

Petition for *Inter Partes* Review of U.S. Patent No. 8,982,110

UNITED STATES PATENT AND TRADEMARK OFFICE

SAMSUNG ELECTRONICS CO., LTD.,
SAMSUNG ELECTRONICS AMERICA, INC., and
GOOGLE LLC

Petitioners,

v.

EYESMATCH LTD.

Patent Owner

IPR2024-00810

**PETITION FOR *INTER PARTES* REVIEW OF
U.S. PATENT NO. 8,982,110**

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Submitted Electronically via P-TACTS

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EXHIBIT LIST

EX[No.]	Description of Documents
1001	U.S. Patent No. 8,982,110 (“’110 Patent”)
1002	Prosecution File History of the ’110 Patent
1003	Expert Declaration of Dr. Lina J. Karam, Ph.D.
1004	Curriculum Vitae of Dr. Lina Karam, Ph.D.
1005	U.S. Patent Publication No. 2011/0298910 (“Haan”)
1006	U.S. Patent Publication No. US 2007/0040033 (“Rosenberg”)
1007	U.S. Patent Publication No. 2011/0246329 (“Geisner”)
1008	WO Patent Pub. No. 2006/108279 (“Lizee”)
1009	Institute for Robotics and Intelligent Systems, Alexandre R.J. Francois, <i>Software Architecture for Computer Vision: Beyond Pipes and Filters</i> (July 2003) (“Francois”)
1010	Hartley et al., <i>Multiple View Geometry in Computer Vision</i> (2nd ed., published 2004) (“Hartley”)
1011	U.S. Patent Publication No. 2007/0065039 (“Park”)
1012-1017	[Reserved]
1018	Excerpts from EyesMatch Ltd.’s and Memomi Labs Inc.’s Objections and Responses to First Set of Interrogatories of Meta Platforms, Inc., Instagram, LLC, and WhatsApp Inc. (Nos. 1-4) in <i>EyesMatch Ltd. v. Facebook, Inc.</i> , No. 1:21-cv-00111-RGA-JLH (D. Del.) (“Infringement Contentions from the Meta Litigation”)
1019	Excerpts from Plaintiffs EyesMatch Ltd.’s Disclosure of Asserted Claims and Infringement Contentions in <i>EyesMatch Ltd. v. Samsung Electronics America, Inc.</i> , No. 2:23-cv-00363-JRG-RSP (E.D. Tex.)

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EX[No.]	Description of Documents
1020	<i>EyesMatch Ltd. v. Samsung Electronics America, Inc.</i> , No. 2:23-cv-00363-JRG-RSP (E.D. Tex.), Docket Control Order, Dkt. No. 27
1021	U.S. Patent No. 8,982,109 (“’109 Patent”)
1022	Prosecution File History of the ’109 Patent
1023	U.S. Provisional Patent Application No. 61/738,957 (filed December 18, 2012)
1024	Prosecution File History of U.S. Patent Application No. 13/088,369 (filed April 17, 2011)
1025	U.S. Provisional Patent Application No. 60/656,884 (filed March 1, 2005)
1026	U.S. Provisional Patent Application No. 60/656,885 (filed March 1, 2005)
1027	James D. Foley et al., <i>Computer Graphics: Principles and Practice</i> (2nd ed., in C published 1995) (“Foley”)
1028	Excerpts from Alan Watt, <i>3D Computer Graphics</i> (3rd ed., published 2000) (“Watt”)
1029	Declaration of Sylvia D. Hall-Ellis, Ph. D. (“Hall-Ellis Declaration”)
1030	Patent Owners EyesMatch Ltd., Memomi Labs Inc.’s Preliminary Response in <i>Meta Platforms, Inc., Instagram, LLC, and WhatsApp Inc. v. EyesMatch Ltd., Memomi Labs Inc.</i> , IPR2022-00490, Paper 9 (“PO’s Preliminary Response in the Meta IPR2022-00490”).

I. MANDATORY NOTICES

A. Real Parties-in-Interest

Samsung Electronics Co., Ltd., Samsung Electronics America, Inc., (together, “Samsung”), Samsung Research America, Inc., and Google LLC¹ are real parties-in-interest to this *inter partes* review (“IPR”).

B. Related Matters

U.S. Patent No. 8,982,110 (“’110 Patent,” EX1001²) is subject to the pending district court litigation: *EyesMatch Ltd. v. Samsung Electronics America, Inc.*, No. 2:23-cv-00363-JRG-RSP (E.D. Tex.) (filed Aug. 8, 2023) (“the Litigation”). U.S. Patent No. 8,982,109 (“’109 Patent,” EX1021) is also asserted in the Litigation.

The ’110 Patent was also asserted in *EyesMatch Ltd. v. Facebook, Inc.*, No. 1:21-cv-00111-RGA-JLH (D. Del.), which settled June 28, 2022, prior to claim construction. The ’110 Patent was the subject of IPR2022-00490, filed January 28,

¹ Google LLC is a subsidiary of XXVI Holdings Inc., which is a subsidiary of Alphabet Inc. XXVI Holdings Inc. and Alphabet Inc. are not real parties in interest to this proceeding.

² All exhibit citations reference original page numbers of the underlying documents, other than citations to EX1002, EX1018, and EX1028, which reference the stamped page numbers in the lower right corner of each exhibit page.

2022, by Meta Platforms, Inc., Instagram, LLC, and WhatsApp Inc., and terminated before institution.

C. Lead and Back-Up Counsel

Petitioners provide the following designation of counsel.

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In concurrently filed Powers of Attorney, Google LLC has granted Power of Attorney to Practitioners at Finnegan, Henderson, Farabow, Garrett & Dunner LLP, and Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc. have granted Power of Attorney to Practitioners at Baker Botts L.L.P.

D. Service Information

This Petition is being served by USPS OVERNIGHT MAIL, costs prepaid, to the address of the attorney or agent of record for Patent Owner at the USPTO for the '110 Patent: Womble Bond Dickinson (US) LLP, ATTN: IP Docketing, P.O. Box 7037, Atlanta GA 30357-0037.

Petitioners consent to service by electronic mail at the addresses above.

II. CLAIMS LISTING

A. Independent 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:
1[a]	operating the camera to generate a stream of images of the user;
1[b]	operating the processor to detect the presence of the user in the stream of images;
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,
1[d]	displaying the modified images on the monitor;
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
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.

B. Claim 2

2[pre]	The method of claim 1,
2[a]	wherein the mapping transformation comprises a combination of at least two of the following transformations:
2[b]	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.

C. Claim 3

3[pre]	The method of claim 1,
3[a]	wherein during idle mode the camera continuously sends captured images to the processor, and

3[b]	the user presence is identified by the processor detecting a body part in the images.
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D. Claim 4

4[pre]	The method of claim 3,
4[a]	wherein the body part comprises one of legs, face, eyes, and hands.

E. Claim 5

5[pre]	The method of claim 1,
5[a]	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.

F. Claim 6

6[pre]	The method of claim 5,
6[a]	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.

G. Claim 7

7[pre]	The method of claim 1,
7[a]	further comprising operating the processor to generate an avatar having body characteristics corresponding to body characteristics of a user appearing in the images.

H. Claim 8

8[pre]	The method of claim 7,
8[a]	further comprising operating the processor to display on the monitor the modified images and an image of the avatar.

I. Claim 9

9[pre]	The method of claim 7,
9[a]	further comprising operating the processor to augment the modified images by overlaying virtual objects on the avatar.

J. Claim 10

10[pre]	The method of claim 1,
10[a]	further comprising operating the processor to augment the modified images by overlaying virtual objects on a user's image appearing within the modified images.

K. Claim 11

11[pre]	The method of claim 1,
11[a]	further comprising operating the processor to transmit the modified image over a network.

L. Claim 12

12[pre]	The method of claim 1,
12[a]	further comprising displaying the modified image on a remote screen for video telepresence.

M. Claim 13

13[pre]	The method of claim 1,
13[a]	further comprising providing data from a depth sensor to the processor, and operating the processor to measure a texture of the image from the data.

N. Claim 14

14[pre]	The method of claim 13,
14[a]	further comprising operating the processor to generate an avatar using the data from the depth sensor.

O. Claim 15

15[pre]	The method of claim 13,
15[a]	wherein the processor generate the avatar by analyzing registration pointers on the images of the camera.

P. Claim 16

16[pre]	The method of claim 1,
16[a]	wherein the processor operates on the images from the camera to

	generate background segmentation, and
16[b]	replaces segments on the images by replacement segments.

Q. Claim 17

17[pre]	The method of claim 16,
17[a]	wherein the replacement segments comprise virtual background or background that was captured in a different setting.

R. Claim 18

18[pre]	The method of claim 1,
18[a]	wherein the processor resides in the remote location, and the method proceeds by transmitting the images from the camera over a network to the processor, and transmitting the modified images back from the processor to the monitor over the network.

III. GROUNDS FOR STANDING

Petitioners certify the '110 Patent is eligible for IPR and Petitioners meet the eligibility requirements set forth in 37 C.F.R. § 42.104.

IV. PRECISE RELIEF REQUESTED

Petitioners request review and cancellation of claims 1-18 under pre-AIA 35 U.S.C. § 103 on the following grounds:

No.	Claims	Ground
1	1-6, 10-12, 16-17	Obvious over Haan in view of Francois
2	1-6, 10-12	Obvious over Rosenberg in view of Park
3	1-18	Obvious over Geisner in view of Lizee
4	7-9, 13-15, 18	Obvious over Haan in view of Francois and Geisner
5	3-4, 7-9, 11-18	Obvious over Rosenberg in view of Park and Geisner

V. LEVEL OF ORDINARY SKILL IN THE ART

A person of ordinary skill in the art (“POSITA”) as of December 18, 2012, would have a bachelor’s degree in electrical or computer engineering, or a closely related field such as computer science, and two years of work experience with image capture and processing systems or related fields. A person with less and/or different education, but more relevant practical experience, or vice versa, may also meet this standard. EX1003, ¶91. The prior art also evidences such level of skill. *Id.*

VI. THE '110 PATENT

A. Summary

The '110 Patent relates to interactive virtual mirrors used in retail, service, medical, and home environments for shopping, “video conferencing, gaming and the like.” EX1001, 1:43-51. It purports to solve projection distortion problems caused by having a camera on top of a mirror-screen with an offset angle and height. *Id.*, 3:21-28, 18:58-63; EX1003, ¶72. Figure 8, from the related '109 Patent incorporated by reference in the '110 Patent, shows this distortion. EX1001, 1:65-2:2, 2:17-18; EX1021 ('109 Patent), Fig. 8, 1:61-2:48, 15:30-40.

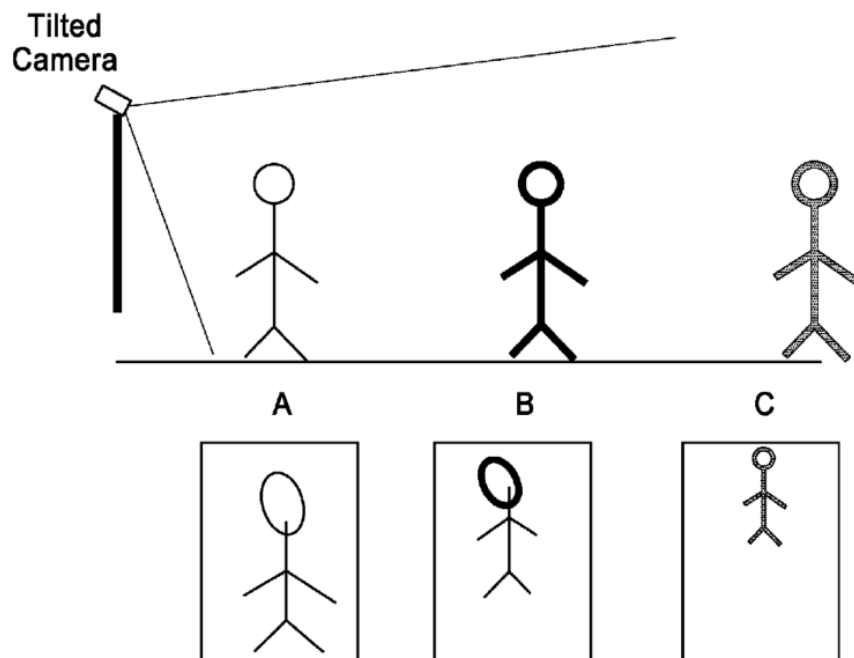


FIG. 8

EX1021, Fig. 8 (original).

To correct distortions, three virtual image transformations (“tilt, elevation, and scale translations”) are performed on captured images to “effectively mimic a mirror reflection.” EX1021, 24:4-7, 23:41-24:3; EX1001, 2:17-18; EX1003, ¶¶72-78.

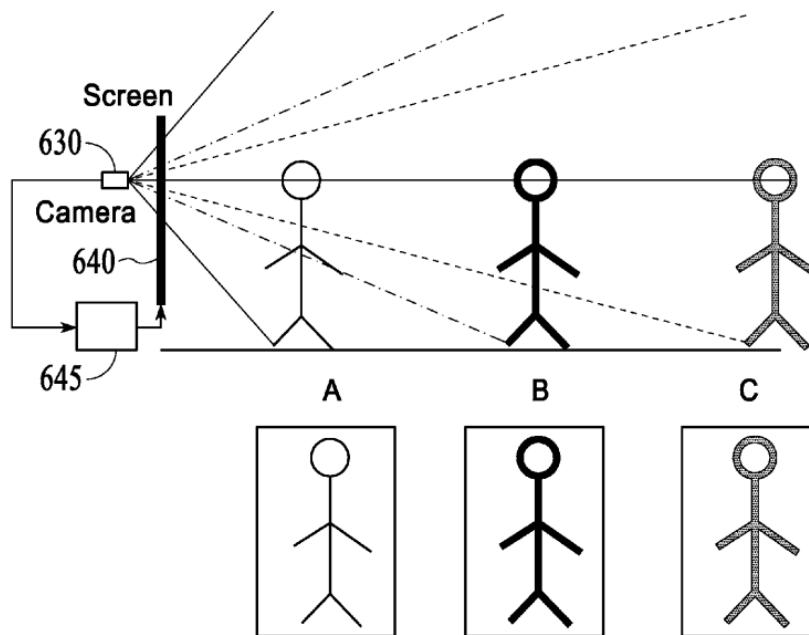
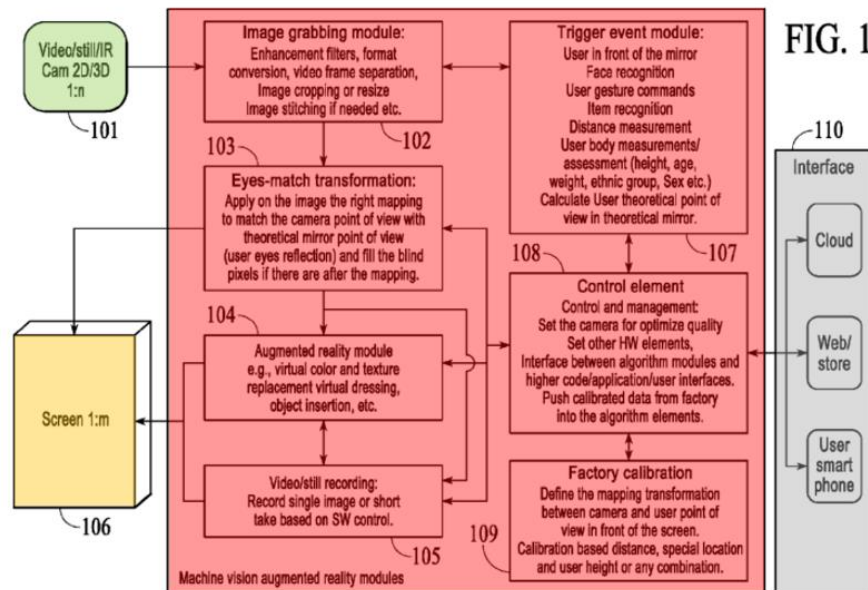


FIG. 6

EX1021, Fig. 6 (original). The tilt transformation corrects distortions caused by a downwards-tilted camera by “modif[yin]g... and transform[ing] the image to appear as if the camera was pointed straight horizontally.” *Id.*, 23:45-51. The elevation transformation corrects distortions such that the image appears to have been taken at eye-level. *Id.*, 23:53-58. And a scale transformation allows a user to see an “almost

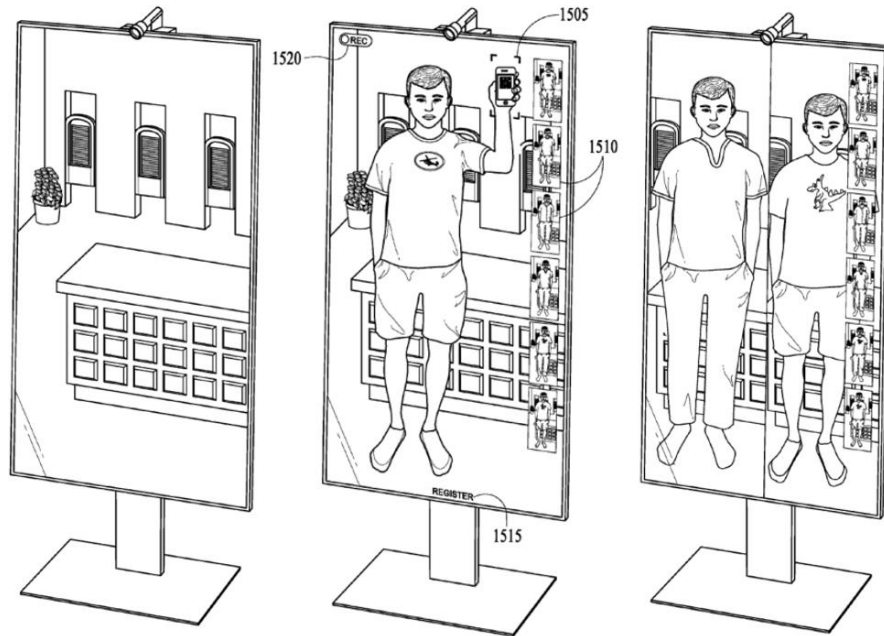
constant size of himself in the screen, regardless of distance to the screen.” *Id.*, 23:65-24:1; EX1003, ¶78.

The disclosed virtual mirror system includes one or more cameras, a display, a computing device, and an interface. EX1001, Fig. 1, 8:28-43.



Id., Fig. 1³. As shown below, an exemplary configuration shows a display acting as a mirror and one or more cameras fixed to the display’s perimeter. *Id.*, Figs. 14-16, 20:56-60, 5:16-21; EX1021, 15:6-9.

³ Unless otherwise specified, figures have been annotated/cropped for clarity.



EX1001, Figs. 14-16.

The '110 Patent describes a large range of use cases, including clothes fitting, virtual dressing, video conferencing over a network, remotely sharing outfits while shopping, and gaming with/without altered appearances. *Id.*, 7:31-55, 13:55-14:16, 23:8-9, 23:50-57, 29:56-63, 1:44-51, 8:16-26; EX1003, ¶81. And it describes generating an avatar of a user using “depth measurement” 3D sensor data. EX1001, Abstract, 21:5-59, 21:13-15; EX1003, ¶82.

B. Prosecution History and Priority Date

The '110 Patent issued from Application No. 14/253,831 (“’831 Application”), filed April 15, 2014, which is a continuation-in-part of the application for the '109 Patent, filed March 15, 2013, which claims priority to the '957 Provisional (EX1023), filed December 18, 2012, and, through a chain of continuations and continuations-

in-part, to two provisionals filed March 1, 2005 (EX1024-1026).

During prosecution of the '110 Patent, the Examiner issued no Office Actions but a Notice of Allowance with Examiner's amendments adding limitations 1[e] and 1[f]. EX1002 at 333.

EyesMatch Ltd. ("Patent Owner") cannot claim priority before December 18, 2012, when the '957 Provisional (EX1023) was filed, at least because "to generate modified images that appear to be captured from a different point of view" and "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" (every claim), are not supported by any specifications before the '957 Provisional. EX1003, ¶90; EX1024-1026. Patent Owner has also claimed priority based on the 2012 '957 provisional in litigation (EX1018 at 3) and applied the 2012 date in determining the level of skill (EX1030 at 8).

VII. CLAIM CONSTRUCTION

Claims need to be construed only if and to the extent necessary to resolve a controversy. *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017). No terms require construction because the claims encompass the prior-art mappings under any reasonable construction. 37 C.F.R. § 42.100(b). Petitioners reserve the right to respond to constructions offered by

Patent Owner or adopted by the Board.⁴

VIII. OVERVIEW OF THE PRIOR ART

As provided in Dr. Karam's declaration, multiple-view geometry modeling, including image flipping, projective transformation, resizing, and rotation, were well known as of 2012. EX1003, ¶¶42-67. These concepts are discussed in numerous textbooks, patents, and publications, including those below, before the 2012 priority date. *Id.*

A. Haan (EX1005)

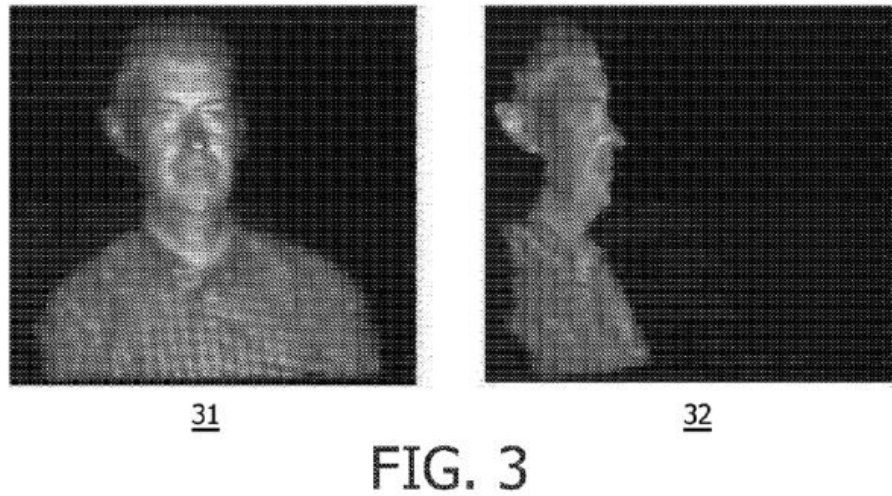
Haan was filed Aug. 17, 2011, with a PCT priority date of Feb. 15, 2010, and published Dec. 8, 2011. It is prior art under §102(a), (b), and (e).

Haan recognizes a conventional mirror's limitation that one cannot see certain areas. EX1005, [0004]. For example, a viewer may not be able to see their profile when looking directly into a mirror, or they cannot see the mirror when their profile is displayed on it. *Id.*

Thus, Haan discloses a virtual mirror allowing a viewer to change the point of view of displayed images and display areas "often just out of sight." *Id.*, [0004]; EX1003, ¶¶95-96. For example, modified image 32 of Haan's Figure 3 shows a

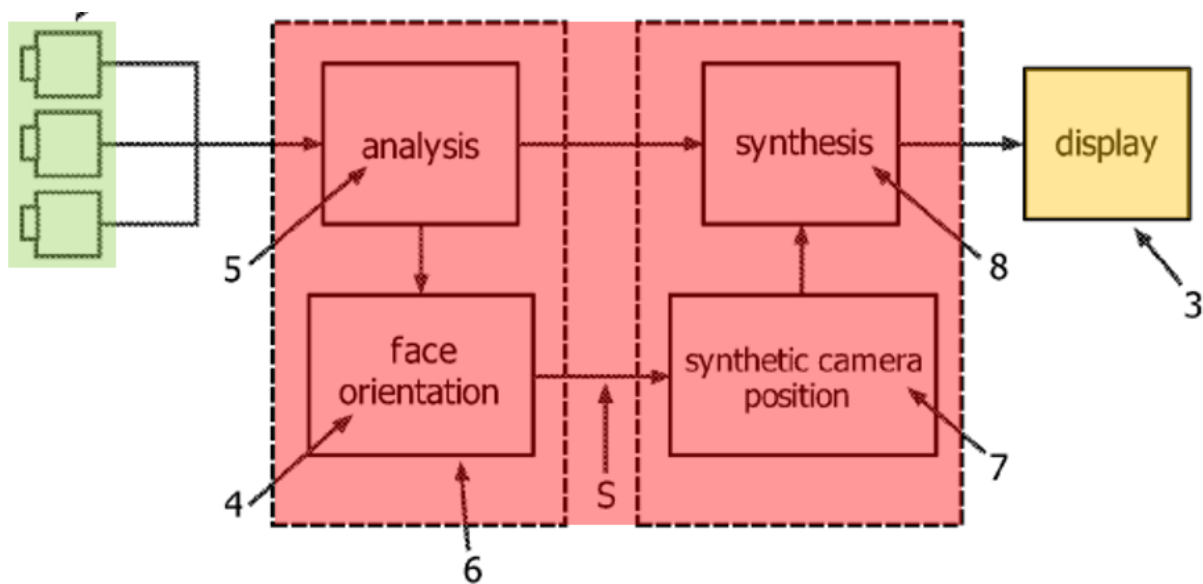
⁴ Petitioners are not waiving arguments under §112 or regarding claim scope raised in litigation.

side/profile of the viewer looking towards the mirror. EX1005, Fig. 3, [0058], [0062]-[0063], [0073].



Id., Fig. 3.

Haan's virtual mirror includes a display device, one or more cameras, and analysis and synthesis modules "embodied in a computer program." *Id.*, Abstract, Fig. 2, [0057]-[0058], [0087]; EX1003, ¶97.



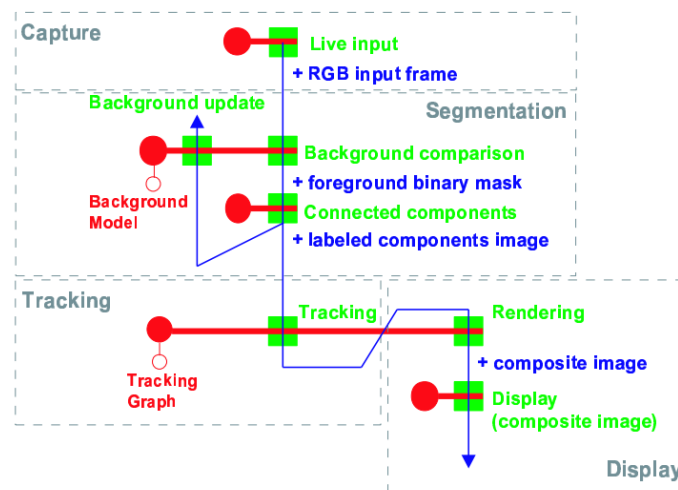
EX1005, Fig. 2.

Like the '110 Patent, Haan's analysis module determines the position of a user's body part (e.g., a head or torso) relative to the display screen. EX1003, ¶98; EX1005, [0058], Fig. 2, claim 2. The synthesis module changes the view point of captured images based on that determined position. EX1003, ¶99; EX1005, [0006]-[0011], [0056]-[0058], [0071].

B. Francois (EX1009)

Francois was published in July 2003 and has been publicly accessible since; it is prior art under §102(a) and (b). See EX1009; EX1029, ¶43.

Francois describes a software architecture model, Software Architecture for Immersipresence ("SAI"), for performing distributed, asynchronous processing in computer vision applications. EX1009, §§1.2-1.3; EX1003, ¶103. Its system comprises four functional modules: "capture, segmentation, tracking, visualization." *Id.*, §4.1, Fig. 7:



Francois discloses a virtual mirror prototype implementing SAI, comprising

an LCD screen, a camera capturing a continuous video stream, and a tracking device, where the “synthesized video stream is a close approximation of what the user would see on the screen surface if it were a real mirror.” *Id.*, §4.3, Figs. 12-13:

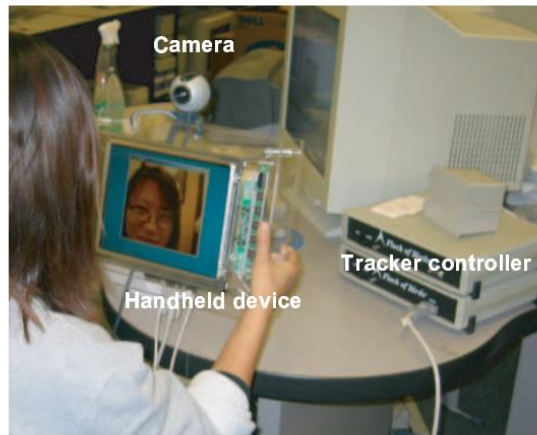


Figure 12: The handheld mirror simulation system (“Virtual Mirror”).

