use a 3-D model of the environment, if available. For our first prototype, we followed a simpler approximate approach. Since we are designing our mirror as a first person interaction tool, we assume that the center of interest is the user himself, and that the background is of lesser

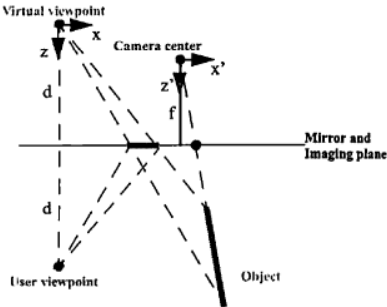
Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
	importance. We thus model the world as a plane parallel to the mirror/imaging plane, at the same distance as the user's viewpoint (see figure 5). The z' component of each world point is thus fixed to $z' = f + d$ in the camera centered coordinate system. We can now inverse the camera projection equations: $x'_p = fx' / (f + d) \Leftrightarrow x' = (f + d)x'_p / f$ $y'_p = fy' / (f + d) \Leftrightarrow y' = (f + d)y'_p / f$ The transformation equations that relate the user's view to the camera image are thus: $x_p = d((f + d)x'_p / f + t_x) / ((f + d) + t_z)$ $y_p = d((f + d)y'_p / f + t_y) / ((f + d) + t_z)$ The only parameters are f, d and $[t_x t_y t_z]$. The theoretical focal length of the camera can be obtained by various calibration methods. The positions and orientations of the user's viewpoint and the camera center provided by the tracking devices, allow to compute both the distance d and the change of referential translation parameters. Note that under our assumptions, the transform relating the user's view to the camera view is reduced to a scaling and a translation. This model provides a straightforward and efficient way of synthesizing the viewer's image stream from the camera stream, while remaining a reasonable approximation for a large class of applications. The major field-of-view variations occurring when varying the angle of view and the distance to the mirror, are convincingly simulated. See <i>A Handheld Mirror Simulation</i>, Francois et al. (2003), 2.3 User view synthesis, pages 746-47.

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	 Figure 6. Mirror simulation application graph. See <i>A Handheld Mirror Simulation</i>, Francois et al. (2003), Fig. 6. “This sketch presents the design and construction of a handheld virtual mirror device. The perception of the world reflected through a mirror depends on the viewer's position with respect to the mirror and the 3-D geometry of the world. In order to simulate a real mirror on a computer screen, images of the observed world, consistent with the viewer's position, must be synthesized and displayed in real-time. Our system is build around a flat LCD screen manipulated by the user, a single camera fixed on the screen, and a tracking device. The continuous input video stream and tracker data is used to synthesize, in real-time, a continuous video stream displayed on the LCD screen. The synthesized video stream is a close approximation of what the user would see on the screen surface if it were a real mirror.” See Integrated Media Systems Center, Alexandre R.J. Francois II et al., <i>A Handheld Virtual Mirror</i> (2002), at the introductory paragraph. “When a person looks into a mirror, they see what they would see from the symmetrical (virtual) point of view (figure 1). A camera whose position and orientation are fixed with

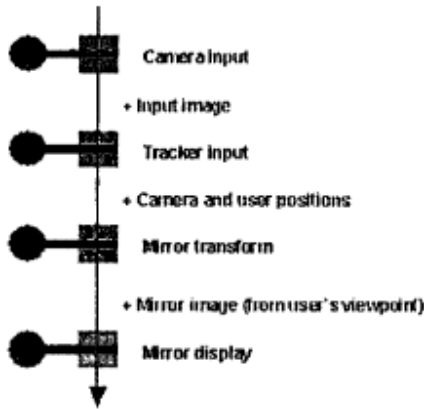
Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
	respect to the mirror produces a video stream that corresponds to this particular viewpoint. In order to synthesize the images corresponding to the user's viewpoint from the images captured by the camera, we must relate them geometrically. Such a transform cannot be formulated without assumptions or knowledge about the world geometry. In our case, the focus of attention is the user's own reflection in the mirror. We thus model the world as a plane parallel to the mirror, at the user's distance from the mirror. We have shown that under these assumptions, the transform relating the camera view and the user view depends only on the relative positions of the user viewpoint and the camera center, and is reduced to a scaling and a translation. The transform is exact when the user viewpoint lies on the camera axis. This model provides a straightforward and efficient way of synthesizing the viewer's image stream from the camera stream, and provides a good approximation when the viewer's position remains close to the camera axis." See Integrated Media Systems Center, Alexandre R.J. Francois II et al., <i>A Handheld Virtual Mirror</i> (2002), at Section 1.Problem formulation and geometric analysis. "We have implemented the mirror image transform as a module in the Modular Flow Scheduling Middleware [François 2001], the open source implementation of IMSC's software architecture for Integrated Media Systems. It is specifically designed for parallel processing of concurrent data streams in real-time, and its modularity dramatically reduces development and integration time. The actual handheld virtual mirror system is composed of a handheld 10" LCD flat screen fitted with a camera and a magnetic tracker sensor (figure 2), a fixed processing unit, a fixed magnetic tracker transmitter, and a second magnetic tracker sensor placed on the user. Real-time camera and tracker inputs are used to synthesize the virtual mirror stream and display it in real-time on the LCD screen. The result is a very convincing handheld mirror simulation." See Integrated Media Systems Center, Alexandre R.J. Francois II et al., <i>A Handheld Virtual Mirror</i> (2002), at Section 2.2.System integration. "The design and construction of realistic virtual mirrors represents an original experiment in Human-Computer Interface, that opens the door to various interactive experiments in entertainment, arts and communication. Use of video analysis and graphics techniques will allow to explore and interfere with what has always been a

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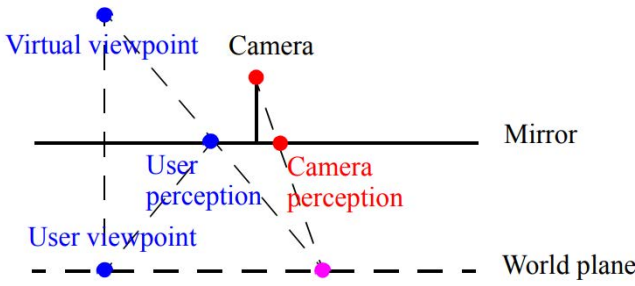
Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
	 Figure 2. Handheld virtual mirror device. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Francois III alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.
1[f]. wherein during mirror tracking mode the processor utilizes the angle of the images captured by the camera and applies parametric input for a mapping transformation that changes imaging perspective of the images captured by the camera.	Francois III expressly and/or inherently discloses and/or renders obvious wherein during mirror tracking mode the processor utilizes the angle of the images captured by the camera and applies parametric input for a mapping transformation that changes imaging perspective of the images captured by the camera. <i>See, e.g.</i>, disclosures below. “In order to synthesize the images corresponding to the user's view1point from the images captured by the camera, we must relate them geometrically, i.e. express x_p and y_p in terms of x'_p and y'_p.

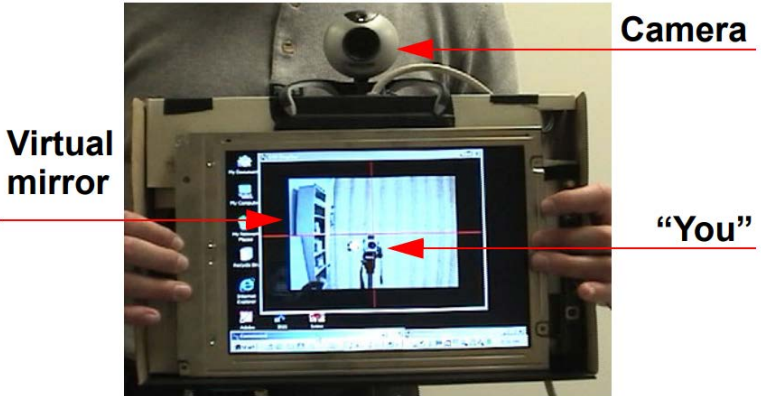
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	$\begin{bmatrix} x \\ y \\ z \\ 1 \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 & t_x \\ 0 & 1 & 0 & t_y \\ 0 & 0 & 1 & t_z \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} x' \\ y' \\ z' \\ 1 \end{bmatrix}$ The mirror projection equations become: $\begin{bmatrix} U_p \\ V_p \\ W_p \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 & t_x \\ 0 & 1 & 0 & t_y \\ 0 & 0 & 1/d & t_z/d \end{bmatrix} \begin{bmatrix} x' \\ y' \\ z' \\ 1 \end{bmatrix} \quad \begin{aligned} x_p &= d(x' + t_x)/(z' + t_z) \\ y_p &= d(y' + t_y)/(z' + t_z) \end{aligned}$  Figure 4. An underconstrained problem. Express x_p and y_p in terms of x'_p and y'_p thus requires to recover the actual 3-D position of each point from its image projection. This is obviously an underconstrained problem, as an image pixel might potentially be the projection of any world point on a ray passing through the camera center and the pixel, as illustrated in figure 4. Various computer vision techniques could be used to attempt to recover the 3-D geometry of the world from images in some cases. Another solution would be to use a 3-D model of the environment, if available. For our first prototype, we followed a simpler approximate approach. Since we are designing our mirror as a first person interaction tool, we assume that the center of interest is the user himself, and that the background is of lesser

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	importance. We thus model the world as a plane parallel to the mirror/imaging plane, at the same distance as the user's viewpoint (see figure 5). The z' component of each world point is thus fixed to $z' = f + d$ in the camera centered coordinate system. We can now inverse the camera projection equations: $x'_p = fx' / (f + d) \Leftrightarrow x' = (f + d)x'_p / f$ $y'_p = fy' / (f + d) \Leftrightarrow y' = (f + d)y'_p / f$ The transformation equations that relate the user's view to the camera image are thus: $x_p = d((f + d)x'_p / f + t_x) / ((f + d) + t_z)$ $y_p = d((f + d)y'_p / f + t_y) / ((f + d) + t_z)$ The only parameters are f, d and $[t_x t_y t_z]$. The theoretical focal length of the camera can be obtained by various calibration methods. The positions and orientations of the user's viewpoint and the camera center provided by the tracking devices, allow to compute both the distance d and the change of referential translation parameters. Note that under our assumptions, the transform relating the user's view to the camera view is reduced to a scaling and a translation. This model provides a straightforward and efficient way of synthesizing the viewer's image stream from the camera stream, while remaining a reasonable approximation for a large class of applications. The major field-of-view variations occurring when varying the angle of view and the distance to the mirror, are convincingly simulated." See <i>A Handheld Mirror Simulation</i>, Francois et al. (2003), 2.3 User view synthesis, pages 746-47.

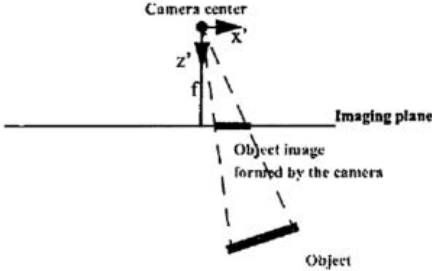
Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
	 Figure 6. Mirror simulation application graph. See <i>A Handheld Mirror Simulation</i>, Francois et al. (2003), Fig. 6. “This sketch presents the design and construction of a handheld virtual mirror device. The perception of the world reflected through a mirror depends on the viewer's position with respect to the mirror and the 3-D geometry of the world. In order to simulate a real mirror on a computer screen, images of the observed world, consistent with the viewer's position, must be synthesized and displayed in real-time. Our system is build around a flat LCD screen manipulated by the user, a single camera fixed on the screen, and a tracking device. The continuous input video stream and tracker data is used to synthesize, in real-time, a continuous video stream displayed on the LCD screen. The synthesized video stream is a close approximation of what the user would see on the screen surface if it were a real mirror.” See Integrated Media Systems Center, Alexandre R.J. Francois II et al., <i>A Handheld Virtual Mirror</i> (2002), at the introductory paragraph. “When a person looks into a mirror, they see what they would see from the symmetrical (virtual) point of view (figure 1). A camera whose position and orientation are fixed with

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	respect to the mirror produces a video stream that corresponds to this particular viewpoint. In order to synthesize the images corresponding to the user's viewpoint from the images captured by the camera, we must relate them geometrically. Such a transform cannot be formulated without assumptions or knowledge about the world geometry. In our case, the focus of attention is the user's own reflection in the mirror. We thus model the world as a plane parallel to the mirror, at the user's distance from the mirror. We have shown that under these assumptions, the transform relating the camera view and the user view depends only on the relative positions of the user viewpoint and the camera center, and is reduced to a scaling and a translation. The transform is exact when the user viewpoint lies on the camera axis. This model provides a straightforward and efficient way of synthesizing the viewer's image stream from the camera stream, and provides a good approximation when the viewer's position remains close to the camera axis." See Integrated Media Systems Center, Alexandre R.J. Francois II et al., <i>A Handheld Virtual Mirror</i> (2002), at Section 1.Problem formulation and geometric analysis. "We have implemented the mirror image transform as a module in the Modular Flow Scheduling Middleware [François 2001], the open source implementation of IMSC's software architecture for Integrated Media Systems. It is specifically designed for parallel processing of concurrent data streams in real-time, and its modularity dramatically reduces development and integration time. The actual handheld virtual mirror system is composed of a handheld 10" LCD flat screen fitted with a camera and a magnetic tracker sensor (figure 2), a fixed processing unit, a fixed magnetic tracker transmitter, and a second magnetic tracker sensor placed on the user. Real-time camera and tracker inputs are used to synthesize the virtual mirror stream and display it in real-time on the LCD screen. The result is a very convincing handheld mirror simulation." See Integrated Media Systems Center, Alexandre R.J. Francois II et al., <i>A Handheld Virtual Mirror</i> (2002), at Section 2.2.System integration. "The design and construction of realistic virtual mirrors represents an original experiment in Human-Computer Interface, that opens the door to various interactive experiments in entertainment, arts and communication. Use of video analysis and graphics techniques will allow to explore and interfere with what has always been a

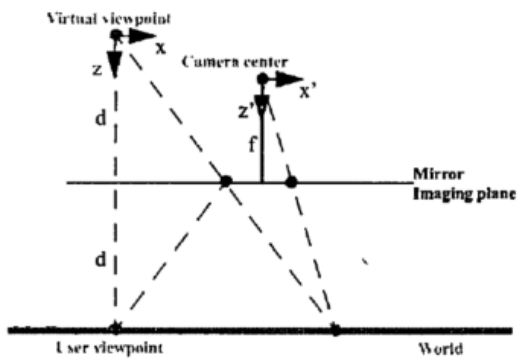
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	 Figure 2. Handheld virtual mirror device. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Francois III alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

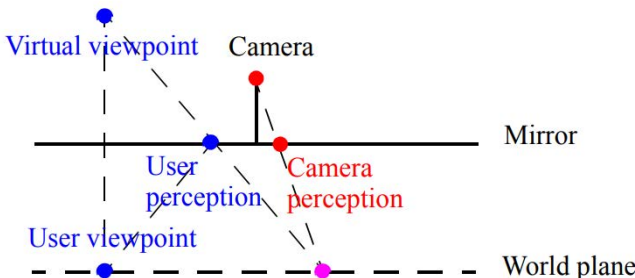
Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
Claim 2	
2. The method of claim 1, wherein the mapping transformation comprises a combination of at least two of the following transformations: vertical flips about a vertical axis, a projection transformation, rotation, resize, two-dimensional offset, optic distortion correction, and polynomial mapping on part or entire captured image.	Francois III expressly and/or inherently discloses and/or renders obvious wherein the mapping transformation comprises a combination of at least two of the following transformations: vertical flips about a vertical axis, a projection transformation, rotation, resize, two-dimensional offset, optic distortion correction, and polynomial mapping on part or entire captured image. <i>See, e.g.</i> , disclosures below.

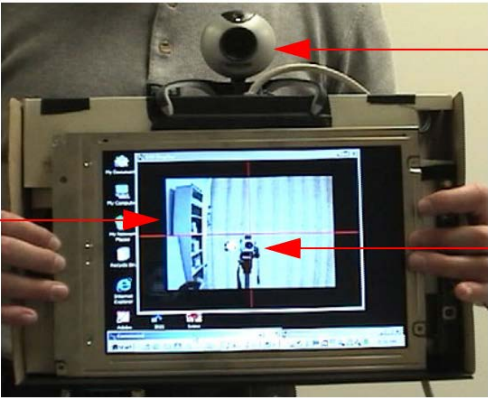
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dimensional offset, optic distortion correction, and polynomial mapping on part or entire captured image.	“We present the design and construction of a handheld mirror simulation device. Rather than attempting to solve the difficult vision problem of a general, exact mirror simulation, our focus is on the design and construction of a first person Human-Computer Interface (HCI) to be used in new interactive experiments and applications. While remaining simple, our first prototype must provide a better experience to the user than the traditional fixed camera / fixed display / horizontal image flip mirror setting. A major novelty in our approach is the hands-on aspect, which requires a more elaborate model to convincingly reproduce the interaction between the user and the mirror as an object. One important clue is the evolution of the user’s field of view in the mirror as her position with respect to the mirror changes. Furthermore, our goal is to produce a working but extensible system, to serve as a platform for future enhancements to the HCI device subsystem itself, as well as to allow easy integration in applications” <i>See A Handheld Mirror Simulation</i>, Francois et al. (2003), 1.INTRODUCTION, page 745. “A camera whose position and orientation are fixed with respect to the mirror produces a video stream that corresponds to this particular viewpoint. Assuming the camera can be approximated by a pinhole model (see figure 3), a point of homogenous coordinates.” <i>See A Handheld Mirror Simulation</i>, Francois et al. (2003), GEOMETRIC ANALYSIS, page 746.  Figure 3. Pinhole camera geometry.

Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
	See <i>A Handheld Mirror Simulation</i>, Francois et al. (2003), GEOMETRIC ANALYSIS, page 746. 2.3 User view synthesis In order to synthesize the images corresponding to the user's viewpoint from the images captured by the camera, we must relate them geometrically, i.e. express x_p and y_p in terms of x'_p and y'_p. We place the camera so that the image plane and (virtual) mirror planes coincide. We chose the viewpoint and camera coordinate systems so that their respective axes directions coincide. Thus the 4x4 matrix relating the two coordinate systems is reduced to a simple translation of the origin: $\begin{bmatrix} x \\ y \\ z \\ 1 \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 & t_x \\ 0 & 1 & 0 & t_y \\ 0 & 0 & 1 & t_z \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} x' \\ y' \\ z' \\ 1 \end{bmatrix}$ The mirror projection equations become: $\begin{bmatrix} U_p \\ V_p \\ W_p \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 & t_x \\ 0 & 1 & 0 & t_y \\ 0 & 0 & 1/d & t_z/d \end{bmatrix} \begin{bmatrix} x' \\ y' \\ z' \\ 1 \end{bmatrix} \quad \begin{aligned} x_p &= d(x' + t_x)/(z' + t_z) \\ y_p &= d(y' + t_y)/(z' + t_z) \end{aligned}$ See <i>A Handheld Mirror Simulation</i>, Francois et al. (2003), GEOMETRIC ANALYSIS, page 746. “Various computer vision techniques could be used to attempt to recover the 3-13 geometry of the world from images in some cases. Another solution would be to use a 3-D model of the environment, if available. For our first prototype, we followed a

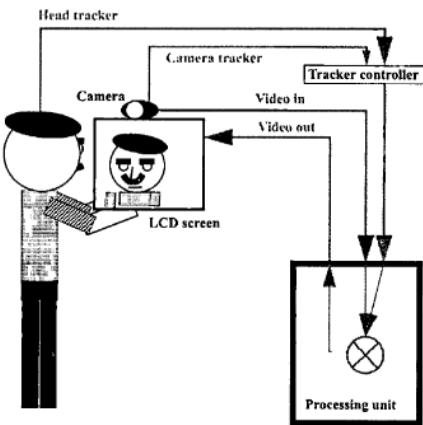
Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
	simpler approximate approach. Since we are designing our mirror as a first person interaction tool, we assume that the center of interest is the user himself, and that the background is of lesser importance. We thus model the world as a plane parallel to the mirror/imaging plane, at the same distance as the user's viewpoint (see figure 5).” See <i>A Handheld Mirror Simulation</i>, Francois et al. (2003), 2.3 User view synthesis, page 747.  Figure 5. Flat world assumption. See <i>A Handheld Mirror Simulation</i>, Francois et al. (2003), GEOMETRIC ANALYSIS, page 747. “This sketch presents the design and construction of a handheld virtual mirror device. The perception of the world reflected through a mirror depends on the viewer's position with respect to the mirror and the 3-D geometry of the world. In order to simulate a real mirror on a computer screen, images of the observed world, consistent with the viewer's position, must be synthesized and displayed in real-time. Our system is build around a flat LCD screen manipulated by the user, a single camera fixed on the screen, and a tracking device. The continuous input video stream and tracker data is used to synthesize, in real-time, a continuous video stream displayed on the LCD screen. The synthesized video stream is a close approximation of what the user would see on the screen surface

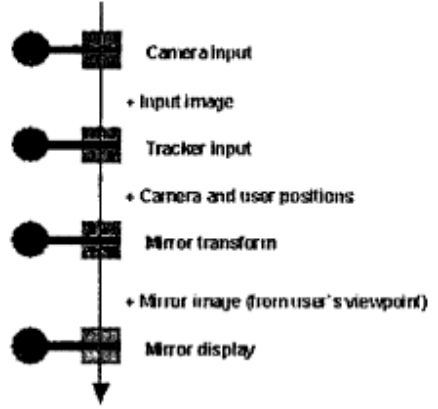
Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
	if it were a real mirror.” See Integrated Media Systems Center, Alexandre R.J. Francois II et al., <i>A Handheld Virtual Mirror</i> (2002), at the introductory paragraph. “When a person looks into a mirror, they see what they would see from the symmetrical (virtual) point of view (figure 1). A camera whose position and orientation are fixed with respect to the mirror produces a video stream that corresponds to this particular viewpoint. In order to synthesize the images corresponding to the user's viewpoint from the images captured by the camera, we must relate them geometrically. Such a transform cannot be formulated without assumptions or knowledge about the world geometry. In our case, the focus of attention is the user's own reflection in the mirror. We thus model the world as a plane parallel to the mirror, at the user's distance from the mirror. We have shown that under these assumptions, the transform relating the camera view and the user view depends only on the relative positions of the user viewpoint and the camera center, and is reduced to a scaling and a translation. The transform is exact when the user viewpoint lies on the camera axis. This model provides a straightforward and efficient way of synthesizing the viewer's image stream from the camera stream, and provides a good approximation when the viewer's position remains close to the camera axis.” See Integrated Media Systems Center, Alexandre R.J. Francois II et al., <i>A Handheld Virtual Mirror</i> (2002), at Section 1.Problem formulation and geometric analysis. “We have implemented the mirror image transform as a module in the Modular Flow Scheduling Middleware [François 2001], the open source implementation of IMSC's software architecture for Integrated Media Systems. It is specifically designed for parallel processing of concurrent data streams in real-time, and its modularity dramatically reduces development and integration time. The actual handheld virtual mirror system is composed of a handheld 10" LCD flat screen fitted with a camera and a magnetic tracker sensor (figure 2), a fixed processing unit, a fixed magnetic tracker transmitter, and a second magnetic tracker sensor placed on the user. Real-time camera and tracker inputs are used to synthesize the virtual mirror stream and display it in real-time on the LCD screen. The result is a very convincing handheld mirror simulation.”

Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
	See Integrated Media Systems Center, Alexandre R.J. Francois II et al., <i>A Handheld Virtual Mirror</i> (2002), at Section 2.2. System integration. “The design and construction of realistic virtual mirrors represents an original experiment in Human-Computer Interface, that opens the door to various interactive experiments in entertainment, arts and communication. Use of video analysis and graphics techniques will allow to explore and interfere with what has always been a private, solitary act of a person looking in a mirror.” See Integrated Media Systems Center, Alexandre R.J. Francois II et al., <i>A Handheld Virtual Mirror</i> (2002), at Section 3. Perspectives. See <i>A Handheld Virtual Mirror</i> (2002), at Figure 1:  Figure 1. Basic mirror geometry. See <i>A Handheld Virtual Mirror</i> (2002), at Figure 2:

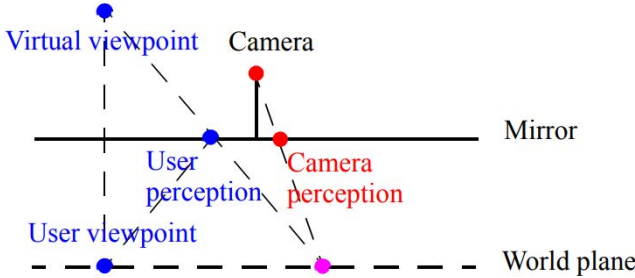
Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
	 Figure 2. Handheld virtual mirror device. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Francois III alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

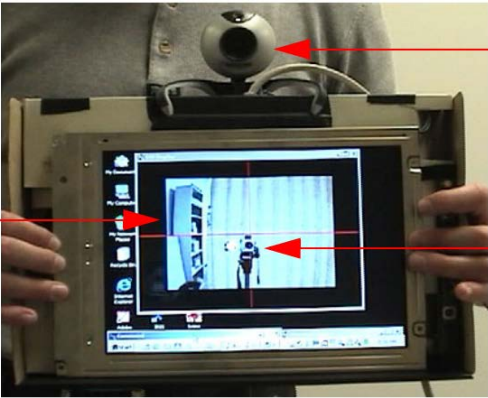
Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
Claim 3	
3. The method of claim 1, wherein during idle mode the camera continuously sends captured images to the processor, and the	Francois III expressly and/or inherently discloses and/or renders obvious wherein during idle mode the camera continuously sends captured images to the processor, and the user

Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
user presence is identified by the processor detecting a body part in the images.	presence is identified by the processor detecting a body part in the images. <i>See, e.g.</i>, disclosures below. “Our system is composed of a handheld LCD screen manipulated by the user, a single camera fixed on the screen, and two 6 degrees of freedom trackers giving in real time the positions and orientations of the camera and the user's head. The major system components and their relations are illustrated in figure 1. The user sees on the screen what they would see on a real mirror.” <i>See A Handheld Mirror Simulation</i>, Francois et al. (2003), 1.INTRODUCTION, page 745.  Figure 1. Handheld mirror simulation system. <i>See A Handheld Mirror Simulation</i>, Francois et al. (2003), Fig. 1. “The only parameters are f, d and $[tx\ ty\ tz]$. The theoretical focal length of the camera can be obtained by various calibration methods. The positions and orientations of the user's viewpoint and the camera center provided by the tracking devices, allow to compute both the distance d and the change of referential translation parameters.” <i>See A Handheld Mirror Simulation</i>, Francois et al. (2003), 3.SYSTEM INTEGRATION, page 747.

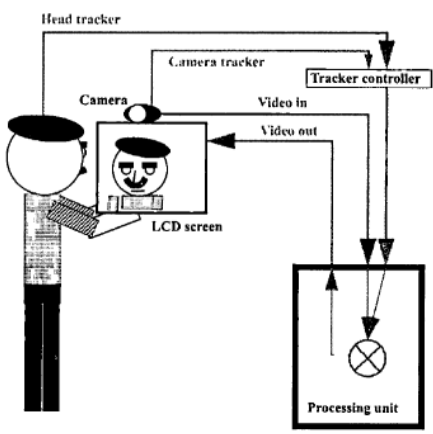
Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
	 Figure 6. Mirror simulation application graph. <i>See A Handheld Mirror Simulation, Francois et al. (2003), Fig. 6.</i> “This sketch presents the design and construction of a handheld virtual mirror device. The perception of the world reflected through a mirror depends on the viewer's position with respect to the mirror and the 3-D geometry of the world. In order to simulate a real mirror on a computer screen, images of the observed world, consistent with the viewer's position, must be synthesized and displayed in real-time. Our system is build around a flat LCD screen manipulated by the user, a single camera fixed on the screen, and a tracking device. The continuous input video stream and tracker data is used to synthesize, in real-time, a continuous video stream displayed on the LCD screen. The synthesized video stream is a close approximation of what the user would see on the screen surface if it were a real mirror.” <i>See Integrated Media Systems Center, Alexandre R.J. Francois II et al., A Handheld Virtual Mirror (2002), at the introductory paragraph.</i> “When a person looks into a mirror, they see what they would see from the symmetrical (virtual) point of view (figure 1). A camera whose position and orientation are fixed with respect to the mirror produces a video stream that corresponds to this particular

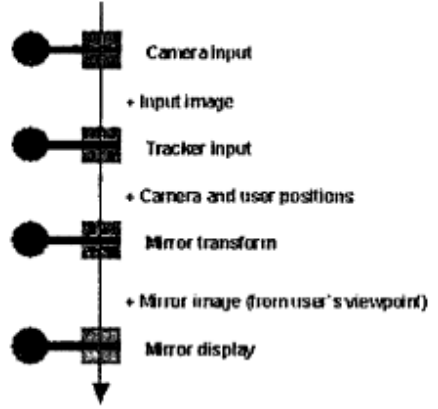
Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
	viewpoint. In order to synthesize the images corresponding to the user's viewpoint from the images captured by the camera, we must relate them geometrically. Such a transform cannot be formulated without assumptions or knowledge about the world geometry. In our case, the focus of attention is the user's own reflection in the mirror. We thus model the world as a plane parallel to the mirror, at the user's distance from the mirror. We have shown that under these assumptions, the transform relating the camera view and the user view depends only on the relative positions of the user viewpoint and the camera center, and is reduced to a scaling and a translation. The transform is exact when the user viewpoint lies on the camera axis. This model provides a straightforward and efficient way of synthesizing the viewer's image stream from the camera stream, and provides a good approximation when the viewer's position remains close to the camera axis." See Integrated Media Systems Center, Alexandre R.J. Francois II et al., <i>A Handheld Virtual Mirror</i> (2002), at Section 1.Problem formulation and geometric analysis. "We have implemented the mirror image transform as a module in the Modular Flow Scheduling Middleware [François 2001], the open source implementation of IMSC's software architecture for Integrated Media Systems. It is specifically designed for parallel processing of concurrent data streams in real-time, and its modularity dramatically reduces development and integration time. The actual handheld virtual mirror system is composed of a handheld 10" LCD flat screen fitted with a camera and a magnetic tracker sensor (figure 2), a fixed processing unit, a fixed magnetic tracker transmitter, and a second magnetic tracker sensor placed on the user. Real-time camera and tracker inputs are used to synthesize the virtual mirror stream and display it in real-time on the LCD screen. The result is a very convincing handheld mirror simulation." See Integrated Media Systems Center, Alexandre R.J. Francois II et al., <i>A Handheld Virtual Mirror</i> (2002), at Section 2.2.System integration. "The design and construction of realistic virtual mirrors represents an original experiment in Human-Computer Interface, that opens the door to various interactive experiments in entertainment, arts and communication. Use of video analysis and graphics techniques will allow to explore and interfere with what has always been a private, solitary act of a person looking in a mirror." See Integrated Media Systems

Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
	Center, Alexandre R.J. Francois II et al., <i>A Handheld Virtual Mirror</i> (2002), at Section 3.Perspectives. See <i>A Handheld Virtual Mirror</i> (2002), at Figure 1:  Figure 1. Basic mirror geometry. See <i>A Handheld Virtual Mirror</i> (2002), at Figure 2:

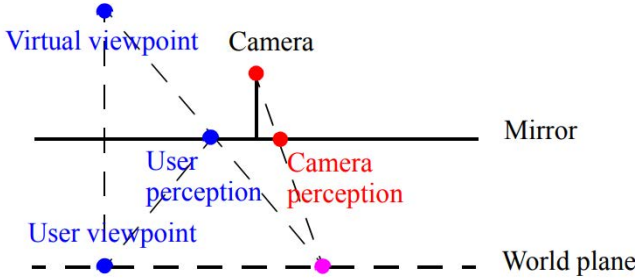
Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
	 Figure 2. Handheld virtual mirror device. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Francois III alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

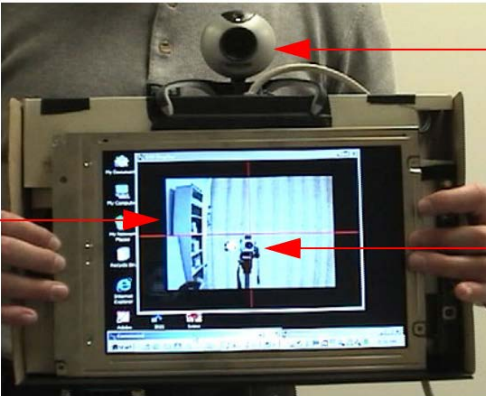
Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
Claim 4	
4. The method of claim 3, wherein the body part comprises one of legs, face, eyes, and hands.	Francois III expressly and/or inherently discloses and/or renders obvious wherein the body part comprises one of legs, face, eyes, and hands. <i>See, e.g.</i> , disclosures below.

Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
	“Our system is composed of a handheld LCD screen manipulated by the user, a single camera fixed on the screen, and two 6 degrees of freedom trackers giving in real time the positions and orientations of the camera and the user's head. The major system components and their relations are illustrated in figure 1. The user sees on the screen what they would see on a real mirror.” See <i>A Handheld Mirror Simulation</i>, Francois et al. (2003), 1.INTRODUCTION, page 745.  Figure 1. Handheld mirror simulation system. See <i>A Handheld Mirror Simulation</i>, Francois et al. (2003), Fig. 1. “The only parameters are f, d and $[txtytz]$. The theoretical focal length of the camera can be obtained by various calibration methods. The positions and orientations of the user's viewpoint and the camera center provided by the tracking devices, allow to compute both the distance d and the change of referential translation parameters.” See <i>A Handheld Mirror Simulation</i>, Francois et al. (2003), 3.SYSTEM INTEGRATION, page 747.

Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
	 Figure 6. Mirror simulation application graph. See <i>A Handheld Mirror Simulation</i>, Francois et al. (2003), Fig. 6. “This sketch presents the design and construction of a handheld virtual mirror device. The perception of the world reflected through a mirror depends on the viewer's position with respect to the mirror and the 3-D geometry of the world. In order to simulate a real mirror on a computer screen, images of the observed world, consistent with the viewer's position, must be synthesized and displayed in real-time. Our system is build around a flat LCD screen manipulated by the user, a single camera fixed on the screen, and a tracking device. The continuous input video stream and tracker data is used to synthesize, in real-time, a continuous video stream displayed on the LCD screen. The synthesized video stream is a close approximation of what the user would see on the screen surface if it were a real mirror.” See Integrated Media Systems Center, Alexandre R.J. Francois II et al., <i>A Handheld Virtual Mirror</i> (2002), at the introductory paragraph. “When a person looks into a mirror, they see what they would see from the symmetrical (virtual) point of view (figure 1). A camera whose position and orientation are fixed with respect to the mirror produces a video stream that corresponds to this particular

Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
	viewpoint. In order to synthesize the images corresponding to the user's viewpoint from the images captured by the camera, we must relate them geometrically. Such a transform cannot be formulated without assumptions or knowledge about the world geometry. In our case, the focus of attention is the user's own reflection in the mirror. We thus model the world as a plane parallel to the mirror, at the user's distance from the mirror. We have shown that under these assumptions, the transform relating the camera view and the user view depends only on the relative positions of the user viewpoint and the camera center, and is reduced to a scaling and a translation. The transform is exact when the user viewpoint lies on the camera axis. This model provides a straightforward and efficient way of synthesizing the viewer's image stream from the camera stream, and provides a good approximation when the viewer's position remains close to the camera axis." See Integrated Media Systems Center, Alexandre R.J. Francois II et al., <i>A Handheld Virtual Mirror</i> (2002), at Section 1.Problem formulation and geometric analysis. "We have implemented the mirror image transform as a module in the Modular Flow Scheduling Middleware [François 2001], the open source implementation of IMSC's software architecture for Integrated Media Systems. It is specifically designed for parallel processing of concurrent data streams in real-time, and its modularity dramatically reduces development and integration time. The actual handheld virtual mirror system is composed of a handheld 10" LCD flat screen fitted with a camera and a magnetic tracker sensor (figure 2), a fixed processing unit, a fixed magnetic tracker transmitter, and a second magnetic tracker sensor placed on the user. Real-time camera and tracker inputs are used to synthesize the virtual mirror stream and display it in real-time on the LCD screen. The result is a very convincing handheld mirror simulation." See Integrated Media Systems Center, Alexandre R.J. Francois II et al., <i>A Handheld Virtual Mirror</i> (2002), at Section 2.2.System integration. "The design and construction of realistic virtual mirrors represents an original experiment in Human-Computer Interface, that opens the door to various interactive experiments in entertainment, arts and communication. Use of video analysis and graphics techniques will allow to explore and interfere with what has always been a private, solitary act of a person looking in a mirror." See Integrated Media Systems

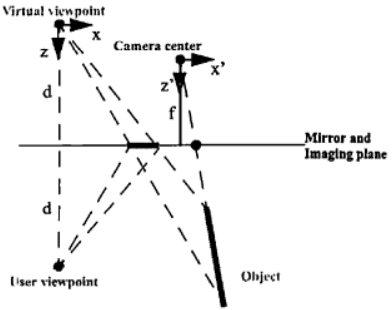
Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
	Center, Alexandre R.J. Francois II et al., <i>A Handheld Virtual Mirror</i> (2002), at Section 3.Perspectives. See <i>A Handheld Virtual Mirror</i> (2002), at Figure 1:  Figure 1. Basic mirror geometry. See <i>A Handheld Virtual Mirror</i> (2002), at Figure 2:

Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
	 Camera Virtual mirror "You" Figure 2. Handheld virtual mirror device. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Francois III alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

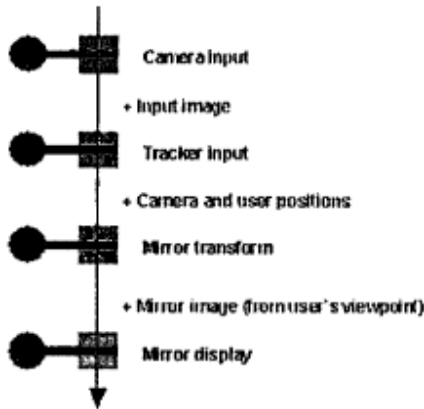
Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
Claim 5	
5. The method of claim 1, further comprising receiving user input and operating the processor to vary image	Francois III expressly and/or inherently discloses and/or renders obvious receiving user input and operating the processor to vary image magnitude or field-of-view of the modified images according to the user input. <i>See, e.g.</i> , disclosures below.

Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
magnitude or field-of-view of the modified images according to the user input.	“Our system provides a generic interface for applications involving rich, first-person interaction, such as the Virtual Daguerreotype.” <i>See A Handheld Mirror Simulation</i>, Francois et al. (2003), Abstract, page 745. “A major novelty in our approach is the hands-on aspect, which requires a more elaborate model to convincingly reproduce the interaction between the user and the mirror as an object. One important clue is the evolution of the user's field of view in the mirror as her position with respect to the mirror changes. Furthermore, our goal is to produce a working but extensible system, to serve as a platform for future enhancements to the HCI device subsystem itself, as well as to allow easy integration in applications Our system is composed of a handheld LCD screen manipulated by the user, a single camera fixed on the screen, and two 6 degrees of freedom trackers giving in real time the positions and orientations of the camera and the user's head. The major system components and their relations are illustrated in figure 1. The user sees on the screen what they would see on a real mirror. The perception of the world reflected through a mirror depends on the viewer's position with respect to the mirror and the 3-D geometry of the world. In order to simulate a real mirror on a computer screen, images of the observed world, consistent with the viewer's position, must be synthesized and displayed in real-time. The continuous input video stream and tracker data is used to synthesize, in real-time, a continuous video stream displayed on the LCD screen. The synthesized video stream is a close approximation of what the user would see on the screen surface if it were a real mirror.” <i>See A Handheld Mirror Simulation</i>, Francois et al. (2003), 1.INTRODUCTION, page 745. “When a person looks into a planar mirror, they see what they would see from the symmetrical (virtual) point of view (see figure 2). Assimilating image formation by the eye to a perspective projection, the image perceived by the viewer on the mirror surface is a perspective projection on the mirror plane with respect to the virtual viewpoint. A point of homogenous coordinates [xyz1] in an orthonormal coordinate system centered on the virtual viewpoint (symmetrical of the user viewpoint with respect to the mirror

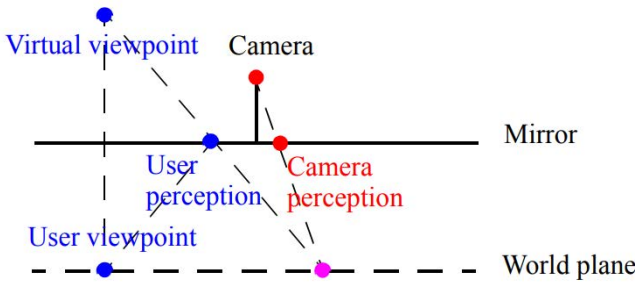
Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
	plane) with the z direction normal to the mirror, is seen on the mirror surface at its projected location [xpypd] , where d is the orthogonal distance of the viewpoint to the mirror plane, and $\begin{bmatrix} U_p \\ V_p \\ W_p \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1/d & 0 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \\ 1 \end{bmatrix} \quad \begin{aligned} x_p &= U_p/W_p = dx/z \\ y_p &= V_p/W_p = dy/z \end{aligned}$ The image perceived on the mirror depends only on the position of the user with respect to the mirror, and the field of view covered by the mirror depends only on the position of the user with respect to the mirror edges. In particular, the image perceived on the mirror remains "fixed" when the viewing direction changes while the viewpoint remains fixed." See <i>A Handheld Mirror Simulation</i>, Francois et al. (2003), 2.GEOMETRIC ANALYSIS, pages 745-46. "In order to synthesize the images corresponding to the user's view1point from the images captured by the camera, we must relate them geometrically, i.e. express x_p and y_p in terms of x'_p and y'_p.

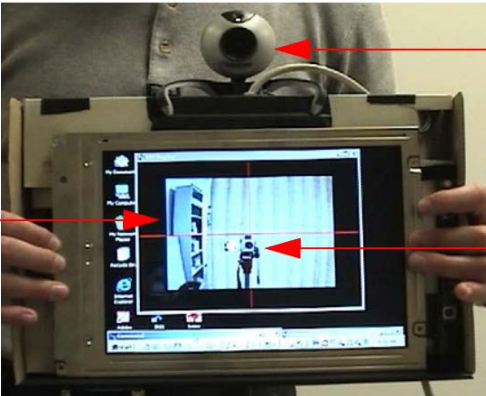
Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
	$\begin{bmatrix} x \\ y \\ z \\ 1 \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 & t_x \\ 0 & 1 & 0 & t_y \\ 0 & 0 & 1 & t_z \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} x' \\ y' \\ z' \\ 1 \end{bmatrix}$ The mirror projection equations become: $\begin{bmatrix} U_p \\ V_p \\ W_p \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 & t_x \\ 0 & 1 & 0 & t_y \\ 0 & 0 & 1/d & t_z/d \end{bmatrix} \begin{bmatrix} x' \\ y' \\ z' \\ 1 \end{bmatrix} \quad \begin{aligned} x_p &= d(x' + t_x)/(z' + t_z) \\ y_p &= d(y' + t_y)/(z' + t_z) \end{aligned}$  Figure 4. An underconstrained problem. Express x_p and y_p in terms of x'_p and y'_p thus requires to recover the actual 3-D position of each point from its image projection. This is obviously an underconstrained problem, as an image pixel might potentially be the projection of any world point on a ray passing through the camera center and the pixel, as illustrated in figure 4. Various computer vision techniques could be used to attempt to recover the 3-D geometry of the world from images in some cases. Another solution would be to use a 3-D model of the environment, if available. For our first prototype, we followed a simpler approximate approach. Since we are designing our mirror as a first person interaction tool, we assume that the center of interest is the user himself, and that the background is of lesser

Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
	importance. We thus model the world as a plane parallel to the mirror/imaging plane, at the same distance as the user's viewpoint (see figure 5). The z' component of each world point is thus fixed to $z' = f + d$ in the camera centered coordinate system. We can now inverse the camera projection equations: $x'_p = fx' / (f + d) \Leftrightarrow x' = (f + d)x'_p / f$ $y'_p = fy' / (f + d) \Leftrightarrow y' = (f + d)y'_p / f$ The transformation equations that relate the user's view to the camera image are thus: $x_p = d((f + d)x'_p / f + t_x) / ((f + d) + t_z)$ $y_p = d((f + d)y'_p / f + t_y) / ((f + d) + t_z)$ The only parameters are f, d and $[t_x t_y t_z]$. The theoretical focal length of the camera can be obtained by various calibration methods. The positions and orientations of the user's viewpoint and the camera center provided by the tracking devices, allow to compute both the distance d and the change of referential translation parameters. Note that under our assumptions, the transform relating the user's view to the camera view is reduced to a scaling and a translation. This model provides a straightforward and efficient way of synthesizing the viewer's image stream from the camera stream, while remaining a reasonable approximation for a large class of applications. The major field-of-view variations occurring when varying the angle of view and the distance to the mirror, are convincingly simulated." See <i>A Handheld Mirror Simulation</i>, Francois et al. (2003), 2.3 User view synthesis, pages 746-47.

