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Filed on behalf of **Luxottica of America Inc.** and **Meta Platforms, Inc.**

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

LUXOTTICA OF AMERICA INC. AND META PLATFORMS, INC.,
Petitioners,

v.

SOLOS TECHNOLOGY LIMITED,
Patent Owner.

Case IPR2026-00376
Patent 12,216,339

**PETITION FOR *INTER PARTES* REVIEW
OF U.S. PATENT NO. 12,216,339**

TABLE OF CONTENTS

Page No.

I. INTRODUCTION	1
II. STATE OF THE ART	2
A. Asukai	2
B. Liu	3
III. THE '339 PATENT	4
A. Overview	4
B. Prosecution History	5
1. Related Japanese Application	5
2. The '339 Patent	6
IV. LEVEL OF ORDINARY SKILL	7
V. CLAIM CONSTRUCTION	7
VI. STATEMENT OF RELIEF REQUESTED	9
A. Grounds	9
B. Asserted References	9
VII. GROUND 1: CLAIMS 1-16 ARE OBVIOUS BASED ON ASUKAI	11
A. Claim 1	11
1. 1[pre]	11
2. 1[a]	12
3. 1[b]	16
4. 1[c]	18
5. 1[d]	21
6. 1[e]	25
B. Claims 2-4	27
C. Claim 5	27
D. Claim 6	28

TABLE OF CONTENTS (*cont'd*)

	Page No.
1. 6[pre]	28
2. 6[a]-[b]	28
3. 6[c]-[d]	29
E. Claims 7-9	29
F. Claim 10	29
G. Claim 11	29
1. 11[pre]	29
2. 11[a]	30
3. 11[b]	31
4. 11[c]	32
5. 11[d]	34
6. 11[e]-11[i]	34
H. Claim 12	35
I. Claim 13	35
J. Claim 14	36
K. Claim 15	37
L. Claim 16	38
VIII. GROUND 2: CLAIMS 11-16 ARE OBVIOUS BASED ON ASUKAI AND SHAN	41
A. Overview of Shan	41
B. Claims 11-16	42
IX. GROUND 3: CLAIMS 1-10 ARE OBVIOUS BASED ON LIU	44
A. Claim 1	44
1. 1[pre]	44
2. 1[a]	46

TABLE OF CONTENTS (*cont'd*)

	Page No.
3. 1[b]	48
4. 1[c]	50
5. 1[d]	52
6. 1[e]	56
B. Claim 2	59
C. Claim 3	59
D. Claim 4	60
E. Claim 5	60
F. Claim 6	60
1. 6[pre]	60
2. 6[a]-[b]	61
3. 6[c]-[d]	62
G. Claims 7-9	62
H. Claim 10	62
X. GROUND 4: CLAIMS 11-16 ARE OBVIOUS BASED ON LIU AND SHAN	62
A. Claim 11	63
1. 11[pre]	63
2. 11[a]	63
3. 11[b]	66
4. 11[c]	67
5. 11[d]	68
6. 11[e]-11[i]	69
B. Claim 12	69
C. Claim 13	69

TABLE OF CONTENTS
(cont'd)

	Page No.
D. Claim 14	70
E. Claim 15	71
F. Claim 16	73
XI. GROUNDS 5-8: CLAIMS 1-16 ARE OBVIOUS BASED ON GROUNDS 1-4 AND LISY	75
A. Overview of Lisy.....	75
B. Ground 5: Claims 1-16 are Obvious Based on Asukai and Lisy	76
C. Ground 6: Claims 11-16 are Obvious Based on Asukai, Shan, and Lisy	77
D. Ground 7: Claims 1-10 are Obvious Based on Liu and Lisy	78
E. Ground 8: Claims 11-16 are Obvious Based on Liu, Shan, and Lisy	79
XII. SECONDARY CONSIDERATIONS	79
XIII. STIPULATION	80
XIV. MANDATORY NOTICES, GROUNDS FOR STANDING, AND FEE PAYMENT	81
A. Real Parties-In-Interest (37 C.F.R. §42.8(b)(1)).....	81
B. Related Matters (37 C.F.R. §42.8(b)(2)).....	81
C. Lead and Backup Counsel (37 C.F.R. §42.8(b)(3))	81
D. Service Information (37 C.F.R. §42.8(b)(4))	83
E. Standing.....	83
XV. CONCLUSION	83

TABLE OF AUTHORITIES

Page(s)

Cases

<i>Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co. Ltd.</i> , 868 F.3d 1013 (Fed. Cir. 2017)	7
<i>Phillips v. AWH Corp.</i> , 415 F.3d 1303 (Fed. Cir. 2005) (en banc)	8
<i>Realtime Data, LLC v. Iancu</i> , 912 F.3d 1368 (Fed. Cir. 2019)	15
<i>Solos Technology Limited v. Meta Platforms, Inc. et al.</i> , No. 1:26-cv-10304 (D. Mass. 2026)	80, 81
<i>Unwired Planet, LLC v. Google Inc.</i> , 841 F.3d 995 (Fed. Cir. 2016)	11
<i>Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.</i> , 200 F.3d 795 (Fed. Cir. 1999)	7