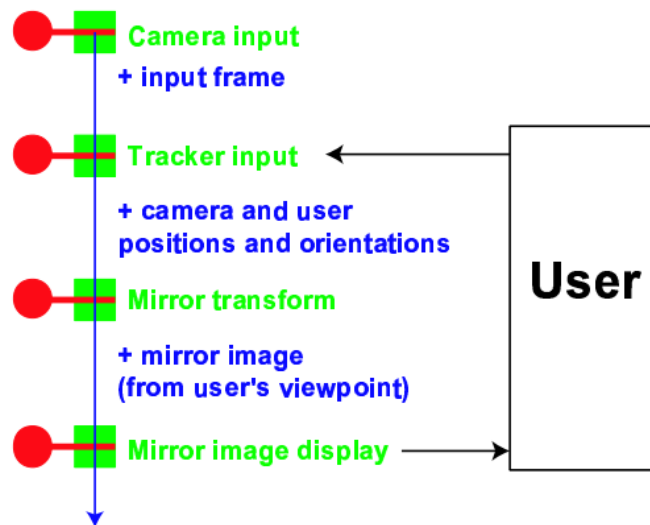


Figure 13: The Virtual Mirror application graph.

Further, Francois describes augmenting the mirrored video streams, enabling real-time video manipulation. *Id.*, §4.5; EX1003, ¶106. These manipulations include

adding animated 3D graphics to video streams or performing background segmentation and substitution. *Id.*, §§4.4-4.5, Fig. 15:

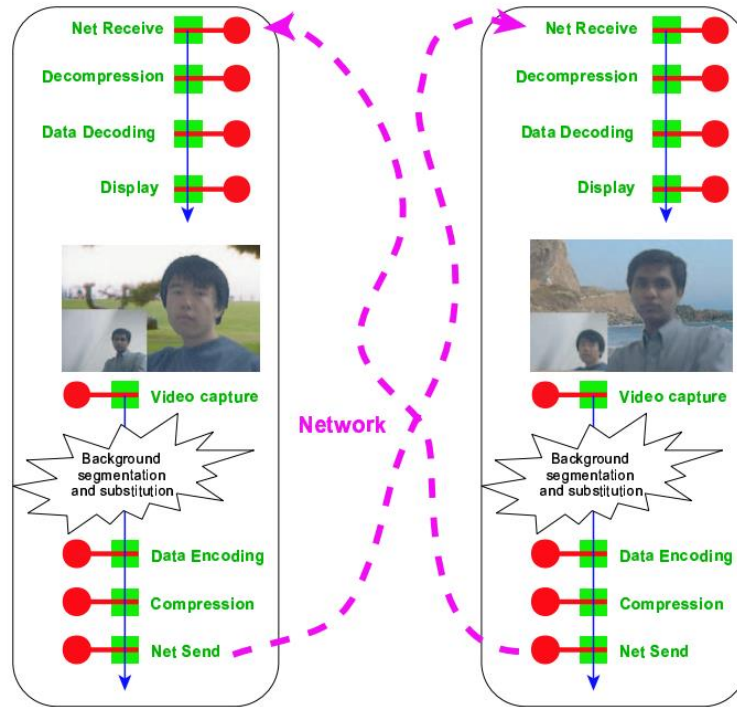


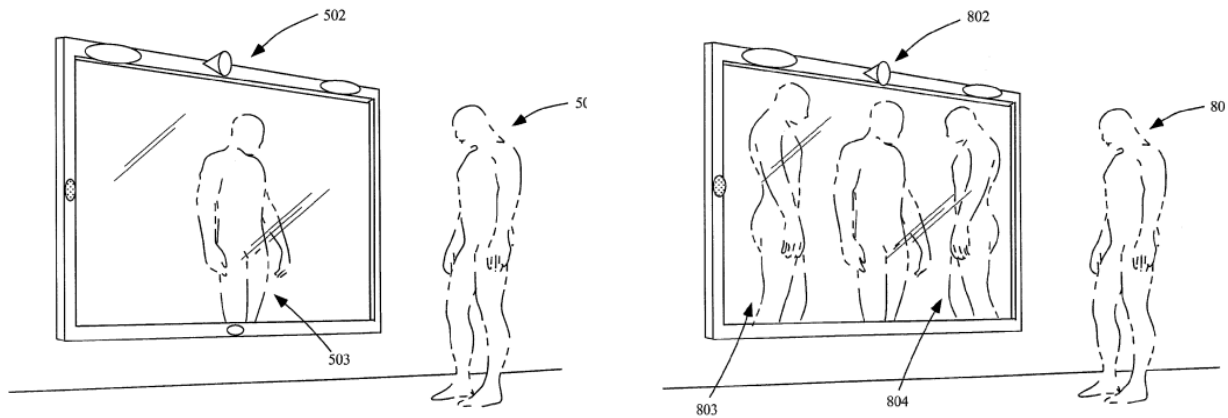
Figure 15: Conceptual graph for an early version of the IMSC Communicator, with support for video (synchronized image and sound).

C. Rosenberg (EX1006)

Rosenberg was filed September 26, 2006, and published February 22, 2007.

Rosenberg is prior art under §102 (a), (b), and (e).

Rosenberg describes a “digital mirror system . . . adapted to provide real-time captured images that approximate what a user would see when viewing an ordinary mirror, with the addition of various other image processing features.” EX1006, [0006]. Like the ’110 Patent, Rosenberg discloses a camera mounted to a digital mirror display and a processor that controls the camera to capture images in response to user input. *Id.*, [0035], [0074], [0077], Figs. 5, 8; EX1003, ¶¶109-115.



EX1006, Figs. 5, 8.

D. Park (EX1011)

Park was filed September 22, 2006, and published March 22, 2007. Park is prior art under §102 (a), (b), and (e).

Park teaches an image capturing apparatus that “perform[s] compensation of a user’s facial image” based on distortions caused by “the position of a camera relative to an imaged object.” EX1011, [0003]. The image capturing apparatus “obtain[s] an image desired by a user by determining the tilt status of a mobile communication device” and “perform[s] compensation of the captured image in accordance with the determined tilt status... .” *Id.*, [0010]; EX1003, ¶¶117-122.

E. Geisner (EX1007)

Geisner was filed April 1, 2010, and published October 6, 2011. Geisner is prior art under §102 (a), (b), and (e).

Geisner relates to a tracking system that “captures user motions” and manipulates “an on-screen representation [of] the user.” EX1007, Abstract. The

tracking system may be deployed with an on-screen garment shopping application (*id.*, [0104]-[0111]), a gaming application (*id.*, [0027], [0092]-[0094]), or a room modeling application (*id.*, [0163]-[0165]). EX1003, ¶¶124, 126.

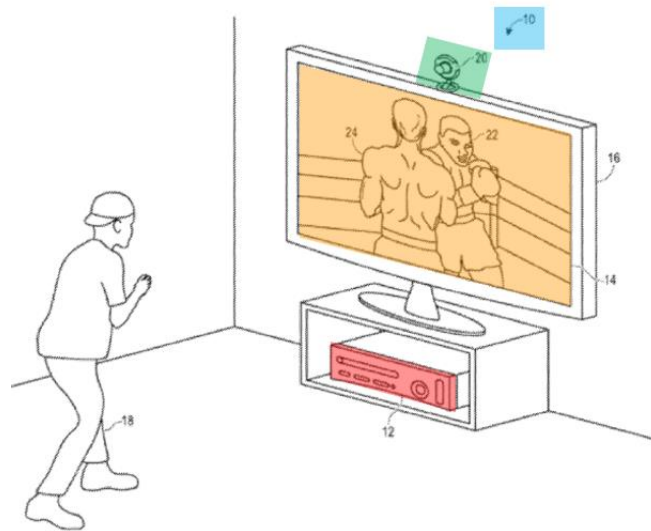
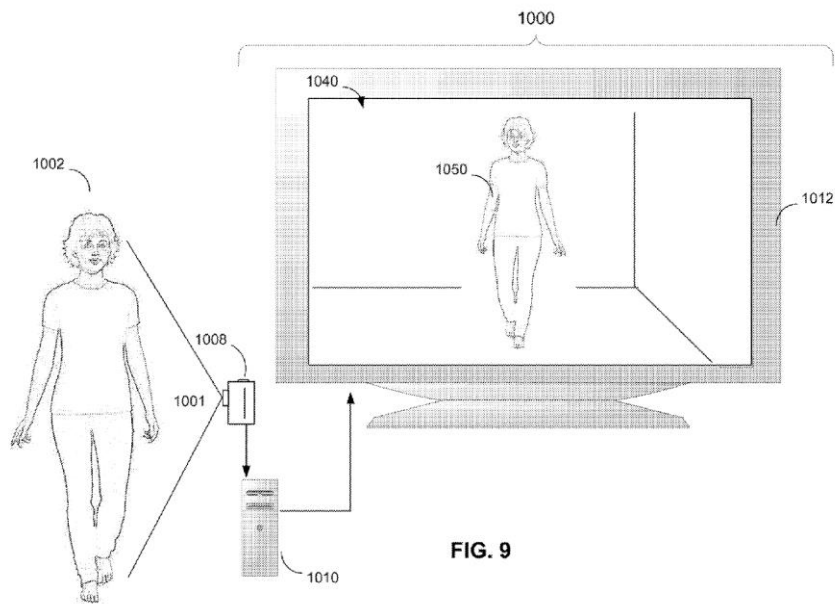


FIG. 1

Id., Fig. 1.

Geisner generates images with a mirrored visual representation of a viewer. The representation “may be altered by applying a color, positioning, or scaling to the target.” *Id.*, [0062]; *see id.*, [0122]; EX1003, ¶¶126-127.



EX1007, Fig. 9.

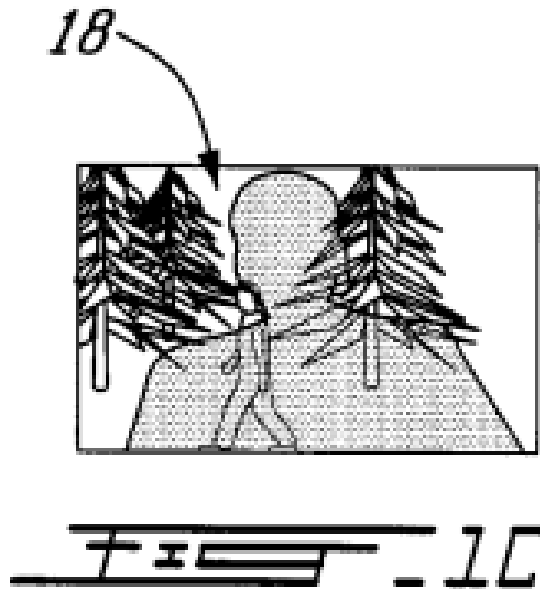
To track motions, Geisner uses a set of two or more cameras to capture “a scene from different angles.” *Id.*, [0039]. The captured image data is processed to obtain image depth information (EX1007, [0039]), generate a user skeleton model, and identify a user gesture or motion (*id.*, [0045], [0132]). See EX1003, ¶¶124-125.

F. Lizée (EX1008)

Lizée was filed April 11, 2006, and published October 19, 2006. Lizée is prior art under §102(a), (b), and (e).

Lizée relates to a “virtual presence system” for “captur[ing] user images” and generating visual representations comprising “a mirrored silhouette transformation of the user image.” EX1008, Abstract. Lizée discloses generating a virtual camera based on user motion or displacement. *Id.*; EX1003, ¶132. For example, Lizée discloses that “a position or viewpoint of the virtual camera 28 could be moved to

reflect a change in the viewing direction of the virtual silhouette 24.” EX1008, [0057], [0063]. Lizee’s System can also use augmented graphical features, including processor-generated virtual backgrounds. *Id.*, [0075], Fig. 1C; EX1003, ¶134.



IX. Ground 1: Haan and Francois render obvious claims 1-6, 10-12, 16-17

A. Reasons for Combining Haan and Francois

A POSITA would have been motivated to combine Haan and Francois to achieve an enhanced virtual mirror experience. EX1003, ¶¶137-151.

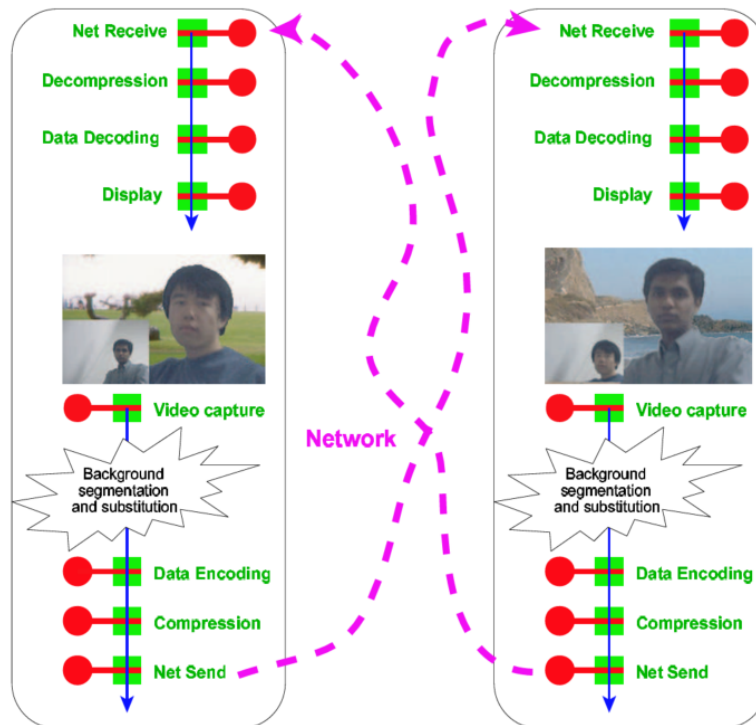
First, both are analogous to the '110 Patent and each other. *Id.*, ¶138. Indeed, the '110 Patent, Haan, and Francois are in the same field of endeavor. *Id.* The '110 Patent concerns “virtualizing a mirror,” and relates “to imaging and display systems” including “monitors, and interactive displays, e.g., in retail and/or service environments, medical or home situations, video conferencing, [and] gaming.”

EX1001, 1:43-51 (emphasis added⁵). Haan similarly discloses a mirror device comprising a display device and a camera that converts monitors into interactive mirroring systems that display images of a viewer having adjusted (virtual) viewpoints based on the positions of the viewer. EX1005, Abstract, [0037]; [0003]; EX1003, ¶139. And Francois discloses a software architecture for “projects ranging from single stream, automatic real-time video processing to fully integrated distributed interactive systems mixing live video, graphics and sound,” which can be implemented on a handheld virtual mirror that synthesizes and displays captured images based on a viewer’s position. EX1009, Abstract, §4.3, Fig. 12; EX1003, ¶140. Francois also discloses communication components for interactive live telecommunications. EX1009, §§4.4-4.5, Fig. 15; EX1003, ¶141.

⁵ Unless otherwise noted, all emphases have been added.



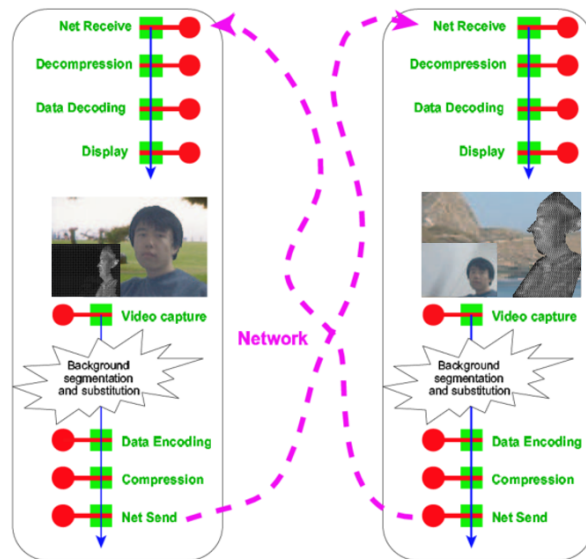
Id., Fig. 12 (original).



Id., Fig. 15 (original).

Second, a POSITA would have been motivated to combine Haan and Francois

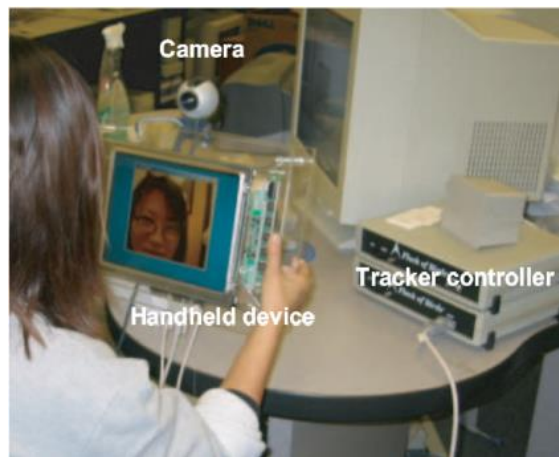
to achieve an enhanced virtual mirror experience. EX1003, ¶142. A POSITA would have been motivated to implement Francois's network module (e.g., IMSC Communicator) in Haan to facilitate transmitting its local images to a remote device for display and enable a network communication functionality. *Id.* This would have provided users with additional flexibility and functionality, expanding on known benefits of Haan, offering users an enhanced experience, like sharing profile views on video calls. *Id.*



EX1009, Fig. 15 (with EX1005, Fig. 3). Indeed, as shown above, a POSITA would have found it obvious to display the modified image on a local display and a remote display. EX1003, ¶143.

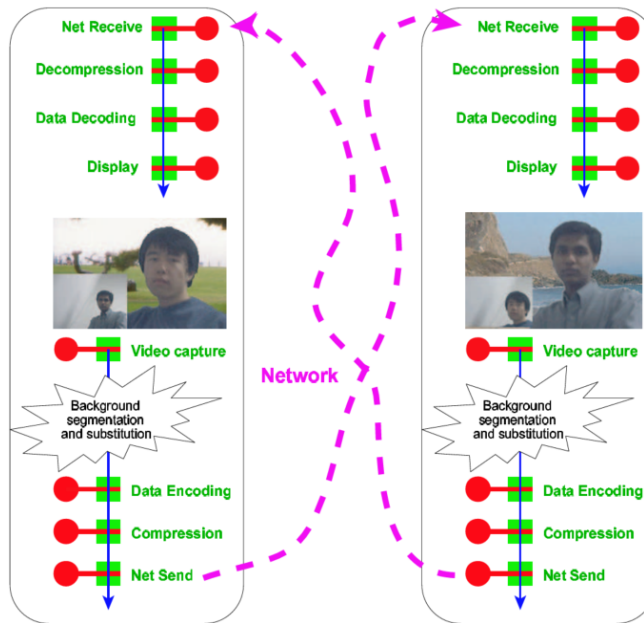
Third, the teachings of Haan and Francois would have motivated a POSITA to combine the references to achieve the claimed invention. *Id.*, ¶¶144-148. Haan's system uses computers and mobile devices (EX1005, [0037]), and a POSITA would

have been motivated to find references like Francois that use the network capabilities of a computer or mobile device to improve upon and ultimately expand the usability of Haan's system. EX1003, ¶¶144-145. Additionally, Francois's SAI, a software architecture, efficiently streamlines image processing applications and permits flexible system expansion and integration. EX1009, §§1.2-1.3; EX1003, ¶146. SAI provides a universal framework for projects, including "automatic real-time video processing" and "fully integrated distributed interactive systems mixing live video, graphics and sound." EX1009, §1.3. Francois explicitly provides that the architecture can be added to a virtual mirror, like that in Haan. *Id.*, §4.3, Figs. 12-13; EX1003, ¶¶144-146.

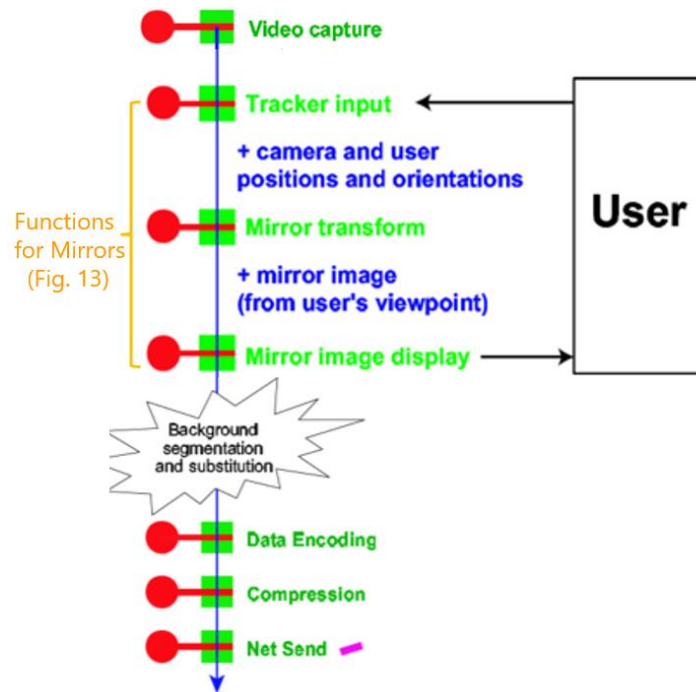


EX1009, Fig. 12 (original).

Further, Francois teaches an extensible platform for remote data sharing compatible with handheld mirror device systems. EX1009, §4.4; EX1003, ¶147.

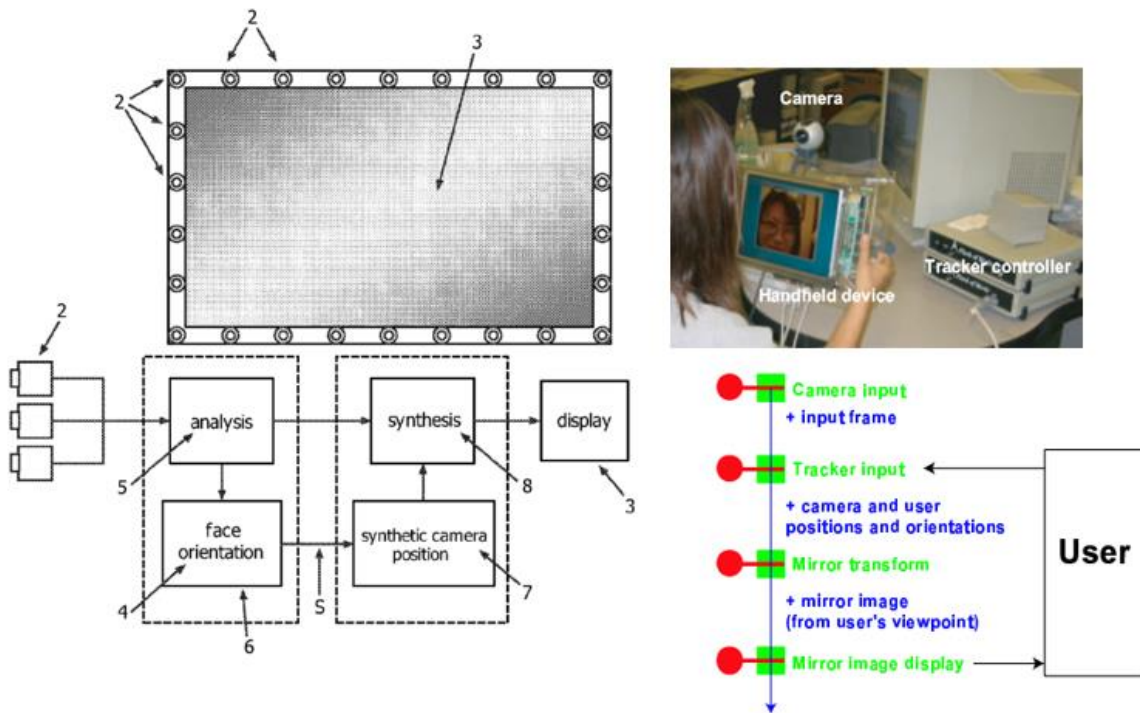


EX1009, Fig. 15. A POSITA would have understood Francois's teachings were relevant to (and compatible with) Haan's device and would have been motivated to modify Haan in view of those teachings to have improved communication capabilities. EX1003, ¶148.



EX1009, Fig. 13 (with *id.*, Fig. 15).

A POSITA would have had a reasonable expectation of success in making this combination. EX1003, ¶149. Haan and Francois apply known techniques to improve similar devices, i.e., a virtual mirror with a camera, computing device, and display. EX1005, Abstract, [0023]-[0027], Fig. 2; EX1009, §4.3, Figs. 12-13; EX1003, ¶149.



EX1005, Fig. 2 (left); EX1009, Figs. 12-13 (right).

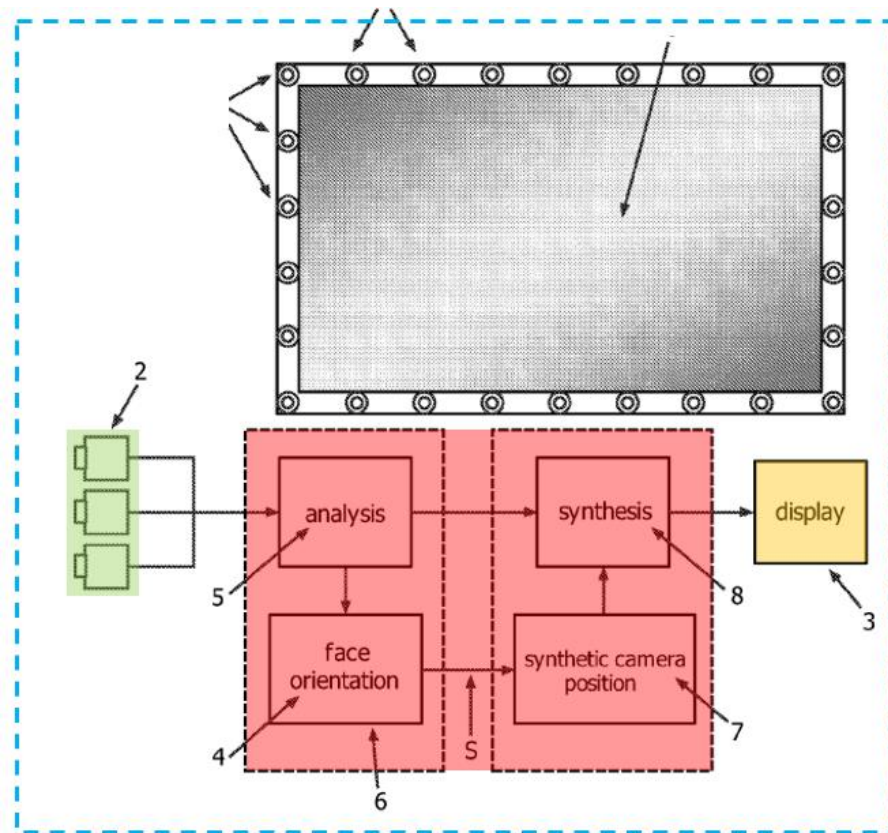
And both apply similar techniques to enhance the user's experience in a virtual mirror system, such as synthesizing and displaying images based on viewer position, to create a virtual camera having a modified point of view. EX1005, [0014], [0058]-[0059], [0075]-[0076]; EX1009, §4.3, Fig. 13; EX1003, ¶150.

Combining Haan and Francois would be no more than simple substitution of known elements to obtain predictable results. EX1003, ¶151. A POSITA would have understood the combination would yield predictable results since Francois discloses how its architecture would be implemented on devices like a virtual mirror. EX1003, ¶151; EX1009, §§4.3-4.5.