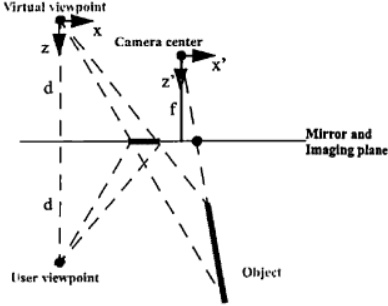
Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
	 Figure 6. Mirror simulation application graph. See <i>A Handheld Mirror Simulation</i>, Francois et al. (2003), Fig. 6. “This sketch presents the design and construction of a handheld virtual mirror device. The perception of the world reflected through a mirror depends on the viewer's position with respect to the mirror and the 3-D geometry of the world. In order to simulate a real mirror on a computer screen, images of the observed world, consistent with the viewer's position, must be synthesized and displayed in real-time. Our system is build around a flat LCD screen manipulated by the user, a single camera fixed on the screen, and a tracking device. The continuous input video stream and tracker data is used to synthesize, in real-time, a continuous video stream displayed on the LCD screen. The synthesized video stream is a close approximation of what the user would see on the screen surface if it were a real mirror.” See Integrated Media Systems Center, Alexandre R.J. Francois II et al., <i>A Handheld Virtual Mirror</i> (2002), at the introductory paragraph. “When a person looks into a mirror, they see what they would see from the symmetrical (virtual) point of view (figure 1). A camera whose position and orientation are fixed with

Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
	respect to the mirror produces a video stream that corresponds to this particular viewpoint. In order to synthesize the images corresponding to the user's viewpoint from the images captured by the camera, we must relate them geometrically. Such a transform cannot be formulated without assumptions or knowledge about the world geometry. In our case, the focus of attention is the user's own reflection in the mirror. We thus model the world as a plane parallel to the mirror, at the user's distance from the mirror. We have shown that under these assumptions, the transform relating the camera view and the user view depends only on the relative positions of the user viewpoint and the camera center, and is reduced to a scaling and a translation. The transform is exact when the user viewpoint lies on the camera axis. This model provides a straightforward and efficient way of synthesizing the viewer's image stream from the camera stream, and provides a good approximation when the viewer's position remains close to the camera axis." See Integrated Media Systems Center, Alexandre R.J. Francois II et al., <i>A Handheld Virtual Mirror</i> (2002), at Section 1.Problem formulation and geometric analysis. "We have implemented the mirror image transform as a module in the Modular Flow Scheduling Middleware [François 2001], the open source implementation of IMSC's software architecture for Integrated Media Systems. It is specifically designed for parallel processing of concurrent data streams in real-time, and its modularity dramatically reduces development and integration time. The actual handheld virtual mirror system is composed of a handheld 10" LCD flat screen fitted with a camera and a magnetic tracker sensor (figure 2), a fixed processing unit, a fixed magnetic tracker transmitter, and a second magnetic tracker sensor placed on the user. Real-time camera and tracker inputs are used to synthesize the virtual mirror stream and display it in real-time on the LCD screen. The result is a very convincing handheld mirror simulation." See Integrated Media Systems Center, Alexandre R.J. Francois II et al., <i>A Handheld Virtual Mirror</i> (2002), at Section 2.2.System integration. "The design and construction of realistic virtual mirrors represents an original experiment in Human-Computer Interface, that opens the door to various interactive experiments in entertainment, arts and communication. Use of video analysis and graphics techniques will allow to explore and interfere with what has always been a

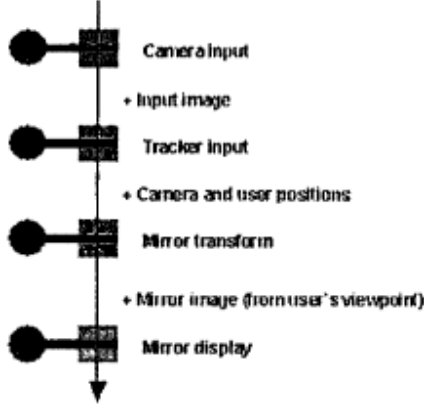
Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
	private, solitary act of a person looking in a mirror.” See Integrated Media Systems Center, Alexandre R.J. Francois II et al., <i>A Handheld Virtual Mirror</i> (2002), at Section 3.Perspectives. See <i>A Handheld Virtual Mirror</i> (2002), at Figure 1:  Figure 1. Basic mirror geometry. See <i>A Handheld Virtual Mirror</i> (2002), at Figure 2:

Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
	 Figure 2. Handheld virtual mirror device. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Francois III alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

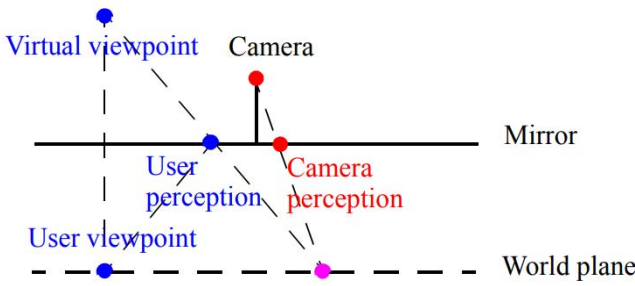
Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
Claim 6	
6. The method of claim 5, wherein the processor varies the image magnitude or field-of-view mapping to display a partial	Francois III expressly and/or inherently discloses and/or renders obvious wherein the processor varies the image magnitude or field-of-view mapping to display a partial or full body of the user in the modified images. <i>See, e.g.</i> , disclosures below.

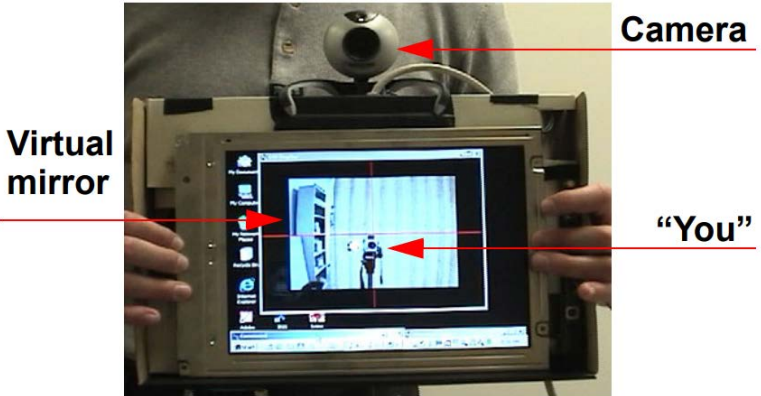
Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
or full body of the user in the modified images.	“In order to synthesize the images corresponding to the user's view1point from the images captured by the camera, we must relate them geometrically, i.e. express x_p and y_p in terms of x'_p and y'_p. $\begin{bmatrix} x \\ y \\ z \\ 1 \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 & t_x \\ 0 & 1 & 0 & t_y \\ 0 & 0 & 1 & t_z \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} x' \\ y' \\ z' \\ 1 \end{bmatrix}$ The mirror projection equations become: $\begin{bmatrix} U_p \\ V_p \\ W_p \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 & t_x \\ 0 & 1 & 0 & t_y \\ 0 & 0 & 1/d & t_z/d \end{bmatrix} \begin{bmatrix} x' \\ y' \\ z' \\ 1 \end{bmatrix}, \quad \begin{aligned} x_p &= d(x' + t_x)/(z' + t_z) \\ y_p &= d(y' + t_y)/(z' + t_z) \end{aligned}$  Figure 4. An underconstrained problem. Express x_p and y_p in terms of x'_p and y'_p thus requires to recover the actual 3-D position of each point from its image projection. This is obviously an underconstrained problem, as an image pixel might potentially be the projection of any world point on a ray passing through the camera center and the pixel, as illustrated in figure 4. Various computer vision techniques could be used to attempt to recover the 3-13 geometry of the world

Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
	from images in some cases. Another solution would be to use a 3-D model of the environment, if available. For our first prototype, we followed a simpler approximate approach. Since we are designing our mirror as a first person interaction tool, we assume that the center of interest is the user himself, and that the background is of lesser importance. We thus model the world as a plane parallel to the mirror/imaging plane, at the same distance as the user's viewpoint (see figure 5). The z' component of each world point is thus fixed to $z' = f + d$ in the camera centered coordinate system. We can now inverse the camera projection equations: $x'_p = fx' / (f + d) \Leftrightarrow x' = (f + d)x'_p / f$ $y'_p = fy' / (f + d) \Leftrightarrow y' = (f + d)y'_p / f$ The transformation equations that relate the user's view to the camera image are thus: $x_p = d((f + d)x'_p / f + t_x) / ((f + d) + t_z)$ $y_p = d((f + d)y'_p / f + t_y) / ((f + d) + t_z)$ The only parameters are f, d and $[t_x, t_y, t_z]$. The theoretical focal length of the camera can be obtained by various calibration methods. The positions and orientations of the user's viewpoint and the camera center provided by the tracking devices, allow to compute both the distance d and the change of referential translation parameters. Note that under our assumptions, the transform relating the user's view to the camera view is reduced to a scaling and a translation. This model provides a straightforward and efficient way of synthesizing the viewer's image stream from the camera stream, while remaining a reasonable approximation for a large class of applications. The major field-of-view variations occurring when varying the angle of view and the distance to the mirror, are

Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
	convincingly simulated.” See <i>A Handheld Mirror Simulation</i>, Francois et al. (2003), 2.3 User view synthesis, pages 746-47.  Figure 6. Mirror simulation application graph. See <i>A Handheld Mirror Simulation</i>, Francois et al. (2003), Fig. 6. “This sketch presents the design and construction of a handheld virtual mirror device. The perception of the world reflected through a mirror depends on the viewer's position with respect to the mirror and the 3-D geometry of the world. In order to simulate a real mirror on a computer screen, images of the observed world, consistent with the viewer's position, must be synthesized and displayed in real-time. Our system is build around a flat LCD screen manipulated by the user, a single camera fixed on the screen, and a tracking device. The continuous input video stream and tracker data is used to synthesize, in real-time, a continuous video stream displayed on the LCD screen. The synthesized video stream is a close approximation of what the user would see on the screen surface

Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
	if it were a real mirror.” See Integrated Media Systems Center, Alexandre R.J. Francois II et al., <i>A Handheld Virtual Mirror</i> (2002), at the introductory paragraph. “When a person looks into a mirror, they see what they would see from the symmetrical (virtual) point of view (figure 1). A camera whose position and orientation are fixed with respect to the mirror produces a video stream that corresponds to this particular viewpoint. In order to synthesize the images corresponding to the user's viewpoint from the images captured by the camera, we must relate them geometrically. Such a transform cannot be formulated without assumptions or knowledge about the world geometry. In our case, the focus of attention is the user's own reflection in the mirror. We thus model the world as a plane parallel to the mirror, at the user's distance from the mirror. We have shown that under these assumptions, the transform relating the camera view and the user view depends only on the relative positions of the user viewpoint and the camera center, and is reduced to a scaling and a translation. The transform is exact when the user viewpoint lies on the camera axis. This model provides a straightforward and efficient way of synthesizing the viewer's image stream from the camera stream, and provides a good approximation when the viewer's position remains close to the camera axis.” See Integrated Media Systems Center, Alexandre R.J. Francois II et al., <i>A Handheld Virtual Mirror</i> (2002), at Section 1.Problem formulation and geometric analysis. “We have implemented the mirror image transform as a module in the Modular Flow Scheduling Middleware [François 2001], the open source implementation of IMSC's software architecture for Integrated Media Systems. It is specifically designed for parallel processing of concurrent data streams in real-time, and its modularity dramatically reduces development and integration time. The actual handheld virtual mirror system is composed of a handheld 10" LCD flat screen fitted with a camera and a magnetic tracker sensor (figure 2), a fixed processing unit, a fixed magnetic tracker transmitter, and a second magnetic tracker sensor placed on the user. Real-time camera and tracker inputs are used to synthesize the virtual mirror stream and display it in real-time on the LCD screen. The result is a very convincing handheld mirror simulation.”

Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
	See Integrated Media Systems Center, Alexandre R.J. Francois II et al., <i>A Handheld Virtual Mirror</i> (2002), at Section 2.2. System integration. “The design and construction of realistic virtual mirrors represents an original experiment in Human-Computer Interface, that opens the door to various interactive experiments in entertainment, arts and communication. Use of video analysis and graphics techniques will allow to explore and interfere with what has always been a private, solitary act of a person looking in a mirror.” See Integrated Media Systems Center, Alexandre R.J. Francois II et al., <i>A Handheld Virtual Mirror</i> (2002), at Section 3. Perspectives. See <i>A Handheld Virtual Mirror</i> (2002), at Figure 1:  Figure 1. Basic mirror geometry. See <i>A Handheld Virtual Mirror</i> (2002), at Figure 2:

Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
	 Figure 2. Handheld virtual mirror device. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Francois III alone; (2) knowledge of a personal of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
Claim 10	
10. The method of claim 1, further comprising operating the processor to augment the modified images by	Francois III inherently discloses and/or renders obvious operating the processor to augment the modified images by overlaying virtual objects on a user's image appearing within the modified images. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Francois III alone; (2) knowledge of a personal of

Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
overlaying virtual objects on a user's image appearing within the modified images.	ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
Claim 11	
11. The method of claim 1, further comprising operating the processor to transmit the modified image over a network.	Francois III inherently discloses and/or renders obvious operating the processor to transmit the modified image over a network. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Francois III alone; (2) knowledge of a personal of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
Claim 12	
12. The method of claim 1, further comprising displaying the modified image on a remote screen for video telepresence.	Francois III inherently discloses and/or renders obvious displaying the modified image on a remote screen for video telepresence. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Francois III alone; (2) knowledge of a personal of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
Claim 16	
16. The method of claim 1, wherein the processor operates on the images from the camera to generate background segmentation, and replaces segments on the images by replacement segments.	Francois III inherently discloses and/or renders obvious wherein the processor operates on the images from the camera to generate background segmentation, and replaces segments on the images by replacement segments. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Francois III alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

Asserted Claim of the '110 Patent	Exemplary Citations to Francois III
Claim 17	
17. The method of claim 16, wherein the replacement segments comprise virtual background or background that was captured in a different setting.	Francois III inherently discloses and/or renders obvious wherein the replacement segments comprise virtual background or background that was captured in a different setting. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Francois III alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

**Exhibit B-27: Invalidity of U.S. Patent No. 8,982,110 in view of
U.S. Patent Pub. No. 2010/0177159 (“Tojo”)**

This chart is subject to all reservations, objections, and disclaimers in Defendants’ Invalidity Contentions and any amendment, supplement, or modification thereof, which are incorporated herein by reference in their entirety.

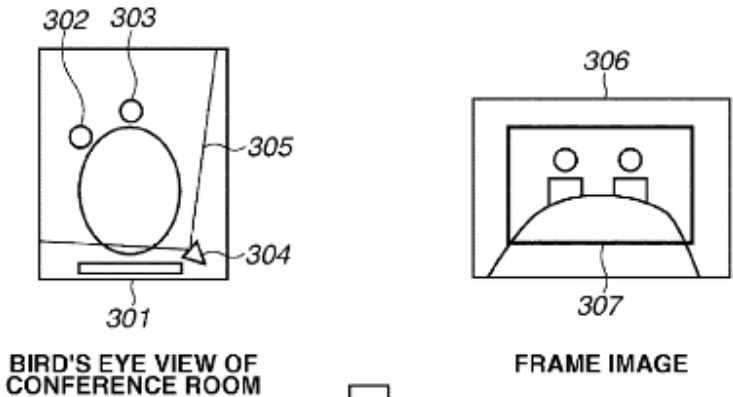
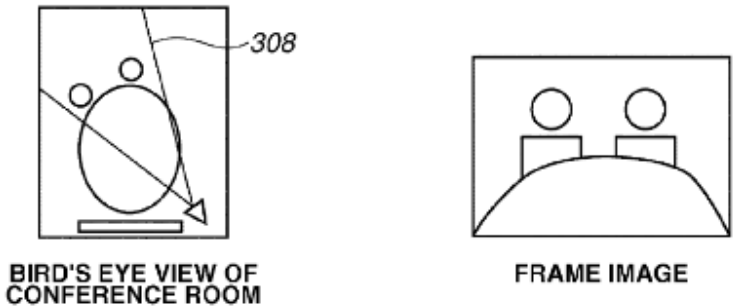
Tojo was originally filed January 7, 2010 and was published on January 15, 2010, and thus is available as prior art to U.S. Patent No. 8,982,110 (the “’110 Patent”) under at least 35 U.S.C. §§ 102(a), (b) and (e).

Tojo anticipates the Asserted Claims of the ’110 Patent. To the extent it is found Tojo does not expressly disclose certain limitations in the Asserted Claims, such limitations are at least implicitly or inherently disclosed. Moreover, to the extent it is found that Tojo does not anticipate the Asserted Claims, Tojo renders obvious the Asserted Claims, either alone or in combination with other prior art identified in the cover pleading or herein, and/or in combination with the general knowledge of a person having ordinary skill in the art.

In these contentions, Defendants have relied in part on Plaintiff’s Infringement Contentions. In those contentions, Plaintiff appears to pursue overly broad claim constructions in an effort to assert infringement where none exists, and to accuse products that do not infringe the claims. Defendants’ assertion that a particular limitation is disclosed by a prior art reference and/or is disclosed in a particular manner may be based in part on Plaintiff’s apparent claim interpretations. In relying on Plaintiff’s apparent claim interpretations, Defendants do not admit that Plaintiff’s apparent claim interpretations are supportable or proper or that the claim limitations in question are definite or otherwise amenable to construction.

Defendants have endeavored to provide as much detail as possible in these contentions and, in doing so, have exceeded the level of detail required. The inclusion of specific details in some areas is not a concession that such details are required or that the omission of similar details in other areas is a defect. These citations to portions of any reference in this chart are exemplary only. Defendants will rely on the entirety of the references cited in this chart to show that the Asserted Claims are invalid.

Asserted Claim of the '110 Patent	Exemplary Citations to Tojo
Claim 1	
1[pre]. A computerized method for operating a display system, the display system having a camera, a monitor, and a processor, the method comprising:	To the extent the preamble is limiting, Tojo expressly and/or inherently discloses and/or renders obvious this limitation. <i>See, e.g.</i>, disclosures below. “According to an aspect of the present invention, an image processing apparatus includes a photographing unit configured to generate a plurality of images by photographing a plurality of times a range which can be photographed, an object detection unit configured to detect a specified object from each of the plurality of images generated by the photographing unit, a position determination unit configured to determine an existing position of the specified object based on a detection result of the specified object in the plurality of images, and a range determination unit configured to determine a photographing range to be photographed within the range which can be photographed based on the existing position of the specified object determined by the position determination unit.” <i>See</i> para. [0013]. “A case where an image processing apparatus according to the exemplary embodiments of the present invention is applied to a video conference system will be described below.” <i>See</i> para. [0037].

Asserted Claim of the '110 Patent	Exemplary Citations to Tojo
	FIG.3A  Diagram illustrating a bird's eye view of a conference room (left) and its corresponding frame image (right). The bird's eye view shows a room with a table (301), chairs (302, 303), and a camera (304) positioned above the table. The frame image shows a top-down view of the table and chairs (307) within a frame (306). FIG.3B  Diagram illustrating a different bird's eye view of a conference room (left) and its corresponding frame image (right). The bird's eye view shows a room with a table (301), chairs (302, 303), and a camera (308) positioned above the table. The frame image shows a top-down view of the table and chairs (307) within a frame (306).

Asserted Claim of the '110 Patent	Exemplary Citations to Tojo
	<i>See</i> para. Figs 3A-B. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Tojo alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.
1[a]. operating the camera to generate a stream of images of the user;	Tojo expressly and/or inherently discloses and/or renders obvious operating the camera to generate a stream of images of the user. <i>See, e.g.</i>, disclosures below. “An object detection unit 105 detects the object from the frame image acquired by the image acquisition unit 102. An object existing probability distribution calculation unit 106 counts the detection results of the object detection unit 105 and calculates an object existing probability distribution at each position. A photographing range determination unit 107 determines the range in which all objects can be included, based on the object existing probability distribution calculated by the object existing probability distribution calculation unit 106.” <i>See</i> para. [0041]. “In step S5403, the image acquisition unit 102 determines whether the image processing apparatus 100 is currently set to a camera setting assist mode. If the image processing apparatus 100 is not set the camera setting assist mode (NO in step S403), the process returns to step S401. The camera setting assist mode is a mode for automatically adjusting the photographing range to include all objects existing in front of the camera (i.e., perform framing). The image processing apparatus 100 can automatically shift to the camera setting assist mode when the power is switched on, or at arbitrary timing by the user operating a button (not illustrated).” <i>See</i> para. [0048]. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Tojo alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of

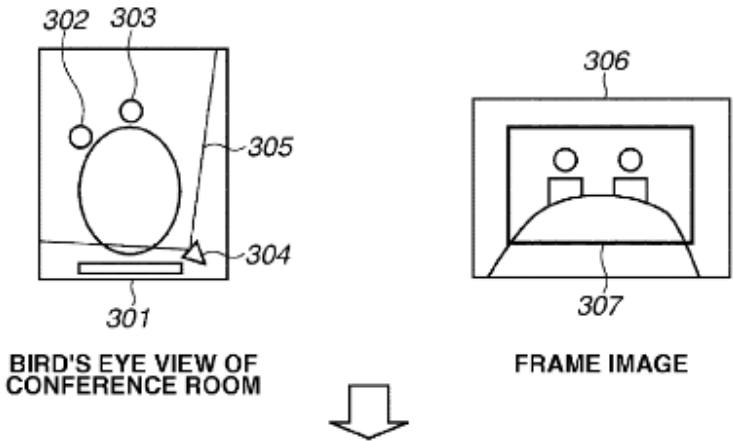
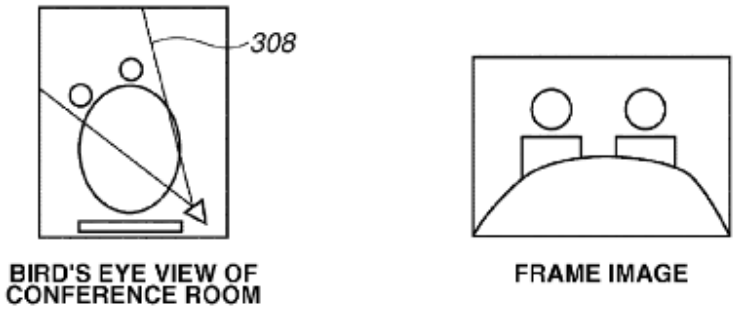
Asserted Claim of the '110 Patent	Exemplary Citations to Tojo
	Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.
1[b]. operating the processor to detect the presence of the user in the stream of image;	Tojo expressly and/or inherently discloses and/or renders obvious operating the processor to detect the presence of the user in the stream of image. <i>See, e.g.</i>, disclosures below. “An object detection unit 105 detects the object from the frame image acquired by the image acquisition unit 102. An object existing probability distribution calculation unit 106 counts the detection results of the object detection unit 105 and calculates an object existing probability distribution at each position. A photographing range determination unit 107 determines the range in which all objects can be included, based on the object existing probability distribution calculated by the object existing probability distribution calculation unit 106.” <i>See</i> para. [0041]. “In step S5403, the image acquisition unit 102 determines whether the image processing apparatus 100 is currently set to a camera setting assist mode. If the image processing apparatus 100 is not set the camera setting assist mode (NO in step S403), the process returns to step S401. The camera setting assist mode is a mode for automatically adjusting the photographing range to include all objects existing in front of the camera (i.e., perform framing). The image processing apparatus 100 can automatically shift to the camera setting assist mode when the power is switched on, or at arbitrary timing by the user operating a button (not illustrated).” <i>See</i> para. [0048]. “When the image processing apparatus 100 shifts to the camera setting assist mode, the image capturing unit 101 is controlled toward the wide-angle end (not illustrated in FIGS. 3A and 3B). A viewing angle 305 indicates a viewing angle in such a case, and the participants are captured small in a frame image 306.” <i>See</i> para. [0049]. “The operation of the camera setting assist mode is described from step S404 to step S409. If it is determined that the present setting is the camera setting assist mode (YES

Asserted Claim of the '110 Patent	Exemplary Citations to Tojo
	in step S403), the process proceeds to step S404. In step S404, the object detection unit 105 detects the object from the frame image. There are various methods for detecting the object, and in the present exemplary embodiment, the face of the object is detected. Face detection will be described in detail below.” <i>See</i> para. [0050]. “In the above-described method, since the region of the object existing near the side of the frame definitely comes into contact with the frame, a predetermined margin can be set without causing the object region to become inscribed. Further, if a template illustrated in FIG. 13 is used, the photographing range can be determined so that all objects can be photographed in bust shots. More specifically, templates of a face region 1302 and an upper body 1303 as illustrated in FIG. 13 are acquired from a ratio of sizes and relative positions of an upper body and a face of an average person 1301. After the position and the size of the face region are determined, the templates are zoomed and applied to determine the photographing range to include the upper body. All objects can thus be photographed as bust shots.” <i>See</i> para. [0071]. “FIG. 8 illustrates a flowchart of an example of a process for performing auto-framing according to the present exemplary embodiment. Since processes performed in step S801 to step S803 are the same as those in step S401 to step S403 illustrated in FIG. 4, description on these steps is omitted. If the setting is a camera setting assist mode (YES in step S803), the process proceeds to step S804. In step S804, face detection is performed on the video image in which pan-tilt control is performed to photograph the entire range that can be photographed by the camera.” <i>See</i> para. [0075].