Statutes

35 U.S.C. § 102	10, 80
35 U.S.C. § 103	9

Other Authorities

37 C.F.R. §42.8(b)	81, 83
37 C.F.R. §42.24	88

LIST OF EXHIBITS

Exhibit No.	Description
1001	U.S. Patent No. 12,216,339 to Villalpando et al. (“’339 patent”)
1002	Excerpts from Prosecution History of the ’339 patent
1003	Declaration of John Feland, Ph.D.
1004	Curriculum Vitae of John Feland, Ph.D.
1005	U.S. Patent App. Publ’n No. 2021/0145340 to Asukai (“Asukai”)
1006	U.S. Patent App. Publ’n No. 2017/0255262 to Liu (“Liu”)
1007	U.S. Patent App. Publ’n No. 2018/0014903 to Shan et al. (“Shan”)
1008	U.S. Patent No. 9,579,060 to Lisy et al. (“Lisy”)
1009	Int’l Patent App. Publ’n No. 2015/127056 to Tanaka et al. (“Tanaka”)
1010	Int’l Patent App. Publ’n No. 2020/144536 to Villalpando et al.
1011	Japanese Patent No. 7185053B2 to Villalpando et al.
1012	Declaration of Philip Schnell for Translation of Excerpts from the File History of Japanese Patent Application No. 2021-539888
1013	English Translation of Excerpts from the File History of Japanese Patent Application No. 2021-539888 from Ex.1012
1014	Int’l Patent App. Publ’n No. 2019/207896 to Asukai (“Asukai’s PCT Counterpart”)
1015	Japanese Patent Application No. 2018-083548 (“Asukai’s Japanese Counterpart”)
1016	Declaration of John Andrews for Translation of Asukai’s Japanese Counterpart

Exhibit No.	Description
1017	English Translation of Asukai’s Japanese Counterpart from Ex.1016
1018	Declaration of John Gaustad

Petitioners Luxottica of America Inc. and Meta Platforms, Inc. (“Petitioners”) request *inter partes* review (“IPR”) of claims 1-16 of U.S. Patent No. 12,216,339 (“’339 patent,” Ex.1001), assigned to Solos Technology Limited (“PO”).

I. INTRODUCTION

The ’339 patent claims are generally directed to (i) receiving first data from a first sensor incorporated into an eyewear device, (ii) receiving second data from an external sensor, (iii) analyzing a user’s state using those data, (iv) determining a user’s context using those data, and (v) providing assistance through the eyewear in the form of feedback related to that context and state. By December 2018, these claimed features were well disclosed in the prior art.

Asukai, for example, discloses combining data from eyewear-incorporated sensors and external sensors to perform the claimed functions. Indeed, the Japanese Patent Office (JPO) rejected nearly identical claims in a Japanese counterpart of the ’339 patent based on Asukai’s disclosure. Rather than dispute that disclosure, PO amended the Japanese claims to add narrowing limitations absent from the challenged claims of the ’339 patent. Although PO filed its U.S. application *after* the JPO’s rejection based on that disclosure, PO never disclosed Asukai to the U.S. Examiner.

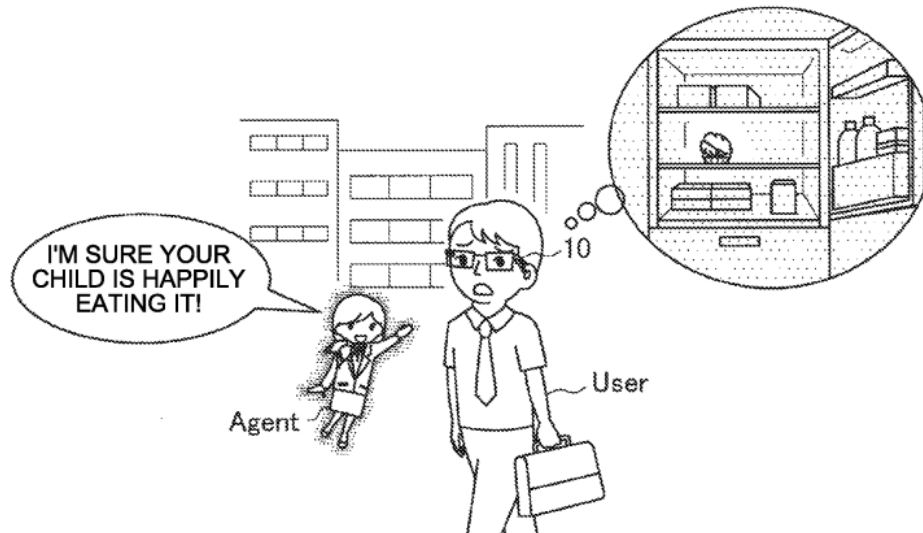
Liu likewise discloses eyewear that uses internal and external sensors to provide the claimed functionality.