B. Independent Claim 1

i. 1[pre]

If the preamble is limiting, Haan-Francois renders obvious “[a] computerized method for operating a display system, the display system having a camera, a monitor, and a processor.” EX1001, cl. 1; EX1003, ¶¶152-154. Specifically, Haan teaches a computer program for operating a **mirror display system** having a camera (**image recording device**), monitor (**display device**), and a processor (**processing means**). EX1005, [0058], cl. 1 (“Mirror device (1) comprising a **display device** [;] at least one **image recording device** [;] a means ... to determine a position[;] a means to change (7) the view point[; and] a means to display the recorded image on **the display screen of the display device** (3).”), Abstract, Fig. 2, [0006]-[0011], [0087], [0109]-[0118]; EX1003, ¶¶152-153.



Id., Fig. 2.

Haan discloses a processor. EX1003, ¶154 As shown above, Haan discloses an “analysis means” and “synthesis means.” *Id.*, Fig. 2, [0058]. Haan explains its invention is “embodied in a computer program comprising program code means for performing a method according to the present invention.” *Id.*, [0087]. A POSITA would have understood that a computer program operates on a processor and that a processor would be an obvious way to implement Haan’s teachings. EX1003, ¶154. In addition, Francois further suggests using processors like the Pentium [4@1.7GHz](#). See §IX.B.iii.

ii. 1[a]

Haan-Francois renders obvious “operating the camera to generate a stream of images of the user.” EX1001, cl. 1; EX1003, ¶¶155-163.

Haan’s system comprises one or more cameras that generate images of a user. EX1005, Abstract, [0008], [0057]-[0058], [0113] (“generated image is **the image of the viewer**”), [0114], [0117]-[0118]. The recorded images, as a stream of images, are “fed to a position determination means” for processing. *Id.*, [0058], *see id.*, Fig. 2; EX1003, ¶¶155-156. A POSITA would have understood that Haan’s cameras generate a stream of images because the virtual

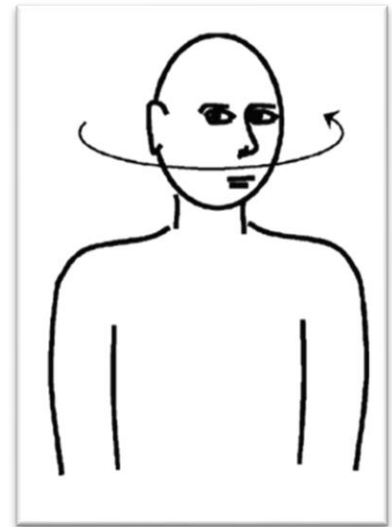


Fig.9(partial).

mirror captures movements, like turning the user’s face/body. Ex 1003, ¶157; EX1005, [0017], [0015], Fig. 9. Moreover, Haan’s device provides a smooth transition between images where magnification is applied and those where magnification is not applied, further showing the one or more cameras generate a stream of images. EX1005, [0076]; EX1003, ¶¶158-159.

Nevertheless, Haan-Francois teaches this limitation. EX1003, ¶¶160-161. Francois teaches operating a camera to generate a stream of images of a user. EX1003, ¶¶160-163. For example, Francois discloses that “video frames captured and processed” (EX1009, §2.2.3), and “images of the observed world, consistent with the viewer’s position, must be synthesized and displayed in real-time” (EX1009,

§4.3). Francois further discloses “[t]he continuous input video stream and tracker data is used to synthesize, in real-time, a continuous video stream displayed on the LCD screen. EX1009, §4.3. As shown in Figure 5, the SAI architecture allows handling streams of data coming from various sources. §§3.1-3.2, Figs. 5, 13; EX1003, ¶162.

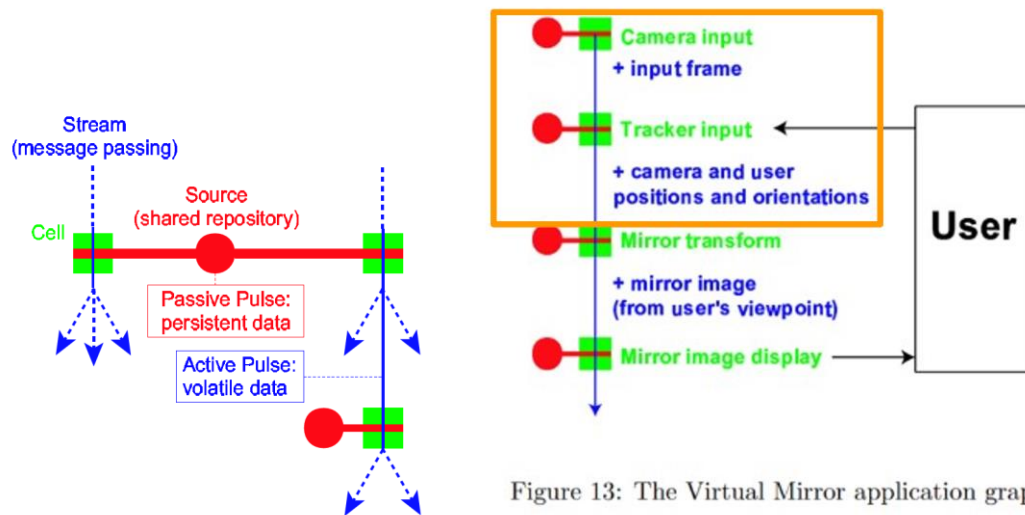


Figure 13: The Virtual Mirror application graph.

Id., Figs. 5, 13. A POSITA would have understood Francois’s data streams, including images, captured video frames, and video streams, are a stream of images and would have been motivated to implement these video or stream of images in Haan to achieve an enhanced virtual mirror experience with a reasonable expectation of success. EX1003, ¶163; §IX.A.

iii. 1/b]

Haan-Francois renders obvious “operating the processor to detect the presence of the user in the stream of images.” EX1001, cl. 1; EX1003, ¶164-168; EX1001, cl. 3; EX1005, Abstract (“means for determining ... the position of a body part”),

[0009], [0013]. Haan's system detects body parts, including face, eyes, and mouth of a user, in the stream of images, and performs calculations based on that detection to determine face orientation. EX1005, [0058]. This is consistent with claim 3 which states: "user presence is identified by ... detecting a body part." EX1001, cl. 3; EX1003, ¶166. Haan's user detection means are in the form of a computer program, which a POSITA would have understood operates on a processor. EX1005, [0058], [0087], [0099], [0105], EX1003, ¶¶167-168.

Moreover, this limitation would have been obvious over Haan in view of Francois. Francois provides a flexible and expandable software framework for implementing functions, like in Haan, including detecting user presence in a stream of images. See EX1009, Fig. 13, §4.3; EX1003, ¶169. Francois's system may use processors like the Pentium 4@1.7GHz. *Id.*, §5. A POSITA would have found it obvious to apply the Francois's processor to ensure compatibility, given that the combination applies Francois's architecture and would have reasonably expected success doing so. EX1003, ¶170; §IX.A.

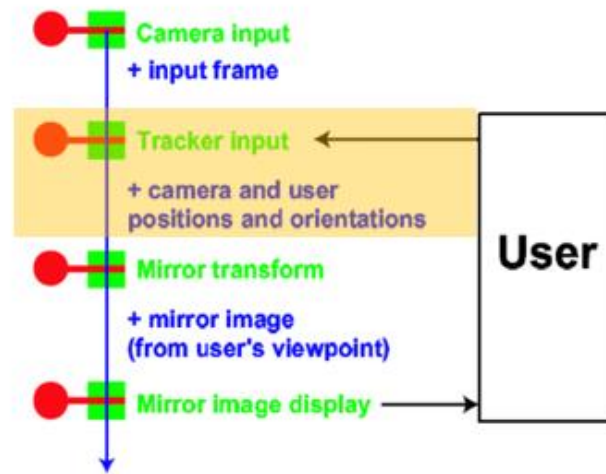


Figure 13: The Virtual Mirror application graph.

EX1009, Fig. 13.

iv. 1/c]

Haan-Francois renders obvious this limitation EX1001, cl. 1; EX1003, ¶¶171-187.

a. Adaptive transformation mapping

Haan-Francois teaches “operating the processor to apply adaptive transformation mapping to the stream of images captured by the camera.” EX1001, cl. 1; EX1003, ¶¶172-179.

The ’109 Patent explains transformation mapping “essentially reassigns new addresses to each pixel of the original image.” EX1021, 29:28-30. It may include “angle, tilt, azimuth, scale, [and] spatial translation.” *Id.*, 29:38-42. A POSITA would have understood transformation mapping may be represented by a matrix. EX1003, ¶173. And a “final transformation is a matrix multiplication of the

individual transformation.” EX1021, 29:40-42. Claim 2 provides examples of mapping transformation, including flipping, rotation, and resizing. EX1001, cl. 2.

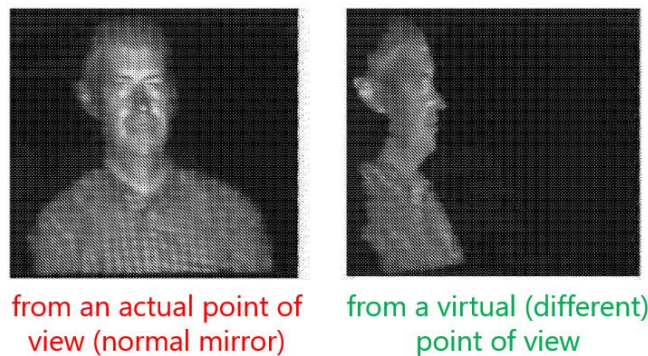
As discussed, Haan-Francois renders obvious the stream of images. §IX.B.ii. Haan discloses at least two adaptive transformation mappings can be applied to such stream of images to synthesize and provide a virtual camera view (EX1005, [0027], [0058], Fig. 2)— (1) adaptive rotation based on the orientation of the viewer’s head or torso (*id.*, [0060]-[0064], [0070]-[0071]), and (2) adaptive resizing based on the distance from a viewer to the screen/camera (*id.*, [0072]-[0076]). EX1003, ¶¶174-176. An explanation of rotation and resizing transformation mappings is provided in limitation 1[e]. *Infra* §IX.B.vi. A POSITA would have known that Haan’s rotation is an angle transformation, while resizing is a scaling transformation. EX1003, ¶176. These transformations are adaptive, as they change according to user orientation or distance. *Id.*

If Patent Owner argues “transformation mapping” and “transformation” are not expressly recited in Haan, a POSITA would have understood Haan’s synthesis corresponds to a transformation mapping. EX1003, ¶¶177, 186. Synthesizing a virtual camera view from an actual camera view was well-known in the art. EX1003, ¶¶55-57. A POSITA would have understood synthesis uses one or more transformation matrices, giving new addresses to the individual pixels of the actual images. EX1003, ¶177.

A POSITA would have understood Haan-Francois operates the processor to perform transformation mappings, because Haan discloses that the means for rotation and resizing are computer programs. *See also* §IX.B.iii; EX1003, ¶¶178-179; EX1005, [0087], [0099], [0105].

b. A different point of view

Haan-Francois uses its adaptive transformation mapping “to generate modified images that appear to be captured from a different point of view of the camera’s actual point of view.” EX1003, ¶¶180-187. Haan discloses “a means to **change... the view point** from which the image is recorded.” EX1005, cl.1, [0027], [0058]. Haan teaches applying rotation transformation to change the camera angle and applying resizing transformation to change the camera distance. EX1005, [0027], [0058], [0060]-[0064], [0070]-[0076]; §IX.B.vi. Shown below, the modified image (right) appears to be captured from a different point of view than the original image (left):



EX1005, Fig. 3; [0060]-[0063]; *see also infra* §IX.B.vi.

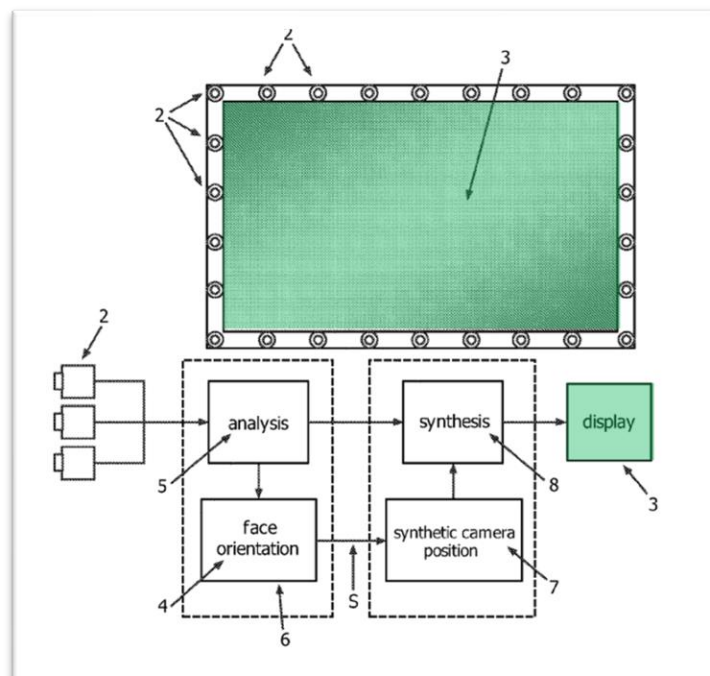
To the extent PO alleges in the Infringement Contentions that panning and

zoom in/out operations meet this limitation, Haan-Francois discloses the same. EX1003, ¶¶198-202; EX1019 at 16-20; EX1005, [0072]-[0077], [0088], [0079].

v. 1[d]

Haan-Francois renders obvious “displaying the modified images on the monitor.” EX1001, cl. 1; EX1003, ¶¶188-190. Haan discloses displays like computer monitors or TVs, EX1005, [0033], [0037], [0099]-[0101], and claims “a means to display the recorded image on the display device” after “chang[ing] the view point,” *id.*, [0010]-[0011]; *see id.*, cl.1.

As shown below, Haan’s synthesized/modified image is displayed on the monitor. EX1003, ¶189. EX1005, Figs. 2, 7, 14, [0027], [0058], [0073], [0099],]-[0101]. And Haan discloses “the displayed image may be an image derived from or associated with the captured image.” *Id.*, [0110], Fig. 2:

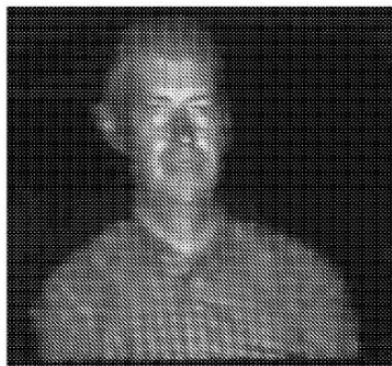


vi. 1[e]

Haan-Francois renders obvious “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.” EX1001, cl. 1; EX1003, ¶¶191-204. In Haan, the virtual point of view (“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” because the means to change the view point includes at least two adaptive mapping transformations: rotation transformation and magnification transformation. *See supra* §IX.B.iv. And as discussed, a POSITA would have understood Haan’s synthesis is transformation mapping. *Id.* EX1003, ¶191.

a. Different Angle

The adaptive rotation transformation rotates the viewpoint so that the display image is taken from a different angle than the actual camera position. EX1003, ¶192; EX1005, [0060]-[0063], [0073]; Fig. 3; *see supra* §IX.B.iv.



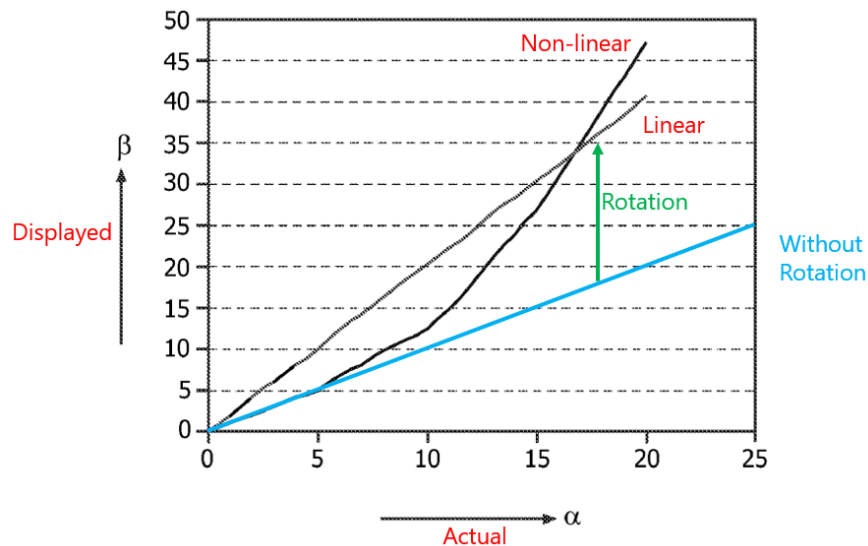
Without rotation
(normal mirror)



With rotation
(Virtual point of view)

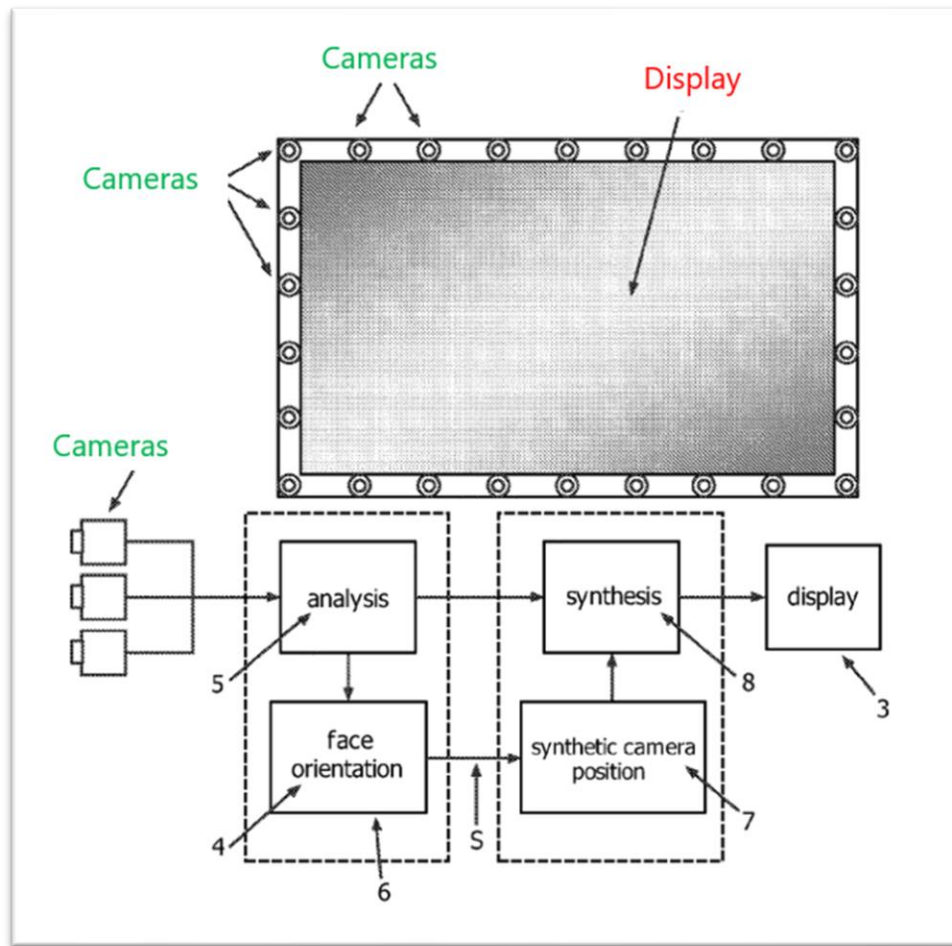
EX1005, Fig. 3. As shown above, “a 12 degree turn of the head causes the head, as displayed on the display screen, to be turned 84 degrees.” *Id.*, [0061]. Haan explains that, when the turning of the head is exaggerated, “the turning angle (and thereby the camera position, i.e., **the point of view** from [which] the image is recorded) is increased.” *Id.*

Haan provides at least two algorithms to increase turning angle—linear and non-linear—shown in Figure 6. *Id.*, [0020]-[0021], Fig. 6; EX1003, ¶¶193-196.



EX1005, Fig. 6. Figures 2, 7, and 14 also show configurations that may implement rotation transformations. *Id.*, Figs. 2, 7, 14. In Figure 2, for example, camera images are analyzed to determine face orientation, which is processed to generate a synthetic camera position (virtual camera position, or “different point of view,” as claimed). *Id.*, [0058]; EX1003, ¶197. Based on the virtual camera position, the mirror synthesizes, or combines, the actual images to form “a single image signal from a

virtual view point,” which is displayed. EX1005, [0027], [0058].



Id., Fig. 2.

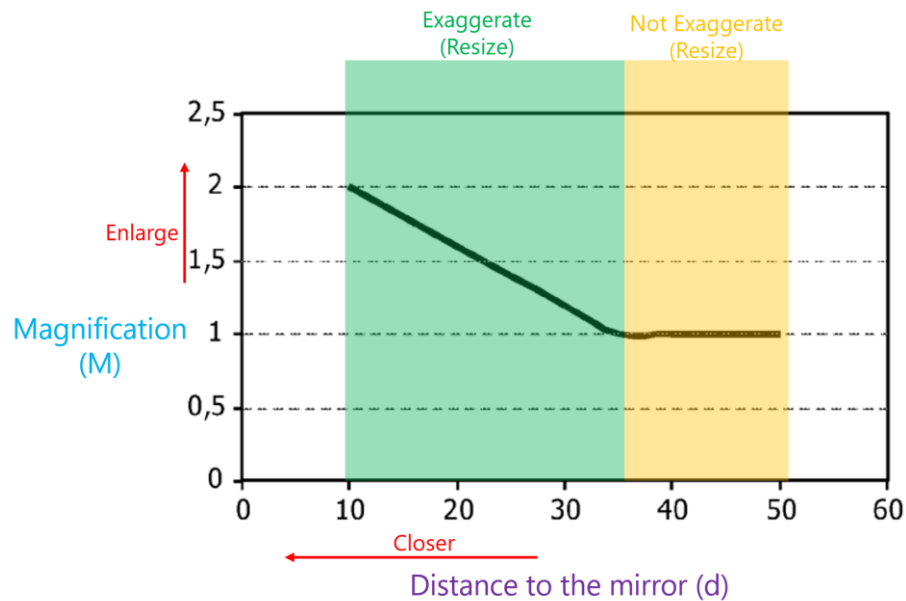
A POSITA would understand that the rotation transformation is a transformation mapping that takes the form of a planar homography transformation ($H = K R K^{-1}$). EX1003, ¶¶64, 197; EX1010 at 204.

b. Different Distance

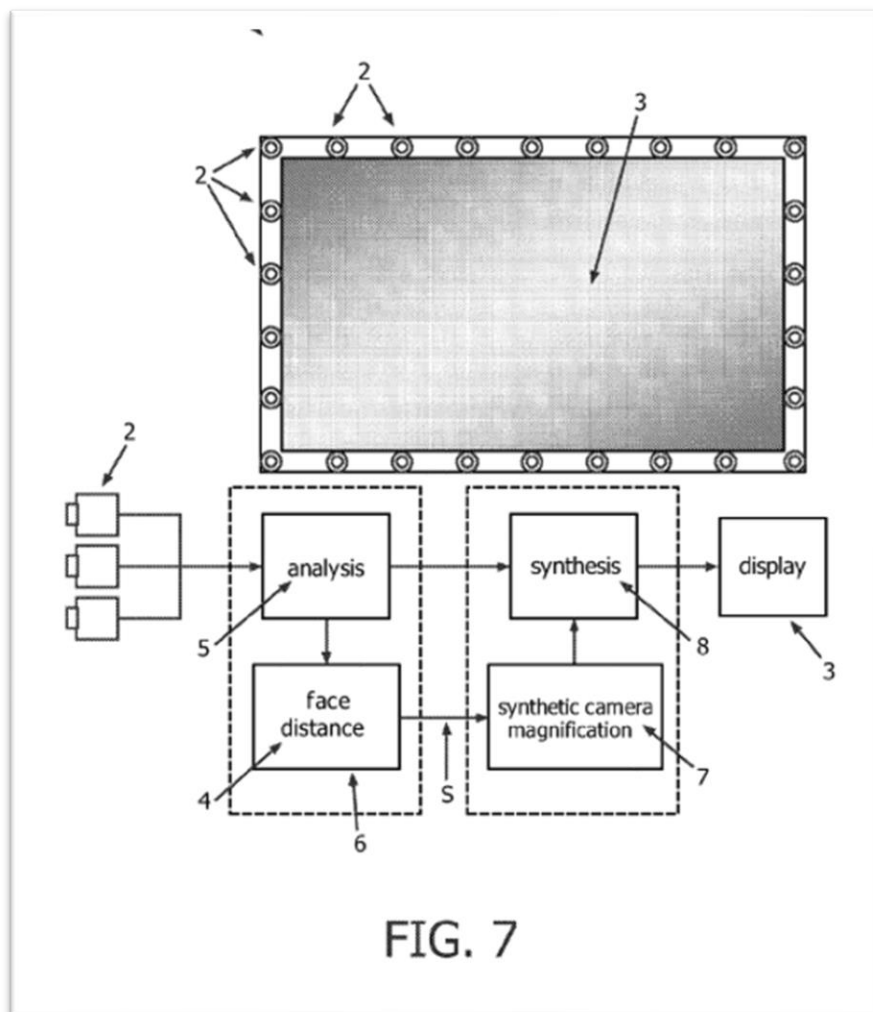
Haan’s adaptive resizing transformation changes an image’s magnification so that the image’s virtual viewpoint appears to have a different distance than the actual distance from the camera to the viewer. EX1003, ¶198. Haan’s system exaggerates

the viewer's movement by applying the resizing transformation, which enlarges/reduces the image to make the user appear closer/farther. EX1005, [0022]-[0023], [0027], [0058], [0072], [0076]; EX1003, ¶198.

Haan explains how its “magnification” is “equivalent to moving a camera.” EX1005, [0073]. Figure 8 depicts the system **exaggerating** movement when a user moves **towards** the mirror, causing the user to appear closer to the camera than he/she is. EX1003, ¶¶199-200.



Id., Fig. 8. In particular, Figure 8 shows this relationship “between the **magnification** M of the image and **the distance** d in centimeter to the mirror.” *Id.*, [0075], Fig. 8.



Id., Fig. 7.

c. Applying Both Modifications

Haan discloses modifying both the angle and distance of an image. EX1003, ¶¶203-204. While the discussions of orientation (Fig. 2) and distance (Figs. 7, 14) are separated for simplicity, Haan explains that “[c]ombinations of the two ... form preferred embodiments,” and both “can be done simultaneous[ly].” EX1005, [0095],

[0014], [0088].

vii. 1/f

Haan-Francois 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.” EX1001, cl. 1.

In the ’110 Patent, the mirror operates in a tracking mode and applies image transformations if “the user enters a specified zone.” EX1001, 25:36-43, 26:22-23. Otherwise, the system operates in an idle mode without applying image transformations. *Id.*, 25:36-39, 25:44-56; EX1003, ¶206.

Haan teaches the claimed mirror tracking mode. EX1001, cl. 1; EX1003, ¶¶205-210. Similar to the ’110 Patent, Haan’s system switches between a display mode (mirror tracking mode) and a reflective mode (idle mode) based on user position/orientation. *See, e.g.*, EX1005, [0080]-[0082], [0090]-[0092], [0097]; EX1003, ¶207. If a viewer is “within a range of angles and/or positions,” the mirror is in display mode performing transformations; otherwise, it is in reflective/idle mode. EX1005, [0093]-[0094], [0080], [0082]; *see supra* §§IX.B.iii, iv, vi. For example, if the viewer is within 35 cm of the camera, a tracking mode is entered, applying resizing transformation. EX1005, [0075]-[0076]; *cf. id.*, [0093]-[0094] (idle mode); EX1003, ¶207.