Asserted Claim of the '110 Patent	Exemplary Citations to Tojo
	FIG.4 <pre>graph TD; START([START]) --> S401{IS POWER SWITCHED OFF?}; S401 -- YES --> END([END]); S401 -- NO --> S402[TRANSMIT VIDEO STREAM]; S402 --> S403{IS CAMERA SETTING ASSIST MODE SPECIFIED?}; S403 -- YES --> S404[DETECT OBJECT]; S404 --> S405[COUNT NUMBER OF DETECTED OBJECTS FOR EACH POSITION]; S405 --> S406{HAS PREDETERMINED TIME ELAPSED?}; S406 -- YES --> S407[ESTIMATE OBJECT POSITION]; S407 --> S408[DETERMINE PHOTOGRAPHING RANGE]; S408 --> S409[DETERMINE CONTROL PARAMETERS]; S409 --> S410[CONTROL CAMERA]; S410 --> S411[SWITCH OFF CAMERA SETTING ASSIST MODE]; S411 --> S403; S406 -- NO --> S403; S403 -- NO --> S401;</pre> See para. Fig. 4. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Tojo alone; (2) knowledge of a personal of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of

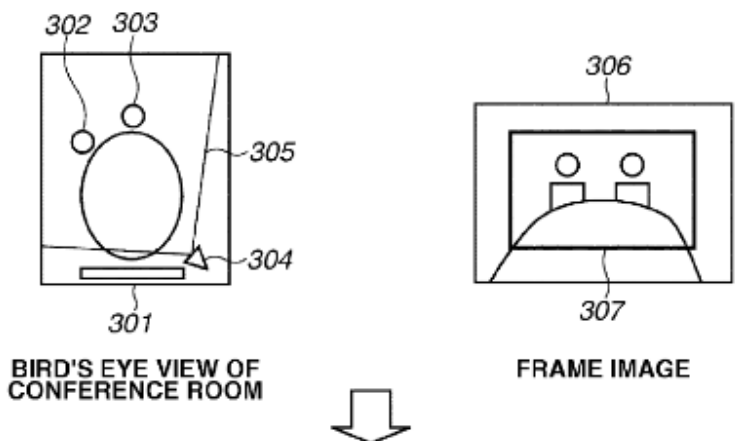
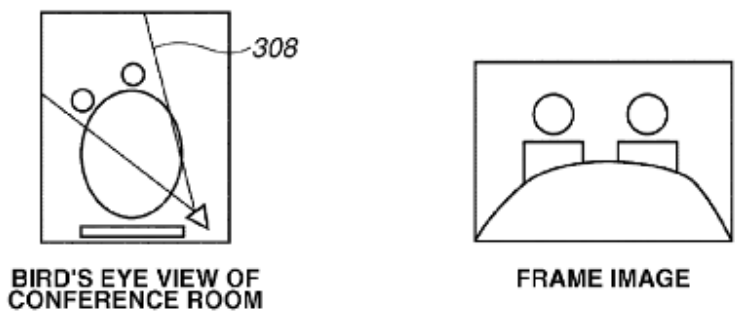
Asserted Claim of the '110 Patent	Exemplary Citations to Tojo
	Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.
1[c]. operating the processor to apply adaptive transformation mapping to the stream of images captured by the camera to generate modified images that appear to be captured from a different point of view of the camera's actual point of view; and	Tojo expressly and/or inherently discloses and/or renders obvious operating the processor to apply adaptive transformation mapping to the stream of images captured by the camera to generate modified images that appear to be captured from a different point of view of the camera's actual point of view. <i>See, e.g.</i>, disclosures below. “An object detection unit 105 detects the object from the frame image acquired by the image acquisition unit 102. An object existing probability distribution calculation unit 106 counts the detection results of the object detection unit 105 and calculates an object existing probability distribution at each position. A photographing range determination unit 107 determines the range in which all objects can be included, based on the object existing probability distribution calculated by the object existing probability distribution calculation unit 106.” <i>See</i> para. [0041]. “In step S5403, the image acquisition unit 102 determines whether the image processing apparatus 100 is currently set to a camera setting assist mode. If the image processing apparatus 100 is not set the camera setting assist mode (NO in step S403), the process returns to step S401. The camera setting assist mode is a mode for automatically adjusting the photographing range to include all objects existing in front of the camera (i.e., perform framing). The image processing apparatus 100 can automatically shift to the camera setting assist mode when the power is switched on, or at arbitrary timing by the user operating a button (not illustrated).” <i>See</i> para. [0048]. “When the image processing apparatus 100 shifts to the camera setting assist mode, the image capturing unit 101 is controlled toward the wide-angle end (not illustrated in FIGS. 3A and 3B). A viewing angle 305 indicates a viewing angle in such a case, and the participants are captured small in a frame image 306.” <i>See</i> para. [0049].

Asserted Claim of the '110 Patent	Exemplary Citations to Tojo
	“The operation of the camera setting assist mode is described from step S404 to step S409. If it is determined that the present setting is the camera setting assist mode (YES in step S403), the process proceeds to step S404. In step S404, the object detection unit 105 detects the object from the frame image. There are various methods for detecting the object, and in the present exemplary embodiment, the face of the object is detected. Face detection will be described in detail below.” <i>See</i> para. [0050]. “Upon acquiring the regions in which the object existing probability is high as described above, a photographing range 1206 is determined so that all of the first region 1204 and the second region 1205 are included when photographed. The photographing range 1206 is determined, for example, by gradually decreasing only the size of a rectangle whose size, center, and aspect ratio are the same as those of the frame 1201. When one side of either the first region 1204 or the second region 1205 becomes inscribed, the rectangle is set as the photographing range 1206.” <i>See</i> para. [0070]. “As described above, according to the present exemplary embodiment, an object is continuously detected for a predetermined time with respect to the same position, and the probability distribution is acquired. The object position of a high probability can thus be acquired. As a result, the load on the user is reduced even when the object is temporarily undetected or erroneously detected, or when the object moves, and an appropriate photographing range can be easily determined and adjusted.” <i>See</i> para. [0072].

Asserted Claim of the '110 Patent	Exemplary Citations to Tojo
	FIG.3A  FIG.3B 

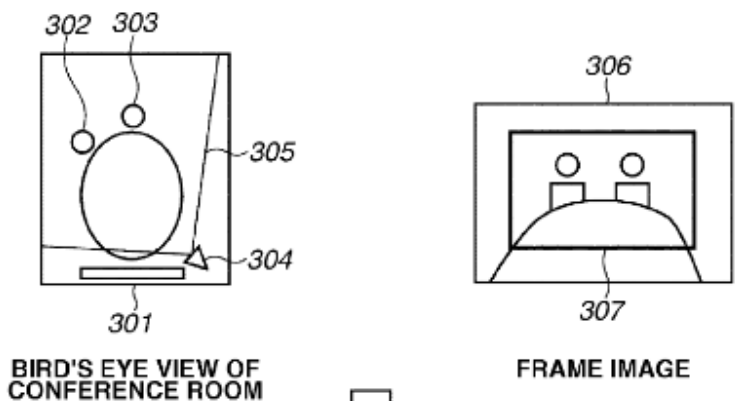
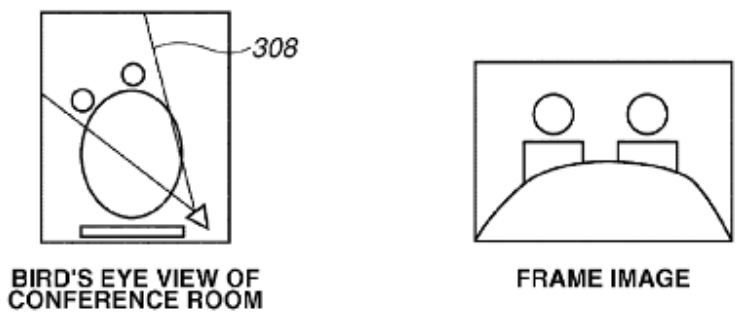
Asserted Claim of the '110 Patent	Exemplary Citations to Tojo
	FIG.4 <pre> graph TD START([START]) --> S401{IS POWER SWITCHED OFF?} S401 -- YES --> END([END]) S401 -- NO --> S402[TRANSMIT VIDEO STREAM] S402 --> S403{IS CAMERA SETTING ASSIST MODE SPECIFIED?} S403 -- NO --> S401 S403 -- YES --> S404[DETECT OBJECT] S404 --> S405[COUNT NUMBER OF DETECTED OBJECTS FOR EACH POSITION] S405 --> S406{HAS PREDETERMINED TIME ELAPSED?} S406 -- NO --> S401 S406 -- YES --> S407[ESTIMATE OBJECT POSITION] S407 --> S408[DETERMINE PHOTOGRAPHING RANGE] S408 --> S409[DETERMINE CONTROL PARAMETERS] S409 --> S410[CONTROL CAMERA] S410 --> S411[SWITCH OFF CAMERA SETTING ASSIST MODE] S411 --> S401 </pre> See para. Fig. 4.

Asserted Claim of the '110 Patent	Exemplary Citations to Tojo
	<i>See</i> para. Figs 3A-B. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Tojo alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.
1[d]. displaying the modified images on the monitor;	Tojo expressly and/or inherently discloses and/or renders obvious displaying the modified images on the monitor. <i>See, e.g.</i>, disclosures below. “When the image processing apparatus 100 shifts to the camera setting assist mode, the image capturing unit 101 is controlled toward the wide-angle end (not illustrated in FIGS. 3A and 3B). A viewing angle 305 indicates a viewing angle in such a case, and the participants are captured small in a frame image 306.” <i>See</i> para. [0049]. “As described above, according to the present exemplary embodiment, an object is continuously detected for a predetermined time with respect to the same position, and the probability distribution is acquired. The object position of a high probability can thus be acquired. As a result, the load on the user is reduced even when the object is temporarily undetected or erroneously detected, or when the object moves, and an appropriate photographing range can be easily determined and adjusted.” <i>See</i> para. [0072].

Asserted Claim of the '110 Patent	Exemplary Citations to Tojo
	FIG.3A  FIG.3B 

Asserted Claim of the '110 Patent	Exemplary Citations to Tojo
	<i>See</i> para. Figs 3A-B. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Tojo alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.
1[e]. wherein the different point of view corresponds to an image taken from a different angle and a different distance than the actual images captured by the camera; and	Tojo expressly and/or inherently discloses and/or renders obvious wherein the different point of view corresponds to an image taken from a different angle and a different distance than the actual images captured by the camera. <i>See, e.g.</i>, disclosures below. “In step S5403, the image acquisition unit 102 determines whether the image processing apparatus 100 is currently set to a camera setting assist mode. If the image processing apparatus 100 is not set the camera setting assist mode (NO in step S403), the process returns to step S401. The camera setting assist mode is a mode for automatically adjusting the photographing range to include all objects existing in front of the camera (i.e., perform framing). The image processing apparatus 100 can automatically shift to the camera setting assist mode when the power is switched on, or at arbitrary timing by the user operating a button (not illustrated).” <i>See</i> para. [0048]. “When the image processing apparatus 100 shifts to the camera setting assist mode, the image capturing unit 101 is controlled toward the wide-angle end (not illustrated in FIGS. 3A and 3B). A viewing angle 305 indicates a viewing angle in such a case, and the participants are captured small in a frame image 306.” <i>See</i> para. [0049]. “The operation of the camera setting assist mode is described from step S404 to step S409. If it is determined that the present setting is the camera setting assist mode (YES in step S403), the process proceeds to step S404. In step S404, the object detection unit 105 detects the object from the frame image. There are various methods for detecting the

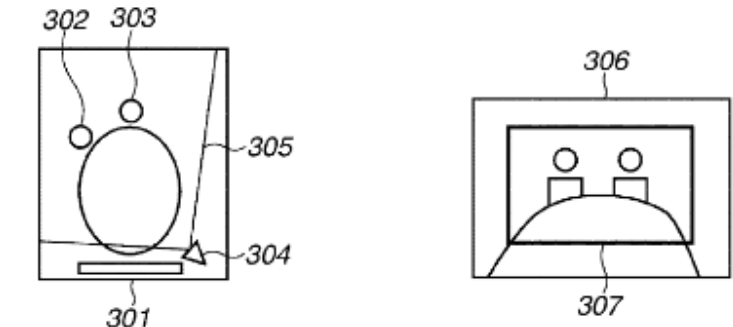
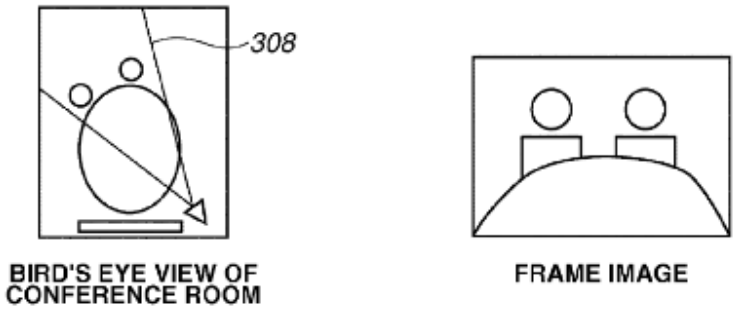
Asserted Claim of the '110 Patent	Exemplary Citations to Tojo
	object, and in the present exemplary embodiment, the face of the object is detected. Face detection will be described in detail below.” <i>See</i> para. [0050]. “As described above, according to the present exemplary embodiment, an object is continuously detected for a predetermined time with respect to the same position, and the probability distribution is acquired. The object position of a high probability can thus be acquired. As a result, the load on the user is reduced even when the object is temporarily undetected or erroneously detected, or when the object moves, and an appropriate photographing range can be easily determined and adjusted.” <i>See</i> para. [0072].

Asserted Claim of the '110 Patent	Exemplary Citations to Tojo
	FIG.3A  ↓ FIG.3B 

Asserted Claim of the '110 Patent	Exemplary Citations to Tojo
	<i>See</i> para. Figs 3A-B. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Tojo alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.
1[f]. wherein during mirror tracking mode the processor utilizes the angle of the images captured by the camera and applies parametric input for a mapping transformation that changes imaging perspective of the images captured by the camera.	Tojo expressly and/or inherently discloses and/or renders obvious wherein during mirror tracking mode the processor utilizes the angle of the images captured by the camera and applies parametric input for a mapping transformation that changes imaging perspective of the images captured by the camera. <i>See, e.g.</i>, disclosures below. “In step S409, the control parameter generation unit 108 determines the control parameter (i.e., zoom position or focal length) so that the range in which the object exists can cover the entire frame. Such a control parameter can be determined by calculating the number by which the area of the object existing range is to be multiplied to equal the area of the frame, and then converting the result into the focal length. For example, if the area of the range in which the object exists is to be doubled when using a lens of 10 mm at the wide-angle end, the focal length becomes 20 mm.” <i>See</i> para. [0054]. “As described above, according to the present exemplary embodiment, an object is continuously detected for a predetermined time with respect to the same position, and the probability distribution is acquired. The object position of a high probability can thus be acquired. As a result, the load on the user is reduced even when the object is temporarily undetected or erroneously detected, or when the object moves, and an appropriate photographing range can be easily determined and adjusted.” <i>See</i> para. [0072]. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Tojo alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of

Asserted Claim of the '110 Patent	Exemplary Citations to Tojo
	Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

Asserted Claim of the '110 Patent	Exemplary Citations to Tojo
Claim 2	
2. The method of claim 1, wherein the mapping transformation comprises a combination of at least two of the following transformations: vertical flips about a vertical axis, a projection transformation, rotation, resize, two-dimensional offset, optic distortion correction, and polynomial mapping on part or entire captured image.	Tojo expressly and/or inherently discloses and/or renders obvious wherein the mapping transformation comprises a combination of at least two of the following transformations: vertical flips about a vertical axis, a projection transformation, rotation, resize, two-dimensional offset, optic distortion correction, and polynomial mapping on part or entire captured image. <i>See, e.g.</i>, disclosures below. “In step S409, the control parameter generation unit 108 determines the control parameter (i.e., zoom position or focal length) so that the range in which the object exists can cover the entire frame. Such a control parameter can be determined by calculating the number by which the area of the object existing range is to be multiplied to equal the area of the frame, and then converting the result into the focal length. For example, if the area of the range in which the object exists is to be doubled when using a lens of 10 mm at the wide-angle end, the focal length becomes 20 mm.” <i>See</i> para. [0054]. “As described above, according to the present exemplary embodiment, an object is continuously detected for a predetermined time with respect to the same position, and the probability distribution is acquired. The object position of a high probability can thus be acquired. As a result, the load on the user is reduced even when the object is temporarily undetected or erroneously detected, or when the object moves, and an appropriate photographing range can be easily determined and adjusted.” <i>See</i> para. [0072].

Asserted Claim of the '110 Patent	Exemplary Citations to Tojo
	FIG.3A  ↓ FIG.3B 

Asserted Claim of the '110 Patent	Exemplary Citations to Tojo
	<i>See</i> para. Figs 3A-B. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Tojo alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

Asserted Claim of the '110 Patent	Exemplary Citations to Tojo
Claim 3	
3. The method of claim 1, wherein during idle mode the camera continuously sends captured images to the processor, and the user presence is identified by the processor detecting a body part in the images.	Tojo expressly and/or inherently discloses and/or renders obvious wherein during idle mode the camera continuously sends captured images to the processor, and the user presence is identified by the processor detecting a body part in the images. <i>See, e.g.</i>, disclosures below. “An object detection unit 105 detects the object from the frame image acquired by the image acquisition unit 102. An object existing probability distribution calculation unit 106 counts the detection results of the object detection unit 105 and calculates an object existing probability distribution at each position. A photographing range determination unit 107 determines the range in which all objects can be included, based on the object existing probability distribution calculated by the object existing probability distribution calculation unit 106.” <i>See</i> para. [0041]. “In step S5403, the image acquisition unit 102 determines whether the image processing apparatus 100 is currently set to a camera setting assist mode. If the image processing apparatus 100 is not set the camera setting assist mode (NO in step S403), the process returns to step S401. The camera setting assist mode is a mode for automatically adjusting the photographing range to include all objects existing in front of the camera (i.e., perform framing). The image processing apparatus 100 can automatically shift to

Asserted Claim of the '110 Patent	Exemplary Citations to Tojo
	the camera setting assist mode when the power is switched on, or at arbitrary timing by the user operating a button (not illustrated).” <i>See</i> para. [0048]. “When the image processing apparatus 100 shifts to the camera setting assist mode, the image capturing unit 101 is controlled toward the wide-angle end (not illustrated in FIGS. 3A and 3B). A viewing angle 305 indicates a viewing angle in such a case, and the participants are captured small in a frame image 306.” <i>See</i> para. [0049]. “The operation of the camera setting assist mode is described from step S404 to step S409. If it is determined that the present setting is the camera setting assist mode (YES in step S403), the process proceeds to step S404. In step S404, the object detection unit 105 detects the object from the frame image. There are various methods for detecting the object, and in the present exemplary embodiment, the face of the object is detected. Face detection will be described in detail below.” <i>See</i> para. [0050]. “In the above-described method, since the region of the object existing near the side of the frame definitely comes into contact with the frame, a predetermined margin can be set without causing the object region to become inscribed. Further, if a template illustrated in FIG. 13 is used, the photographing range can be determined so that all objects can be photographed in bust shots. More specifically, templates of a face region 1302 and an upper body 1303 as illustrated in FIG. 13 are acquired from a ratio of sizes and relative positions of an upper body and a face of an average person 1301. After the position and the size of the face region are determined, the templates are zoomed and applied to determine the photographing range to include the upper body. All objects can thus be photographed as bust shots.” <i>See</i> para. [0071]. “FIG. 8 illustrates a flowchart of an example of a process for performing auto-framing according to the present exemplary embodiment. Since processes performed in step S801 to step S803 are the same as those in step S401 to step S403 illustrated in FIG. 4, description on these steps is omitted. If the setting is a camera setting assist mode (YES in step S803), the process proceeds to step S804. In step S804, face detection is

Asserted Claim of the '110 Patent	Exemplary Citations to Tojo
	performed on the video image in which pan-tilt control is performed to photograph the entire range that can be photographed by the camera.” <i>See</i> para. [0075]. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Tojo alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants’ Invalidity Contentions and Defendants’ other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

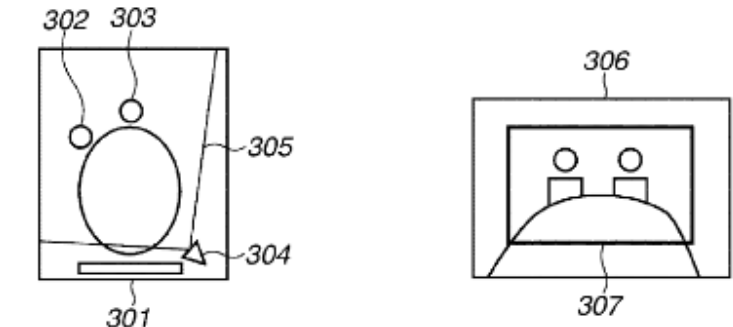
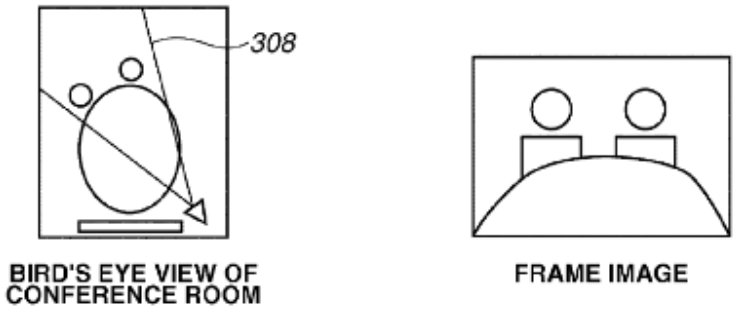
Asserted Claim of the '110 Patent	Exemplary Citations to Tojo
Claim 4	
4. The method of claim 3, wherein the body part comprises one of legs, face, eyes, and hands.	Tojo expressly and/or inherently discloses and/or renders obvious wherein the body part comprises one of legs, face, eyes, and hands. <i>See, e.g.</i>, disclosures below. “An object detection unit 105 detects the object from the frame image acquired by the image acquisition unit 102. An object existing probability distribution calculation unit 106 counts the detection results of the object detection unit 105 and calculates an object existing probability distribution at each position. A photographing range determination unit 107 determines the range in which all objects can be included, based on the object existing probability distribution calculated by the object existing probability distribution calculation unit 106.” <i>See</i> para. [0041]. “In step S5403, the image acquisition unit 102 determines whether the image processing apparatus 100 is currently set to a camera setting assist mode. If the image processing apparatus 100 is not set the camera setting assist mode (NO in step S403), the process returns to step S401. The camera setting assist mode is a mode for automatically adjusting the photographing range to include all objects existing in front of the camera (i.e., perform framing). The image processing apparatus 100 can automatically shift to