As shown herein, the prior art renders all claims of the '339 patent unpatentable. The Board should therefore institute review and cancel claims 1-16.

II. STATE OF THE ART

A. Asukai

Asukai discloses a wearable feedback system including a “spectacle-type HMD [head mounted display] that includes earphones and a see-through display unit.” Ex.1005, [0072]; *see also* [0068], [0114]-[0117].



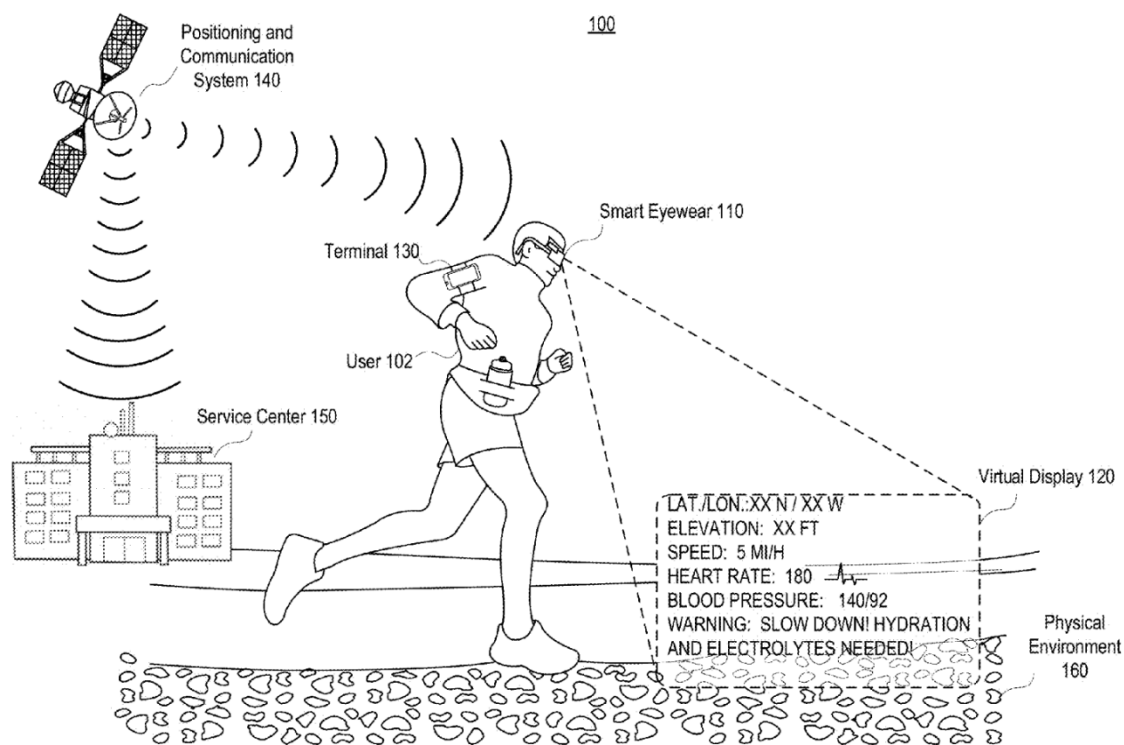
Id., Fig.1 (excerpt).

Asukai’s system includes multiple sensors to collect “various sensing data.” *Id.*, [0069]. Those sensors may include cameras, microphones, acceleration sensors, gyro sensors, location-information acquisition units, biological sensors, gaze sensors, and environmental sensors. *Id.* Asukai’s sensors are located on the spectacle-type HMD, on an external device, or both. *Id.*, [0103] (“[T]he sensor unit

122...may be provided in both the information processing device 10a and the external device”), [0069]; *see also* [0072]. Using information collected from the sensors, the system recognizes a user’s situation and action, determines the user’s emotion, and provides feedback to assist with the user’s state and quality of life. *Id.*, Abstract, [0061]-[0069].

B. Liu

Liu discloses a sports-management system having smart eyewear 110. Ex.1006, [0016]-[0018]. Liu’s eyewear includes wearable biosensors, positioning sensors, and imaging sensors, and works with a separate terminal 130—such as a smartphone, smart watch, smart bracelet, smart camera, or medical device—supplying additional biosensor or camera data. *Id.*, [0017], [0021]-[0023].