Haan-Francois further discloses the processor utilizes the angle of the images

captured by the camera. EX1005, [0027], [0058], [0097]; EX1003, ¶¶208-210.

As discussed above, Haan discloses using user orientation for the rotation transformation. See §§IX.B.iv, IX.B.vi. To the extent the “angle of the images” has discernable meaning, it covers user orientation, i.e., the angle of the camera optical axis with respect to a user’s facing direction. EX1003, ¶208; EX1005, [0027]; [0058], [0097], [0099].

Haan also teaches applying parametric input (*e.g.*, signal S, which provides data indicative of parameters including, *inter alia*, face orientation, distance) for a mapping transformation that changes imaging perspective (point of view). EX1005, [0027], [0058], [0097]; EX1003, ¶209. The ’110 Patent suggests “parametric input” may include feature parameters like weight and height. EX1001, 29:64-30:1. The ’109 Patent also suggests parameters include “position of user,” “camera position,” “capturing angle,” or the like. EX1021, 9:26-52.

Similarly, Haan’s synthesis unit receives the parametric input (Signal S), including variables associated with user features (*e.g.*, user orientation) and positions (*e.g.*, distance, angle, coordinate) during the rotation or resizing transformation. See §IX.B.vi; EX1005, Fig. 2; [0014]-[0015], [0058]-[0059], [0097]; EX1003, ¶210 As explained, rotation changes the angle aspect of point of view, and resizing changes the distance aspect the point of view. See §§IX.B.iv, IX.B.vi. A POSITA would have understood changing the camera point of view changes the imaging perspective.

To the extent PO alleges in the Infringement Contentions that panning and zoom in/out operations meet this limitation, Haan-Francois discloses the same. EX1003, ¶¶198-202; EX1019 at 38-44; EX1005, [0072]-[0077], [0088], [0079].

C. Dependent Claims

i. Claim 2

Haan-Francois renders obvious this claim.⁶ EX1003, ¶¶211-215. Haan's transformations include at least flipping, resizing, and rotation transformations. *See supra* §§IX.B.iii, iv, vi.

Haan further discloses that the transformations can be combined. EX1003, ¶¶212-214. It discloses “[c]ombinations of the two, in which both orientation and distance are measured.” EX1005, [0095]. Haan also describes a rotation

⁶To the extent that “vertical flips about a vertical axis” recited in claim 2 has discernible meaning, it should be understood to include at least the '110 Patent's related disclosure in the specification, which includes “flipping the image about a vertical axis to reverse right and left sides of the image.” EX1001 ('110 Patent) at 3:21-24; *see also, e.g.*, describing transformations including flipping, translation, and resizing for zoom in/out, EX1021 ('109 Patent), 16:46-17:28, 22:1-13, 23:41-24:9, 24:51-53, 25:48-51, 29:22-58. And the prior art discloses such “flipping,” as discussed here and below.

transformation and resizing transformation, where a flipping transformation is also applied. Haan EX1005, [0070]-[0076], [0037]; EX1003, ¶¶212-214.

ii. Claim 3

Haan-Francois renders obvious this claim. EX1003, ¶¶216-221.

Haan discloses a mirror tracking mode (display mode, explained in 1[f]), and an idle mode (reflective mode). *See supra* §IX.B.vii. In idle mode, the mirror acts like an ordinary mirror where no resizing is applied. EX1005, [0076], Fig. 8. The idle mode is activated when the detected distance of the user exceeds a threshold and is deactivated when the distance falls below that threshold. *Id.*; EX1003, ¶218.

Similarly, Haan's mirror device may enter into an idle mode (e.g., reflective mode) when face orientation is lower than 5, in which case rotation transformations are not performed. EX1005, Fig. 6; EX1003, ¶219. Since user orientation and/or distance need to be measured to exit idle mode, a POSITA would have understood that the system detects the presence of the user during the idle mode. EX1003, ¶220; *see supra* §IX.B.iii.

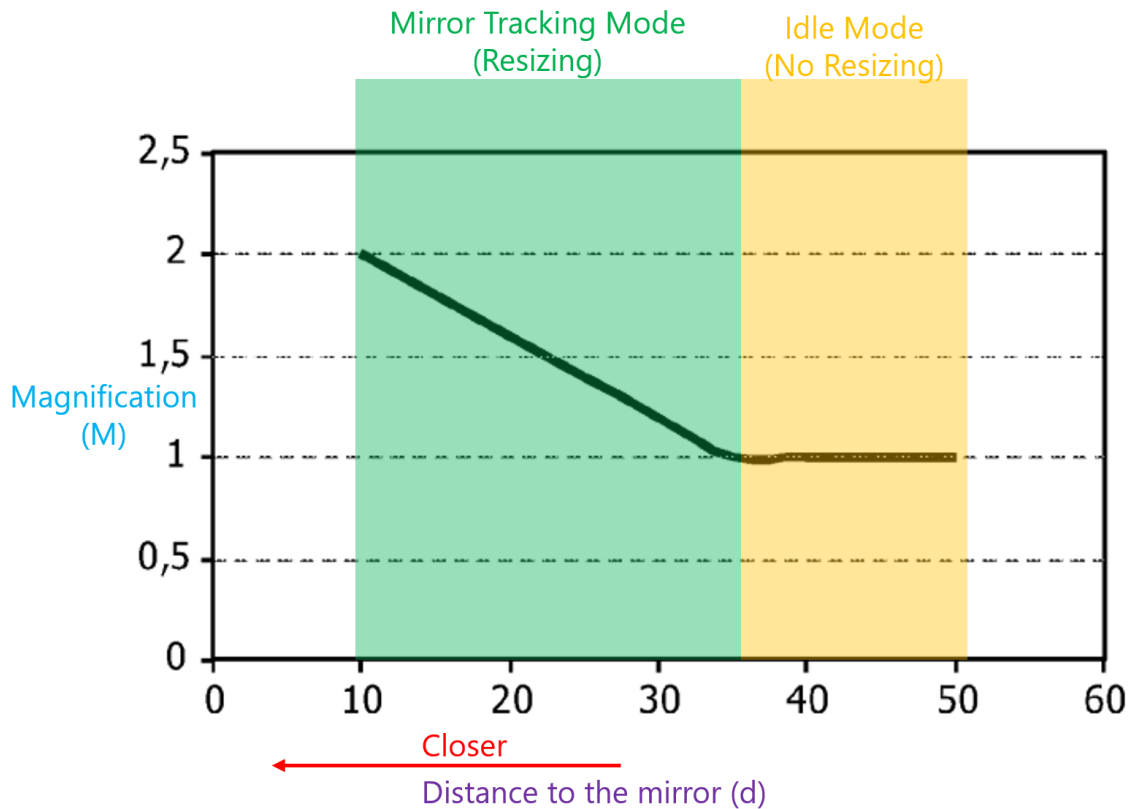


FIG. 8

iii. Claim 4

Haan-Francois renders obvious this claim. Haan discloses detecting a body part like the “head or **face** of a person” in the images. EX1005, [0013]; EX1003, ¶¶222-223.

iv. Claims 5-6

Haan-Francois renders obvious these claims. EX1003, ¶¶224-227. Haan discloses “operating the processor to vary image magnitude or field-of-view of the modified images.” See *supra* §§IX.A, IX.B.iv, IX.B.vi.b.

The operation is determined based on user movements, which are a type of

user input under Patent Owner’s interpretation. EX1003, ¶¶224-225. Patent Owner alleges in its infringement contentions: “[u]ser input includes the user’s movements captured by the camera.” EX1019 at 63.

Haan discloses increasing magnification to display a partial body of the user in the modified images. EX1005, [0072]-[0073]; EX1003, ¶226.

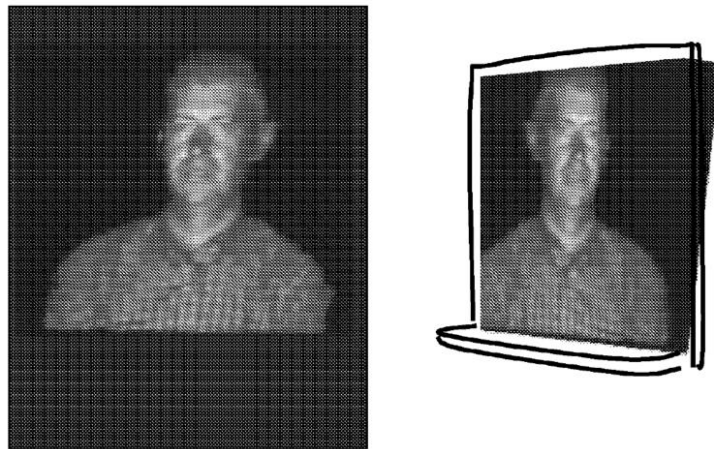


FIG. 1

EX1005, Fig. 1; *id.*, Figs. 3, 8, 9-10. Haan also discloses “a magnification smaller than 1,” applying a zoom out effect. *Id.*, [0076]. A POSITA would have found it obvious to display a full body when a user zooms out indicating a desire to show out of sight areas. *Id.*, [0004], EX1003, ¶227.

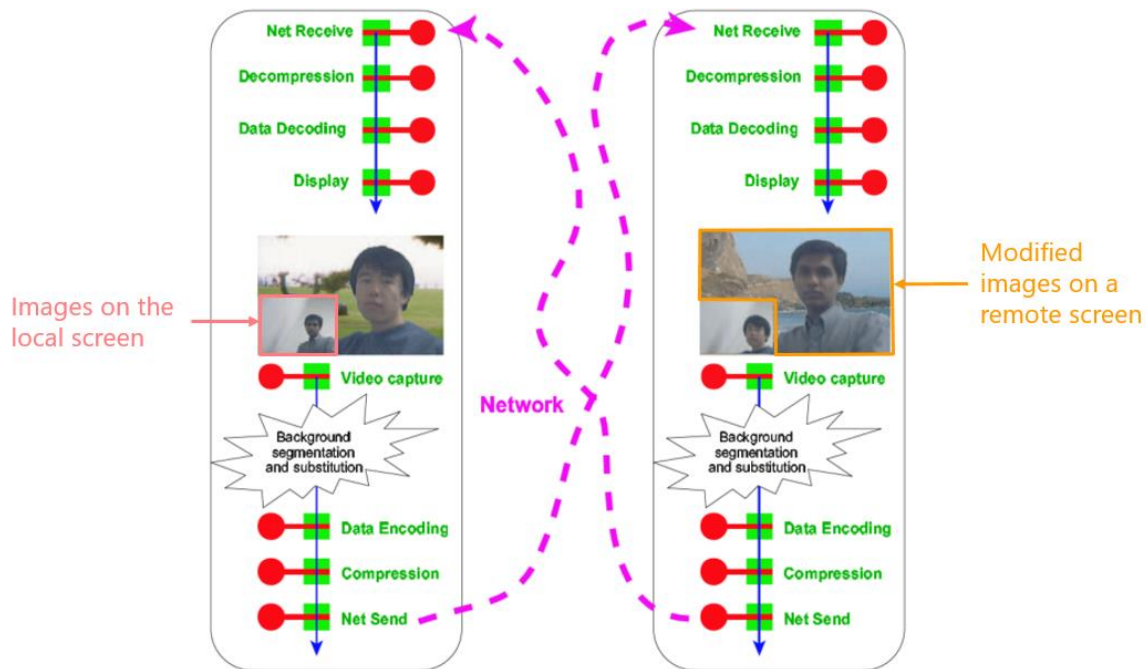
v. Claim 10

Haan-Francois renders obvious this claim. EX1003, ¶¶228-229. Haan discloses overlaying make-up to its images. EX1005, [0113], [0114] (“computer altered to provide various different hair styles and color”), [0115]-[0116]. In such

situation, “the mirror image shown is a composite of the recorded image with some artificial compounds.” *Id.*, [0118].

vi. Claims 11-12

Haan-Francois renders obvious these claims. EX1003, ¶¶230-234. Francois discloses a sequence of “encoding, compression and **networking (send)** on the emitting side, [and] **networking (receive)**, decompression and decoding on the receiving side.” EX1009, §4.4; *see also id.*, Fig. 15.



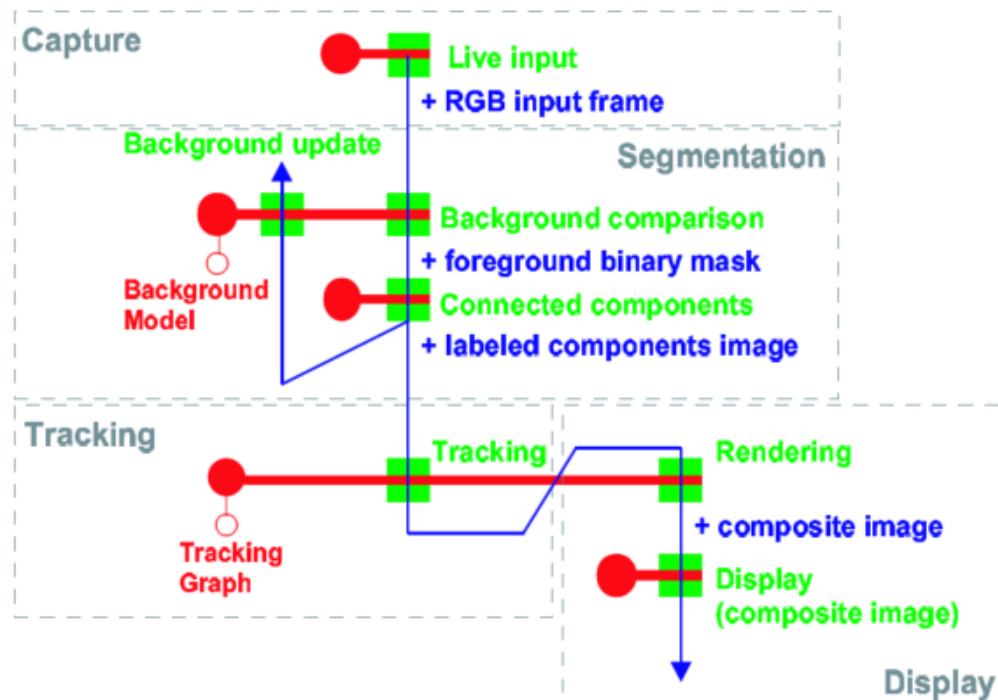
Id., Fig. 15. As shown, Haan-Francois transmits images captured by the camera to a remote screen over a network. *Id.*, Fig. 15, §4.4. The received image is then decompressed, decoded, and displayed on the screen at the receiving side. *Id.*

As discussed, including Francois’s IMSC Communicator functionality would improve Haan by adding remote collaborative data sharing. *Id.*, §4.4; *see supra*

§IX.A; EX1003, ¶¶232-234. As Francois explains, such communication may use popular architectures, including “Client/Server and Peer To Peer.” EX1009, §4.4.

vii. Claims 16-17

Haan-Francois renders obvious these claims. EX1003, ¶¶235-241. Francois discloses image segmentation for background/foreground identification and tracking. EX1009, §4.1, Figs. 7-9; EX1003, ¶¶235-241. EX1009, §4.1, Fig. 7. As shown below, Francois’s system performs a background comparison using a background model and generates a foreground binary mask. EX1009, §4.1, Figs. 7-9; EX1003, ¶236.



Id., Fig. 7 (original).

The identified segments may be replaced using a “background replacement

unit,” which applies “a video stream captured live or read from a file” to replace the identified segments. EX1009, §§4.5, 4.1, 4.4, Fig. 15; EX1003, ¶¶238-239. As shown below, the background segments in the left image are replaced with segments from another stream, resulting in the right image with a background of a beach. EX1003, ¶¶240-241.



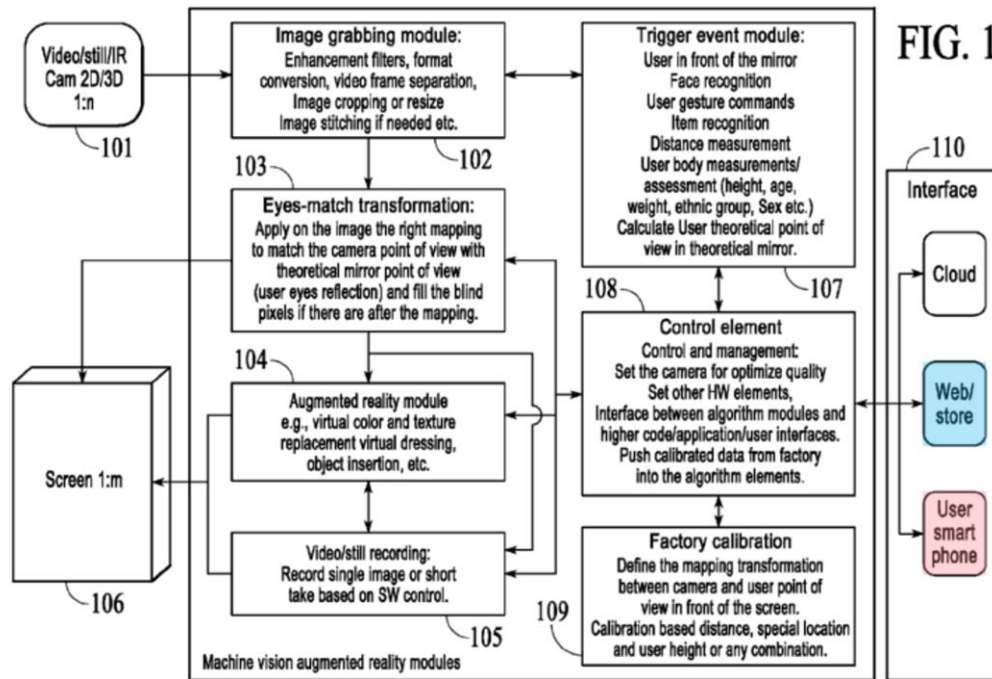
Id., Fig. 15. A POSITA would have found it obvious to use a virtual background to minimize distraction from the physical background and thereby enable an enhanced video telepresence experience for a user. EX1003, ¶¶240-241.

X. Ground 2: Rosenberg and Park render obvious claims 1-6 and 10-12

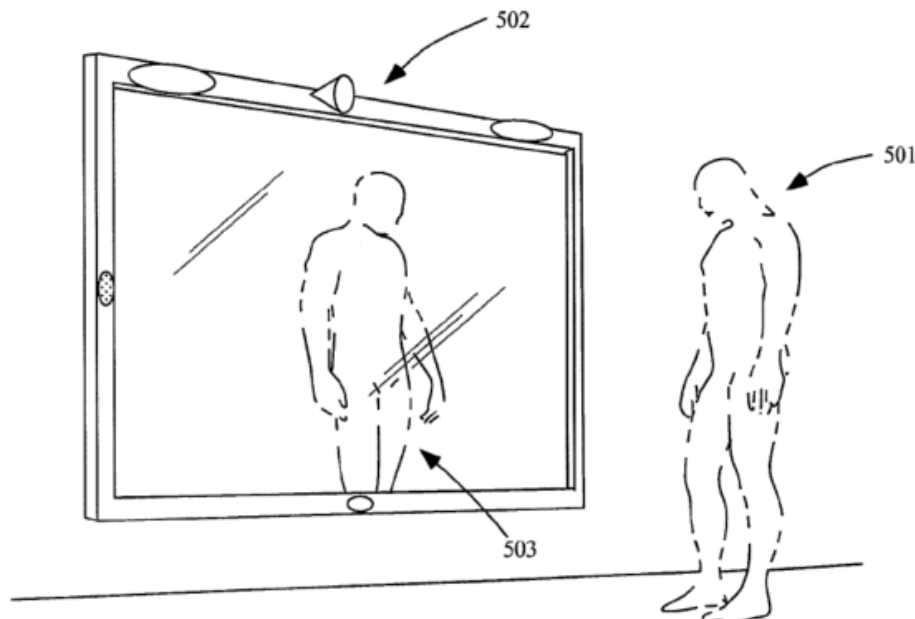
A. Reasons for Combining Rosenberg with Park

A POSITA would have found it obvious to combine Rosenberg and Park. EX1003, ¶242.

Rosenberg, Park, and the '110 Patent are analogous because they are in the same field of endeavor. *Id.* The '110 patent concerns “virtualizing a mirror” that may be used in a fitting room setting or on a user smart phone to capture, modify, and display images on a display. EX1001, 1:47-49. Figs. 1, 5, 2:45-57, 8:41-44.



Id., Fig. 1. Rosenberg similarly describes adapting a flat panel display with a camera to mimic a mirror when a camera is centered horizontally across a display and aimed slightly downward. *See, e.g.*, EX1006, [0006], [0077], Figs. 3, 5; EX1003, ¶244.



Id., Fig. 5. And Park concerns transforming images, such as images captured by a tilted camera positioned above the display and user. *See, e.g.*, EX1011, [0010], Figs. 10A-10C; EX1003, ¶¶245-246.

The teachings of Rosenberg and Park would have led a POSITA to combine them. EX1003, ¶247. For example, Rosenberg recognizes that having a camera mounted above a screen is “non-ideal because it provides the user with... a somewhat unnatural perspective,” directing a POSITA to find a software-based solution to address projective distortion issues. EX1006, [0027]; EX1003, ¶247. Park provides the needed solution, which compensates “a perspective distortion of the facial image that is not desired by the user” by applying transformations (i.e., compensations) to “captured image[s]” in accordance with camera angles assessed by a tilt sensor. EX1003, ¶247; EX1011, [0034], [0050], [0051]. Park’s compensation is performed when the image capturing unit is “above or below the object,” covering the use case described in Rosenberg. *Id.*, cl. 44. A POSITA would have been motivated to implement Park’s image compensation into Rosenberg to correct image distortions and provide a more realistic mirror image. EX1003, ¶247.

A POSITA would have been motivated to implement Park’s software-based image compensation to reduce cost and complexity of Rosenberg’s hardware solution. EX1003, ¶¶247-248; EX1006, [0027]-[0028]. A POSITA would have

understood Park's solution lowers costs and system complexity by avoiding costly customized displays and behind-screen cameras set at the eye level of the display. *Id.* Even with a behind-screen camera, the camera may not match each user's eye-level, motivating a POSITA to, as suggested in Park, use software to correct distortions from mismatched eye-levels. EX1003, ¶248.

A POSITA would have understood implementing Park's image compensation in Rosenberg would simply require adding 1) a function module that detects the camera angle, and 2) a compensation module that compensates the images captured at undesirable angles. EX1003, ¶249. A POSITA would have understood that these modules would be readily implemented in Rosenberg's system including a programmable processor and memory storing program code, and would have had a reasonable expectation of success in such implementation that only requires ordinary programming skill. *Id.*

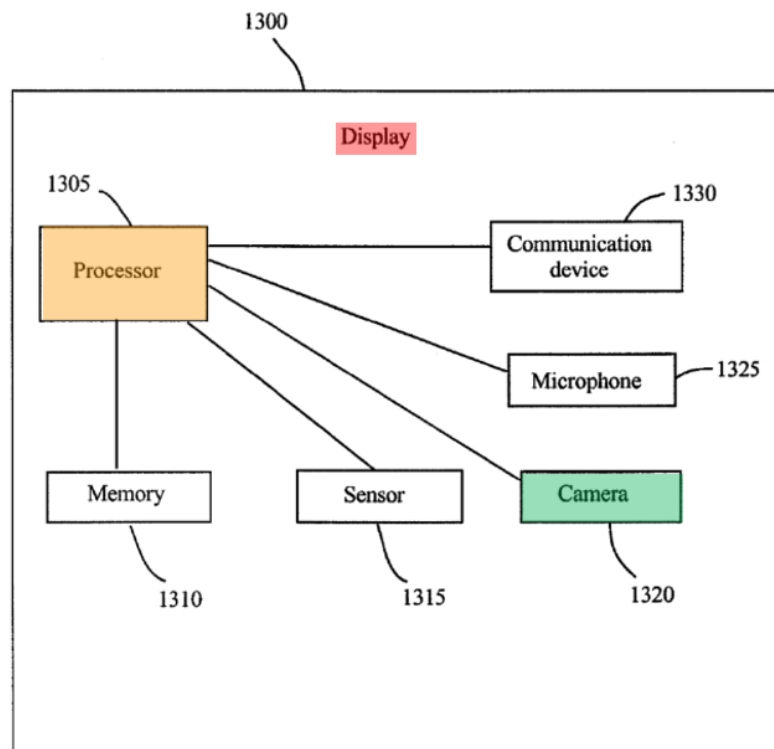
Further, modifying Rosenberg in view of Park improves similar devices in the same way. *Id.*, ¶249. Rosenberg and Park concerns improving virtual display systems with a camera mounted on a display above a user. EX1006, Figs. 3, 5, Abstract; EX1011, Fig. 9, Abstract. Applying Park's transformation in Rosenberg would reduce distortions in the same way it reduces distortions of the device in Park. In addition, Park's solution would have had known, predictable benefits when applied in Rosenberg's system, to capture images from a desirable angle. EX1003,

¶249; EX1006, Abstract; EX1011, Abstract.

B. Independent Claim 1:

i. 1[pre]

If the preamble is limiting, Rosenberg-Park renders it obvious. EX1003, ¶250; EX1006, Fig. 13. Rosenberg discloses “display 1300 includes a processor 1305, ... a camera 1320, ...and a communication device 1330.” EX1006, Fig. 13, [0109] (alterations added), Figs. 3, 5-12, [0006], [0025].

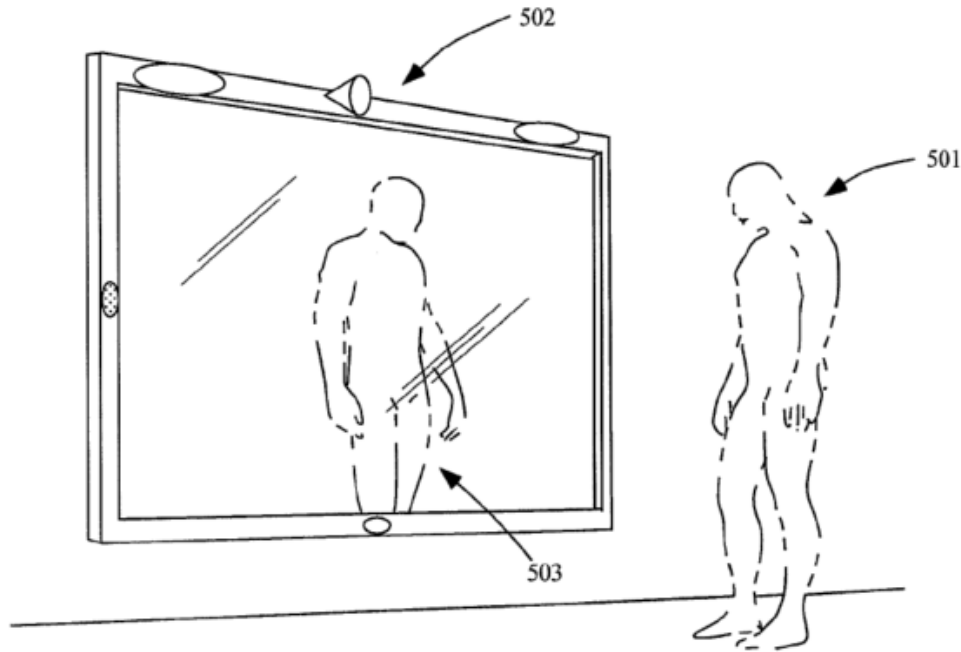


Id., Fig. 13.

ii. 1[a]

Rosenberg-Park renders obvious this limitation. EX1003, ¶251. Rosenberg discloses “camera(s) configured to provide real-time images of a user who stands before the display.” EX1006, [0026] (“the real time images are streamed video

images captured by a camera mounted upon the display...”), [0077], Fig. 5; EX1003, ¶251. This real-time video image is a “stream of images.” EX1003, ¶251.



EX1006, Fig. 5.