Asserted Claim of the '110 Patent	Exemplary Citations to Tojo
	the camera setting assist mode when the power is switched on, or at arbitrary timing by the user operating a button (not illustrated).” <i>See</i> para. [0048]. “When the image processing apparatus 100 shifts to the camera setting assist mode, the image capturing unit 101 is controlled toward the wide-angle end (not illustrated in FIGS. 3A and 3B). A viewing angle 305 indicates a viewing angle in such a case, and the participants are captured small in a frame image 306.” <i>See</i> para. [0049]. “The operation of the camera setting assist mode is described from step S404 to step S409. If it is determined that the present setting is the camera setting assist mode (YES in step S403), the process proceeds to step S404. In step S404, the object detection unit 105 detects the object from the frame image. There are various methods for detecting the object, and in the present exemplary embodiment, the face of the object is detected. Face detection will be described in detail below.” <i>See</i> para. [0050]. “In the above-described method, since the region of the object existing near the side of the frame definitely comes into contact with the frame, a predetermined margin can be set without causing the object region to become inscribed. Further, if a template illustrated in FIG. 13 is used, the photographing range can be determined so that all objects can be photographed in bust shots. More specifically, templates of a face region 1302 and an upper body 1303 as illustrated in FIG. 13 are acquired from a ratio of sizes and relative positions of an upper body and a face of an average person 1301. After the position and the size of the face region are determined, the templates are zoomed and applied to determine the photographing range to include the upper body. All objects can thus be photographed as bust shots.” <i>See</i> para. [0071]. “FIG. 8 illustrates a flowchart of an example of a process for performing auto-framing according to the present exemplary embodiment. Since processes performed in step S801 to step S803 are the same as those in step S401 to step S403 illustrated in FIG. 4, description on these steps is omitted. If the setting is a camera setting assist mode (YES in step S803), the process proceeds to step S804. In step S804, face detection is

Asserted Claim of the '110 Patent	Exemplary Citations to Tojo
	performed on the video image in which pan-tilt control is performed to photograph the entire range that can be photographed by the camera.” <i>See</i> para. [0075]. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Tojo alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants’ Invalidity Contentions and Defendants’ other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

Asserted Claim of the '110 Patent	Exemplary Citations to Tojo
Claim 5	
5. The method of claim 1, further comprising receiving user input and operating the processor to vary image magnitude or field-of-view of the modified images according to the user input.	Tojo expressly and/or inherently discloses and/or renders obvious receiving user input and operating the processor to vary image magnitude or field-of-view of the modified images according to the user input. <i>See, e.g.</i>, disclosures below. “In step S407, the object existing probability distribution calculation unit 106 calculates the object position existing probability distribution and then acquires a region in which the object existing probability is high from the calculated object position existing probability distribution. The process for acquiring such a region in which the object existing probability is high will be described in detail below. In step S408, the photographing range determination unit 107 determines a photographing range 307 of the object as illustrated in FIG. 3A.” <i>See</i> para. [0053]. “In step S409, the control parameter generation unit 108 determines the control parameter (i.e., zoom position or focal length) so that the range in which the object exists can cover the entire frame. Such a control parameter can be determined by calculating the number by which the area of the object existing range is to be multiplied to equal the area of the frame, and then converting the result into the focal length. For example, if the

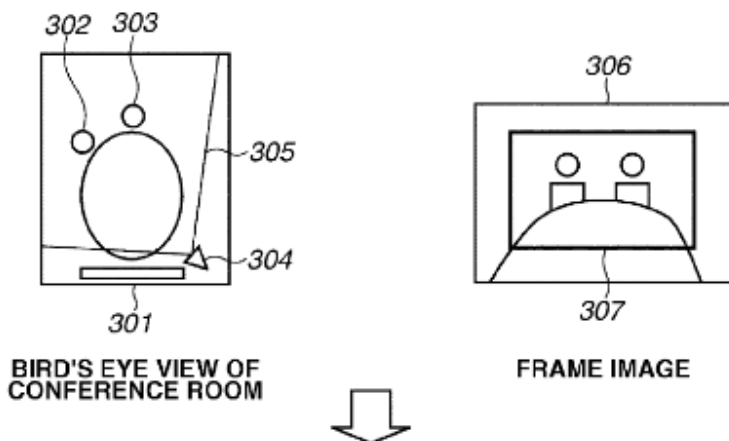
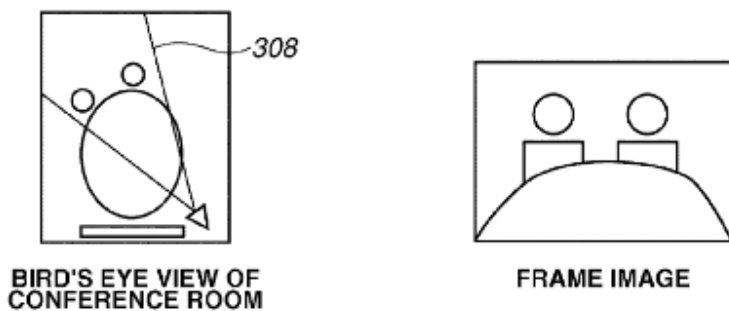
Asserted Claim of the '110 Patent	Exemplary Citations to Tojo
	area of the range in which the object exists is to be doubled when using a lens of 10 mm at the wide-angle end, the focal length becomes 20 mm.” <i>See</i> para. [0054]. “In step S410, the zoom control unit 109 performs zoom control on the image capturing unit 101 based on the determined zoom position. As a result, an angle of view 308 as illustrated in FIG. 3B is achieved. In step S411, the camera setting assisting is completed, so that the zoom control unit 109 turns off the camera setting assist mode, and the process returns to step S401.” <i>See</i> para. [0055]. “As described above, according to the present exemplary embodiment, an object is continuously detected for a predetermined time with respect to the same position, and the probability distribution is acquired. The object position of a high probability can thus be acquired. As a result, the load on the user is reduced even when the object is temporarily undetected or erroneously detected, or when the object moves, and an appropriate photographing range can be easily determined and adjusted.” <i>See</i> para. [0072].

Asserted Claim of the '110 Patent	Exemplary Citations to Tojo
	FIG.3A  ↓ FIG.3B 

Asserted Claim of the '110 Patent	Exemplary Citations to Tojo
	<i>See</i> para. Figs 3A-B. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Tojo alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

Asserted Claim of the '110 Patent	Exemplary Citations to Tojo
Claim 6	
6. The method of claim 5, wherein the processor varies the image magnitude or field-of-view mapping to display a partial or full body of the user in the modified images.	Tojo expressly and/or inherently discloses and/or renders obvious wherein the processor varies the image magnitude or field-of-view mapping to display a partial or full body of the user in the modified images. <i>See, e.g.</i>, disclosures below. “In step S407, the object existing probability distribution calculation unit 106 calculates the object position existing probability distribution and then acquires a region in which the object existing probability is high from the calculated object position existing probability distribution. The process for acquiring such a region in which the object existing probability is high will be described in detail below. In step S408, the photographing range determination unit 107 determines a photographing range 307 of the object as illustrated in FIG. 3A.” <i>See</i> para. [0053]. “In step S409, the control parameter generation unit 108 determines the control parameter (i.e., zoom position or focal length) so that the range in which the object exists can cover the entire frame. Such a control parameter can be determined by calculating the number by which the area of the object existing range is to be multiplied to equal the area of the frame, and then converting the result into the focal length. For example, if the

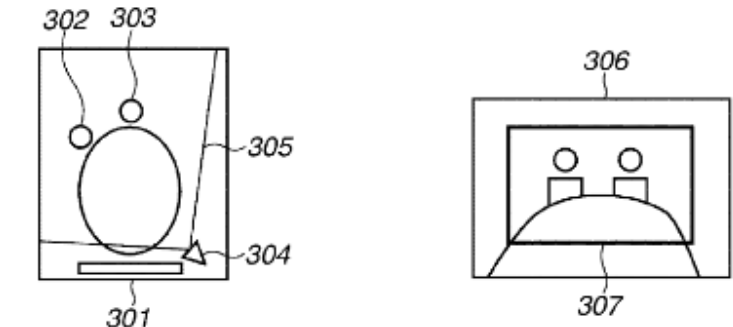
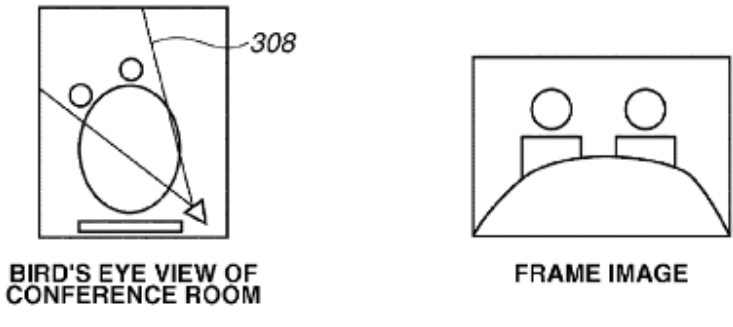
Asserted Claim of the '110 Patent	Exemplary Citations to Tojo
	area of the range in which the object exists is to be doubled when using a lens of 10 mm at the wide-angle end, the focal length becomes 20 mm.” <i>See</i> para. [0054]. “In step S410, the zoom control unit 109 performs zoom control on the image capturing unit 101 based on the determined zoom position. As a result, an angle of view 308 as illustrated in FIG. 3B is achieved. In step S411, the camera setting assisting is completed, so that the zoom control unit 109 turns off the camera setting assist mode, and the process returns to step S401.” <i>See</i> para. [0055]. “As described above, according to the present exemplary embodiment, an object is continuously detected for a predetermined time with respect to the same position, and the probability distribution is acquired. The object position of a high probability can thus be acquired. As a result, the load on the user is reduced even when the object is temporarily undetected or erroneously detected, or when the object moves, and an appropriate photographing range can be easily determined and adjusted.” <i>See</i> para. [0072].

Asserted Claim of the '110 Patent	Exemplary Citations to Tojo
	FIG.3A  FIG.3B 

Asserted Claim of the '110 Patent	Exemplary Citations to Tojo
	<i>See</i> para. Figs 3A-B. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Tojo alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

Asserted Claim of the '110 Patent	Exemplary Citations to Tojo
Claim 10	
10. The method of claim 1, further comprising operating the processor to augment the modified images by overlaying virtual objects on a user's image appearing within the modified images.	Tojo expressly and/or inherently discloses and/or renders obvious operating the processor to augment the modified images by overlaying virtual objects on a user's image appearing within the modified images. <i>See, e.g.</i>, disclosures below. “An object detection unit 105 detects the object from the frame image acquired by the image acquisition unit 102. An object existing probability distribution calculation unit 106 counts the detection results of the object detection unit 105 and calculates an object existing probability distribution at each position. A photographing range determination unit 107 determines the range in which all objects can be included, based on the object existing probability distribution calculated by the object existing probability distribution calculation unit 106.” <i>See</i> para. [0041]. “In step S5403, the image acquisition unit 102 determines whether the image processing apparatus 100 is currently set to a camera setting assist mode. If the image processing apparatus 100 is not set the camera setting assist mode (NO in step S403), the process returns to step S401. The camera setting assist mode is a mode for automatically adjusting the photographing range to include all objects existing in front of the camera (i.e., perform framing). The image processing apparatus 100 can automatically shift to

Asserted Claim of the '110 Patent	Exemplary Citations to Tojo
	the camera setting assist mode when the power is switched on, or at arbitrary timing by the user operating a button (not illustrated).” <i>See</i> para. [0048]. “When the image processing apparatus 100 shifts to the camera setting assist mode, the image capturing unit 101 is controlled toward the wide-angle end (not illustrated in FIGS. 3A and 3B). A viewing angle 305 indicates a viewing angle in such a case, and the participants are captured small in a frame image 306.” <i>See</i> para. [0049]. “The operation of the camera setting assist mode is described from step S404 to step S409. If it is determined that the present setting is the camera setting assist mode (YES in step S403), the process proceeds to step S404. In step S404, the object detection unit 105 detects the object from the frame image. There are various methods for detecting the object, and in the present exemplary embodiment, the face of the object is detected. Face detection will be described in detail below.” <i>See</i> para. [0050]. “Upon acquiring the regions in which the object existing probability is high as described above, a photographing range 1206 is determined so that all of the first region 1204 and the second region 1205 are included when photographed. The photographing range 1206 is determined, for example, by gradually decreasing only the size of a rectangle whose size, center, and aspect ratio are the same as those of the frame 1201. When one side of either the first region 1204 or the second region 1205 becomes inscribed, the rectangle is set as the photographing range 1206.” <i>See</i> para. [0070]. “As described above, according to the present exemplary embodiment, an object is continuously detected for a predetermined time with respect to the same position, and the probability distribution is acquired. The object position of a high probability can thus be acquired. As a result, the load on the user is reduced even when the object is temporarily undetected or erroneously detected, or when the object moves, and an appropriate photographing range can be easily determined and adjusted.” <i>See</i> para. [0072].

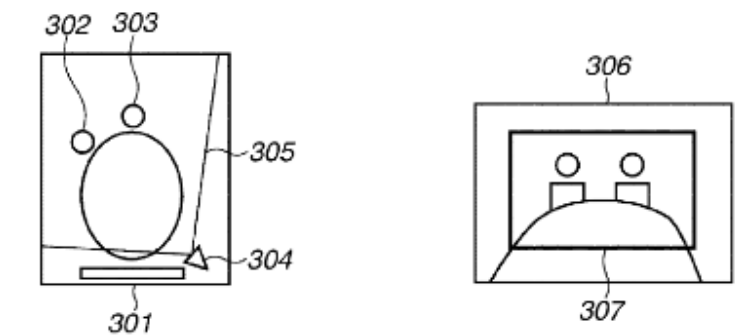
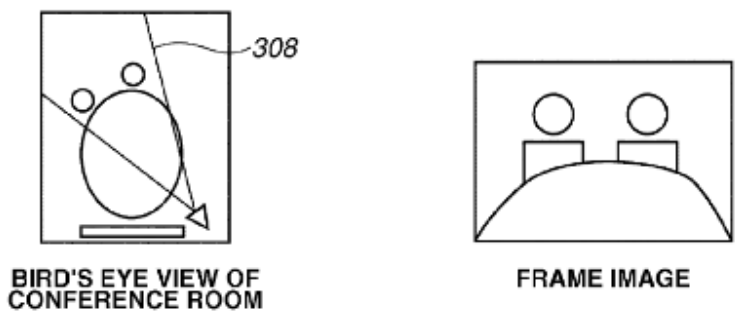
Asserted Claim of the '110 Patent	Exemplary Citations to Tojo
	FIG.3A  ↓ FIG.3B 

Asserted Claim of the '110 Patent	Exemplary Citations to Tojo
	This limitation would have been obvious to a person of ordinary skill in the art based on (1) Tojo alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

Asserted Claim of the '110 Patent	Exemplary Citations to Tojo
Claim 11	
11. The method of claim 1, further comprising operating the processor to transmit the modified image over a network.	Tojo expressly and/or inherently discloses and/or renders obvious operating the processor to transmit the modified image over a network. <i>See, e.g.</i>, disclosures below. “An object detection unit 105 detects the object from the frame image acquired by the image acquisition unit 102. An object existing probability distribution calculation unit 106 counts the detection results of the object detection unit 105 and calculates an object existing probability distribution at each position. A photographing range determination unit 107 determines the range in which all objects can be included, based on the object existing probability distribution calculated by the object existing probability distribution calculation unit 106.” <i>See</i> para. [0041]. “Before starting the video conference, the user places the image processing apparatus 304 alongside the display as illustrated in FIG. 3A, so that the eyes of the participants in the conference room are level with the eyes of participants to communicate with on the other side. The user switches on the image processing apparatus 304 which then operates according to the flowchart illustrated in FIG. 4.” <i>See</i> para. [0045]. “In step S5403, the image acquisition unit 102 determines whether the image processing apparatus 100 is currently set to a camera setting assist mode. If the image processing

Asserted Claim of the '110 Patent	Exemplary Citations to Tojo
	apparatus 100 is not set the camera setting assist mode (NO in step S403), the process returns to step S401. The camera setting assist mode is a mode for automatically adjusting the photographing range to include all objects existing in front of the camera (i.e., perform framing). The image processing apparatus 100 can automatically shift to the camera setting assist mode when the power is switched on, or at arbitrary timing by the user operating a button (not illustrated).” <i>See</i> para. [0048]. “When the image processing apparatus 100 shifts to the camera setting assist mode, the image capturing unit 101 is controlled toward the wide-angle end (not illustrated in FIGS. 3A and 3B). A viewing angle 305 indicates a viewing angle in such a case, and the participants are captured small in a frame image 306.” <i>See</i> para. [0049]. “The operation of the camera setting assist mode is described from step S404 to step S409. If it is determined that the present setting is the camera setting assist mode (YES in step S403), the process proceeds to step S404. In step S404, the object detection unit 105 detects the object from the frame image. There are various methods for detecting the object, and in the present exemplary embodiment, the face of the object is detected. Face detection will be described in detail below.” <i>See</i> para. [0050]. “Upon acquiring the regions in which the object existing probability is high as described above, a photographing range 1206 is determined so that all of the first region 1204 and the second region 1205 are included when photographed. The photographing range 1206 is determined, for example, by gradually decreasing only the size of a rectangle whose size, center, and aspect ratio are the same as those of the frame 1201. When one side of either the first region 1204 or the second region 1205 becomes inscribed, the rectangle is set as the photographing range 1206.” <i>See</i> para. [0070]. “As described above, according to the present exemplary embodiment, an object is continuously detected for a predetermined time with respect to the same position, and the probability distribution is acquired. The object position of a high probability can thus be acquired. As a result, the load on the user is reduced even when the object is

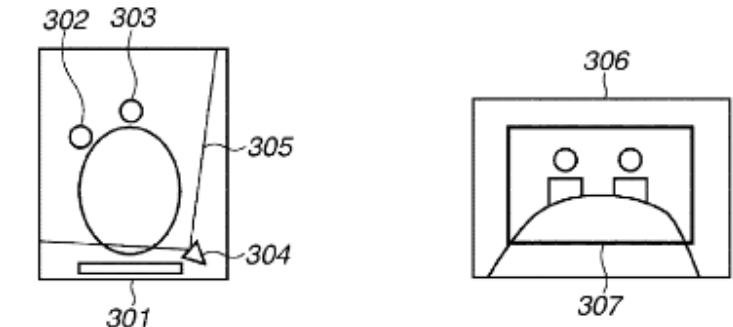
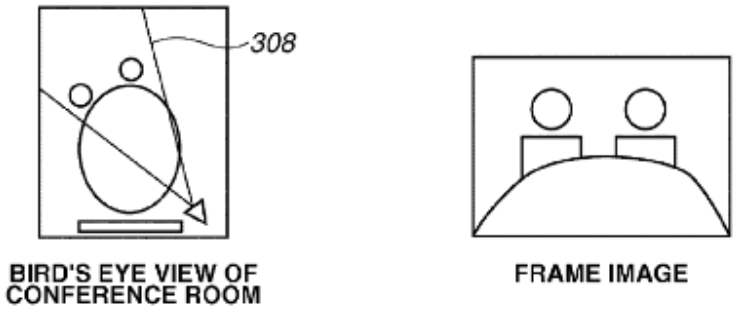
Asserted Claim of the '110 Patent	Exemplary Citations to Tojo
	temporarily undetected or erroneously detected, or when the object moves, and an appropriate photographing range can be easily determined and adjusted.” <i>See</i> para. [0072].

Asserted Claim of the '110 Patent	Exemplary Citations to Tojo
	FIG.3A  ↓ FIG.3B 

Asserted Claim of the '110 Patent	Exemplary Citations to Tojo
	This limitation would have been obvious to a person of ordinary skill in the art based on (1) Tojo alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

Asserted Claim of the '110 Patent	Exemplary Citations to Tojo
Claim 12	
12. The method of claim 1, further comprising displaying the modified image on a remote screen for video telepresence.	Tojo expressly and/or inherently discloses and/or renders obvious displaying the modified image on a remote screen for video telepresence. <i>See, e.g.</i>, disclosures below. Tojo expressly and/or inherently discloses and/or renders obvious this limitation. <i>See, e.g.</i>, disclosures below. “Before starting the video conference, the user places the image processing apparatus 304 alongside the display as illustrated in FIG. 3A, so that the eyes of the participants in the conference room are level with the eyes of participants to communicate with on the other side. The user switches on the image processing apparatus 304 which then operates according to the flowchart illustrated in FIG. 4.” <i>See</i> para. [0045]. “When the image processing apparatus 100 shifts to the camera setting assist mode, the image capturing unit 101 is controlled toward the wide-angle end (not illustrated in FIGS. 3A and 3B). A viewing angle 305 indicates a viewing angle in such a case, and the participants are captured small in a frame image 306.” <i>See</i> para. [0049]. “As described above, according to the present exemplary embodiment, an object is continuously detected for a predetermined time with respect to the same position, and the probability distribution is acquired. The object position of a high probability can thus

Asserted Claim of the '110 Patent	Exemplary Citations to Tojo
	be acquired. As a result, the load on the user is reduced even when the object is temporarily undetected or erroneously detected, or when the object moves, and an appropriate photographing range can be easily determined and adjusted.” <i>See</i> para. [0072].

Asserted Claim of the '110 Patent	Exemplary Citations to Tojo
	FIG.3A  ↓ FIG.3B 

Asserted Claim of the '110 Patent	Exemplary Citations to Tojo
	<i>See</i> para. Figs 3A-B. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Tojo alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

Asserted Claim of the '110 Patent	Exemplary Citations to Tojo
Claim 16	
16. The method of claim 1, wherein the processor operates on the images from the camera to generate background segmentation, and replaces segments on the images by replacement segments.	Tojo expressly and/or inherently discloses and/or renders obvious wherein the processor operates on the images from the camera to generate background segmentation, and replaces segments on the images by replacement segments. <i>See, e.g.</i>, disclosures below. “Conventionally, there is a technique for detecting an object region and determining and adjusting the photographing range to cover the entire object region (hereinafter to be referred to as auto-framing). For example, Japanese Patent Application Laid-Open No. 60-208184 discusses a technique in which a camera used in a video conference previously photographs a conference room before the start of the conference as a background image. Positions of the participants of the conference are then detected based on a difference between the background image and the image at the start of the conference, and zoom control is thus performed to include all participants of the conference in the photographing range.” <i>See</i> para. [0045]. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Tojo alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of

Asserted Claim of the '110 Patent	Exemplary Citations to Tojo
	Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

Asserted Claim of the '110 Patent	Exemplary Citations to Tojo
Claim 17	
17. The method of claim 16, wherein the replacement segments comprise virtual background or background that was captured in a different setting.	Tojo expressly and/or inherently discloses and/or renders obvious wherein the replacement segments comprise virtual background or background that was captured in a different setting. <i>See, e.g.</i>, disclosures below. “Conventionally, there is a technique for detecting an object region and determining and adjusting the photographing range to cover the entire object region (hereinafter to be referred to as auto-framing). For example, Japanese Patent Application Laid-Open No. 60-208184 discusses a technique in which a camera used in a video conference previously photographs a conference room before the start of the conference as a background image. Positions of the participants of the conference are then detected based on a difference between the background image and the image at the start of the conference, and zoom control is thus performed to include all participants of the conference in the photographing range.” <i>See</i> para. [0045]. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Tojo alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

**Exhibit B-28: Invalidity of U.S. Patent No. 8,982,110 in view of
U.S. Patent Pub. No. 2007/0040033 (“Wolf”)**

This chart is subject to all reservations, objections, and disclaimers in Defendants’ Invalidity Contentions and any amendment, supplement, or modification thereof, which are incorporated herein by reference in their entirety.