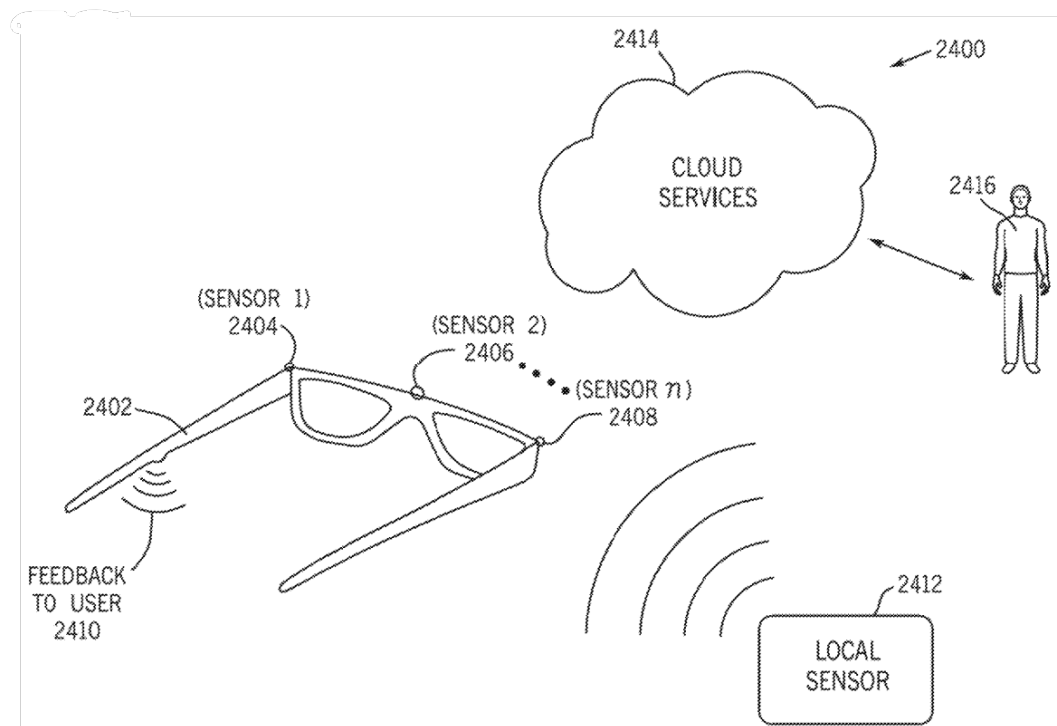


Id., Fig.1. Liu’s eyewear uses these inputs to monitor the user’s physiological reactions, movement, position, and surrounding environment, while also providing exercise and safety advice and issuing alerts or rescue requests when the user’s condition becomes abnormal. *Id.*, [0016]-[0018], [0046], [0050], [0060]-[0062].

III. THE ’339 PATENT

A. Overview

The ’339 patent “provid[es] information to a user through a modularized eyewear device” (Ex.1001, 1:43-46) and uses sensor data associated with the eyewear to determine a user’s context, analyze the user’s state, and provide assistance through the eyewear (*id.*, 1:66-2:17).



Id., Fig.24. According to the '339 patent, the user's state includes health, wellbeing, safety, cognitive, physical, and emotional, while the user's context includes physical orientation, activity, and environment. *Id.*, Figs.18, 21.

B. Prosecution History

1. Related Japanese Application

PO filed Int'l Patent App. No. PCT/IB2020/000021 (Ex.1010), which claims priority to the same three provisional applications as the '339 patent. Ex.1010; Ex.1001. PO entered the Japanese national stage ("339 Japanese Counterpart") based on that PCT application and pursued claims directed to the same core eyewear-based assistance architecture later claimed in the '339 patent. Ex.1011; Ex.1013¹; Ex.1001.

¹ Ex.1012 is the translator's declaration for the English translation submitted as Ex.1013. Ex.1013 translates excerpts from the file history of Japanese Patent Application No. 2021-539888, which is the Japanese national-phase application of Int'l Patent App. No. PCT/IB2020/000021 and issued as Japanese Patent No. 7185053 (Ex.1011). Ex.1018 is a declaration explaining how those file-history excerpts were obtained.

In June 2022, the JPO rejected claims of the '339 Japanese Counterpart based on Int'l Patent App. No. PCT/JP2019/003924 ("Asukai's PCT Counterpart," Ex.1014). Ex.1013, 14-19. Regarding claim 1, the JPO explained:

[T]he invention as in Claim 1 of the present application is the invention described in Cited Document 1 [Asukai's PCT Counterpart]. In addition, the invention as in Claim 1 of the present application could have been easily invented by a person skilled in the art based on the invention described in Cited Document 1 [Asukai's PCT Counterpart].

Id., 15.

Rather than arguing that the then-pending claims were patentable over Asukai's PCT Counterpart, PO amended the Japanese claims to add new limitations, including limitations concerning a "risk level," and argued that those added limitations were "neither disclose[d] nor suggest[ed]" by Asukai's PCT Counterpart.