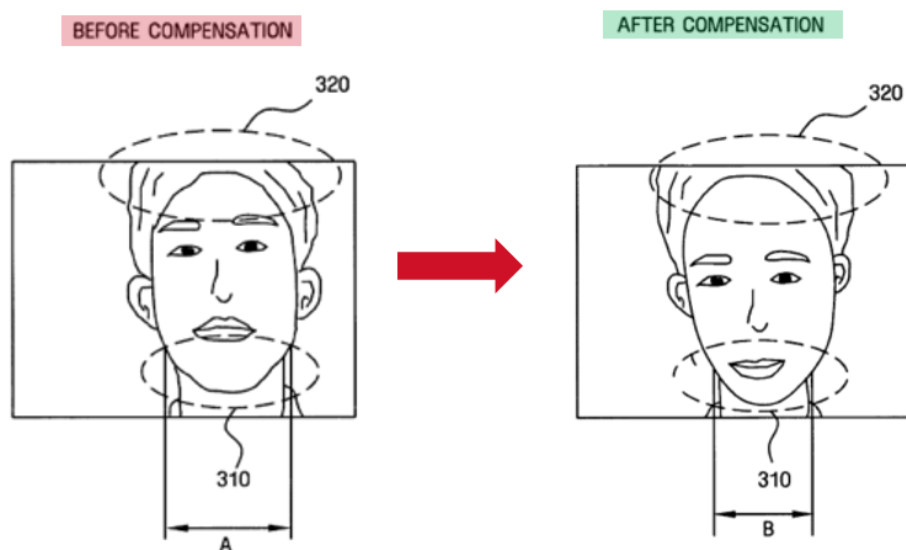
iii. 1[b]

Rosenberg-Park renders obvious this limitation. EX1003, ¶252. Rosenberg discloses the processor works with proximity or motion sensors to “**detect[] the presence of a person** standing before the digital mirror.” *Id.*, [0058], [0071]; EX1003, ¶252. Its digital camera may be proximity/motion sensor. EX1006, [0034], [0069], [0073], [0109]. A POSITA would have understood the video images captured by the digital camera would be used to detect the user’s presence, and that the detected user would be the user in Rosenberg’s image stream. EX1003, ¶252.

iv. 1[c]

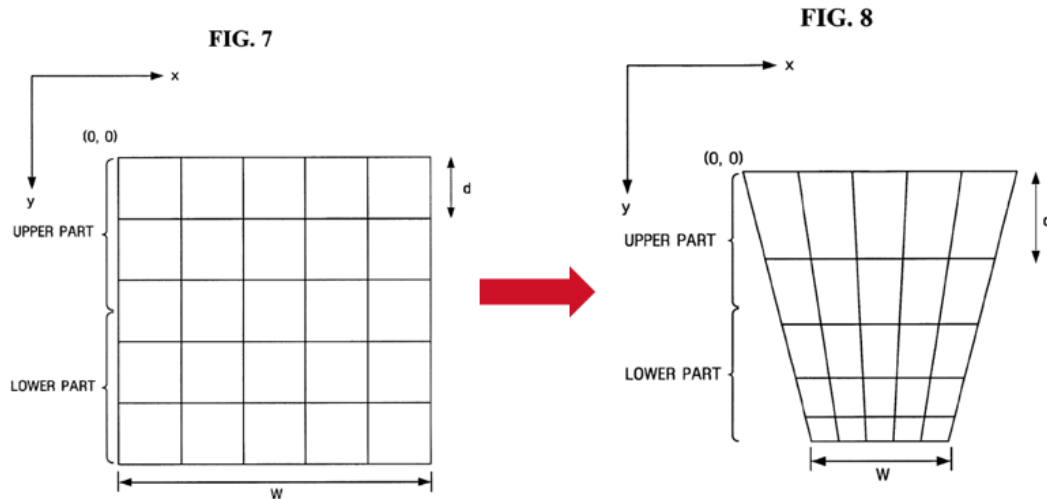
Rosenberg-Park renders obvious this limitation. EX1003, ¶¶253-257. Rosenberg teaches “provid[ing] the user with a natural and accurate **visual perspective** of himself or herself as compared to a traditional mirror.” *Id.*, [0026]-[0027]. It recognizes that a camera mounted above the display generates an “unnatural perspective as compared to a traditional mirror.” *Id.* And it discloses the need to provide images captured “approximately at eye-level” for “a highly realistic mirror replication image.” *Id.*, [0027]-[0028], [0061], [0075]; EX1003, ¶253.

Park teaches modifying images to appear to have been taken at a different angle, which is applicable to Rosenberg’s system, as explained above. *See supra* §X.A; EX1003, ¶254. In particular, Park discloses modifying images having “a perspective distortion of the facial image that is not desired by the user.” EX1011, [0050], Figs. 6A-6B.



Park explains when a camera is positioned below the user’s face, the captured

images may be distorted with an “emphasized” chin and a “narrowed” forehead. *Id.*, [0051], Fig. 6A. Thus, Park discloses “image compensation using a geometric transform technique and a perspective transform technique.” *Id.*, [0059], Figs. 7-8.



Id., Figs. 7 & 8. The compensated image has the chin reduced and forehead enlarged compared to the distorted image. *Id.*, [0051], Fig. 6B; EX1003, ¶255.

A POSITA would have understood that Park’s perspective transformation is a “transformation mapping” because it maps positions of pixels from the captured image to those of the compensated image. EX1003, ¶256. A POSITA would have understood Park’s transformation to be “adaptive” because it adapts to the camera angle. *Id.* A POSITA would have found it obvious to apply the transformation mapping in Park to the images captured by the cameras in Rosenberg to correct the unnatural perspective and provide an ideal perspective, “i.e., an image that is from a vantage point perfectly straight ahead.” EX1006, [0028]; EX1003, ¶257. A POSITA would have recognized the transformed images would appear to be captured from a

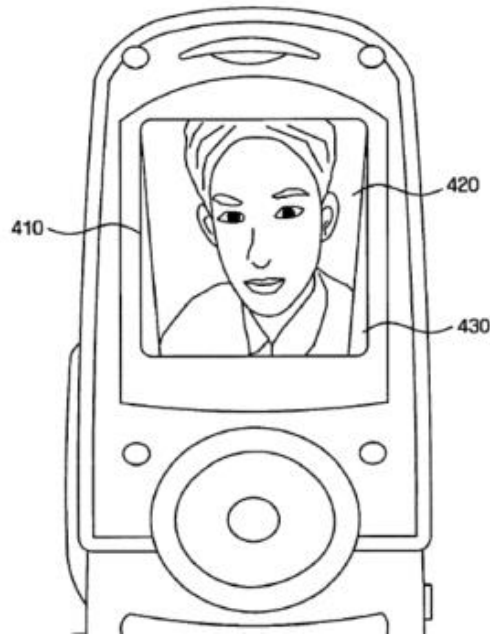
different point of view of the camera's actual point of view. EX1003, ¶257; *see infra* §§IX.B.vi-IX.B.vii.

To the extent PO alleges in the Infringement Contentions that panning and zoom in/out operations meet this limitation, Rosenberg-Park discloses the same. EX1003, ¶¶264-268; EX1019 at 16-20; EX1006, [0050] (“the digital mirror also enables the user to Zoom-in and/or Zoom-out the real-time image”)-[0052] (“the user may issue verbal commands that move the Zoom guide, including ‘move left,’ ‘move right,’ ‘move up,’ and ‘move down.’”).

v. 1[d]

Rosenberg-Park renders obvious this limitation. EX1003, ¶¶258-260. Rosenberg discloses “adjusting and/or modifying the images that are displayed upon the screen to achieve unique mirroring features” EX1006, [0035], [0025]; EX1003, ¶258. Park also discloses displaying modified images. For example, Park discloses “displaying the image compensated by the compensation unit.” EX1011, cl. 16; *see also id.*, Fig. 9, [0055]-[0056]. A POSITA would have understood images in Rosenberg-Park would be compensated/modified for distortion before display. EX1003, ¶¶258-260.

FIG. 9

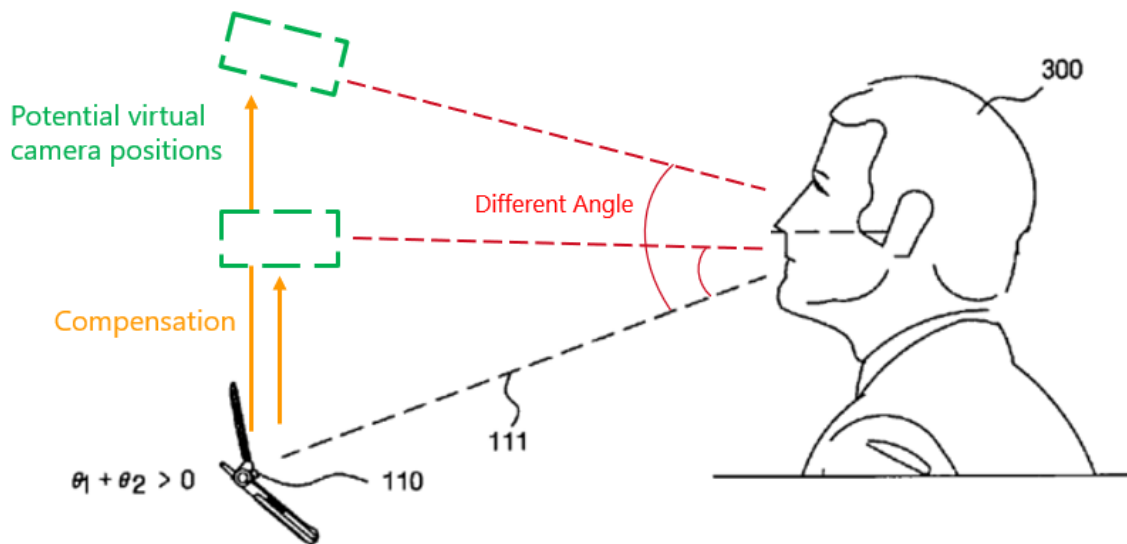


vi. 1[e]

Rosenberg-Park renders obvious this limitation. EX1003, ¶¶261-268.

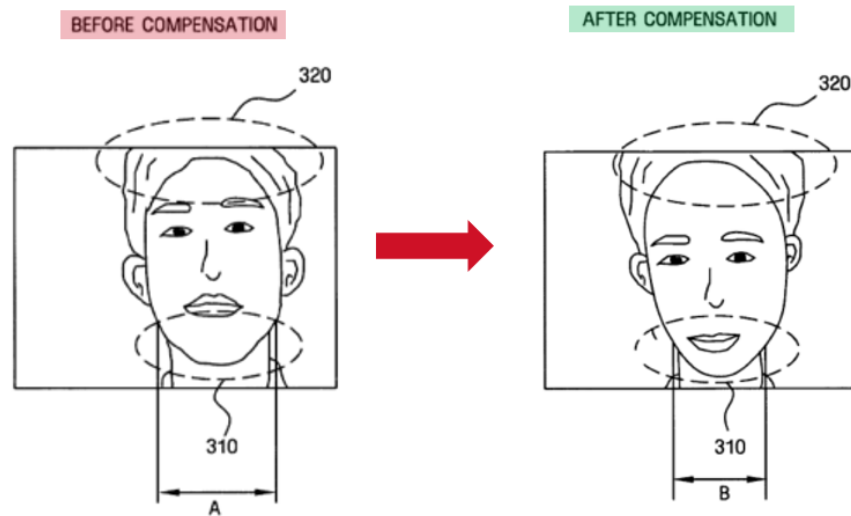
a. A different angle

Implementing Park's compensation in Rosenberg would result in a different point of view corresponding to an image taken from a different angle. Park discloses generating images having a point of view corresponding to an image taken from a different angle. For example, Park discloses applying compensation, as shown below, to generate images with different user perspectives. EX1003, ¶262.



EX1011, Fig. 5.

A POSITA would have understood, after applying the compensation, that the system would create virtual camera positions having a point of view with different angles. EX1003, ¶263. For example, the user's image is captured at a point of view below the user's face; after compensating the distortion, the image appears to be captured at a virtual point of view above the user. EX1011, [0050]-[0051], Figs. 6A-6B, 14-15; EX1003, ¶263.



Id., Figs. 6A-6B.

b. A different distance

Combining Park’s compensation with Rosenberg’s mirror image processing would result in a different point of view corresponding to an image taken from a different distance. EX1003, ¶¶264-268. A POSITA would have understood that resizing an image would create a virtual point of view corresponding to a different distance. *Id.*, ¶268; see *id.*, ¶¶65-67. The ’110 Patent describes “resizing the image to reduce variations caused by changes in the object’s distance to the camera.” EX1001, 3:26-28. The ’109 Patent also resizes the image based on distance to the user to match the size the user would see in a mirror. EX1021, 17:19-24, 21:57-60, 23:65-24:9, 25:46-48, 30:4-11, Fig. 11. Like the ’109 and ’110 Patents, Rosenberg discloses scaling (resizing) user’s images that are captured as real-time video images by the camera so that each of the scaled video images appear to emulate “a traditional life-size mirror image.” EX1006, [0077]. A POSITA would have understood that

resizing an image would make the image appear to be captured from a virtual point of view at a different distance. EX1003, ¶266; EX1021, 2:19-27.

Rosenberg also discloses digital zooming in/out to create a virtual point of view corresponding to a different distance. EX1006, [0050]. A POSITA would have understood Rosenberg's digital zooming in/out changes the size of the modified image, creating a virtual point of view corresponding to a different distance from the user to the camera. EX1003, ¶267.

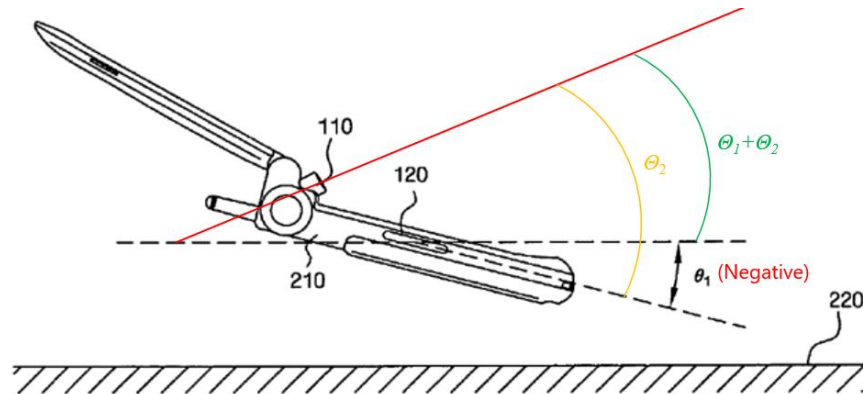
vii. 1[f]

Rosenberg-Park renders obvious this limitation. EX1003, ¶¶269-276. Rosenberg teaches a mirror tracking mode, which detects whether “a user is physically present.” EX1006, [0025], [0032]-[0033], [0056], [0069]-[0073], [0109], [0114], Fig. 13; *see* EX1003, ¶270. When a proximity sensor detects a user within a specified proximity range, the system automatically engages its mirror mode (“mirror tracking mode”). EX1006, [0025], [0026], [0028], [0035], [0077]; EX1003, ¶270. When the sensor detects the user is no longer before the mirror, the system automatically switches to a digital picture frame state. EX1006, [0083], [0114], [0025], [0032]-[0033], [0056], [0069]-[0073], [0109]; EX1003, ¶271. Rosenberg also discloses the digital camera can be used, alone or with other sensors, to provide proximity/motion sensing functionality. EX1006, [0034], [0069], [0073], [0109], Fig. 13; EX1003, ¶271.

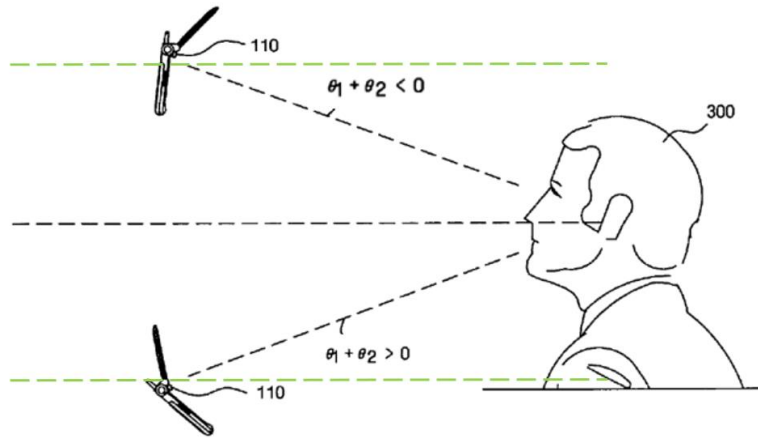
When Rosenberg is modified with Park's transformation mapping (*see supra*),

during the mirror tracking mode, the processor would utilize the angle of the images that are captured by the camera of Rosenberg and apply parametric input for a mapping transformation that changes imaging perspective of the images as taught by Park. EX1003, ¶¶272-276.

Park teaches utilizing the angle of images captured by the camera (calculated tilt $\Theta_1 + \Theta_2$, camera angle with respect to horizontal) to apply parametric input for a mapping transformation that changes the imaging perspective of the images captured by the camera. *Id.*; EX1011, Fig. 3. In Park, the system measures the tilt of the main body against a horizontal plane (Θ_1), and the angle between the camera and the main body (Θ_2). At a position shown in Figure 3, Θ_1 has a negative value. EX1003, ¶272.



Id. The calculated tilt $\Theta_1 + \Theta_2$ represents an angle of the image captured by the camera. EX1003, ¶273.



Id., Fig. 5.

Park's device calculates tilt for image processing and applies parametric input for a mapping transformation. EX1003, ¶274. Park's perspective transformation refers to a matrix-based image transformation algorithm (the claimed "transformation mapping") according to the equation below:

$$\begin{bmatrix} x' \\ y' \\ w \end{bmatrix} = \begin{bmatrix} m00 & m01 & m02 \\ m10 & m11 & m12 \\ m20 & m21 & m22 \end{bmatrix} \begin{bmatrix} x \\ y \\ 1 \end{bmatrix}$$

$$x' = \frac{m00x + m01y + m02}{m20x + m21y + m22}$$

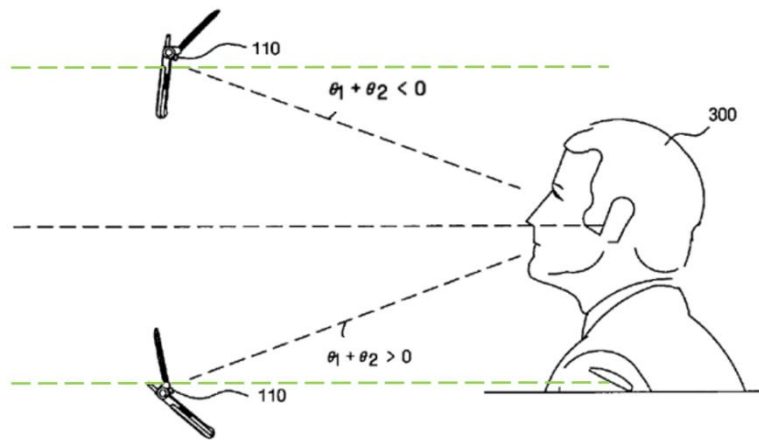
$$y' = \frac{m10x + m11y + m12}{m20x + m21y + m22}$$

$$X = \frac{x'}{w}, Y = \frac{y'}{w}$$

EX1011, Equation (1), [0061]; EX1003, ¶274.

In the equation, m00-m22 are matrix coefficients adjusted on the basis of the calculated tilt. EX1011, [0061]. A POSITA would have understood the coefficients are a "parametric input" of the transformation because changes of these coefficients

would change the performed transformation. *Id.*; EX1003, ¶275. Therefore, Park teaches utilizing the angle of the images captured by the camera (the calculated tilt $\Theta_1 + \Theta_2$), and applies parametric input for a mapping transformation. EX1003, ¶275. A POSITA would have understood the Rosenberg's camera angle, in relation to the horizontal, is equivalent to the calculated tilt $\Theta_1 + \Theta_2$. EX1003, ¶275; *see* EX1011, Fig. 5:



A POSITA would have been motivated to implement Park's transformation mapping in Rosenberg as an efficient solution to the image distortion problem described in Rosenberg created by the angle of Rosenberg's camera. EX1003, ¶276; EX1006, [0027]-[0028], [0061]; *see supra* §X.A.

To the extent PO alleges in the Infringement Contentions that panning and zoom in/out operations meet this limitation, Rosenberg-Park discloses the same. EX1003, ¶¶264-268; EX1019 at 38-44; EX1006, [0050] -[0052].

C. Dependent Claims

i. Claim 2

Rosenberg-Park renders obvious this claim. EX1003, ¶¶277-278.

Rosenberg discloses applying transformations including at least flips about a vertical axis, as well as resizing and panning. *See, e.g.*, EX1006, [0026], [0035], [0038], [0048]-[0052], [0077], [0093]-[0111], Figs. 5, 8, 10-11; EX1003, ¶277.

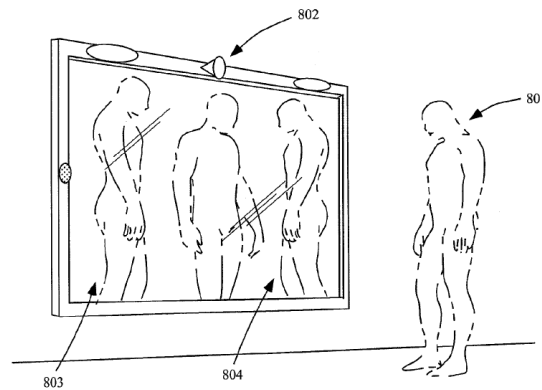


Fig. 8

Id., Figs. 8, [0094]-[0095] (moving left or right).

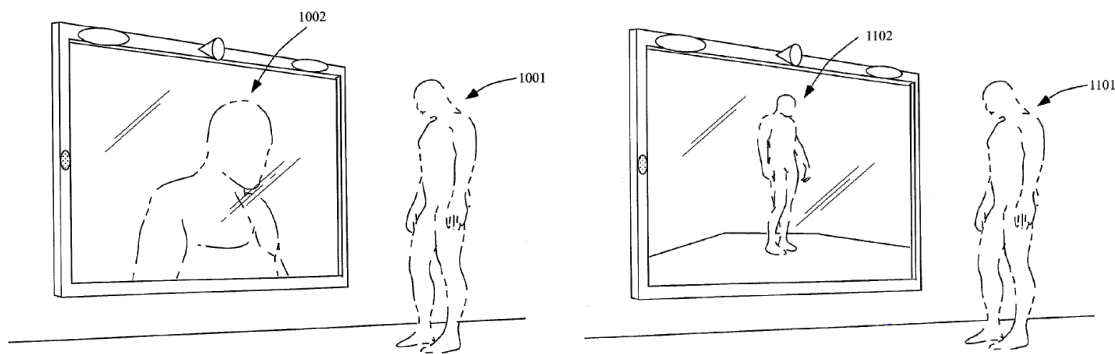
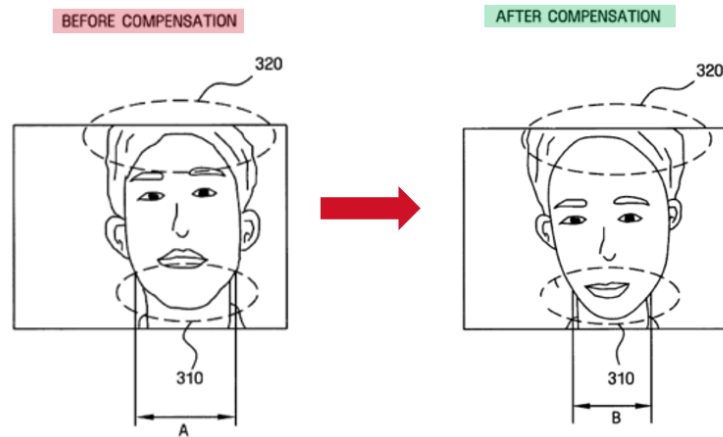


Fig. 10

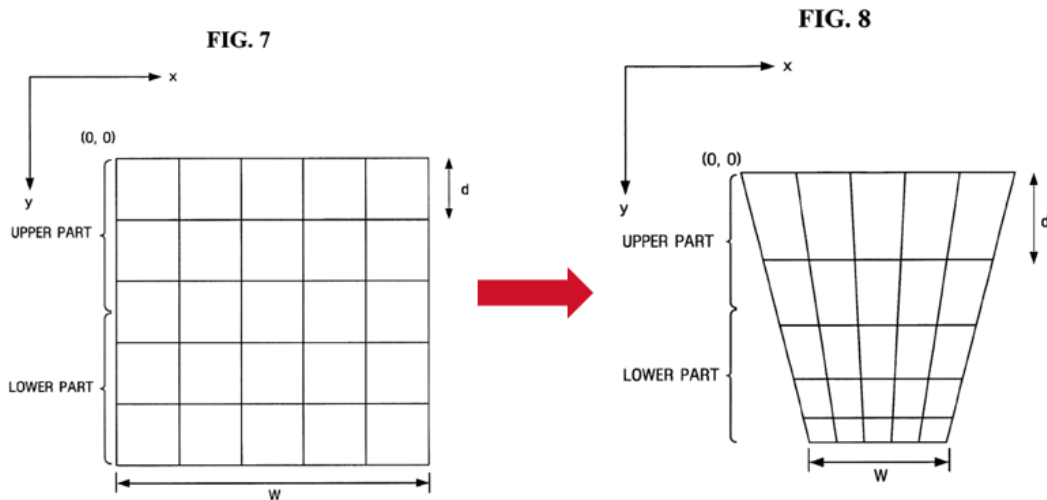
Fig. 11

Id., Figs. 10-11, [0103]-[0104] (zooming).

Moreover, Park discloses correcting distortion with perspective transformation. EX1011, [0050], [0059], Figs. 6-8; EX1003, ¶278; *see also supra* §§X.B.iv, X.B.vi.a.



EX1011, Figs. 6A-6B.



Id., Figs. 7-8. A POSITA would have understood perspective transformation is a projection transformation because it maps the positions of pixels from the captured image to those of the compensated image. EX1003, ¶278.

A POSITA would have understood these transformations are similar to the

flipping, translation, and resizing for zoom in/out of the '109 Patent. EX1021 ('109 Patent), 16:46-17:28, 22:1-13, 23:41-24:9, 24:51-53, 25:48-51, 29:22-58; EX1003, ¶278. And a POSITA would have understood that the transformation mapping in the Rosenberg-Park combination could be comprised of at least two of the above-noted transformations. EX1003, ¶278.

ii. Claims 3-4

Rosenberg-Park renders obvious these claims. EX1003, ¶¶279-280.

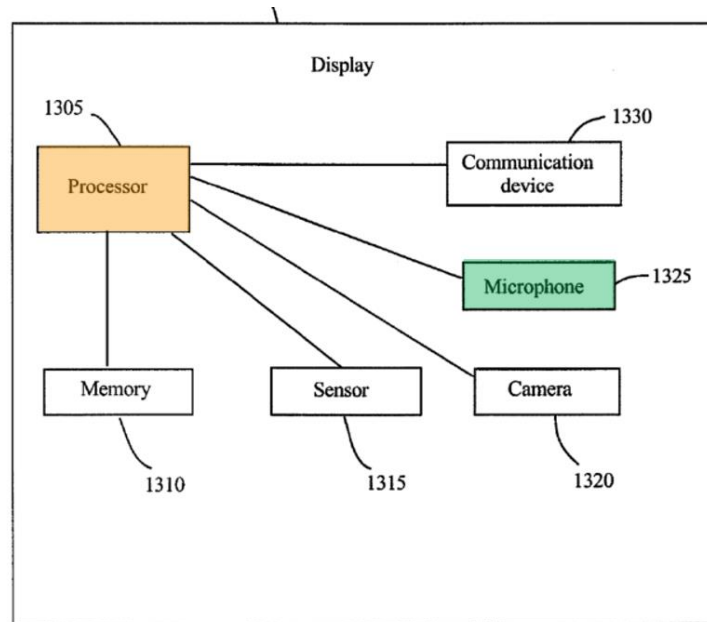
Rosenberg teaches switching modes based on detected user action. EX1006, [0032] (activating low-power idle state (idle mode) with an auto-activation feature, in which proximity and/or motion sensors would continuously detect a person located before the display screen); EX1003, ¶279. Rosenberg's proximity sensor may be a digital camera, which a POSITA would have understood, continuously sends data to the processor for identifying user presence. EX1006, [0109], Fig. 13; EX1003, ¶279. Detecting user presence using a digital camera was well-known in the art. EX1003, ¶280; *see also* EX1008, [0043]-[0046], EX1005, [0074]. A POSITA would have understood these methods include detecting one of legs, face, eyes, and hands of the user detected in the image because these are among finite options for detecting users. EX1003, ¶280.

iii. Claim 5

Rosenberg-Park renders obvious this claim. EX1003, ¶281.