Wolf was originally filed May 26, 2010 and was published on March 21, 2013, and thus is available as prior art to U.S. Patent No. 8,982,110 (the “’110 Patent”) under at least 35 U.S.C. §§ 102(a), (b) and (e).

Wolf anticipates the Asserted Claims of the ’110 Patent. To the extent it is found Wolf does not expressly disclose certain limitations in the asserted claim, such limitations are at least implicitly or inherently disclosed. Moreover, to the extent it is found that Wolf does not anticipate the Asserted Claims, Wolf renders obvious the Asserted Claims, either alone or in combination with other prior art identified in the cover pleading or herein, and/or in combination with the general knowledge of a person having ordinary skill in the art.

In these contentions, Defendants have relied in part on Plaintiff’s Infringement Contentions. In those contentions, Plaintiff appears to pursue overly broad claim constructions in an effort to assert infringement where none exists, and to accuse products that do not infringe the claims. Defendants’ assertion that a particular limitation is disclosed by a prior art reference and/or is disclosed in a particular manner may be based in part on Plaintiff’s apparent claim interpretations. In relying on Plaintiff’s apparent claim interpretations, Defendants do not admit that Plaintiff’s apparent claim interpretations are supportable or proper or that the claim limitations in question are definite or otherwise amenable to construction.

Defendants have endeavored to provide as much detail as possible in these contentions and, in doing so, have exceeded the level of detail required. The inclusion of specific details in some areas is not a concession that such details are required or that the omission of similar details in other areas is a defect. These citations to portions of any reference in this chart are exemplary only. Defendants will rely on the entirety of the references cited in this chart to show that the Asserted Claims are invalid.

Asserted Claim of the '110 Patent	Exemplary Citations to Wolf
Claim 1	
1[pre]. A computerized method for operating a display system, the display system having a camera, a monitor, and a processor, the method comprising:	To the extent the preamble is limiting, Wolf expressly and/or inherently discloses and/or renders obvious this limitation. <i>See, e.g.</i>, disclosures below. “According to an aspect of some embodiments of the present invention there is provided an imaging system. The imaging system comprises: (a) a camera for capturing an image of at least one individual having eyes; and (b) a processor configured for: processing the image so as to extract locations of at least one eye over the image, processing the image to replace imagery data associated with each location of each eye with replacement data, thereby providing a corrected image, and transmitting the corrected image to a display device. The replacement data are preferably being previously-recorded imagery data respectively corresponding to the same eye but a different gaze.” <i>See</i> para. [0024]. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Wolf alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants’ Invalidity Contentions and Defendants’ other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.
1[a]. operating the camera to generate a stream of images of the user;	Wolf expressly and/or inherently discloses and/or renders obvious operating the camera to generate a stream of images of the user. <i>See, e.g.</i>, disclosures below. “In various exemplary embodiments of the invention the method of the present embodiments analyzes a stream of imaging data. The stream can be in the form of a series of images or a series of batches of images captured at a rate which is selected so as to provide sufficient information to allow spatial as well as time-dependent analysis. For example, the images can be acquired by a video camera. A single image in a stream of images such as a video stream is referred to as a frame.” <i>See</i> para. [0067].

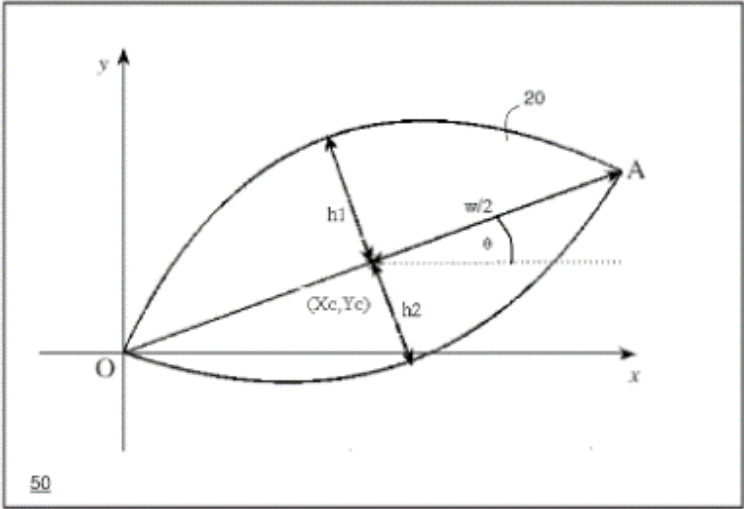
Asserted Claim of the '110 Patent	Exemplary Citations to Wolf
	This limitation would have been obvious to a person of ordinary skill in the art based on (1) Wolf alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.
1[b]. operating the processor to detect the presence of the user in the stream of image;	Wolf expressly and/or inherently discloses and/or renders obvious operating the processor to detect the presence of the user in the stream of image. <i>See, e.g.</i>, disclosures below. “According to an aspect of some embodiments of the present invention there is provided a computer software product, comprising a computer-readable medium in which program instructions are stored. The instructions, when read by a processor, cause the processor to process the image so as to extract locations of at least one eye over the image, to provide a corrected image by replacing imagery data associated with each location of each eye with replacement data and to transmit the corrected image to a display device. The replacement data are preferably previously-recorded imagery data respectively corresponding to the same eye but a different gaze.” <i>See</i> para. [0023]. “In various exemplary embodiments of the invention the method of the present embodiments analyzes a stream of imaging data. The stream can be in the form of a series of images or a series of batches of images captured at a rate which is selected so as to provide sufficient information to allow spatial as well as time-dependent analysis. For example, the images can be acquired by a video camera. A single image in a stream of images such as a video stream is referred to as a frame.” <i>See</i> para. [0067]. “Referring now to FIG. 1, the method begins at 10 and continues to 11 at which image 100 is processed to extract locations of one or more of the eyes over image 100. The locations of the eyes can be extracted using any known image processing technique for automatic extraction of features from an image.” <i>See</i> para. [0072].

Asserted Claim of the '110 Patent	Exemplary Citations to Wolf
	This limitation would have been obvious to a person of ordinary skill in the art based on (1) Wolf alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.
1[c]. operating the processor to apply adaptive transformation mapping to the stream of images captured by the camera to generate modified images that appear to be captured from a different point of view of the camera's actual point of view; and	Wolf expressly and/or inherently discloses and/or renders obvious operating the processor to apply adaptive transformation mapping to the stream of images captured by the camera to generate modified images that appear to be captured from a different point of view of the camera's actual point of view. <i>See, e.g.</i>, disclosures below. “The method optionally continues to 47 at which a morphological transformation is applied to the replacement data according to the eye model parameters. This transformation is preferably executed so as to rescale image 50 to fit the eye in image 100. The transformation can include any of: translation, rotation, stretching and shrinking. For example, when the six-parameter eye model of FIG. 5 is used (both for image 50 and image 100), the center can be shifted by the differences in the respective XC and YC values, the width w can be scaled by the ratio of the respective w values, the regions above and below the OA line segment can be stretched or shrunk in accordance with the respective h1 and h2 values, and the entire replacement eye image can be rotated by the difference in the respective θ values. The transformation can also be part of the search over the database. Specifically, the transformation can be applied to each candidate eye in the database and the comparison can be made between the morphologically transformed candidate eye and the eye of the currently processed image.” <i>See</i> para. [0108]. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Wolf alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of

Asserted Claim of the '110 Patent	Exemplary Citations to Wolf
	Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.
1[d]. displaying the modified images on the monitor;	Wolf expressly and/or inherently discloses and/or renders obvious displaying the modified images on the monitor. <i>See, e.g.</i>, disclosures below. “According to an aspect of some embodiments of the present invention there is provided a computer software product, comprising a computer-readable medium in which program instructions are stored. The instructions, when read by a processor, cause the processor to process the image so as to extract locations of at least one eye over the image, to provide a corrected image by replacing imagery data associated with each location of each eye with replacement data and to transmit the corrected image to a display device. The replacement data are preferably previously-recorded imagery data respectively corresponding to the same eye but a different gaze.” <i>See</i> para. [0023]. “The method continues to 14 at which the corrected image is transmitted to a display device. The transmission is typically over a communication network to a remote location in which a remote display device receives the corrected image and displays it. When more than one corrected image is formed, each corrected image can be transmitted to a different display device.” <i>See</i> para. [0080]. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Wolf alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.
1[e]. wherein the different point of view corresponds to an image taken from a different angle and a different distance than	Wolf expressly and/or inherently discloses and/or renders obvious wherein the different point of view corresponds to an image taken from a different angle and a different distance than the actual images captured by the camera. <i>See, e.g.</i> , disclosures below.

Asserted Claim of the '110 Patent	Exemplary Citations to Wolf
the actual images captured by the camera; and	“According to an aspect of some embodiments of the present invention there is provided a computer software product, comprising a computer-readable medium in which program instructions are stored. The instructions, when read by a processor, cause the processor to process the image so as to extract locations of at least one eye over the image, to provide a corrected image by replacing imagery data associated with each location of each eye with replacement data and to transmit the corrected image to a display device. The replacement data are preferably previously-recorded imagery data respectively corresponding to the same eye but a different gaze.” <i>See</i> para. [0023]. “The method optionally continues to 47 at which a morphological transformation is applied to the replacement data according to the eye model parameters. This transformation is preferably executed so as to rescale image 50 to fit the eye in image 100. The transformation can include any of: translation, rotation, stretching and shrinking. For example, when the six-parameter eye model of FIG. 5 is used (both for image 50 and image 100), the center can be shifted by the differences in the respective XC and YC values, the width w can be scaled by the ratio of the respective w values, the regions above and below the OA line segment can be stretched or shrunk in accordance with the respective h1 and h2 values, and the entire replacement eye image can be rotated by the difference in the respective θ values. The transformation can also be part of the search over the database. Specifically, the transformation can be applied to each candidate eye in the database and the comparison can be made between the morphologically transformed candidate eye and the eye of the currently processed image.” <i>See</i> para. [0108]. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Wolf alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants’ Invalidity Contentions and Defendants’ other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

Asserted Claim of the '110 Patent	Exemplary Citations to Wolf
1[f]. wherein during mirror tracking mode the processor utilizes the angle of the images captured by the camera and applies parametric input for a mapping transformation that changes imaging perspective of the images captured by the camera.	Wolf expressly and/or inherently discloses and/or renders obvious wherein during mirror tracking mode the processor utilizes the angle of the images captured by the camera and applies parametric input for a mapping transformation that changes imaging perspective of the images captured by the camera. <i>See, e.g.</i>, disclosures below. “The eye parameters can be computed according to a predetermined eye model. Representative examples of eye parameters suitable for the present embodiments include, but are not limited to, the location of the center of the eye relative to one of the corners of the eye, the location of a corner of the eye relative to another corner of the eye, orientation of the eye, width of the eye, height of the eye above a line connecting the corners of the eye, height of the eye below the line connecting the corners of the eye, parameters defining one or more curved sections (e.g., parabola, hyperbola, ellipsis) conjointly modeling the boundary of the eye, the radius of the iris, etc.” <i>See</i> para. [0094].

Asserted Claim of the '110 Patent	Exemplary Citations to Wolf
	 FIG. 5 Wolf at Fig. 5. “A representative non-limiting example of an eye model suitable for the present embodiments is illustrated in FIG. 5. A rectangle system of coordinate is defined over an image 50 which includes eye 20, such that the axes x and y of the system are parallel to the image gridlines (not shown) and the origin O(0, 0) is defined at one of the corners of the eye (the leftmost corner in the present example). The antipodal corner (the rightmost corner in the present example) is marked A, and the straight line segment connecting the two corners is referred to hereinbelow as the OA line segment. The eye model defines the shape of the imaged eye in terms of six parameters: the center (XC, YC) of the eye (middle point of OA), the width w of the eye (length of OA), a first height h1 measured perpendicularly to and above OA, a second height h2 measured perpendicularly to and below OA, and an angle θ describing the orientation of OA

Asserted Claim of the '110 Patent	Exemplary Citations to Wolf
	(measured anticlockwise relative to the x direction in the present example).” <i>See</i> para. [0095]. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Wolf alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants’ Invalidity Contentions and Defendants’ other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

Asserted Claim of the '110 Patent	Exemplary Citations to Wolf
Claim 2	
2. The method of claim 1, wherein the mapping transformation comprises a combination of at least two of the following transformations: vertical flips about a vertical axis, a projection transformation, rotation, resize, two-dimensional offset, optic distortion correction, and polynomial mapping on part or entire captured image.	Wolf expressly and/or inherently discloses and/or renders obvious wherein the mapping transformation comprises a combination of at least two of the following transformations: vertical flips about a vertical axis, a projection transformation, rotation, resize, two-dimensional offset, optic distortion correction, and polynomial mapping on part or entire captured image. <i>See, e.g.</i>, disclosures below. “The method optionally continues to 47 at which a morphological transformation is applied to the replacement data according to the eye model parameters. This transformation is preferably executed so as to rescale image 50 to fit the eye in image 100. The transformation can include any of: translation, rotation, stretching and shrinking. For example, when the six-parameter eye model of FIG. 5 is used (both for image 50 and image 100), the center can be shifted by the differences in the respective XC and YC values, the width w can be scaled by the ratio of the respective w values, the regions above and below the OA line segment can be stretched or shrunk in accordance with the respective h1 and h2 values, and the entire replacement eye image can be rotated by the difference in the respective θ values. The transformation can also be part of the search over the database. Specifically, the transformation can be applied to each

Asserted Claim of the '110 Patent	Exemplary Citations to Wolf
	candidate eye in the database and the comparison can be made between the morphologically transformed candidate eye and the eye of the currently processed image.” <i>See</i> para. [0108]. “This initial model was then refined by performing a local search in the space of the 6 parameters. The search was conducted in a range of twice the average error in each parameter, and in a coarse to fine manner.” <i>See</i> para. [0157]. “For each set of candidate parameter values, the closest eye in the non-specific database was translated, rotated and stretched in accordance with the difference in parameters. The center was shifted by the different in XC and YC, the width was scaled by the ratio of the w values, the regions above and below the line connecting the two corners were stretched in accordance with h1 and h2 respectively, and the database eye image was rotated by the difference in the 0 values between the database image and the candidate parameter value.” <i>See</i> para. [0158]. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Wolf alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants’ Invalidity Contentions and Defendants’ other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

Asserted Claim of the '110 Patent	Exemplary Citations to Wolf
Claim 3	
3. The method of claim 1, wherein during idle mode the camera continuously sends captured images to the processor, and the	Wolf expressly and/or inherently discloses and/or renders obvious wherein during idle mode the camera continuously sends captured images to the processor, and the user

Asserted Claim of the '110 Patent	Exemplary Citations to Wolf
user presence is identified by the processor detecting a body part in the images.	presence is identified by the processor detecting a body part in the images. <i>See, e.g.</i>, disclosures below. “According to an aspect of some embodiments of the present invention there is provided an imaging system. The imaging system comprises: (a) a camera for capturing an image of at least one individual having eyes; and (b) a processor configured for: processing the image so as to extract locations of at least one eye over the image, processing the image to replace imagery data associated with each location of each eye with replacement data, thereby providing a corrected image, and transmitting the corrected image to a display device. The replacement data are preferably being previously-recorded imagery data respectively corresponding to the same eye but a different gaze.” <i>See</i> para. [0024]. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Wolf alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants’ Invalidity Contentions and Defendants’ other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

Asserted Claim of the '110 Patent	Exemplary Citations to Wolf
Claim 4	
4. The method of claim 3, wherein the body part comprises one of legs, face, eyes, and hands.	Wolf expressly and/or inherently discloses and/or renders obvious wherein the body part comprises one of legs, face, eyes, and hands. <i>See, e.g.</i>, disclosures below. “According to an aspect of some embodiments of the present invention there is provided an imaging system. The imaging system comprises: (a) a camera for capturing an image of at least one individual having eyes; and (b) a processor configured for: processing the image so as to extract locations of at least one eye over the image, processing the image to replace imagery data associated with each location of each eye with replacement data, thereby providing a corrected image, and transmitting the corrected image to a display

Asserted Claim of the '110 Patent	Exemplary Citations to Wolf
	device. The replacement data are preferably being previously-recorded imagery data respectively corresponding to the same eye but a different gaze.” <i>See</i> para. [0024]. “Referring now to FIG. 1, the method begins at 10 and continues to 11 at which image 100 is processed to extract locations of one or more of the eyes over image 100. The locations of the eyes can be extracted using any known image processing technique for automatic extraction of features from an image.” <i>See</i> para. [0072]. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Wolf alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants’ Invalidity Contentions and Defendants’ other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

Asserted Claim of the '110 Patent	Exemplary Citations to Wolf
Claim 5	
5. The method of claim 1, further comprising receiving user input and operating the processor to vary image magnitude or field-of-view of the modified images according to the user input.	Wolf expressly and/or inherently discloses and/or renders obvious receiving user input and operating the processor to vary image magnitude or field-of-view of the modified images according to the user input. <i>See, e.g.</i>, disclosures below. “For example, hardware for performing selected tasks according to embodiments of the invention could be implemented as a chip or a circuit. As software, selected tasks according to embodiments of the invention could be implemented as a plurality of software instructions being executed by a computer using any suitable operating system. In an exemplary embodiment of the invention, one or more tasks according to exemplary embodiments of method and/or system as described herein are performed by a data processor, such as a computing platform for executing a plurality of instructions. Optionally, the data processor includes a volatile memory for storing instructions and/or

Asserted Claim of the '110 Patent	Exemplary Citations to Wolf
	data and/or a non-volatile storage, for example, a magnetic hard-disk and/or removable media, for storing instructions and/or data. Optionally, a network connection is provided as well. A display and/or a user input device such as a keyboard or mouse are optionally provided as well.” <i>See</i> para. [0040]. “The data in the specific database is preferably in a digital form. Optionally and preferably, the specific database includes data pertaining to several images of each eye, and the method searches the specific database for replacement data that best matches the eyes in image 100. Once the respective imagery data in image 100 is replaced with the replacement data, a corrected image is formed.” <i>See</i> para. [0077]. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Wolf alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants’ Invalidity Contentions and Defendants’ other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

Asserted Claim of the '110 Patent	Exemplary Citations to Wolf
Claim 6	
6. The method of claim 5, wherein the processor varies the image magnitude or field-of-view mapping to display a partial or full body of the user in the modified images.	Wolf expressly and/or inherently discloses and/or renders obvious wherein the processor varies the image magnitude or field-of-view mapping to display a partial or full body of the user in the modified images. <i>See, e.g.</i>, disclosures below. “The data in the specific database is preferably in a digital form. Optionally and preferably, the specific database includes data pertaining to several images of each eye, and the method searches the specific database for replacement data that best matches the eyes in image 100. Once the respective imagery data in image 100 is replaced with the replacement data, a corrected image is formed.” <i>See</i> para. [0077].