Id., 20-32.

2. The '339 Patent

After PO amended the Japanese claims in response to the citation of Asukai's PCT Counterpart, PO filed in November 2023 the U.S. application that issued as the '339 patent. Ex.1002, 1-2. During prosecution of the '339 patent, the U.S. Examiner rejected most pending claims as anticipated by U.S. Patent App. Publ'n No. 2016/0066847, but indicated three dependent claims as containing allowable subject

matter. *Id.*, 136-143. PO then amended the independent claims to incorporate that subject matter. *Id.*, 119-125. The '339 patent issued on February 4, 2025. *Id.*, 2.

Asukai, Liu, and their respective counterparts were not before the Examiner during prosecution. Ex.1001.

IV. LEVEL OF ORDINARY SKILL

A hypothetical person of ordinary skill in the art (“POSA”) would have had at least a bachelor’s degree in mechanical or manufacturing engineering; mechatronics; electrical engineering plus coursework in mechanical engineering, manufacturing engineering, or mechatronics; or a similar technical degree. Ex.1003, ¶34. A POSA would have also had at least 2 years of experience designing eyewear and/or consumer electronics. *Id.* Work experience could substitute for formal education, and additional formal education could substitute for work experience. *Id.*

This Petition does not turn on this specific definition of the level of ordinary skill. The claims would have been obvious from the perspective of a POSA under any reasonable definition. *Id.*, ¶35; *see also* ¶¶32-33, 36-38.

V. CLAIM CONSTRUCTION

Petitioners do not believe construction of any term is required beyond the ordinary meaning informed by the intrinsic record. *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co. Ltd.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017); *Vivid Techs.*,

Inc. v. Am. Sci. & Eng’g, Inc., 200 F.3d 795, 803 (Fed. Cir. 1999); *see also* Ex.1003, ¶¶64-71.

Two terms nevertheless warrant brief clarification. First, the ’339 patent describes a user’s “state” as including categories such as “health,” “wellbeing,” “safety,” “cognitive,” “physical,” and “emotional,” with “no limitation implied thereby.” Ex.1001, 23:19-24, Fig.21. Second, the ’339 patent describes the user’s “context” as including “one or more of a physical orientation, an activity, and an environment that the user is in.” *Id.*, 20:34-37, Fig.18. Petitioners use those intrinsic descriptions below to explain how the prior art’s determinations of emotion, physiological status, movement, activity, location, and surroundings fall within the ordinary meaning of the claims. *See Phillips v. AWH Corp.*, 415 F.3d 1303, 1312-13 (Fed. Cir. 2005) (en banc); Ex.1003, ¶¶68-69.

Petitioners use the terms “analyze” and “determine” consistently with the intrinsic descriptions of “analyze state” and “determine context.” *See, e.g.*, Ex.1001, 22:14-19, 22:48, 23:12-13, 25:36-40, 28:50-51, 2:14-15, 26:4, 27:21-25, 27:65, 21:4, 2:13-14, 20:34-41; Ex.1003, ¶70.

VI. STATEMENT OF RELIEF REQUESTED**A. Grounds**

Petitioners request IPR for the following grounds:

Ground	Reference(s)	Basis	Challenged Claim(s)
1	Asukai	§103	1-16
2	Asukai and Shan	§103	11-16
3	Liu	§103	1-10
4	Liu and Shan	§103	11-16
5	Asukai and Lisy	§103	1-16
6	Asukai, Shan, and Lisy	§103	11-16
7	Liu and Lisy	§103	1-10
8	Liu, Shan, and Lisy	§103	11-16

In support of the Petition, Petitioners submit the expert declaration of John Feland, Ph.D. (Ex.1003). *See* Ex.1003, ¶¶1-31, 39-63, 295-296; *see also* Ex.1004.

B. Asserted References

The '339 patent's earliest claimed priority date is December 12, 2018. Ex.1001.

The references are prior art for the following reasons:

Exhibit	Reference	Date	Art Type
1005	Asukai	JP Priority Filed: Apr. 25, 2018	§102(a)(2)
1006	Liu	Filed: Apr. 28, 2016 Published: Sep. 7, 2017	§§102(a)(1)-(2)
1007	Shan	PCT Filed: Dec. 9, 2015 Published: Jan. 18, 2018	§§102(a)(1)-(2)
1008	Lisy	Filed: Dec. 16, 2014 Issued: Feb. 28, 2017	§§102(a)(1)-(2)

Asukai entered the U.S. national stage on October 19, 2020 from Asukai’s PCT Counterpart (Ex.1014), filed February 4, 2019, and claims priority to Japanese Patent Application No. 2018-083548 (“Asukai’s Japanese Counterpart,” Ex.1015; English translation at Ex.1017²), filed April 25, 2018. Ex.1005, Front Page. The disclosures in Asukai relied on herein—including the Title, Abstract, paragraphs [0014]-[0021], [0036], [0061]-[0201], [0258]-[0273], claim 15, and Figures 1-17—are described in Asukai’s Japanese Counterpart at Title, Abstract, [0009]-[0016], [0018]-[0154], claim 15, and Figs.1-17. Accordingly, under 35 U.S.C. §§ 102(a)(2) and 102(d)(2), the Asukai disclosures relied upon herein are effectively filed as of April 25, 2018.