Rosenberg discloses receiving user verbal input (e.g., “zoom-in”/“zoom-out”

commands) to modify image magnitude. *Id.*; EX1006, [0100]. Rosenberg teaches using a microphone to receive a user input, and a speech processor to recognize the commands. EX1006, [0031], [0100], [0109].



Id., Fig. 13. The zooming functions “may be performed by digital zoom,” which is “performed by enlarging the display graphically without changing the optics of the camera in the image capture process.” *Id.*, [0100].

iv. Claim 6

Rosenberg-Park renders obvious this claim. EX1003, ¶283.

Rosenberg teaches varying image magnitude. *Id.*; *supra* §X.B.vi.b. Rosenberg also discloses (i) increasing magnitude (zooming in) to display a partial body “if a user is putting on makeup or performing some other action that requires close attention to small details,” and (ii) decreasing magnitude (zooming out) to display a full body if “a user wants to see a full length image of himself or herself on a mirror

screen.” EX1006, [0050]-[0051], [0099]-[0105], Figs. 10-11.

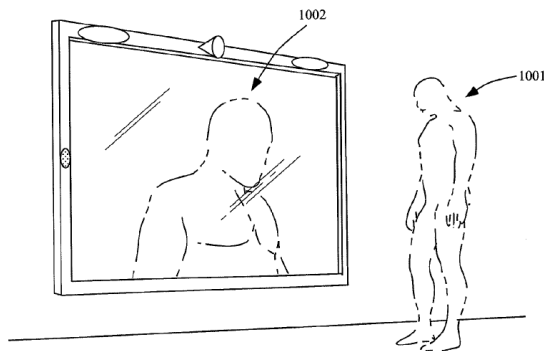


Fig. 10

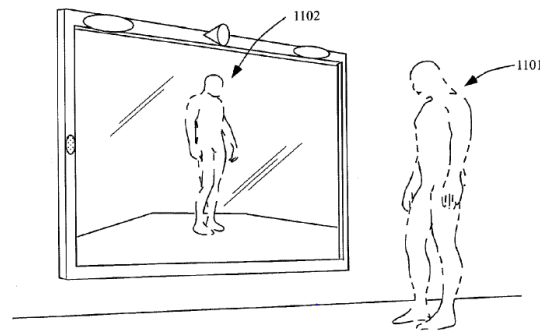


Fig. 11

v. Claim 10

Rosenberg-Park renders obvious this claim. EX1003, ¶284. Rosenberg discloses overlaying stock hairstyle images “as an onionskin transparency upon the real-time image of the user himself or herself.” *Id.*, [0111].

vi. Claims 11-12

Rosenberg-Park renders obvious these claims. EX1003, ¶284.

For example, Rosenberg’s processor “may have communication access to one or more communication networks via a network connection 306.” EX1006, [0074]. In Rosenberg, “communication device 1330 is utilized to receive and transmit images across a network.” *Id.*, [0109]; *id.*, Fig. 13. Park also discloses a transmission unit for transmitting compensated images to another user over a network for video telephony. Park, [0010], [0013], [0037], [0063], [0082], [0092], Fig. 2. A POSITA would have found it obvious to utilize Rosenberg’s system to transmit and display a modified image on another user’s screen at a remote location for video telepresence

to improve user experience and enhance user communication. EX1003, ¶284.

XI. Ground 3: Geisner and Lizée renders obvious claims 1-18.

A. Reasons for Combining Geisner with Lizée

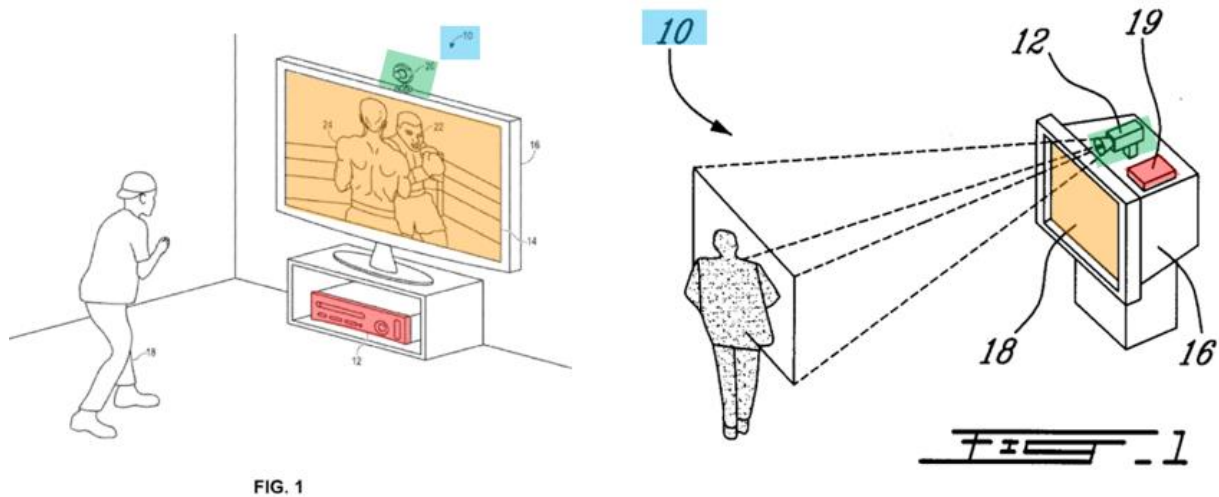
A POSITA would have found it obvious to combine Geisner with Lizée. EX1003, ¶285.

Geisner and Lizée are analogous to the '110 Patent and each other. *Id.* The '110 Patent relates to “imaging and display systems and, more particularly, to monitors, and interactive displays, e.g., in retail and/or service environments, medical or home situations, video conferencing, gaming, and the like.” EX1001, 1:43-51. Geisner is in the same field, disclosing an interactive application deployed on a display screen that includes trying on virtual garments in a store or playing games in commercial/home settings. EX1007, Abstract, [0001], [0026]; EX1003, ¶287. Lizée is also in the same field, disclosing an “interactive immersion of a silhouette image on a display screen of a user.” EX1008, [0003]; EX1003, ¶288. Lizée teaches a system with “[a]n image capture device” enabling a user to use “a virtual representation” to interact with “a given virtual environment.” Lizée, Abstract, [0003]. One implementation is for a virtual boxing game. *Id.*, [0079], [0004].

The '110 Patent, Geisner, and Lizée aim to solve a similar problem: enhancing techniques that create a user representation on a screen, track user movements, and enable user interactions with virtual objects and/or a virtual environment. EX1003,

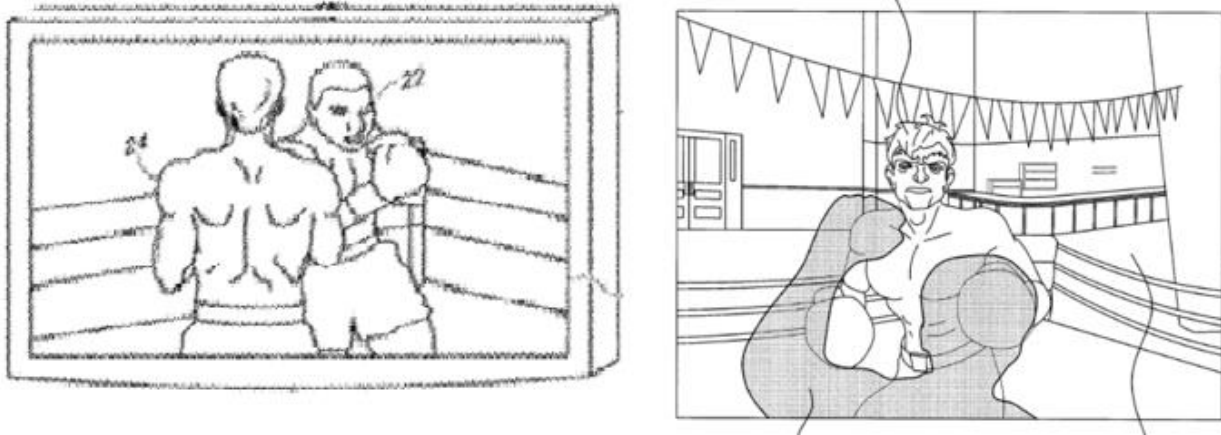
¶289.

A POSITA would have been motivated to combine Geisner and Lizee because they use known techniques to improve similar devices in the same way. EX1003, ¶291; *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 415-421 (2007); MPEP 2143. As shown below, Geisner and Lizee aim to improve similar **display systems** comprising a camera, processor, and display. EX1003, ¶291.



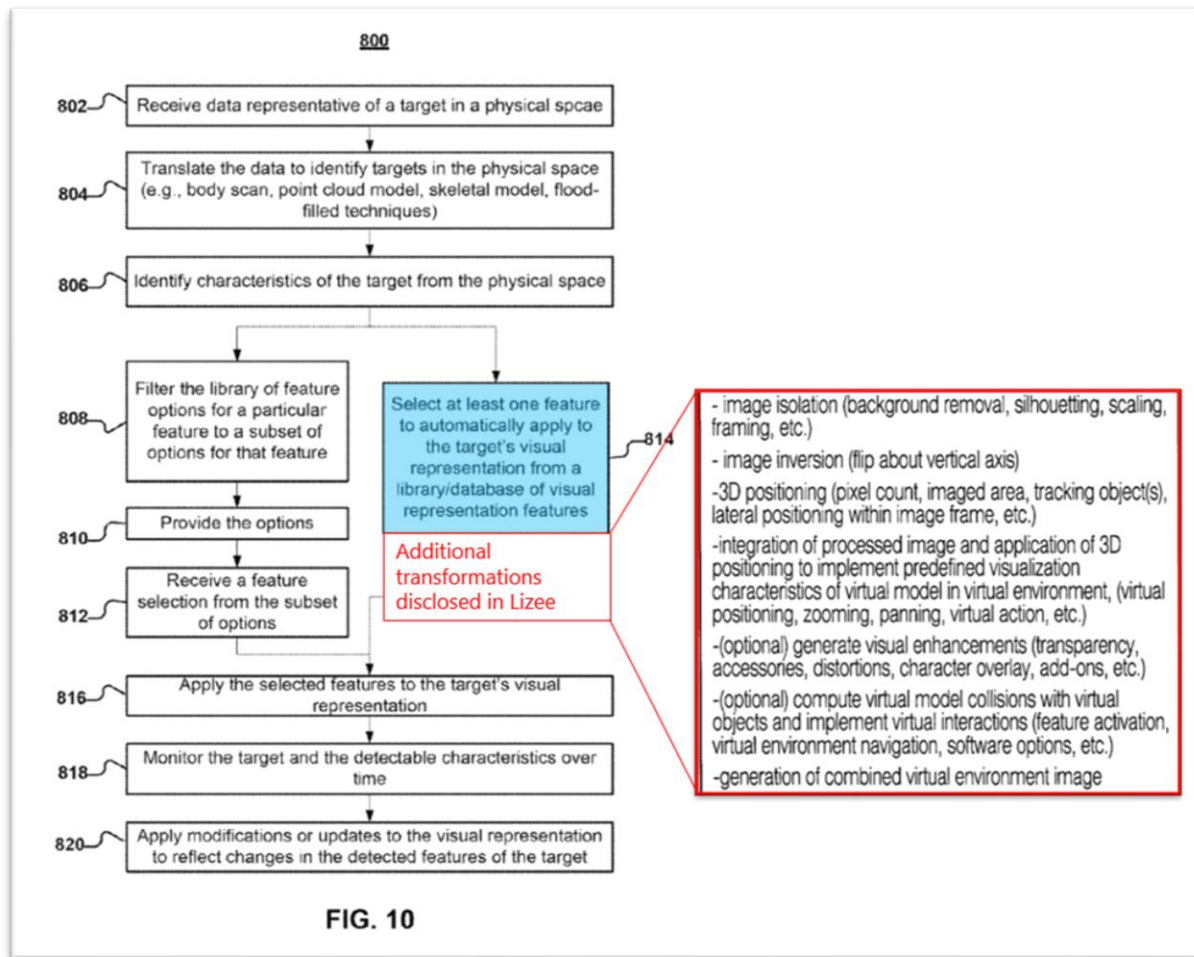
EX1007, Fig. 1; EX1008, Fig. 1.

Geisner and Lizee use similar techniques in the same way. EX1003, ¶292. They both transform images of a user's body and movement data into on-screen avatars interacting with virtual objects in a virtual environment (e.g., boxing). *Id.*; EX1007, [0026]; EX1008, [0079].



EX1007, Fig. 1; EX1008, Fig. 5.

Combining Geisner and Lizee would involve a straightforward substitution and utilization of known methods to yield predictable results. *KSR*, 550 U.S. at 415-421; MPEP 2143. A POSITA would have understood it is feasible and desirable to implement the transformation methods and algorithms disclosed in Lizee within the system in Geisner. The resulting combination would use Lizee's transformations to generate an enhanced visual representation of a user, providing the Geisner system with the benefit of Lizee's reduced image distortion. EX1003, ¶¶293-296. A POSITA would have found it obvious to implement one or more of the **Lizee's transformations** as visual representation features of the **library/database** of Geisner, as shown in the combined image below. *Id.*, ¶294.



EX1007, Fig. 10; EX1008, Fig. 7.

B. Independent Claim 1

i. 1/prel

If the preamble is limiting, Geisner-Lizee renders it obvious. EX1001, cl. 1; see EX1003, ¶¶297-298.

Geisner discloses “a system 10, which tracks user movements and presents an on-screen representation of a user,” that comprises a camera (capture device 20), monitor (visual device 16), and processor (computing system 12). EX1007, [0025], [0031], Figs.1-1B; EX1003, ¶297.

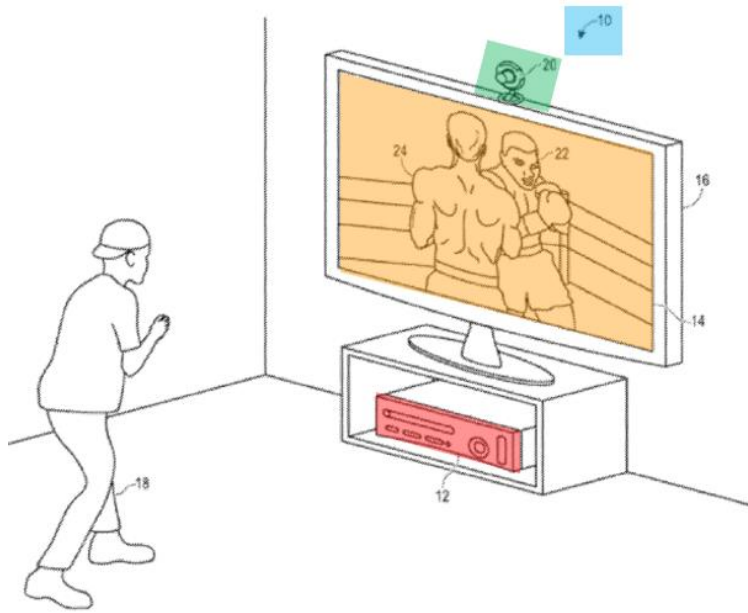


FIG. 1

Id., Fig. 1.

Figure 2 provides that the capture device 20 comprises a 3-D camera 26 and/or RGB camera 28 and processor 32. *Id.*, [0036]. The capture device communicates with the computing system 12, which comprises a processor 195 and display device 194. *Id.*, [0044]; EX1003, ¶298.

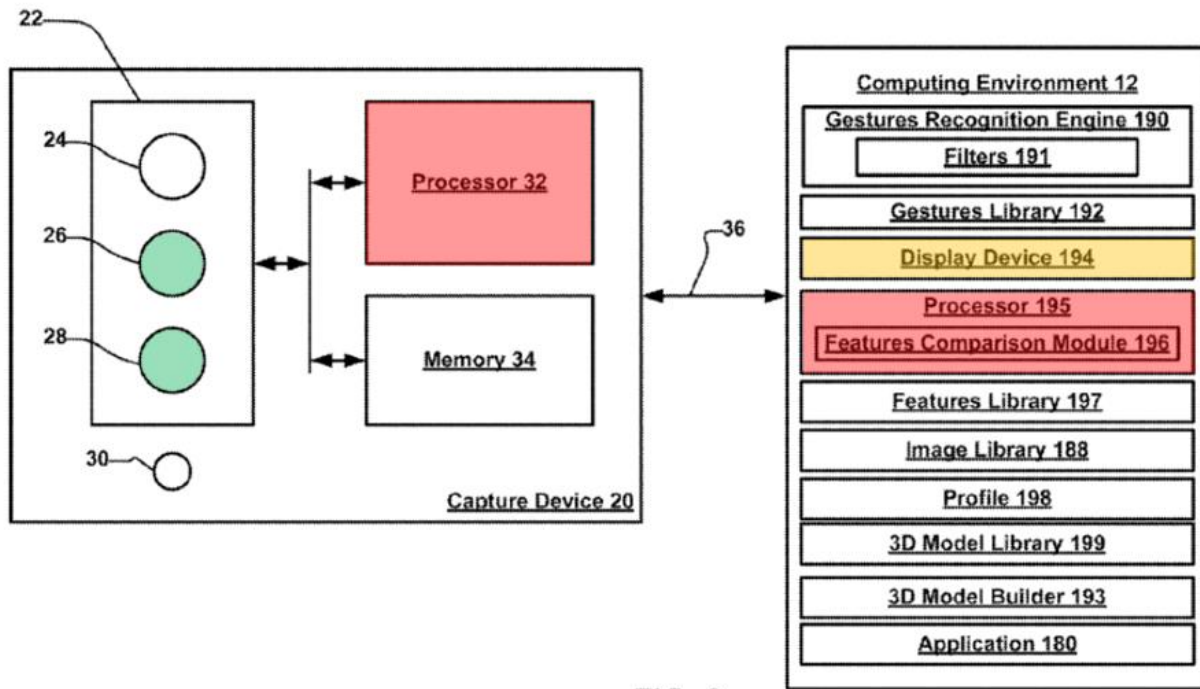


FIG. 2

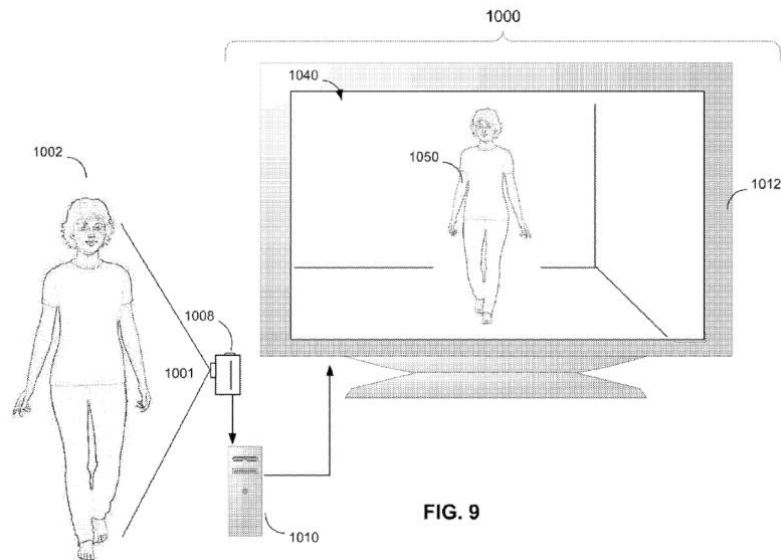
Id., Fig. 2.

ii. 1[a]

Geisner-Lizee renders obvious this limitation. EX1003, ¶¶299-303.

Geisner discloses operating a camera (capture device 20) to generate a stream of images (video) of the user. For example, “a human target user is captured using a capture device.” EX1007, [0004],[0034], [0045].

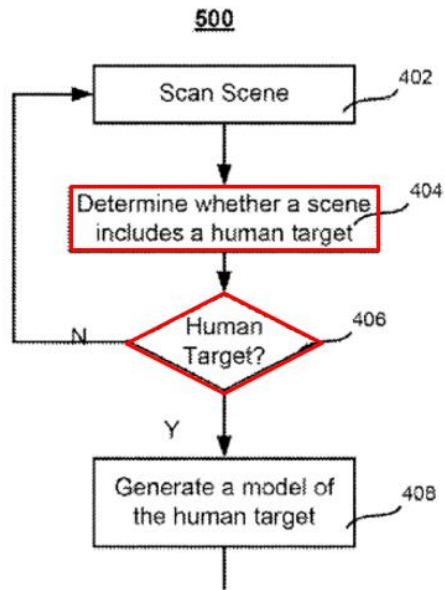
As shown in Figure 9, the camera captures images of a user, and the visual representation of the user is displayed on a screen. *Id.*, Fig. 9, [0013], [0130], [0132], [0137].



Id., Fig. 9.

iii. 1[b]

Geisner-Lizee renders obvious this limitation. Geisner discloses a tracking system “used to recognize, analyze, and/or track a human target such as the user.” *Id.*, [0030]; EX1003, ¶¶304-308. As shown below, the system determines, step 404, whether a scene includes a human target. EX1007, [0105]. If no targets are present, the system will re-scan the scene until a target is identified, in which case, the system generates a model of the target at step 408. *Id.*, [0105]; *see id.*, Fig. 8, 10, [0139] (techniques identifying user include “body scan, point cloud models, skeletal models, flood-filled techniques”).



Id., Fig. 5.

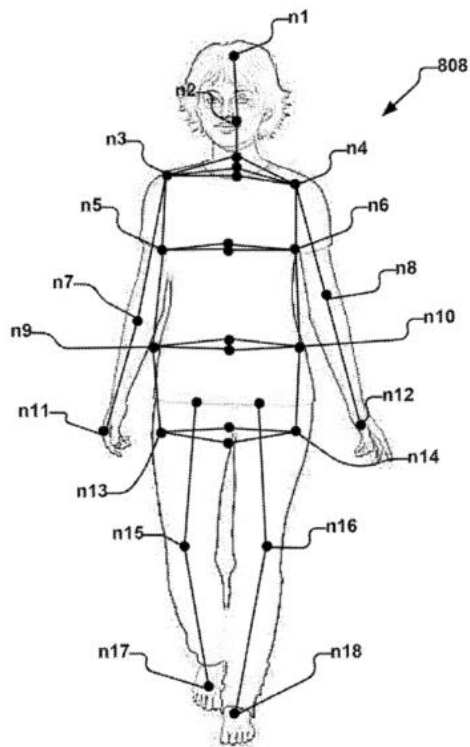


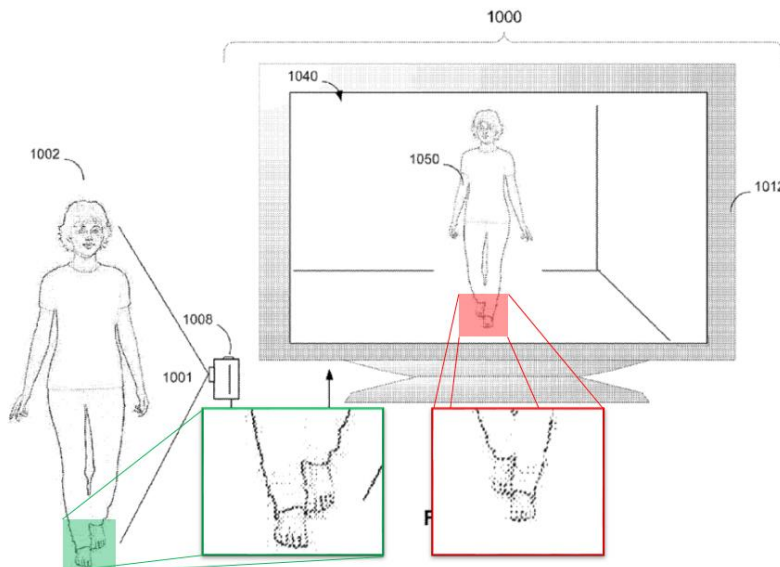
FIG. 8

Id., Fig. 8. Further, Geisner discloses detecting a body part of a user during facial

recognition (e.g., user's eyes, mouth, nose) and gesture identification (e.g., user's hand). *Id.*, [0135], [0051]; EX1003, ¶¶304-307. A POSITA would have found it obvious to detect the presence of the user in the stream of images to detect and track the user's motion. EX1003, ¶308.

iv. 1[c]

Geisner-Lizee renders obvious this limitation. Geisner-Lizee operates a processor to apply adaptive transformation mapping to the image stream. *Id.*, ¶¶309-328. For example, Geisner discloses applying a flip transformation. *Id.*, ¶311. Figures 9 and 12 show that the displayed image 1050 is a flipped image of the user 1002 (relative front-back position of the left and right feet). EX1007, Figs. 9, 12-13, 17.



Id., Fig. 9. Geisner also discloses other transformations like resizing and positioning. Geisner, [0062].

Lizee discloses additional transformations, e.g., position-dependent transformations, including “background removal, silhouetting, scaling, framing, mirrored transformation.” EX1008, [0088]; EX1003, ¶¶314-322. Lizee further discloses transformations to adjust displacement of the virtual representation, like “a forward displacement, a backward displacement, an orbital displacement, a rotational displacement and a side displacement.” *Id.*, cl. 6. A detailed discussion on these transformations is presented in §XI.B.vi, with respect to limitation 1[e].

Geisner-Lizee also discloses “generat[ing] modified images that appear to be captured from a different point of view of the camera’s actual point of view.” EX1001, cl. 1; EX1003, ¶¶323-328.

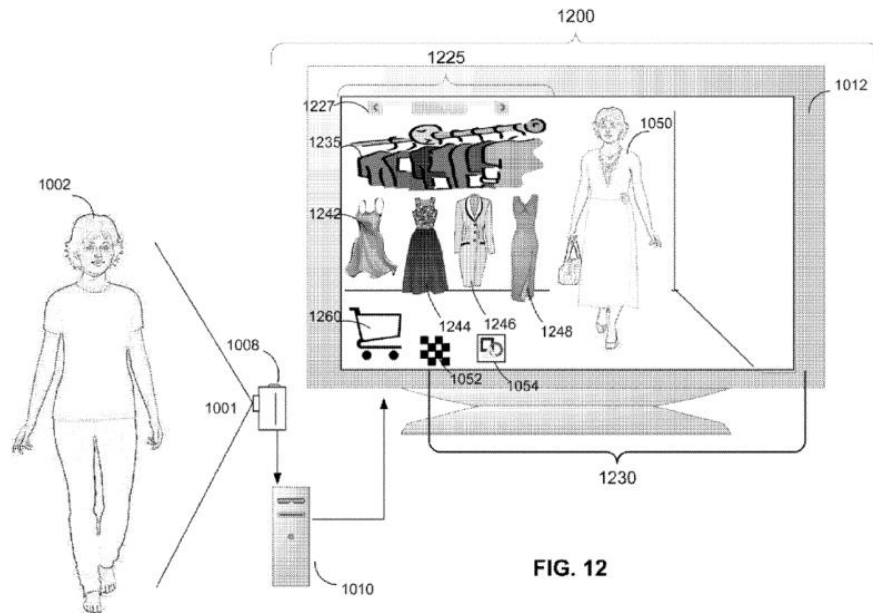
For example, Lizee discloses that “a position or **viewpoint of the virtual camera** 28 could be moved to reflect **a change in the viewing direction** of the virtual silhouette 24.” EX1008, [0057]. Lizee discloses and claims “generat[ing] a virtual camera such that the virtual representation is displayed from **a perspective of said virtual camera**.” *Id.*, cls.11-12, 15, 29 (“modifying said perspective as a function of said user motion”). Lizee’s virtual camera point of view may be modified by “moving, rotating, panning, zooming, orbiting and/or dollying.” *Id.*, [0063]. Therefore, A POSITA would have understood modifying the perspective of an image results in the image appearing to be captured from a different point of view. EX1003, ¶328; *supra* §§VIII, IX.B.iv, IX.B.vi.