Asserted Claim of the '110 Patent	Exemplary Citations to Wolf
	This limitation would have been obvious to a person of ordinary skill in the art based on (1) Wolf alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

Asserted Claim of the '110 Patent	Exemplary Citations to Wolf
Claim 10	
10. The method of claim 1, further comprising operating the processor to augment the modified images by overlaying virtual objects on a user's image appearing within the modified images.	Wolf expressly and/or inherently discloses and/or renders obvious operating the processor to augment the modified images by overlaying virtual objects on a user's image appearing within the modified images. <i>See, e.g.</i>, disclosures below. “According to an aspect of some embodiments of the present invention there is provided an imaging system. The imaging system comprises: (a) a camera for capturing an image of at least one individual having eyes; and (b) a processor configured for: processing the image so as to extract locations of at least one eye over the image, processing the image to replace imagery data associated with each location of each eye with replacement data, thereby providing a corrected image, and transmitting the corrected image to a display device. The replacement data are preferably being previously-recorded imagery data respectively corresponding to the same eye but a different gaze.” <i>See</i> para. [0024]. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Wolf alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

Asserted Claim of the '110 Patent	Exemplary Citations to Wolf
Claim 11	
11. The method of claim 1, further comprising operating the processor to transmit the modified image over a network.	Wolf expressly and/or inherently discloses and/or renders obvious operating the processor to transmit the modified image over a network. <i>See, e.g.</i>, disclosures below. “According to an aspect of some embodiments of the present invention there is provided an imaging system. The imaging system comprises: (a) a camera for capturing an image of at least one individual having eyes; and (b) a processor configured for: processing the image so as to extract locations of at least one eye over the image, processing the image to replace imagery data associated with each location of each eye with replacement data, thereby providing a corrected image, and transmitting the corrected image to a display device. The replacement data are preferably being previously-recorded imagery data respectively corresponding to the same eye but a different gaze.” <i>See</i> para. [0024]. “The method continues to 14 at which the corrected image is transmitted to a display device. The transmission is typically over a communication network to a remote location in which a remote display device receives the corrected image and displays it. When more than one corrected image is formed, each corrected image can be transmitted to a different display device.” <i>See</i> para. [0080]. “The system and method of the present embodiments are particularly useful in videoconferencing wherein the gaze of a given participant in the videoconference is corrected according to some embodiments of the present invention so as to provide the other participants with a natural view of the given participant. The system and method can be used in bilateral as well as multilateral videoconferencing.” <i>See</i> para. [0083]. “For multilateral videoconferencing, the system and method preferably provides more than one gaze corrected images of the local participant. The situation is better explained with reference to FIGS. 2E-G. Consider a videoconferencing with three participants P1,

Asserted Claim of the '110 Patent	Exemplary Citations to Wolf
	P2 and P3. In FIG. 2E, participant P1 is local (seen from the back) and participants P2 and P2 are situated at remote locations. Images of P1 and P2 are transmitted to one or more display devices which are viewed by P1. FIG. 2E is similar to FIG. 2E except that P2 is local (seen from the back) and is viewing images of P2 and P3 which are situated at remote locations. FIG. 2F is also similar to FIG. 2E except that P3 is local and is viewing images of remote participants P1 and P2.” <i>See</i> para. [0085]. “Referring to FIG. 2E, suppose that P1 is looking at P2 along gaze direction 22. In this case, the system and method according to some embodiments of the present invention generate two gaze corrected images of P1. In the first corrected image, P1 is seen as if he or she were looking into the camera. This corrected image is transmitted to P2's location, as illustrated in FIG. 2F where the first corrected gaze of P1 is indicated by arrow 24 <i>a</i>. In the second corrected image, P1 is seen as if he or she were looking leftward. This corrected image is transmitted to P3, as illustrated in FIG. 2G, where the second corrected gaze of P1 is indicated by arrow 24 <i>b</i>. As shown in FIG. 2G, P1 is seen to P3 as if he or she were looking in the direction of P2, thus creating an illusion of a face to face meeting.” <i>See</i> para. [0086]. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Wolf alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants’ Invalidity Contentions and Defendants’ other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

Asserted Claim of the '110 Patent	Exemplary Citations to Wolf
Claim 12	

Asserted Claim of the '110 Patent	Exemplary Citations to Wolf
12. The method of claim 1, further comprising displaying the modified image on a remote screen for video telepresence.	Wolf expressly and/or inherently discloses and/or renders obvious displaying the modified image on a remote screen for video telepresence. <i>See, e.g.</i>, disclosures below. “The method continues to 14 at which the corrected image is transmitted to a display device. The transmission is typically over a communication network to a remote location in which a remote display device receives the corrected image and displays it. When more than one corrected image is formed, each corrected image can be transmitted to a different display device.” <i>See</i> para. [0080]. “The system and method of the present embodiments are particularly useful in videoconferencing wherein the gaze of a given participant in the videoconference is corrected according to some embodiments of the present invention so as to provide the other participants with a natural view of the given participant. The system and method can be used in bilateral as well as multilateral videoconferencing.” <i>See</i> para. [0083]. “For multilateral videoconferencing, the system and method preferably provides more than one gaze corrected images of the local participant. The situation is better explained with reference to FIGS. 2E-G. Consider a videoconferencing with three participants P1, P2 and P3. In FIG. 2E, participant P1 is local (seen from the back) and participants P2 and P2 are situated at remote locations. Images of P1 and P2 are transmitted to one or more display devices which are viewed by P1. FIG. 2E is similar to FIG. 2E except that P2 is local (seen from the back) and is viewing images of P2 and P3 which are situated at remote locations. FIG. 2F is also similar to FIG. 2E except that P3 is local and is viewing images of remote participants P1 and P2.” <i>See</i> para. [0085]. “Referring to FIG. 2E, suppose that P1 is looking at P2 along gaze direction 22. In this case, the system and method according to some embodiments of the present invention generate two gaze corrected images of P1. In the first corrected image, P1 is seen as if he or she were looking into the camera. This corrected image is transmitted to P2's location, as illustrated in FIG. 2F where the first corrected gaze of P1 is indicated

Asserted Claim of the '110 Patent	Exemplary Citations to Wolf
	by arrow 24 <i>a</i>. In the second corrected image, P1 is seen as if he or she were looking leftward. This corrected image is transmitted to P3, as illustrated in FIG. 2G, where the second corrected gaze of P1 is indicated by arrow 24 <i>b</i>. As shown in FIG. 2G, P1 is seen to P3 as if he or she were looking in the direction of P2, thus creating an illusion of a face to face meeting.” See para. [0086]. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Wolf alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants’ Invalidity Contentions and Defendants’ other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

Asserted Claim of the '110 Patent	Exemplary Citations to Wolf
Claim 16	
16. The method of claim 1, wherein the processor operates on the images from the camera to generate background segmentation, and replaces segments on the images by replacement segments.	Wolf expressly and/or inherently discloses and/or renders obvious wherein the processor operates on the images from the camera to generate background segmentation, and replaces segments on the images by replacement segments. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Wolf alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants’ Invalidity Contentions and Defendants’ other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

Asserted Claim of the '110 Patent	Exemplary Citations to Wolf
Claim 17	

Asserted Claim of the '110 Patent	Exemplary Citations to Wolf
17. The method of claim 16, wherein the replacement segments comprise virtual background or background that was captured in a different setting.	Wolf expressly and/or inherently discloses and/or renders obvious wherein the replacement segments comprise virtual background or background that was captured in a different setting. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Wolf alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

**Exhibit B-29: Invalidity of U.S. Patent No. 8,982,110 in view of
U.S. Patent No. 6,677,980 (“Jeon”)**

This chart is subject to all reservations, objections, and disclaimers in Defendants’ Invalidity Contentions and any amendment, supplement, or modification thereof, which are incorporated herein by reference in their entirety.

Jeon was originally filed November 10, 2000 and was published on January 13, 2004, and thus is available as prior art to U.S. Patent No. 8,982,110 (the “’110 Patent”) under at least 35 U.S.C. §§ 102 (e).

Jeon anticipates the Asserted Claims of the ’110 Patent. To the extent it is found Jeon does not expressly disclose certain limitations in the Asserted Claims, such limitations are at least implicitly or inherently disclosed. Moreover, to the extent it is found that Jeon does not anticipate the Asserted Claims, Jeon renders obvious the Asserted Claims, either alone or in combination with other prior art identified in the cover pleading or herein, and/or in combination with the general knowledge of a person having ordinary skill in the art.

In these contentions, Defendants have relied in part on Plaintiff’s Infringement Contentions. In those contentions, Plaintiff appears to pursue overly broad claim constructions in an effort to assert infringement where none exists, and to accuse products that do not infringe the claims. Defendants’ assertion that a particular limitation is disclosed by a prior art reference and/or is disclosed in a particular manner may be based in part on Plaintiff’s apparent claim interpretations. In relying on Plaintiff’s apparent claim interpretations, Defendants do not admit that Plaintiff’s apparent claim interpretations are supportable or proper or that the claim limitations in question are definite or otherwise amenable to construction.

Defendants have endeavored to provide as much detail as possible in these contentions and, in doing so, have exceeded the level of detail required. The inclusion of specific details in some areas is not a concession that such details are required or that the omission of similar details in other areas is a defect. These citations to portions of any reference in this chart are exemplary only. Defendants will rely on the entirety of the references cited in this chart to show that the Asserted Claims are invalid.

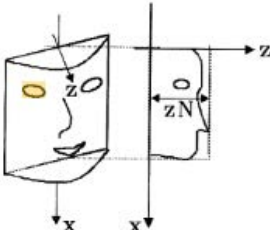
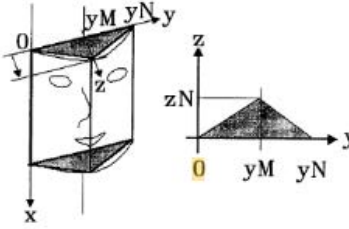
Asserted Claim of the '110 Patent	Exemplary Citations to Jeon
Claim 1	
1[pre]. A computerized method for operating a display system, the display system having a camera, a monitor, and a processor, the method comprising:	To the extent the preamble is limiting, Jeon expressly and/or inherently discloses and/or renders obvious this limitation. <i>See, e.g.</i>, disclosures below. “In FIG. 1, a camera 1 capturing the image of a user is located on a monitor 2 of the computer system. Here, a direction 3 of the camera 1 is directed to a user 5. The user 5 gazes at the center of the monitor 2, not toward the camera 1, in order to watch the face of the other party displayed on the monitor 2. For this reason, an image containing the face of the user 5 photographed via the camera 1 is viewed by the other party as illustrated in FIG. 2. That is, the gaze of the image is downwards, and does not meet that of the other party. This greatly reduces reality of the video phone featuring face-to-face talking. Even though the camera 1 is located on the lower portion or lateral portion of the monitor 2, instead of the upper portion thereof, the above-described problem of poor eye contact cannot be avoided. Unless the camera 1 is located on the center of the monitor 2, that is, a corresponding position of the monitor 2 in which the face of the other party is viewed, the above problem always remains so that the gaze 4 of the object captured by the camera 1 does not meet that of the camera 1. Even if the video communications system is constructed to have the form of a telephone set other than that of the computer system, the direction of the gaze by the user is not directed toward the camera, but toward the corresponding portion of the monitor on which the face of the other party is displayed, to accordingly cause the same problem.” <i>See Jeon at 1:25-49</i> This limitation would have been obvious to a person of ordinary skill in the art based on (1) Jeon alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants’ Invalidity Contentions and Defendants’ other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

Asserted Claim of the '110 Patent	Exemplary Citations to Jeon
1[a]. operating the camera to generate a stream of images of the user;	Jeon expressly and/or inherently discloses and/or renders obvious operating the camera to generate a stream of images of the user. <i>See, e.g.</i>, disclosures below. “A method and apparatus for correcting a gaze of an image using a single camera, corrects an image so that a communication familiarity can be enhanced by letting the eyes meet in a video communications system such as a video phone or video conference with a single camera. The input image from the camera is analyzed to determine a gaze deviation value formed between the viewing direction toward the camera and the object viewing direction. In order to obtain a gaze corrected image with respect to the image captured by the camera, a corresponding point coordinate of the input image corresponding to a particular coordinate value of the corrected image is calculated and then a pixel value of the corrected image corresponding to the calculated coordinate is obtained using the input image from the camera. Thus, the eyes can be met with the other party with a single camera, to thereby enhance familiarity of the video communication.” <i>See Jeon at Abstract</i> “In an embodiment of the present invention, the camera 1 used for video communications is installed on the monitor 2 in the direction 3 of the camera 1 as shown in FIG. 5. The user being the object gazes at the center of the monitor 2 in the direction of a line 4 in order to watch the face of the other party displayed on the monitor 2.” <i>See Jeon at 3:6-11.</i> This limitation would have been obvious to a person of ordinary skill in the art based on (1) Jeon alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants’ Invalidity Contentions and Defendants’ other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

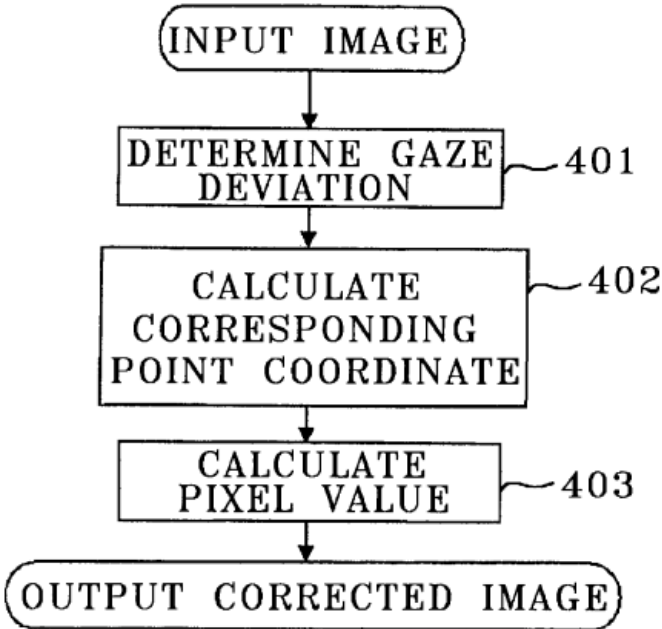
Asserted Claim of the '110 Patent	Exemplary Citations to Jeon
1[b]. operating the processor to detect the presence of the user in the stream of image;	Jeon expressly and/or inherently discloses and/or renders obvious operating the processor to detect the presence of the user in the stream of image. <i>See, e.g.</i>, disclosures below. “In the above equation (2), in order to obtain EES, EES0, EMS, and EMS0, the gaze deviation determiner 31 should analyze the input image and find the eyes and mouth. This can be sufficed by the known technology disclosed in a reference entitled “Automatic Generation of the Personal 3D Face Model” Korean Electronics Engineering Association Vol. 36, S edit, No. 1, January 1999, S.-J. Ham and H.-G. Kim, pp. 104 114.” <i>See</i> Jeon at 3:63-4:3. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Jeon alone; (2) knowledge of a personal of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants’ Invalidity Contentions and Defendants’ other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.
1[c]. operating the processor to apply adaptive transformation mapping to the stream of images captured by the camera to generate modified images that appear to be captured from a different point of view of the camera's actual point of view; and	Jeon expressly and/or inherently discloses and/or renders obvious operating the processor to apply adaptive transformation mapping to the stream of images captured by the camera to generate modified images that appear to be captured from a different point of view of the camera's actual point of view. <i>See, e.g.</i>, disclosures below. “The corresponding point coordinate calculator 32 receives the gaze deviation value THETA determined by the gaze deviation determiner 31, receives a coordinate value (xnew, ynew) with respect to a particular position of the corrected image from the pixel value calculator 33, and calculates a corresponding point coordinate of the input image corresponding to the position of the corrected image (step 402 of FIG. 4). That is, the corresponding point coordinate calculator 32 calculates a corresponding point coordinate (xold, yold) of the input image of FIG. 7A that is an image existing before

Asserted Claim of the '110 Patent	Exemplary Citations to Jeon
	rotation in correspondence to a particular position (xnew, ynew) of an image of FIG. 7B that is virtually rotated by the gaze deviation value THETA, in order to obtain a corrected image by rotating the image captured by the camera by the gaze deviation value THETA centered on the y-axis, at the normal state where the object watches the monitor screen. The corrected image can be obtained by rotating the whole of the input image or only a part of the input image containing such as eyes. Also, the range of the particular position (xnew, ynew) can be either the whole image or a part within the image. Here, x, y, and z axes mean the coordinate system on the camera video plane 11 as shown in FIG. 5. Further, the x axis and the y axis represent a vertical direction and a horizontal direction of the image captured by the camera 1 as shown in FIGS. 7A and 7B, respectively. The z axis represents the direction toward the camera 1 from the object. Here, the object is defined as at $z=0$. The corresponding point coordinate calculator 32 obtains a corresponding point coordinate (xold, yold) by the following equation (3).” <i>See Jeon at 4:13-42.</i>

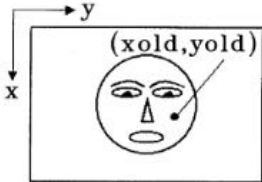
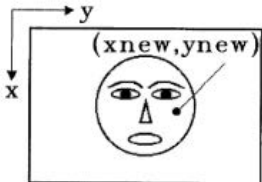
Asserted Claim of the '110 Patent	Exemplary Citations to Jeon
	FIG. 7A FIG. 7B <i>See Jeon at Fig. 7A and Fig. 7b.</i> Fig. 7A shows an input image and Fig. 7B shows a corrected image. “Since the currently input image is rotated by the gaze deviation value THETA centered on the y axis, the value on the x axis is varied and the value on the y axis is same. In the above equation (3), a value of $z(xnew, ynew)$ is a z value of a point on the object corresponding to the pixel located at $(xnew, ynew)$. As shown in FIG. 8, this occurs owing to the difference of the height of the face in the z direction. Since the image photographed by the camera 1 is a two-dimensional image, the z axis information

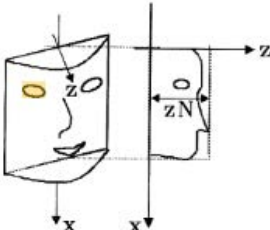
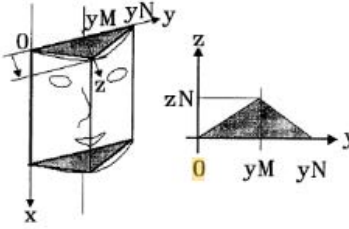
Asserted Claim of the '110 Patent	Exemplary Citations to Jeon
	cannot be recoverable with only the image itself. However, a simple model can be used as shown in FIGS. 8 and 9, in order to calculate the z axis information. In FIGS. 8 and 9, z_N is a distance from the x axis to the nose when the highest point in the face in the z direction is modelled as the nose. That is, as shown in FIG. 9, the face is approximated into a triangular column. Accordingly, a z value at a certain coordinate (x, y) without actual information about a correct shape of the face itself can be expressed as the following equation (4)." <i>See Jeon at 4:46-63.</i> FIG. 8  FIG. 9 

Asserted Claim of the '110 Patent	Exemplary Citations to Jeon
	<i>See Jeon at Fig. 8 and Fig. 9.</i> This limitation would have been obvious to a person of ordinary skill in the art based on (1) Jeon alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.
1[d]. displaying the modified images on the monitor;	Jeon expressly and/or inherently discloses and/or renders obvious displaying the modified images on the monitor. <i>See, e.g.</i>, disclosures below. “To accomplish the above object of the present invention, there is provided a method for correcting a gaze of an image using a single camera, the method for correcting a gaze of an image received from the camera comprising the steps of: (a) determining a gaze deviation value to correct a gaze; (b) calculating a corresponding point coordinate of an input image corresponding to a particular position in a corrected image using the gaze deviation value determined in step (a); (c) calculating a pixel value at the calculated corresponding point coordinate using the input image from the camera; and (d) outputting a gaze corrected image by using the pixel value calculated in step (c) as the pixel value of the particular position of the corrected image” <i>See Jeon at 1:63-2:9.</i>

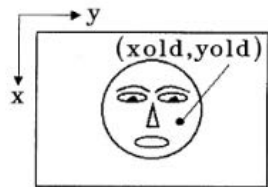
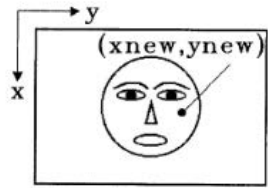
Asserted Claim of the '110 Patent	Exemplary Citations to Jeon
	FIG. 4  <pre> graph TD A([INPUT IMAGE]) --> B[DETERMINE GAZE DEVIATION 401] B --> C[CALCULATE CORRESPONDING POINT COORDINATE 402] C --> D[CALCULATE PIXEL VALUE 403] D --> E([OUTPUT CORRECTED IMAGE]) </pre> <i>See Jeon at Fig. 4.</i> This limitation would have been obvious to a person of ordinary skill in the art based on (1) Jeon alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of

Asserted Claim of the '110 Patent	Exemplary Citations to Jeon
	Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.
1[e]. wherein the different point of view corresponds to an image taken from a different angle and a different distance than the actual images captured by the camera; and	Jeon expressly and/or inherently discloses and/or renders obvious wherein the different point of view corresponds to an image taken from a different angle and a different distance than the actual images captured by the camera. <i>See, e.g.</i>, disclosures below. “The corresponding point coordinate calculator 32 receives the gaze deviation value THETA determined by the gaze deviation determiner 31, receives a coordinate value (xnew, ynew) with respect to a particular position of the corrected image from the pixel value calculator 33, and calculates a corresponding point coordinate of the input image corresponding to the position of the corrected image (step 402 of FIG. 4). That is, the corresponding point coordinate calculator 32 calculates a corresponding point coordinate (xold, yold) of the input image of FIG. 7A that is an image existing before rotation in correspondence to a particular position (xnew, ynew) of an image of FIG. 7B that is virtually rotated by the gaze deviation value THETA, in order to obtain a corrected image by rotating the image captured by the camera by the gaze deviation value THETA centered on the y-axis, at the normal state where the object watches the monitor screen. The corrected image can be obtained by rotating the whole of the input image or only a part of the input image containing such as eyes. Also, the range of the particular position (xnew, ynew) can be either the whole image or a part within the image. Here, x, y, and z axes mean the coordinate system on the camera video plane 11 as shown in FIG. 5. Further, the x axis and the y axis represent a vertical direction and a horizontal direction of the image captured by the camera 1 as shown in FIGS. 7A and 7B, respectively. The z axis represents the direction toward the camera 1 from the object. Here, the object is defined as at z=0. The corresponding point coordinate calculator 32 obtains a corresponding point coordinate (xold, yold) by the following equation (3).” <i>See Jeon at 4:13-42.</i>

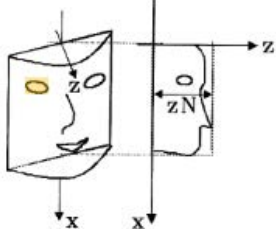
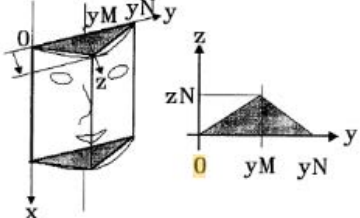
Asserted Claim of the '110 Patent	Exemplary Citations to Jeon
	FIG. 7A  FIG. 7B  <i>See Jeon at Fig. 7A and Fig. 7b.</i> Fig. 7A shows an input image and Fig. 7B shows a corrected image. “Since the currently input image is rotated by the gaze deviation value THETA centered on the y axis, the value on the x axis is varied and the value on the y axis is same. In the above equation (3), a value of $z(x_{new}, y_{new})$ is a z value of a point on the object corresponding to the pixel located at (x_{new}, y_{new}). As shown in FIG. 8, this occurs owing to the difference of the height of the face in the z direction. Since the image photographed by the camera 1 is a two-dimensional image, the z axis information

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	cannot be recoverable with only the image itself. However, a simple model can be used as shown in FIGS. 8 and 9, in order to calculate the z axis information. In FIGS. 8 and 9, z_N is a distance from the x axis to the nose when the highest point in the face in the z direction is modelled as the nose. That is, as shown in FIG. 9, the face is approximated into a triangular column. Accordingly, a z value at a certain coordinate (x, y) without actual information about a correct shape of the face itself can be expressed as the following equation (4)." <i>See Jeon at 4:46-63.</i> FIG. 8  FIG. 9 

Asserted Claim of the '110 Patent	Exemplary Citations to Jeon
	<i>See Jeon at Fig. 8 and Fig. 9.</i> This limitation would have been obvious to a person of ordinary skill in the art based on (1) Jeon alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.
1[f]. wherein during mirror tracking mode the processor utilizes the angle of the images captured by the camera and applies parametric input for a mapping transformation that changes imaging perspective of the images captured by the camera.	Jeon expressly and/or inherently discloses and/or renders obvious wherein during mirror tracking mode the processor utilizes the angle of the images captured by the camera and applies parametric input for a mapping transformation that changes imaging perspective of the images captured by the camera. <i>See, e.g.,</i> disclosures below. “The corresponding point coordinate calculator 32 receives the gaze deviation value THETA determined by the gaze deviation determiner 31, receives a coordinate value (xnew, ynew) with respect to a particular position of the corrected image from the pixel value calculator 33, and calculates a corresponding point coordinate of the input image corresponding to the position of the corrected image (step 402 of FIG. 4). That is, the corresponding point coordinate calculator 32 calculates a corresponding point coordinate (xold, yold) of the input image of FIG. 7A that is an image existing before rotation in correspondence to a particular position (xnew, ynew) of an image of FIG. 7B that is virtually rotated by the gaze deviation value THETA, in order to obtain a corrected image by rotating the image captured by the camera by the gaze deviation value THETA centered on the y-axis, at the normal state where the object watches the monitor screen. The corrected image can be obtained by rotating the whole of the input image or only a part of the input image containing such as eyes. Also, the range of the particular position (xnew, ynew) can be either the whole image or a part within the image. Here, x, y, and z axes mean the coordinate system on the camera video plane 11 as shown in FIG. 5. Further, the x axis and the y axis represent a vertical direction and a horizontal direction of the image captured by the camera 1 as shown in FIGS. 7A and 7B, respectively. The z axis represents the direction toward

Asserted Claim of the '110 Patent	Exemplary Citations to Jeon
	the camera 1 from the object. Here, the object is defined as at $z=0$. The corresponding point coordinate calculator 32 obtains a corresponding point coordinate (xold, yold) by the following equation (3).” <i>See Jeon at 4:13-42.</i> FIG. 7A  FIG. 7B  <i>See Jeon at Fig. 7A and Fig. 7b.</i> Fig. 7A shows an input image and Fig. 7B shows a corrected image.