² Ex.1016 is the translator’s declaration for the English translation submitted as Ex.1017.

The references are analogous art at least because they are from the same field as the '339 patent, e.g., wearable systems that sense user condition and provide feedback. Ex.1003, ¶¶72-73; Ex.1001, Abstract; *Unwired Planet, LLC v. Google Inc.*, 841 F.3d 995, 1000 (Fed. Cir. 2016). They are pertinent to a problem the inventors were focused on, e.g., using sensed user state/context to generate assistance to the wearer. Ex.1003, ¶73.

VII. GROUND 1: CLAIMS 1-16 ARE OBVIOUS BASED ON ASUKAI

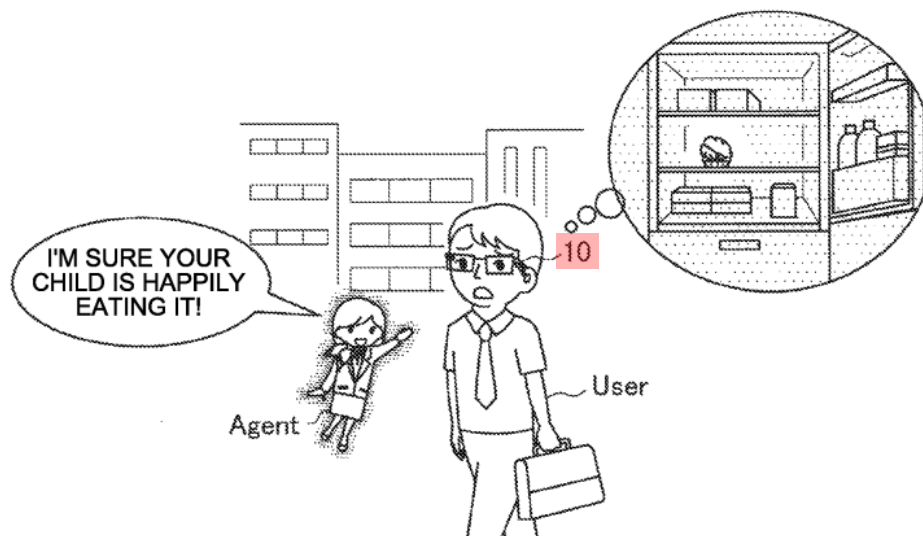
Asukai renders claims 1-16 unpatentable. Ex.1003, ¶¶74-177. Asukai describes information processing device 10 as a head-mounted display (HMD) in the form of eyewear, discloses various information processing device embodiments (e.g., 10a, 10b, 10e) that use sensing data to recognize a user's situation, action, and/or emotion, and explains that sensors may be provided both in information processing device 10 and in an external device communicatively connected to information processing device 10. Ex.1005, Figs.1-2, 7, 10, [0068]-[0069], [0072], [0075], [0097], [0099], [0115]-[0116], [0195]-[0197].

A. Claim 1

1. 1[pre]

To the extent 1[pre] is limiting, Asukai discloses a method to provide assistance to a user through an eyewear device. Ex.1005, [0015], [0061]; Ex.1003, ¶¶86-87; *see also* Ex.1005, Title, Abstract, [0067]-[0068], [0074], Fig.5. For

example, Asukai describes an “information processing device 10” (red), such as a “spectacle-type HMD [head mounted display] that includes earphones and a see-through display unit.” Ex.1005, [0068], [0072]; *see also* [0099], [0114]-[0117]. Asukai’s information processing device is used to determine “whether a user is positive or negative and has any one of a function of promoting an action of the user when it is estimated that the user is positive, [and] a function of suppressing an action of the user when it is estimated that the user is negative.” *Id.*, Abstract.