A POSITA would have been motivated to add Lizee’s adaptive transformation mapping in Geisner to expand system capability, and a POSITA would have had a reasonable expectation of success in doing so. EX1003, ¶¶323-328; *see also supra* §XI.A.

To the extent PO alleges in the Infringement Contentions that panning and zoom in/out operations meet this limitation, Geisner-Lizee discloses the same. EX1003, ¶¶333-336; EX1019 at 16-20; *see e.g.*, EX1008, [0056] (“the framing 34 of the virtual camera 28 may also be altered dynamically to provide a zooming action”)-[0058]; [0061](“the typical camera movements used in 3D software, like zooming and panning can be available with this system”).

v. 1[d]

Geisner-Lizee renders obvious this limitation. Geisner discloses and claims “rendering a representation of the scene and the human target on a display device.” EX1007, cl. 1, [0004], [0024]; EX1003, ¶329. As shown below, the system displays modified images on screen 1200:



Id., Fig. 12; see also Figs. 1, 1b, 9, 13-15, 17. EX1003, ¶329.

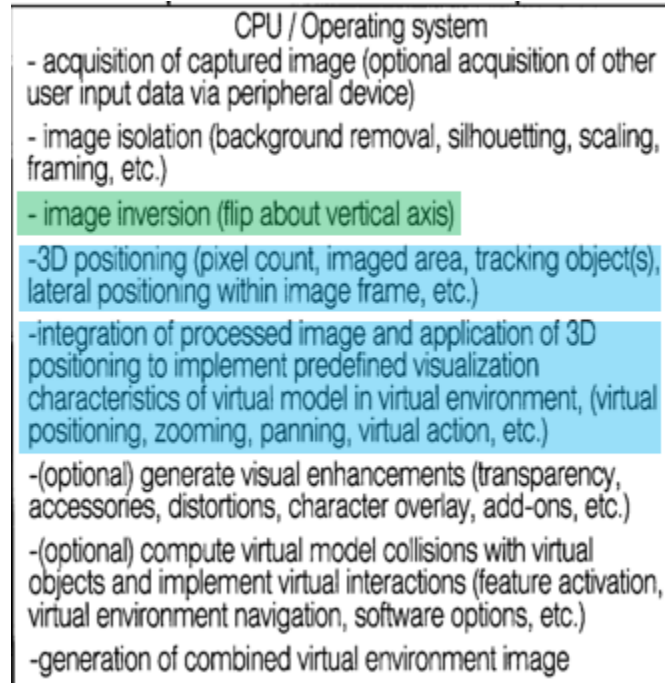
vi. 1[e]

Geisner-Lizee renders obvious this limitation. *Id.*, ¶¶330-338.

a. Different Angle

Lizee teaches the different point of view corresponds to **a different angle** than the actual images. *Id.*, ¶¶331-332. For example, Lizee discloses moving “a position or viewpoint of the virtual camera... to reflect a change in the viewing direction.” EX1008, [0057]; EX1003, ¶331. Such virtual camera perspective modifications may include “moving, **rotating**, panning, zooming, **orbiting**.” EX1008, [0063]. Lizee further discloses “implement[ing] virtual displacements of the virtual model 24 such as ... **an orbital displacement**, **a rotational displacement**.” *Id.* A POSITA would have understood that both displacements would require rotating the displayed target,

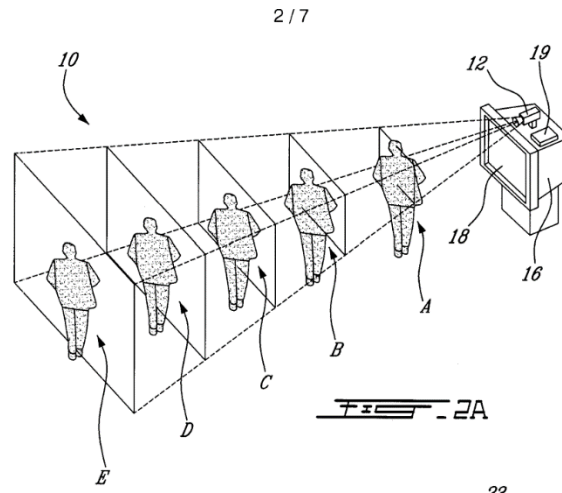
which changes the angle of the virtual camera (i.e., the modified images appearing to be taken from a different angle than the actual angle). EX1003, ¶331.



EX1008, Fig. 7.

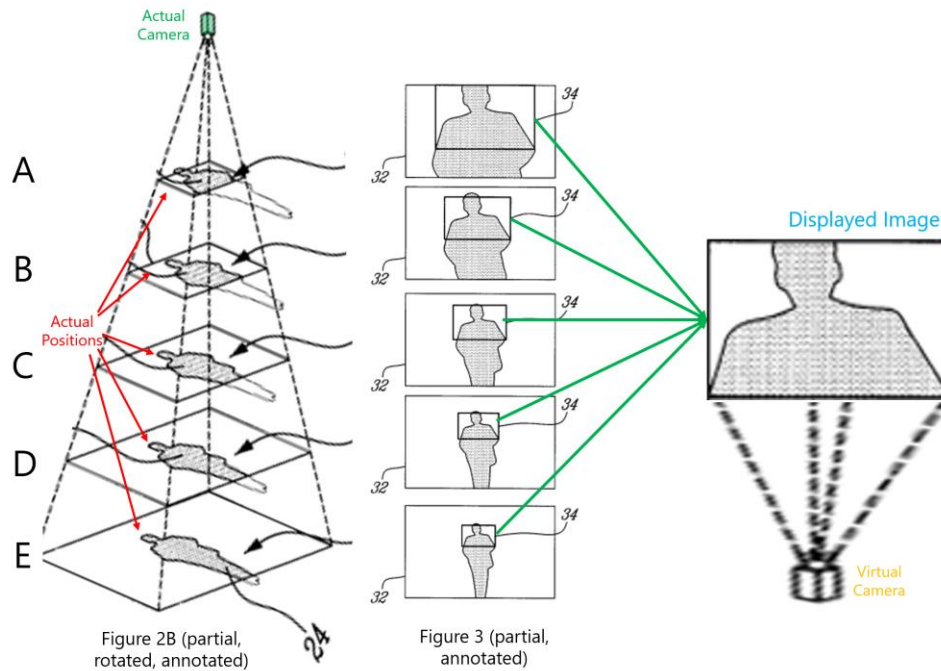
b. Different Distance

Lizee teaches that the different point of view corresponds to **a different distance**. EX1003, ¶¶333-336. Lizee discloses operating the camera to capture images of a user at five successive positions as “the user moves ... from positions A to E.” EX1008, [0040]; *see id.*, Fig. 2A.



Id., Fig. 2A (original).

When the user moves **away** from the camera (from point A to point E), the user representation in the captured images becomes smaller (Figure 3), and the system adjusts scaling of the **displayed** images to maintain a constant size of the user representation. *Id.*, [0051]; EX1003, ¶335. The displayed images, therefore, appear to be captured from a virtual camera with a fixed distance to the user creating virtual points of view different from the actual ones in terms of distance. EX1003, ¶335.

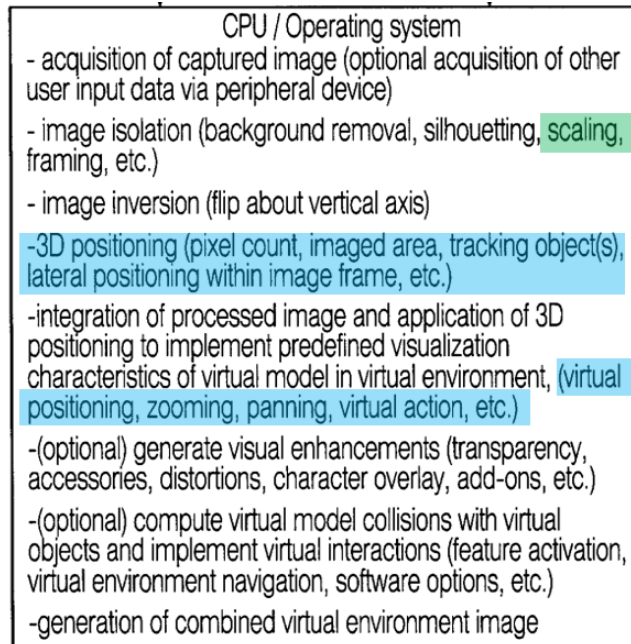


EX1008, Figs. 2-3.

Additionally, Lizee provides a dynamic zooming (resizing) transformation. *Id.*, [0056] (“As the distance of the user from the image capture device 12 increases, the virtual camera framing 34 may also increase, thereby providing a zoom-out effect.”); EX1003, ¶¶336.

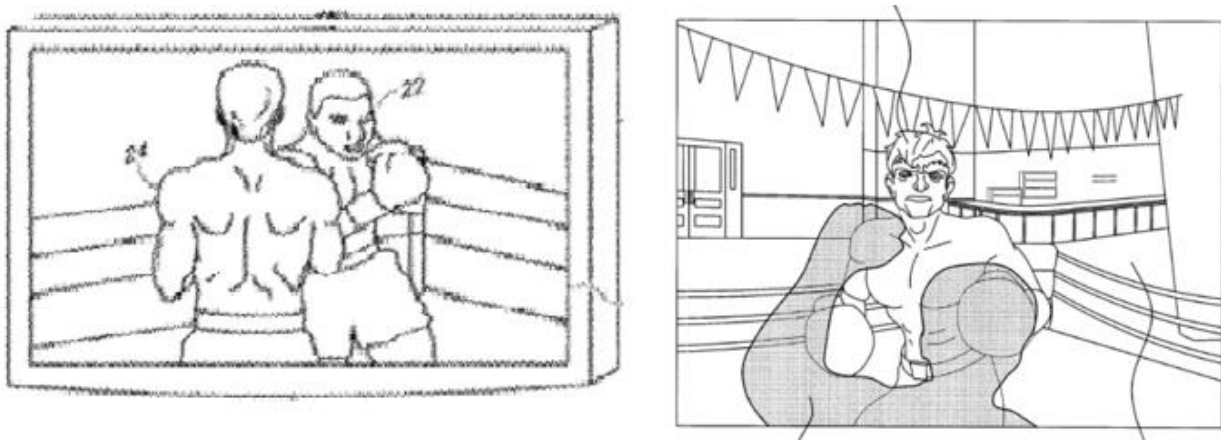
c. Applying Both Modifications

First, Lizee discloses applying both **scaling** (change distance) and **positioning** (change angle and distance). EX1003, ¶¶337-338; EX1008, Fig. 7.



EX1008, Fig. 7.

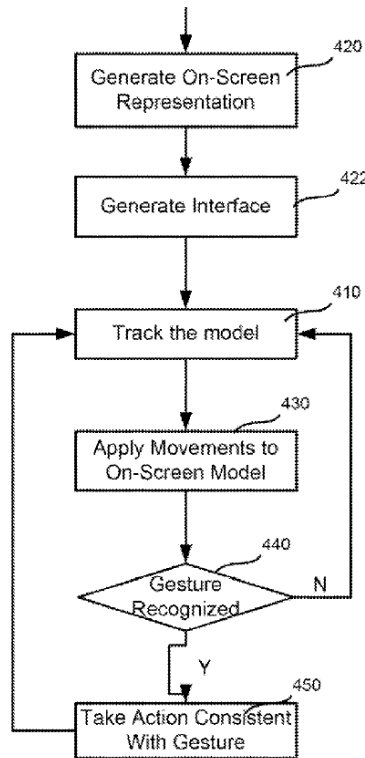
Second, a POSITA would have found it obvious to apply angle and distance modification transformations to the Geisner-Lizee combination. EX1003, ¶337. As shown below, Geisner (left) and Lizee (right) concern similar use cases, where a user representation needs to be scaled and rotated for proper displacements:



EX1007, Fig. 1; EX1008, Fig. 5.

As shown in Figure 5 (Lizee), a POSITA would have understood, to enrich

the user experience in a virtual environment, Lizee's scaling can be applied at step 420, Generating On-Screen Representation, and Lizee's positioning can be applied at step 430, in Geisner. EX1003, ¶338.



EX1007, Fig. 5.

vii. 1[f]

Geisner-Lizee renders obvious this limitation. EX1003, ¶¶ 339-343. Geisner discloses a system for tracking user motion. EX1007, Abstract, [0003], [0039], [0102]. When tracking, Geisner's system obtains image depth information by utilizing two or more cameras viewing a scene from different angles. *Id.*, [0039], [0102]. A POSITA would have found it obvious to use the angles of the separated cameras to register their corresponding captured images in order to properly generate

depth information. EX1003, ¶340.

Geisner teaches using parametric inputs. *Id.*, ¶¶341-343. According to the '110 Patent, “parametric input” may include user feature parameters (e.g., height, weight) and avatar model parameters (e.g., depth data). EX1001, 29:64-30:1 (“the system is able to ... calculate parameters of the user, e.g., weight, height, etc.”); 21:13-15 (“a 3D sensor will generate depth measurement that will be used to control a parametric model of the user’s avatar”). These parametric inputs may be used in mapping transformations to generate a more accurate 3D avatar. *Id.*, 21:24-28 (“The data from a depth sensor or 3D camera can pass a similar mapping transformation engine and the result can be the base of a more accurate 3D avatar of the user.”). EX1003, ¶341.

Similarly, Geisner discloses acquiring user feature parameters like size, height, arm length, width of the head, etc. EX1007, [0132]; *id.*, [0067]. Geisner discloses acquiring image depth information (an example of the claimed “parametric input”) to generate a skeleton model of the user, which includes various parameters (another example of the claimed “parametric input”), such as the spots of “joints of the hand, wrists, elbows, knees, nose, ankles, shoulders.” EX1007, [0054]; *see also id.*, Fig. 8, [0039], [0123], [0101]. The spots of joints are then processed to identify the user’s features (yet another example of the claimed “parametric input”), such as a user’s gesture/motion. *Id.*, [0053]-[0054], [0062]. These parametric inputs are

applied for transformations changing “positioning, or scaling to the target.” EX1007, [0059]-[0066]. A POSITA would have found it obvious to apply Lizee’s transformations based upon Geisner’s parametric inputs, such as increasing magnification, when a smaller user size is detected. *Id.*; EX1003, ¶¶342-343; *see also supra* §XI.B.vi.

To the extent PO alleges in the Infringement Contentions that panning and/or zoom in/out operations meet this limitation, Geisner-Lizee discloses the same. EX1003, ¶¶333-336; EX1019 at 38-44; *see e.g.*, EX1008, [0056]-[0058]; [0061].

C. Dependent Claims

i. Claim 2

Geisner-Lizee renders obvious a combination of at least two transformations including flips about a vertical axis, resize, rotation, and projection transformation as similarly disclosed in the ’110 Patent. *See* §§XI.B.iv, vi (limitations 1[c] and 1[e]); EX1003, ¶¶344-345.

ii. Claims 3-4

Geisner-Lizee renders obvious these claims. EX1003, ¶346-349. Geisner discloses a modification mode (idle mode), which pauses the application and resumes the application upon exiting the mode. EX1007, [0052]. During the modification mode, a user can modify the visual representation while the application is paused. *Id.*; EX1003, ¶347. The modification mode can be triggered by a user gesture that may interrupt “the current state of the application” and put the system

into a modification mode. EX1007, [0052]; EX1003, ¶¶346-347. *Id.*

In the idle mode, the system keeps “monitoring the target and detecting a change in the detected target feature” and “updating the visual representation of the target ... based on the change.” *Id.*, [0048]. As explained, Geisner’s gesture identification requires identifying at least one user body part. *See supra* §XI.B.iii. A POSITA would understand that, during Geisner’s modification mode, the camera continuously sends captured images to the processor for gesture identification, which requires identifying the presence of a user by detecting a user body part. EX1003, ¶348.

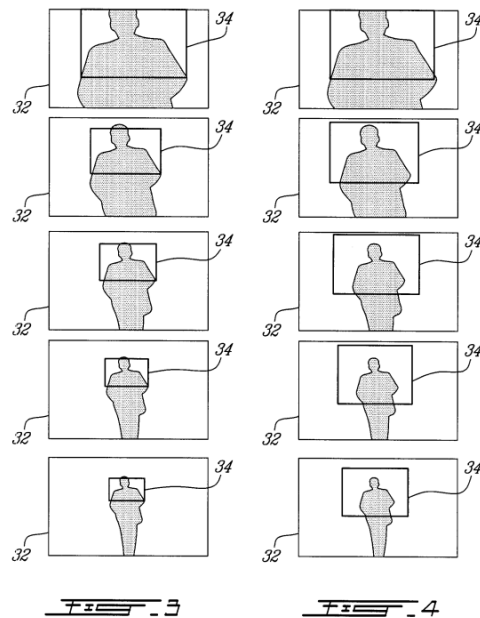
During idle mode, Geisner detects body parts, including the user’s hands, for gesture identification. EX1007, [0049]-[0052]; EX1003, ¶349. Geisner also teaches additional body part recognition techniques, like facial recognition, which detects features such as the eyes, mouth, and nose. EX1007, [0135].

iii. Claims 5-6

Geisner-Lizee renders obvious these claims. EX1003, ¶¶350-354.

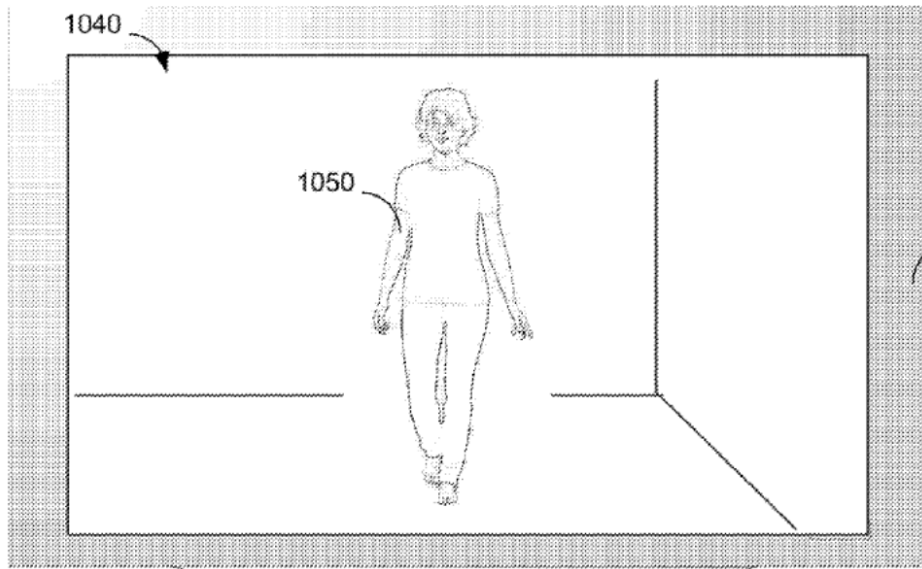
User input includes certain user motions. *See supra* §IX.C.iv; EX1003, ¶350. Lizee teaches receiving user motions to apply a zoom-in/out function, which varies image magnitude or field-of-view. EX1003, ¶351. For example, Lizee discloses “the user may use a backward motion to implement a zoom-out function.” EX1008, [0056]. Lizee explains the zoom-out effect can be carried out by increasing the virtual camera framing when the distance of the user increases. *Id.*

Lizee also teaches displaying a partial body of the user. EX1003, ¶353. As shown below, the processor varies the virtual camera framing 34 (example of virtual field-of-view) to display a partial user body in the modified images. EX1008, Figs. 3-4, [0051]-[0056].



Id., Figs. 3-4.

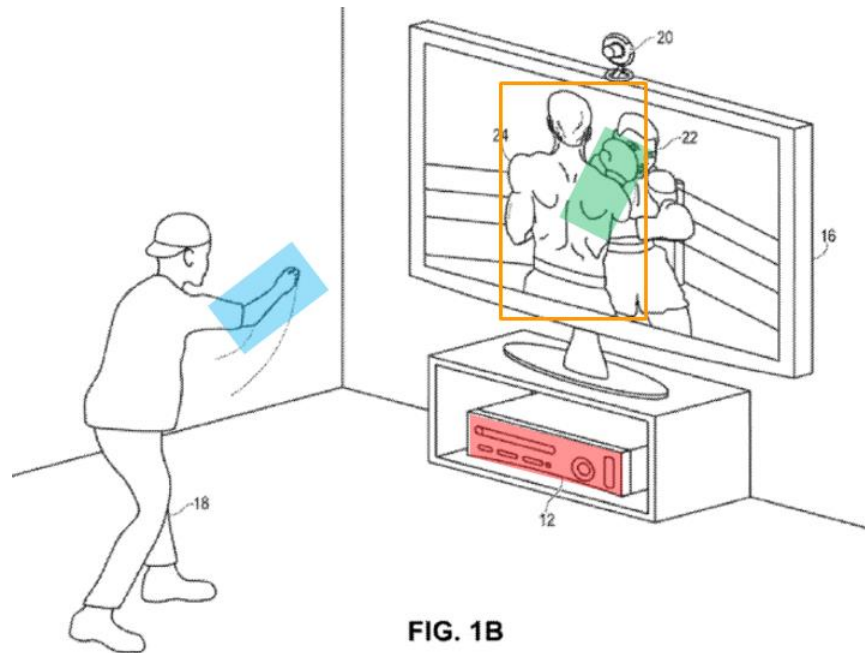
A POSITA would have found it obvious to zoom-in/out images to display a partial or full user body, similar to Geisner Figure 9. EX1003, ¶354; EX1007, Figs., 10-11.



EX1007, Fig. 9.

iv. Claim 7

Geisner-Lizee renders obvious this claim. EX1003, ¶¶355-356. Geisner describes a processor (**computing system**) for generating **an avatar** having body characteristics (**user features**) corresponding to body characteristics of a displayed user (**displayed user features**), as claimed. EX1003, ¶355; EX1007, Fig. 1B.



EX1007, Fig.1B.

For example, Geisner discloses a computing system used to generate a body model, which is “used to **render an on-screen player avatar.**” *Id.*, [0122]; *see also id.*, Figs. 1A-1B, [0080], [0028], [0030], [0072]. In Geisner, the avatar may have features that “**resemble the [user] features.**” *Id.*, [0146], *id.*, [0048], [0056], [0129]; EX1003, ¶356.

v. Claim 8-9

Geisner-Lizee renders obvious “operating the processor to display on the monitor the modified images and an image of the avatar” and “to augment the modified images by overlaying virtual objects on the avatar.” EX1001, cls. 8-9; EX1003, ¶¶357-358.

For example, Geisner discloses “**display[ing]** a representation of a human target user ... such as in the form of **an avatar.**” EX1007, [0072], Figs.1A-1B, [0122]

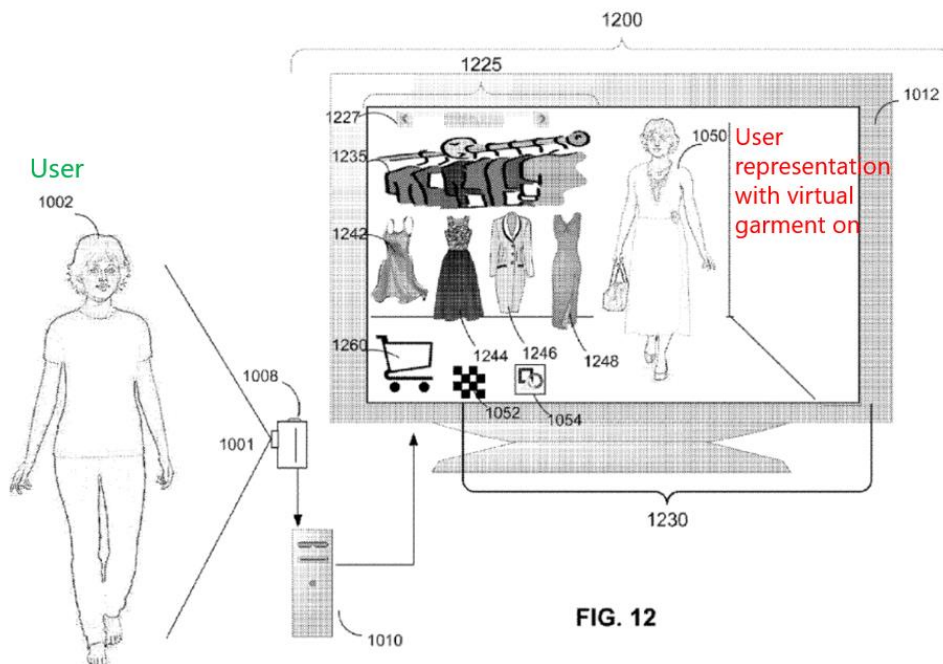
(“Upon making such adjustments and applying such constraints, the gaming console may **display the adjusted player avatar.**”).

Geisner further teaches “applying an article to an on-screen image,” including placing a garment on the avatar. *Id.*, [0154]; *see also id.*, at [0060]-[0061], [0147], [0153], [0156]-[0157]; EX1003, ¶358.

vi. Claim 10

Geisner-Lizee renders obvious this claim. EX1003, ¶¶359-361.

As shown below, Geisner discloses overlaying a virtual object (e.g., a virtual garment) on a user’s image appearing in the modified images (user representation). EX1007, [0156].

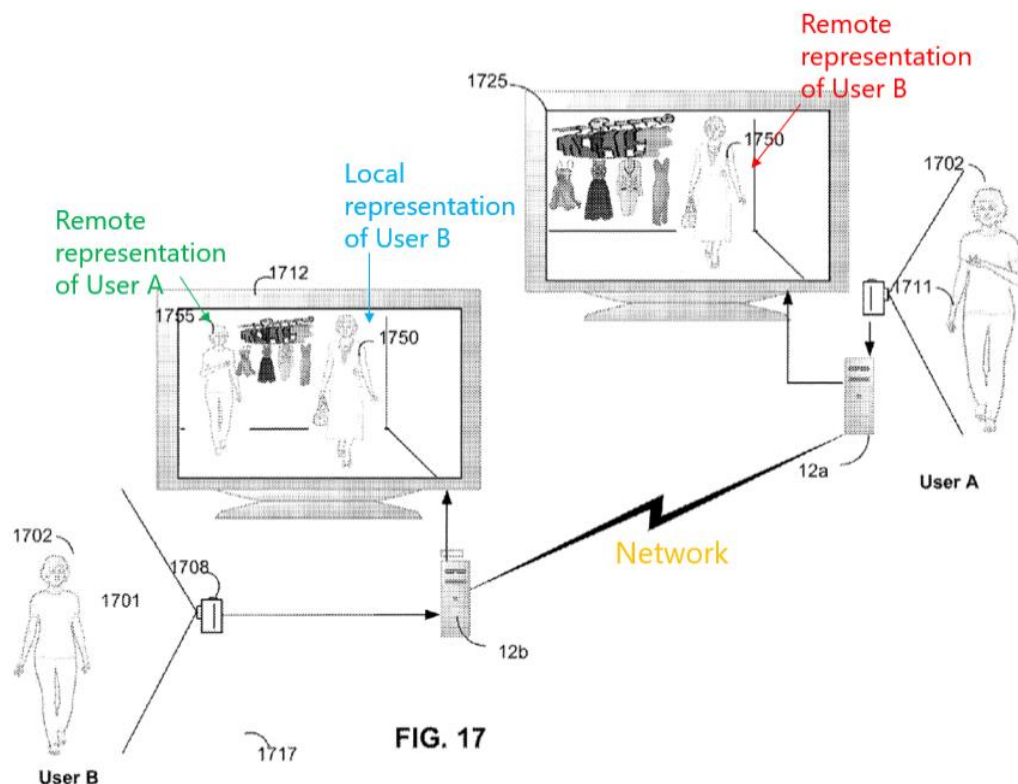


Id., Fig. 12. Geisner discloses “placing the garment on top of the on-screen representation.” *Id.*, [0154]; EX1003, ¶361. Specifically, Geisner discloses a user

may use a gesture to instruct the system to grab a virtual garment and try that garment on. *Id.*

vii. Claim 11-12

Geisner-Lizee renders obvious these claims. Geisner teaches operating the processor to transmit the modified image (a user representation) over a network. EX1003, ¶¶362-363. Geisner discloses that “two users can communicate and collaborate via a networked environment.” EX1007, [0171]. As shown below, the representation of user B may be transmitted over a network to the device at User A’s location and displayed. EX1003, ¶363. Similarly, the representation of User A is also transmitted and displayed as representation 1755. EX1007, [0171].