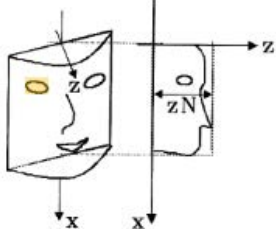
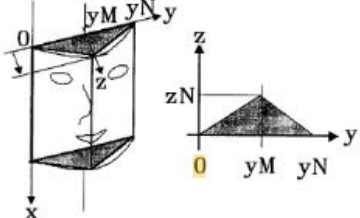
Asserted Claim of the '110 Patent	Exemplary Citations to Jeon
	“Since the currently input image is rotated by the gaze deviation value THETA centered on the y axis, the value on the x axis is varied and the value on the y axis is same. In the above equation (3), a value of $z(x_{new}, y_{new})$ is a z value of a point on the object corresponding to the pixel located at (x_{new}, y_{new}). As shown in FIG. 8, this occurs owing to the difference of the height of the face in the z direction. Since the image photographed by the camera 1 is a two-dimensional image, the z axis information cannot be recoverable with only the image itself. However, a simple model can be used as shown in FIGS. 8 and 9, in order to calculate the z axis information. In FIGS. 8 and 9, z_N is a distance from the x axis to the nose when the highest point in the face in the z direction is modelled as the nose. That is, as shown in FIG. 9, the face is approximated into a triangular column. Accordingly, a z value at a certain coordinate (x, y) without actual information about a correct shape of the face itself can be expressed as the following equation (4).” <i>See Jeon at 4:46-63.</i>

Asserted Claim of the '110 Patent	Exemplary Citations to Jeon
	FIG. 8  FIG. 9  <i>See Jeon at Fig. 8 and Fig. 9.</i> This limitation would have been obvious to a person of ordinary skill in the art based on (1) Jeon alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

Asserted Claim of the '110 Patent	Exemplary Citations to Jeon
Claim 2	
2. The method of claim 1, wherein the mapping transformation comprises a combination of at least two of the following transformations: vertical flips about a vertical axis, a projection transformation, rotation, resize, two-dimensional offset, optic distortion correction, and polynomial mapping on part or entire captured image.	Jeon expressly and/or inherently discloses and/or renders obvious wherein the mapping transformation comprises a combination of at least two of the following transformations: vertical flips about a vertical axis, a projection transformation, rotation, resize, two-dimensional offset, optic distortion correction, and polynomial mapping on part or entire captured image. <i>See, e.g.,</i> disclosures below. “The corresponding point coordinate calculator 32 receives the gaze deviation value THETA determined by the gaze deviation determiner 31, receives a coordinate value (xnew, ynew) with respect to a particular position of the corrected image from the pixel value calculator 33, and calculates a corresponding point coordinate of the input image corresponding to the position of the corrected image (step 402 of FIG. 4). That is, the corresponding point coordinate calculator 32 calculates a corresponding point coordinate (xold, yold) of the input image of FIG. 7A that is an image existing before rotation in correspondence to a particular position (xnew, ynew) of an image of FIG. 7B that is virtually rotated by the gaze deviation value THETA, in order to obtain a corrected image by rotating the image captured by the camera by the gaze deviation value THETA centered on the y-axis, at the normal state where the object watches the monitor screen. The corrected image can be obtained by rotating the whole of the input image or only a part of the input image containing such as eyes. Also, the range of the particular position (xnew, ynew) can be either the whole image or a part within the image. Here, x, y, and z axes mean the coordinate system on the camera video plane 11 as shown in FIG. 5. Further, the x axis and the y axis represent a vertical direction and a horizontal direction of the image captured by the camera 1 as shown in FIGS. 7A and 7B, respectively. The z axis represents the direction toward the camera 1 from the object. Here, the object is defined as at z=0. The corresponding point coordinate calculator 32 obtains a corresponding point coordinate (xold, yold) by the following equation (3).” <i>See Jeon at 4:13-42.</i>

Asserted Claim of the '110 Patent	Exemplary Citations to Jeon
	FIG. 7A FIG. 7B See Jeon at Fig. 7A and Fig. 7b. Fig. 7A shows an input image and Fig. 7B shows a corrected image. “Since the currently input image is rotated by the gaze deviation value THETA centered on the y axis, the value on the x axis is varied and the value on the y axis is same. In the above equation (3), a value of $z(xnew, ynew)$ is a z value of a point on the object corresponding to the pixel located at $(xnew, ynew)$. As shown in FIG. 8, this occurs

Asserted Claim of the '110 Patent	Exemplary Citations to Jeon
	owing to the difference of the height of the face in the z direction. Since the image photographed by the camera 1 is a two-dimensional image, the z axis information cannot be recoverable with only the image itself. However, a simple model can be used as shown in FIGS. 8 and 9, in order to calculate the z axis information. In FIGS. 8 and 9, zN is a distance from the x axis to the nose when the highest point in the face in the z direction is modelled as the nose. That is, as shown in FIG. 9, the face is approximated into a triangular column. Accordingly, a z value at a certain coordinate (x, y) without actual information about a correct shape of the face itself can be expressed as the following equation (4).” <i>See Jeon at 4:46-63.</i>

Asserted Claim of the '110 Patent	Exemplary Citations to Jeon
	FIG. 8  FIG. 9  <i>See Jeon at Fig. 8 and Fig. 9.</i> This limitation would have been obvious to a person of ordinary skill in the art based on (1) Jeon alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

Asserted Claim of the '110 Patent	Exemplary Citations to Jeon
Claim 3	
3. The method of claim 1, wherein during idle mode the camera continuously sends captured images to the processor, and the user presence is identified by the processor detecting a body part in the images.	Jeon expressly and/or inherently discloses and/or renders obvious wherein during idle mode the camera continuously sends captured images to the processor, and the user presence is identified by the processor detecting a body part in the images. <i>See, e.g.</i>, disclosures below. “In an embodiment of the present invention, the camera 1 used for video communications is installed on the monitor 2 in the direction 3 of the camera 1 as shown in FIG. 5. The user being the object gazes at the center of the monitor 2 in the direction of a line 4 in order to watch the face of the other party displayed on the monitor 2.” <i>See Jeon at 3:6-11.</i> This limitation would have been obvious to a person of ordinary skill in the art based on (1) Jeon alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants’ Invalidity Contentions and Defendants’ other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

Asserted Claim of the '110 Patent	Exemplary Citations to Jeon
Claim 4	
4. The method of claim 3, wherein the body part comprises one of legs, face, eyes, and hands.	Jeon expressly and/or inherently discloses and/or renders obvious wherein the body part comprises one of legs, face, eyes, and hands. <i>See, e.g.</i>, disclosures below. “In an embodiment of the present invention, the camera 1 used for video communications is installed on the monitor 2 in the direction 3 of the camera 1 as shown

Asserted Claim of the '110 Patent	Exemplary Citations to Jeon
	in FIG. 5. The user being the object gazes at the center of the monitor 2 in the direction of a line 4 in order to watch the face of the other party displayed on the monitor 2.” <i>See</i> Jeon at 3:6-11. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Jeon alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants’ Invalidity Contentions and Defendants’ other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

Asserted Claim of the '110 Patent	Exemplary Citations to Jeon
Claim 5	
5. The method of claim 1, further comprising receiving user input and operating the processor to vary image magnitude or field-of-view of the modified images according to the user input.	Jeon expressly and/or inherently discloses and/or renders obvious receiving user input and operating the processor to vary image magnitude or field-of-view of the modified images according to the user input. <i>See, e.g.</i>, disclosures below. “However, if both or either one of the distance (L) and the height (H) are not known, the gaze deviation determiner 31 analyzes an input image captured by the camera 1 and a reference image and then determines a gaze deviation value THETA (step 401 of FIG. 4). In more detail, the object is directed to the direction 3 of the camera 1 at an initial state or at a user's desire, to obtain a reference image. In the case of the reference image, the direction 3 of the camera 1 and the gaze direction 4 of the object are met with each other. The reference image is analyzed to extract the two pupils and the mouth. Then, as shown in FIG. 6A, a distance EMS0 between the line connecting the centers of the two pupils and the center line of the mouth, and a distance EES0 between the center of the two pupils are obtained. Meanwhile, the image captured via the camera 1 is analyzed at the normal state where the object watches the screen of the monitor 2, to extract the two

Asserted Claim of the '110 Patent	Exemplary Citations to Jeon
	pupils and the mouth. Then, as shown in FIG. 6B, a distance EMS between the line connecting the centers of the two pupils and the center line of the mouth, and a distance EES between the center of the two pupils are obtained. In the case of the reference image where the direction 3 of the camera 1 and the gaze direction 4 of the object coincide, and in the case of the input image at the general state where both the directions differ by the gaze deviation value THETA as shown in FIG. 5, a length of the object acquired on a video plane 11 of the camera 1 differs from the other. The ratio is expressed by the following equation (2). $\cos(\text{THETA}) \times \text{EMS}_0 / \text{EES}_0 = \text{EMS} / \text{EES}$ <i>See Jeon at 3:23-52.</i> This limitation would have been obvious to a person of ordinary skill in the art based on (1) Jeon alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

Asserted Claim of the '110 Patent	Exemplary Citations to Jeon
Claim 6	
6. The method of claim 5, wherein the processor varies the image magnitude or field-of-view mapping to display a partial or full body of the user in the modified images.	Jeon expressly and/or inherently discloses and/or renders obvious wherein the processor varies the image magnitude or field-of-view mapping to display a partial or full body of the user in the modified images. <i>See, e.g.</i>, disclosures below. “However, if both or either one of the distance (L) and the height (H) are not known, the gaze deviation determiner 31 analyzes an input image captured by the camera 1 and a reference image and then determines a gaze deviation value THETA (step 401 of FIG. 4). In more detail, the object is directed to the direction 3 of the camera 1 at an initial

Asserted Claim of the '110 Patent	Exemplary Citations to Jeon
	state or at a user's desire, to obtain a reference image. In the case of the reference image, the direction 3 of the camera 1 and the gaze direction 4 of the object are met with each other. The reference image is analyzed to extract the two pupils and the mouth. Then, as shown in FIG. 6A, a distance EMS0 between the line connecting the centers of the two pupils and the center line of the mouth, and a distance EES0 between the center of the two pupils are obtained. Meanwhile, the image captured via the camera 1 is analyzed at the normal state where the object watches the screen of the monitor 2, to extract the two pupils and the mouth. Then, as shown in FIG. 6B, a distance EMS between the line connecting the centers of the two pupils and the center line of the mouth, and a distance EES between the center of the two pupils are obtained. In the case of the reference image where the direction 3 of the camera 1 and the gaze direction 4 of the object coincide, and in the case of the input image at the general state where both the directions differ by the gaze deviation value THETA as shown in FIG. 5, a length of the object acquired on a video plane 11 of the camera 1 differs from the other. The ratio is expressed by the following equation (2). $\cos(\text{THETA}) \times \text{EMS} 0 / \text{EES} 0 = \text{EMS} / \text{EES}$ <i>See Jeon at 3:23-52.</i> This limitation would have been obvious to a person of ordinary skill in the art based on (1) Jeon alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

Asserted Claim of the '110 Patent	Exemplary Citations to Jeon
Claim 10	
10. The method of claim 1, further comprising operating the processor to augment the modified images by overlaying virtual objects on a user's image appearing within the modified images.	Jeon expressly and/or inherently discloses and/or renders obvious operating the processor to augment the modified images by overlaying virtual objects on a user's image appearing within the modified images. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Jeon alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

Asserted Claim of the '110 Patent	Exemplary Citations to Jeon
Claim 11	
11. The method of claim 1, further comprising operating the processor to transmit the modified image over a network.	Jeon expressly and/or inherently discloses and/or renders obvious operating the processor to transmit the modified image over a network. <i>See, e.g.</i>, disclosures below. “In FIG. 1, a camera 1 capturing the image of a user is located on a monitor 2 of the computer system. Here, a direction 3 of the camera 1 is directed to a user 5. The user 5 gazes at the center of the monitor 2, not toward the camera 1, in order to watch the face of the other party displayed on the monitor 2. For this reason, an image containing the face of the user 5 photographed via the camera 1 is viewed by the other party as illustrated in FIG. 2. That is, the gaze of the image is downwards, and does not meet that of the other party. This greatly reduces reality of the video phone featuring face-to-face talking. Even though the camera 1 is located on the lower portion or lateral portion of the monitor 2, instead of the upper portion thereof, the above-described problem of poor eye contact cannot be avoided. Unless the camera 1 is located on the center of the monitor 2, that is, a corresponding position of the monitor 2 in which the face of the other party is viewed, the above problem always remains so that the gaze 4 of the object captured by the camera 1 does not meet that of the camera 1. Even if the video

Asserted Claim of the '110 Patent	Exemplary Citations to Jeon
	communications system is constructed to have the form of a telephone set other than that of the computer system, the direction of the gaze by the user is not directed toward the camera, but toward the corresponding portion of the monitor on which the face of the other party is displayed, to accordingly cause the same problem.” Jeon 1:25-50. “In an embodiment of the present invention, the camera 1 used for video communications is installed on the monitor 2 in the direction 3 of the camera 1 as shown in FIG. 5. The user being the object gazes at the center of the monitor 2 in the direction of a line 4 in order to watch the face of the other party displayed on the monitor 2.” See Jeon at 3:6-11. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Jeon alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants’ Invalidity Contentions and Defendants’ other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

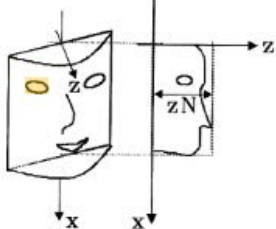
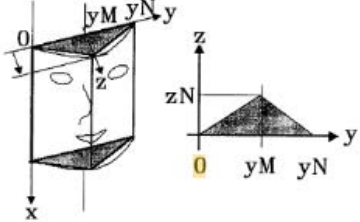
Asserted Claim of the '110 Patent	Exemplary Citations to Jeon
Claim 12	
12. The method of claim 1, further comprising displaying the modified image on a remote screen for video telepresence.	Jeon expressly and/or inherently discloses and/or renders obvious displaying the modified image on a remote screen for video telepresence. <i>See, e.g.</i>, disclosures below. “In FIG. 1, a camera 1 capturing the image of a user is located on a monitor 2 of the computer system. Here, a direction 3 of the camera 1 is directed to a user 5. The user 5 gazes at the center of the monitor 2, not toward the camera 1, in order to watch the face

Asserted Claim of the '110 Patent	Exemplary Citations to Jeon
	of the other party displayed on the monitor 2. For this reason, an image containing the face of the user 5 photographed via the camera 1 is viewed by the other party as illustrated in FIG. 2. That is, the gaze of the image is downwards, and does not meet that of the other party. This greatly reduces reality of the video phone featuring face-to-face talking. Even though the camera 1 is located on the lower portion or lateral portion of the monitor 2, instead of the upper portion thereof, the above-described problem of poor eye contact cannot be avoided. Unless the camera 1 is located on the center of the monitor 2, that is, a corresponding position of the monitor 2 in which the face of the other party is viewed, the above problem always remains so that the gaze 4 of the object captured by the camera 1 does not meet that of the camera 1. Even if the video communications system is constructed to have the form of a telephone set other than that of the computer system, the direction of the gaze by the user is not directed toward the camera, but toward the corresponding portion of the monitor on which the face of the other party is displayed, to accordingly cause the same problem.” Jeon 1:25-50. “In an embodiment of the present invention, the camera 1 used for video communications is installed on the monitor 2 in the direction 3 of the camera 1 as shown in FIG. 5. The user being the object gazes at the center of the monitor 2 in the direction of a line 4 in order to watch the face of the other party displayed on the monitor 2.” See Jeon at 3:6-11. This limitation would have been obvious to a person of ordinary skill in the art based on (1) Jeon alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants’ Invalidity Contentions and Defendants’ other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

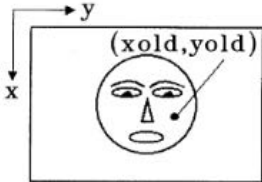
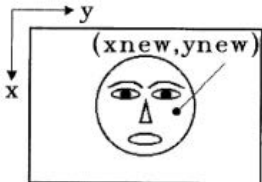
Asserted Claim of the '110 Patent	Exemplary Citations to Jeon
Claim 16	
16. The method of claim 1, wherein the processor operates on the images from the camera to generate background segmentation, and replaces segments on the images by replacement segments.	Jeon expressly and/or inherently discloses and/or renders obvious wherein the processor operates on the images from the camera to generate background segmentation, and replaces segments on the images by replacement segments. <i>See, e.g.</i>, disclosures below. “The corresponding point coordinate calculator 32 receives the gaze deviation value THETA determined by the gaze deviation determiner 31, receives a coordinate value (xnew, ynew) with respect to a particular position of the corrected image from the pixel value calculator 33, and calculates a corresponding point coordinate of the input image corresponding to the position of the corrected image (step 402 of FIG. 4). That is, the corresponding point coordinate calculator 32 calculates a corresponding point coordinate (xold, yold) of the input image of FIG. 7A that is an image existing before rotation in correspondence to a particular position (xnew, ynew) of an image of FIG. 7B that is virtually rotated by the gaze deviation value THETA, in order to obtain a corrected image by rotating the image captured by the camera by the gaze deviation value THETA centered on the y-axis, at the normal state where the object watches the monitor screen. The corrected image can be obtained by rotating the whole of the input image or only a part of the input image containing such as eyes. Also, the range of the particular position (xnew, ynew) can be either the whole image or a part within the image. Here, x, y, and z axes mean the coordinate system on the camera video plane 11 as shown in FIG. 5. Further, the x axis and the y axis represent a vertical direction and a horizontal direction of the image captured by the camera 1 as shown in FIGS. 7A and 7B, respectively. The z axis represents the direction toward the camera 1 from the object. Here, the object is defined as at $z=0$. The corresponding point coordinate calculator 32 obtains a corresponding point coordinate (xold, yold) by the following equation (3).” <i>See Jeon at 4:13-42.</i>

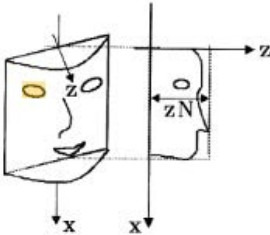
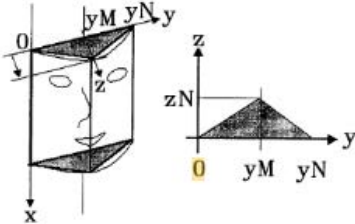
Asserted Claim of the '110 Patent	Exemplary Citations to Jeon
	FIG. 7A FIG. 7B See Jeon at Fig. 7A and Fig. 7b. Fig. 7A shows an input image and Fig. 7B shows a corrected image. “Since the currently input image is rotated by the gaze deviation value THETA centered on the y axis, the value on the x axis is varied and the value on the y axis is same. In the above equation (3), a value of $z(xnew, ynew)$ is a z value of a point on the object corresponding to the pixel located at $(xnew, ynew)$. As shown in FIG. 8, this occurs

Asserted Claim of the '110 Patent	Exemplary Citations to Jeon
	owing to the difference of the height of the face in the z direction. Since the image photographed by the camera 1 is a two-dimensional image, the z axis information cannot be recoverable with only the image itself. However, a simple model can be used as shown in FIGS. 8 and 9, in order to calculate the z axis information. In FIGS. 8 and 9, zN is a distance from the x axis to the nose when the highest point in the face in the z direction is modelled as the nose. That is, as shown in FIG. 9, the face is approximated into a triangular column. Accordingly, a z value at a certain coordinate (x, y) without actual information about a correct shape of the face itself can be expressed as the following equation (4).” <i>See Jeon at 4:46-63.</i>

Asserted Claim of the '110 Patent	Exemplary Citations to Jeon
	FIG. 8  FIG. 9  <i>See Jeon at Fig. 8 and Fig. 9.</i> This limitation would have been obvious to a person of ordinary skill in the art based on (1) Jeon alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.

Asserted Claim of the '110 Patent	Exemplary Citations to Jeon
Claim 17	
17. The method of claim 16, wherein the replacement segments comprise virtual background or background that was captured in a different setting.	Jeon expressly and/or inherently discloses and/or renders obvious wherein the replacement segments comprise virtual background or background that was captured in a different setting. <i>See, e.g.</i>, disclosures below. “The corresponding point coordinate calculator 32 receives the gaze deviation value THETA determined by the gaze deviation determiner 31, receives a coordinate value (xnew, ynew) with respect to a particular position of the corrected image from the pixel value calculator 33, and calculates a corresponding point coordinate of the input image corresponding to the position of the corrected image (step 402 of FIG. 4). That is, the corresponding point coordinate calculator 32 calculates a corresponding point coordinate (xold, yold) of the input image of FIG. 7A that is an image existing before rotation in correspondence to a particular position (xnew, ynew) of an image of FIG. 7B that is virtually rotated by the gaze deviation value THETA, in order to obtain a corrected image by rotating the image captured by the camera by the gaze deviation value THETA centered on the y-axis, at the normal state where the object watches the monitor screen. The corrected image can be obtained by rotating the whole of the input image or only a part of the input image containing such as eyes. Also, the range of the particular position (xnew, ynew) can be either the whole image or a part within the image. Here, x, y, and z axes mean the coordinate system on the camera video plane 11 as shown in FIG. 5. Further, the x axis and the y axis represent a vertical direction and a horizontal direction of the image captured by the camera 1 as shown in FIGS. 7A and 7B, respectively. The z axis represents the direction toward the camera 1 from the object. Here, the object is defined as at z=0. The corresponding point coordinate calculator 32 obtains a corresponding point coordinate (xold, yold) by the following equation (3).” <i>See Jeon at 4:13-42.</i>

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	FIG. 7A  FIG. 7B  <i>See Jeon at Fig. 7A and Fig. 7b.</i> Fig. 7A shows an input image and Fig. 7B shows a corrected image. “Since the currently input image is rotated by the gaze deviation value THETA centered on the y axis, the value on the x axis is varied and the value on the y axis is same. In the above equation (3), a value of $z(x_{new}, y_{new})$ is a z value of a point on the object corresponding to the pixel located at (x_{new}, y_{new}). As shown in FIG. 8, this occurs owing to the difference of the height of the face in the z direction. Since the image photographed by the camera 1 is a two-dimensional image, the z axis information

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	cannot be recoverable with only the image itself. However, a simple model can be used as shown in FIGS. 8 and 9, in order to calculate the z axis information. In FIGS. 8 and 9, z_N is a distance from the x axis to the nose when the highest point in the face in the z direction is modelled as the nose. That is, as shown in FIG. 9, the face is approximated into a triangular column. Accordingly, a z value at a certain coordinate (x, y) without actual information about a correct shape of the face itself can be expressed as the following equation (4)." <i>See Jeon at 4:46-63.</i> FIG. 8  FIG. 9 

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	<i>See Jeon at Fig. 8 and Fig. 9.</i> This limitation would have been obvious to a person of ordinary skill in the art based on (1) Jeon alone; (2) knowledge of a person of ordinary skill in the art, and/or (3) the teachings with respect to this claim element as detailed in the cover document of Defendants' Invalidity Contentions and Defendants' other invalidity charts. Exemplary combinations are provided in Section II.B of the cover document.