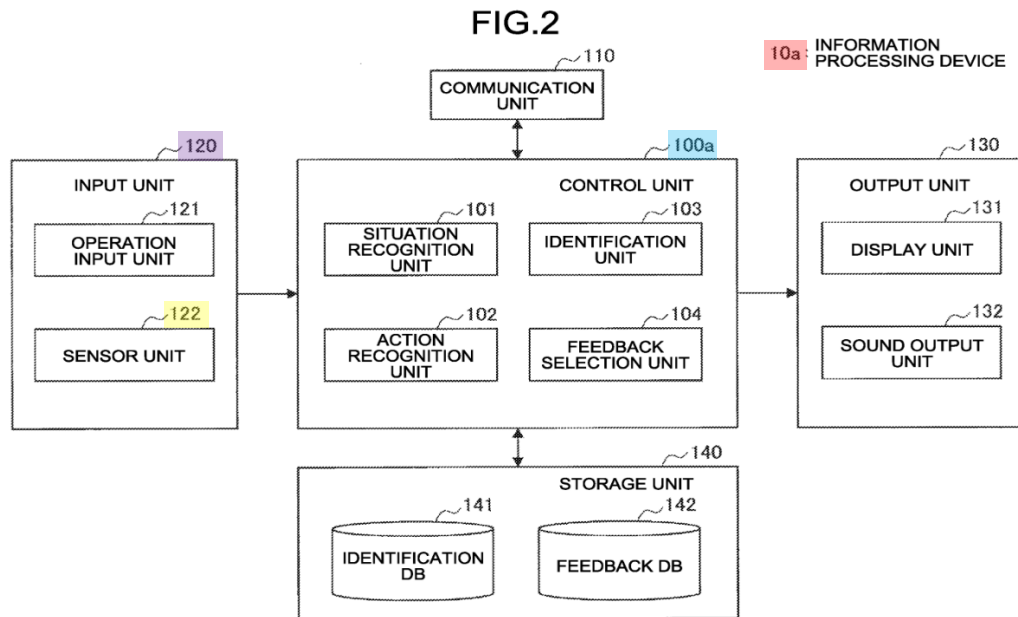


Ex.1003, ¶87(annotating Ex.1005, Fig.1(excerpt)).

2. 1[a]

Asukai discloses, or at least renders obvious, 1[a]: “receiving first data from a first sensor, the first sensor is incorporated into the eyewear device, the first sensor measures a parameter related to the user.” Ex.1003, ¶¶88-95.

As explained for 1[pre], Asukai's information processing device may be implemented as a "spectacle-type HMD." *Supra* §VII.A.1. Asukai's information processing device 10a (red) includes input unit 120 (purple) and sensor unit 122 (yellow), which "senses various types of sensing data for recognizing a user situation or a user action." Ex.1005, [0095], [0097], Fig.2(reproduced below); *see also* [0069], [0072], [0103], [0075]-[0076] ("[T]he information processing system [including information processing device 10] according to the present embodiment will be described in detail by using a plurality of exemplary embodiments [including information processing device 10a]."). Sensor unit 122 includes sensors such as a camera, microphone, acceleration sensor, gyro sensor, location-information acquisition unit, and biological sensor, which measure user-related parameters including motion, voice, gaze, blink, eye movement, brain waves, body movement, body position, heartbeat, pulse, respiration, and SpO2. *Id.*, [0068]-[0069], [0079]-[0084], [0097]. Because Asukai teaches that those sensors may be provided in the information processing device, Asukai discloses an eyewear-incorporated sensor when the information processing device is implemented as the spectacle-type HMD. Ex.1003, ¶90.



Id.(annotating Ex.1005, Fig.2); *see also* Ex.1005, [0069] (“These sensors may be provided in, for example, the information processing device 10.”).

Asukai further discloses receiving first data from that eyewear-incorporated sensor. Input unit 120 “acquires input information for the information processing device 10a and outputs the input information to the control unit 100a [blue].” Ex.1005, [0095]. Control unit 100a uses sensor data to perform situation recognition and action recognition. *Id.*, [0078]-[0084]. Thus, Asukai discloses receiving first data from a sensor, such as an acceleration sensor, gyro sensor, or microphone, incorporated into the eyewear device. Ex.1003, ¶91.

To the extent a particular Asukai example does not repeat that the sensor is incorporated into the spectacle-type HMD, that implementation would have been obvious. *Id.*, ¶92. Asukai repeatedly describes HMD-mounted sensing, including

an HMD camera, microphone near the user's ear, HMD acceleration sensor/GPS, and HMD microphone worn by a parent. Ex.1005, [0080], [0157], [0160], [0197]. A POSA would have implemented the claimed first sensor in the spectacle-type HMD to use Asukai's disclosed placement option to collect the same user-perspective/user-worn data for situation/action recognition and emotion estimation. Ex.1003, ¶92; *see also* ¶¶76-82. That placement would simplify architecture, improve portability and convenience, reduce wiring, and align sensed data with head movement, field of view, and speech direction; HMD acceleration/location sensors correspond to displayed-image orientation/movement, and HMD microphones/cameras capture audio/images from the user's perspective. *Id.*, ¶92. A POSA would have expected success because this uses Asukai's disclosed placement without changing its data flow or feedback architecture. *Id.*, ¶93; *see also* ¶¶83-85.