Id., Fig. 17.

As shown in Figure 17, the representation 1750 of user B is displayed on a remote screen 1725. *Id.*, Fig. 17, [0171]. A POSITA would have understood such mutual display configuration is one type of video telepresence because it captures and displays user movements (*id.*, [0151]) and allows communication/interaction between User A and User B (*id.*, [0171]). EX1003, ¶¶364-365.

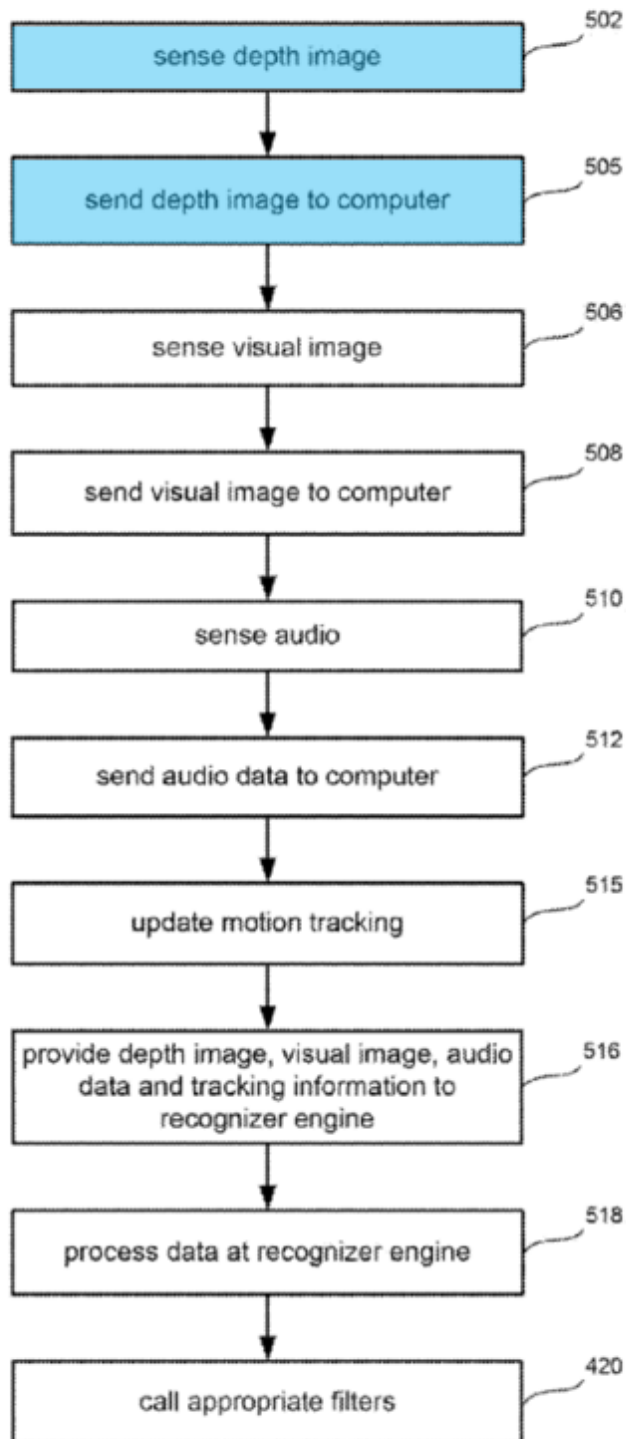
viii. Claim 13

Geisner-Lizee renders obvious “providing data from a depth sensor to the processor, and operating the processor to measure a texture of the image from the data.” EX1001, cl. 13. For example, Geisner discloses “identifying surfaces, **textures**, and object dimensions from unorganized point clouds derived from a capture device, such as **a depth sensing device**.” EX1007, [0133], [0132], [0134], [0035], [0116].]; EX1003, ¶366.

ix. Claim 14

Geisner-Lizee renders obvious this claim. Geisner teaches generating an avatar using depth images (i.e., data from depth sensor). EX1003, ¶¶367-368; EX1007, Fig. 6.

FIG. 6



EX1007, Fig. 6.

Geisner discloses generating a skeleton using data from a depth sensor.

EX1007, [0102],[0103],[0112]-[0113],[0116],[0120]-[0125]; *supra* XI.B.vii. The skeleton is then “used to render an on-screen player avatar.” EX1007, [0122]; *see also* EX1003, ¶368.

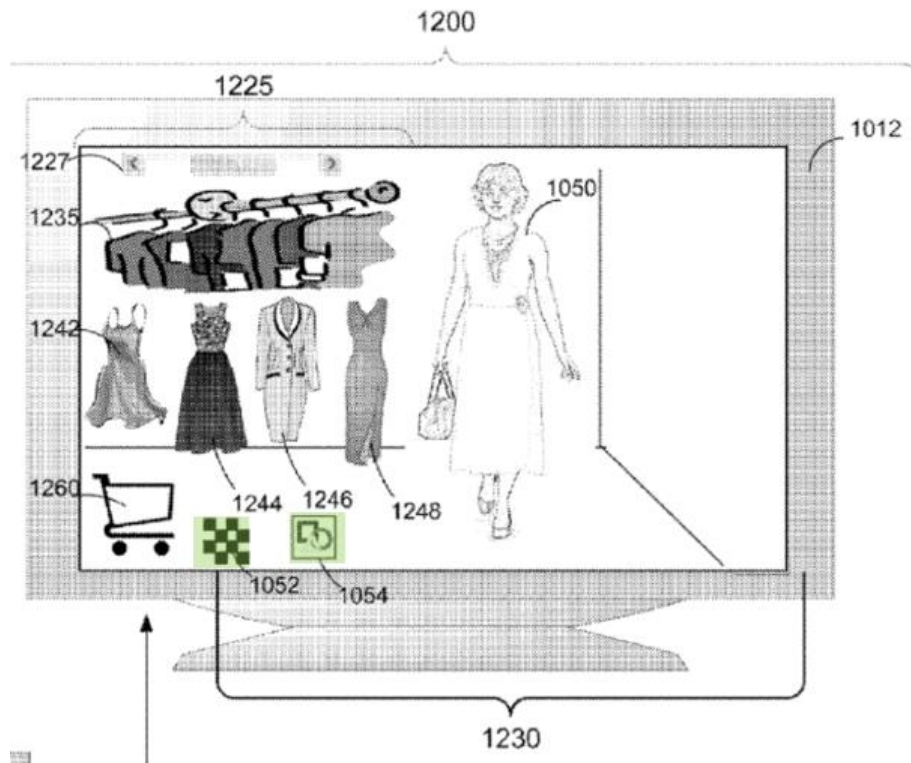
x. Claim 15

Geisner-Lizee renders obvious this claim . EX1003, ¶¶369-370. In Geisner, the avatar is rendered from a skeleton. *See supra* XI.C.xii. The skeleton is generated by analyzing various spots (claimed registration pointers) including joints and other pointers. EX1003, ¶370; EX1007, [0054] (“**determine various spots** on that user’s skeleton, joints of the hand, wrists, elbows, knees, nose, ankles... .”); *see also id.*, [0102] (“skeleton will include a set of joints and connections between the joints.”); *id.*, [0103], [0122].

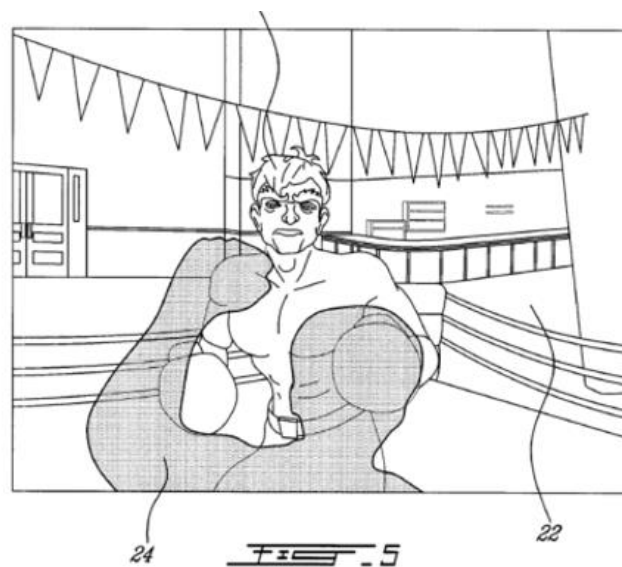
xi. Claims 16-17

Geisner-Lizee renders obvious these claims. EX1003, ¶¶371-383.

Geisner discloses “acquiring a depth image, ... identifying and removing the background, and assigning each of the foreground pixels to different parts of the body.” EX1007, [0102]. Geisner discloses applying virtual segments to replace the identified background segments. As shown in Figure 12, interface 1200 comprises a series of **background icons 1052, 1054**. *Id.*, [0156]. A user may select an icon “to provide a scene specific background.” *Id.*, [0158], [0153]-[0157], [0159]; EX1003, ¶¶373-374.



EX1007, Fig. 12. Lizee discloses replacing an existing background with additional virtual background segments like a boxing arena. EX1003, ¶381; EX1008, Fig. 5, [0079].



EX1008, Fig. 5.

xii. Claim 18

Geisner-Lizee renders obvious this claim. Geisner teaches “wherein the processor resides in the remote location, and the method proceeds by transmitting the images from the camera over a network to the processor, and transmitting the modified images back from the processor to the monitor over the network.” EX1001, cl. 18; EX1003, ¶¶384-388.

In Geisner, **images** are captured at **Capture Device 20** and transmitted via **a communication link** to **a processor** in Computing Environment 12 for processing. EX1007, Fig. 2; EX1003, ¶385.

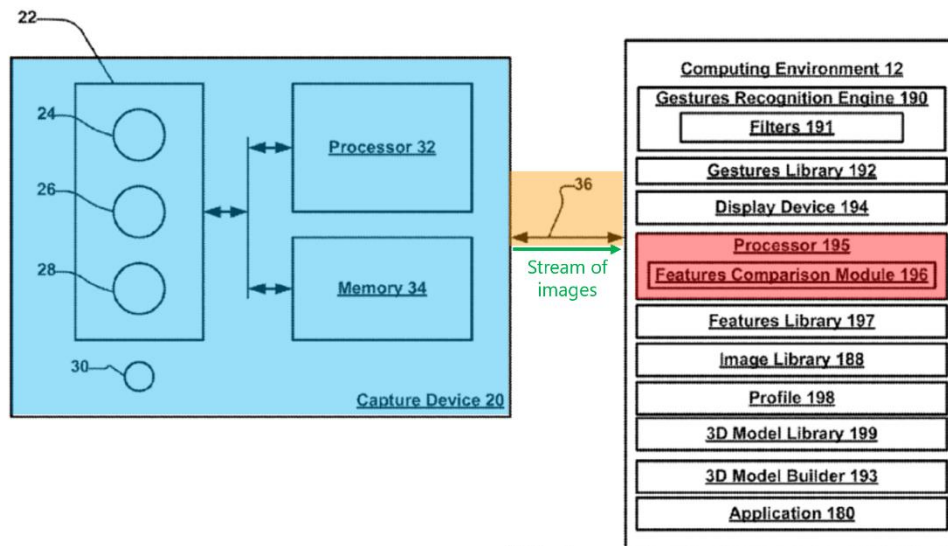


FIG. 2

Id., Fig. 2.

Geisner discloses “transmit[ing] the raw data for processing by another computing environment.” EX1007, [0055]. The computing environment (and the processor therein) may reside in a remote location. *Id.*, [0099]-[0100] (“program

modules... may be stored in the remote memory storage device”). A POSITA would have found it obvious, for reducing system requirements of local devices and increasing efficiency, to place the processor at a remote computing environment, where the program modules are stored and which is connected to LAN or WAN via a cable or wireless connection. EX1003, ¶387; Ex1007, [0044]; Fig. 2.

The modified images would then be transmitted back to the local display. EX1003, ¶¶387-388. Geisner’s display “may be an entity separate but coupled to the computing environment.” EX1007, [0079]. A POSITA therefore would have found it obvious to position a display and camera(s) in the vicinity of a user (to allow the user to view himself/herself) and to transmit the modified images from the remote computing environment to the user. EX1003, ¶388.

XII. Ground 4: Haan in view of Francois and Geisner renders obvious claims 7-9, 13-15, and 18

Haan-Geisner-Francois renders obvious claims 7-9, 13-15, and 18. EX1003, ¶¶389-396. As explained, it would have been obvious to combine Haan and Francois. *Supra* §IX.A; EX1003, ¶389. A POSITA would have found it obvious to add Geisner.

Haan, Francois, and Geisner are analogous to the ’110 Patent and each other, and are in the same field of endeavor. *Id.*; see §§IX.A, XI.A. A POSITA would have been motivated to combine Haan, Francois, and Geisner to enhance the user’s virtual mirror experience by adding comprehensive augmented reality features. EX1003,

¶390. For example, while Haan discloses some augmented reality features, EX1005, [0113], Geisner discloses more comprehensive augmented reality features, EX1007, [0175]. EX1003, ¶391. A POSITA would have found it obvious to add augmented features, like changing garments or body parts, and providing an avatar to offer an enhanced user experience. *Id.* A POSITA would have found it obvious to combine Geisner's depth sensor with the virtual mirror sensor in Haan to improve accuracy of the avatar and/or further enhance the user's augmented reality experience. *Id.*; see also EX1007, [0132]-[0134], [0035], [0116]; EX1003, ¶394. And a POSITA would have found it obvious to combine Geisner's networked computing environment with Haan to increase system efficiency and accessibility. EX1003, ¶395.

A POSITA would have expected success in implementing Geisner's processes in Haan (as modified by Francois) because it would have just been using a known technique to improve a similar device in a similar way to yield the predictable result of a more versatile digital mirror system with an enhanced user experience. EX1003, ¶392. Haan discloses a virtual mirror system using computers and mobile devices, and Francois discloses "a universal framework" for easy integration into such known systems. Geisner's processors execute instructions to implement augmented reality features. *Id.* A POSITA would have understood Haan-Francois (and its disclosure of processors for implementing virtual mirror system) would be suitable for performing Geisner's processes. *Id.*

Haan in view of Francois renders obvious claim 1 (from which claims 7-9, 13-15, 18 depend). *Supra* §IX.B. Geisner teaches the additional limitations in claims 7-9, 13-15, and 18. EX1003, ¶393; §§XI.C.iv-v, XI.C.viii-x, §XI.C.xii. A POSITA would have been motivated to combine Haan, Francois, and Geisner to achieve the alleged inventions in claims 7-9, 13-15, 18 with a reasonable expectation of success, as discussed above. EX1003, ¶¶389-396.

XIII. Ground 5: Rosenberg in view of Park and Geisner renders obvious claims 3-4, 7-9, and 11-18

Rosenberg-Park-Geisner renders obvious claims 3-4, 7-9, and 11-18. EX1003, ¶¶397-399.

As explained, it would have been obvious to combine Rosenberg and Park. *Supra* §X.A; EX1003, ¶397. A POSITA would have found it obvious to add Geisner to the combination. Geisner is analogous to Rosenberg, Park, and the '110 Patent because they are in the same field of endeavor. EX1003, ¶398; *supra* §§X.A, XI.A. A POSITA would have been motivated to use Geisner's gesture identification to detect the presence of a user and allow for more control of mirror operations, to use Geisner's remote image transfer and avatar generation to improve user experiences, to use Geisner's remote processor to reduce processing capacity and associated costs, and to use Geisner's virtual background to improve system versatility and user experience. EX1003, ¶¶398-399. A POSITA would have had a reasonable expectation of success in combining these references because they improve similar

display systems using cameras and concern fitting scenarios, giving users options to see their images and to send the images over the network. *Id.* A POSITA would have understood that Rosenberg's programmable processor, memory, and other hardware or software components would be suitable for performing Geisner's processes. *Id.* And a POSITA would have expected success because it would have been using a known technique to improve a similar device in the same way to yield predictable results. *Id.*

A. Claims 3-4

Rosenberg-Park-Geisner renders obvious claims 3-4. EX1003, ¶¶400-405. As explained, Rosenberg-Park renders obvious claims 3-4. *See supra* §X.C.ii. Providing additional implementation details, Geisner discloses continuously identifying a user presence during another type of idle mode (modification mode) by detecting a body part. EX1003, ¶401; §XI.C.ii. Geisner further discloses the body part may be one of legs, face, eyes, and hands. EX1003, ¶404; *see supra* §§XI.C.ii. A POSITA would have found it obvious to combine Geisner's idle mode and user identification to the Rosenberg-Park combination to create a comprehensive and interactive idle mode, where the user would have more control of the operation. EX1003, ¶¶400-405.

B. Claims 7-9, 13-15

Rosenberg-Park-Geisner renders obvious these claims. EX1003, ¶¶406-410. As explained, Geisner renders obvious claims 7-9 and 13-18. *See supra* §§XI.C.iv-v, viii-xii. A POSITA would have found it obvious to add Geisner's avatar related

features and depth sensor to enhance user experience. EX1003, ¶¶398-399, 406-410.

C. Claims 11-12, 18

Rosenberg-Park-Geisner renders obvious these claims. EX1003, ¶¶411-414. As explained, Rosenberg-Park renders obvious claims 11-12. *See supra* §X.C.vi. Geisner provides additional implementation details for transferring modified images over a network and displaying the images on a remote screen for video telepresence. *See supra* §XI.C.x. It further teaches transmitting images to a remote processor and receiving modified images for display locally. *See* §XI.C.xii. A POSITA would have been motivated to incorporate Geisner's network configuration because it offers additional functionality to Rosenberg-Park (including allowing users to share looks with each other) and increases system efficiency and accessibility. EX1003, ¶¶398-399, 414.

D. Claims 16-17

Rosenberg-Park-Geisner renders obvious claims 16-17. EX1003, ¶¶415-416. A POSITA would have found it obvious to apply Geisner's background replacement features to Rosenberg-Park to enable a user to, for example, see how a garment may look in a different background environment. *Id.*

XIV. SECONDARY CONSIDERATIONS

Petitioners are not aware of secondary considerations that would meaningfully rebut conclusions of obviousness.

XV. DISCRETIONARY DENIAL IS NOT APPROPRIATE

A. Under § 314(a)

Petitioners respectfully submit the Board should not exercise its discretion to deny institution under 35 U.S.C. § 314(a).

Firstly, Petitioners have filed no other petitions against the '110 Patent, and thus, the General Plastics factors weigh in favor of institution. *See Gen. Plastic Indus. Co. v. Canon Kabushiki Kaisha*, IPR2016-01357, Paper 19 at 15-16 (PTAB Sept. 6, 2017) (precedential). Only one other petition, IPR2022-00490, has been filed against the '110 Patent, which was voluntarily dismissed on July 7, 2022, prior to an institution decision. Petitioners were not involved in the preparation or filing of that petition, and have no relationship with the Petitioners of IPR2022-00490. Thus, this Petition should not be considered in any *General Plastics* analysis. *Ford Motor Co v. Neo Wireless*, IPR2023-00763, Paper 28 at 4-5, 9-11 (Director Review Decision) (earlier petition considered in General Plastic analysis only when there is a “significant relationship” between second and first Petitioner). Further, this Petition is different from IPR2022-00490 because it challenges different claims⁷ and uses different prior art references and/or combinations. The *General Plastics* factors

⁷ IPR2022-00490, filed by Meta Platforms, Inc et al., challenged claims 1, 5-6, 10, 12, 16, and 17 . This Petition challenges all claims 1-18.

weigh against denying institution.

Further, if the Board applies the analysis provided in *NHK Spring Co. Ltd v. Intri-Plex Technologies, Inc.*, IPR2018-00752, Paper 8 at 19-20 (PTAB Sept. 12, 2018) (precedential)⁸ or *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (PTAB Mar. 20, 2020) (precedential), those factors collectively weigh in favor of institution.

The Petition was filed within 6 months of Samsung receiving Patent Owner's infringement contentions, and before receiving Patent Owner's claim construction briefing.⁹ The pending district court lawsuit remains in its early stages, with trial scheduled in June 2025. EX1020 at 1. In cases where the petitioner acted expeditiously, the Board has declined to exercise discretion to deny institution. *Fintiv*, Paper 11 at 11. Efficiency, fairness, and the strength of the Petition weigh against discretionary denial here.

The **first *Fintiv* factor** is neutral. Samsung intends to move for a stay, and the Board does not speculate how the district court will rule. *Hulu LLC v. SITO Mobile R&D IP, LLC et al.*, IPR2021-00298, Paper 11 at 10-11 (PTAB May 19, 2021).

The **second *Fintiv* factor** is neutral. The district court litigation with Samsung is still in its early stages, and the earliest a trial would occur is June 2025. EX1020

⁸ Petitioners reserve objection to the Board's application of *NHK-Fintiv*.

⁹ Petitioner Google is not a party to the Litigation. EX1020.

at 1. Given the distant date of trial, the actual trial date is uncertain. *Halliburton Energy Servs., Inc. v. U.S. Well Servs., LLC*, IPR2021-01037, Paper 12 at 10 (PTAB Jan. 19, 2022) (“district court trial dates are often delayed by several months”). Further, the Final Written Decision is expected around a similar time. *Micron Tech., Inc. v. Godo Kaisha IP Bridge 1*, IPR2020-01008, Paper 10 at 14 (PTAB Dec. 7, 2020) (“due to the uncertainty as to this trial date, this factor is, at most, neutral to whether we should exercise our discretion”); *Google LLC et al. v. Parus Holdings, Inc.*, IPR2020-00846, Paper 9 at 12-14 (PTAB Oct. 21, 2020) (“where. . . there is at least some persuasive evidence that delays are possible, . . . this factor is, at best, neutral”).

The **third *Fintiv* factor** weighs strongly against denial. This Petition was within 6 months of Samsung receiving Patent Owner’s infringement contentions, and before any claim construction briefing. In fact, the Markman hearing is not until December 6, 2024. EX1020 at 3. Because investment in the district court case has been minimal, and Samsung acted diligently, this weighs strongly against discretionary denial here. *Hulu*, Paper 11 at 13.

The **fourth *Fintiv* factor** weighs against denial. Petitioners are challenging all claims of the ’110 Patent, with only a subset of those claims being asserted (and at issue) in the district court litigation with Samsung. Samsung also intends to raise different and additional invalidity arguments in the district court case than raised

here, including invalidity arguments under 35 U.S.C. §§ 101 and 112. This IPR does not duplicate efforts with respect to the district court action.

As to the **fifth *Fintiv* factor**, little weight is given to the fact that Samsung and Patent Owner are the same parties in district court case. *Weatherford U.S., L.P., v. Enventure Global Tech., Inc.*, IPR2020-01684, Paper 16 at 11-13 (PTAB. Apr. 14, 2021). Further, Google is not a party to the co-pending district court litigation, which weighs against denial.

The **sixth *Fintiv* factor** likewise weighs against denial. This Petition presents a compelling unpatentability challenge to the '110 claims and merits institution. For example, challenges based on at least Haan, Geisner, and Lizee were not previously before the Patent Office. *Cf. Comcast Cable Commc'ns, LLC v. Rovi Guides, Inc.*, IPR2019-00231, Paper 14 at 11 (PTAB May 20, 2019) (obviousness challenges not previously considered by Patent Office weigh in favor of not denying institution).

Finally, “trial here avoids potentially complicated and overlapping jury issues” over multiple patents. *Apple Inc. v. Seven Networks, LLC*, IPR2020-00156, Paper 10 at 22 (PTAB June 15, 2020) (factor 6 strongly favored petitioner). The related district court case currently asserts two patents and involves hundreds of accused products. In addition, the related district court case may impact other third parties because the products of those third parties are referred to in the infringement contentions. The institution of this IPR provides an opportunity to narrow and simplify the litigation.

B. Discretion Under 35 U.S.C. § 325(d)

Petitioners respectfully submit the Board should not exercise its discretion to deny institution under 35 U.S.C. § 325(d).

None of Haan, Park, Geisner, Lizée, and/or François were evaluated during prosecution and are not cumulative of the art considered during prosecution. As such, multiple *Becton, Dickinson* factors weigh in favor of institution. *Becton, Dickinson & Co. v. B. Braun Melsungen AG*, IPR2017-01586, Paper 8 at 17-18 (PTAB Dec. 15, 2017).

Rosenberg was cited on an Information Disclosure Statement (IDS) submitted after a Notice of Allowance. EX1002 at 354-55. But it was not the basis of a rejection and does not provide a reason to deny institution here. *See, supra*, §VI.A; *also e.g., Celco Partnership v. Huawei*, IPR2020-01117, Paper 10 at 13 (P.T.A.B. Feb. 3, 2021) (“[T]he fact that Wen was not the basis of rejection weighs strongly against exercising our discretion to deny institution under [§325(d)].”).

Furthermore, Petitioners combine Rosenberg with other references not cited during prosecution. *See, e.g., Oticon Med. AB v. Cochlear Ltd.*, IPR2019-00975, Paper 15 at 20 (PTAB. Oct. 16, 2019) (precedential) (declining to exercise discretion for “[t]here is new, noncumulative prior art asserted in the Petition”). For example, grounds 3 and 5 rely on Park (a reference not considered during prosecution, as noted above) for limitations in claim 1, including the “adaptive transformation mapping” and “different point of view” limitations. Ground 5 also relies on Geisner (again, a

reference not considered during prosecution) for various features in the dependent claims. This too weighs against denying institution.

XVI. CONCLUSION

Petitioners respectfully request that *inter partes* review of the '110 Patent be instituted and that the Challenged Claims be cancelled as unpatentable.

Respectfully Submitted,

Dated: May 10, 2024

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CERTIFICATE OF SERVICE

In accordance with 37 C.F.R. §§42.6(e) and 42.105, the undersigned certifies that on May 10, 2024, a complete and entire copy of the **PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT NO. 8,982,110 UNDER 35 U.S.C. §§311-319 AND 37 C.F.R. §§42.100 *ET SEQ.*** (“Petition”) including exhibits and testimony relied upon were served via USPS Overnight Delivery on the Patent Owner at the correspondence address of record for the subject patent and counsel for Patent Owner in the District Court Litigation, as included below:

Womble Bond Dickinson (US) LLP
ATTN: IP Docketing
P.O. Box 7037
Atlanta GA 30357-0037

Via USPS Overnight Delivery, with a courtesy copy via electronic mail to counsel of record for Patent Owner in the litigation pending before the U.S. District Court for the District of Delaware entitled *EyesMatch Ltd. v. Samsung Electronics Co.*, No. 2-23-cv-00363 (E.D. Tex.) as follows:

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Dated: May 10, 2024

/ Eliot D. Williams /
Eliot D. Williams

CERTIFICATION UNDER 37 C.F.R. §42.24(d)

Pursuant to 37 C.F.R. §42.24(d), the undersigned hereby certifies that the word count under §42.24(a)(1) for the foregoing Petition for *Inter Partes* Review totals 13,905 words, within the 14,000 word limit allowed under §42.24(a)(1)(i).

Dated: May 10, 2024

/ Eliot D. Williams /
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