No separate motivation-to-combine finding is required because Asukai itself discloses sensors in the eyewear device. *See Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1372-73 (Fed. Cir. 2019). Even if characterized as an obvious implementation of Asukai's options, Asukai supplies the rationale and reasonable expectation of success by teaching sensors in the information processing device, implementing that device as a spectacle-type HMD, and using those sensors to collect user-related data for recognition/feedback functions. Ex.1003, ¶¶76-85; *see* Ex.1005, [0069], [0078]-[0084], [0097].

Asukai’s embodiment structure confirms this. Components with substantially the same functional configuration use the same reference signs and are not repeatedly described; Asukai identifies 10 and 10a-10f as information processing devices with common components, including sensor unit 122. Ex.1005, [0036], [0258]-[0269]. It also states that later embodiments may use prior information processing devices and may be combined with earlier embodiments. *Id.*, [0140], [0147], [0161], [0187]. Thus, a POSA would have understood Asukai’s HMD implementation, sensor unit 122, connected-device sensor disclosure, and use-case examples as compatible implementations of the same architecture. Ex.1003, ¶95.

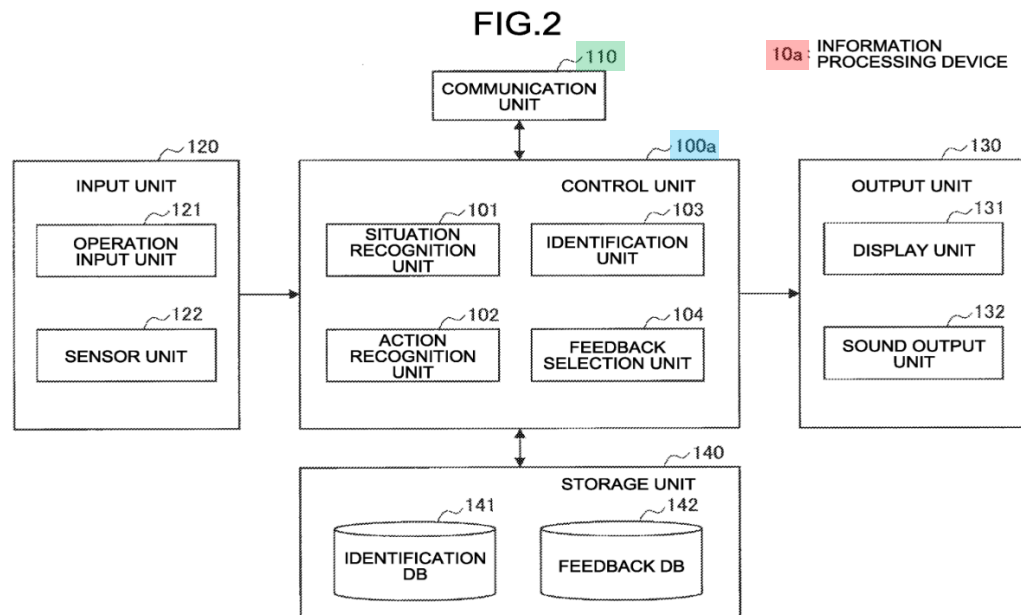
3. 1[b]

Asukai discloses 1[b]: “receiving second data from a second sensor, wherein the second sensor is an external sensor.” Ex.1003, ¶¶96-98.

Asukai discloses using an external sensor separate from the eyewear to collect data used by its information processing device. *Id.*, ¶97. Asukai discloses sensors “may be implemented by another wearable device, a smartphone, or the like that is communicatively connected to the information processing device 10.” Ex.1005, [0069]. Asukai explains “[t]he number of respective sensors may be plural,” and identifies examples of such external sensors, including a global navigation satellite system (GNSS) or smartphone providing location information (*id.*, [0097]), a video camera in a room providing video data, a wearable smart band providing pulse data,

or a room microphone providing audio data (*id.*, [0197]). *Id.*, [0103]; *see also* [0072].

Asukai discloses receiving second data from the external sensor. Ex.1003, ¶98. Asukai’s communication unit 110 (green) “is connected to an external device in a wired or wirelessly [sic] manner, and transmits and receives data to and from the external device” (Ex.1005, [0093]), where that external device includes sensors from the sensor unit 122 (*id.*, [0103]).



Ex.1003, ¶98(annotating Ex.1005, Fig.2). Situation recognition unit 101 of control unit 100a (blue) uses “sensing data acquired from a sensor device (surveillance camera, surveillance microphone, or the like) installed in the vicinity...acquired by the information processing device 10a,” “in addition to the sensing data sensed by the sensor unit 122.” Ex.1005, [0081]; *see also* [0196]-[0197]. Thus, Asukai

discloses receiving first data from a sensor incorporated into the eyewear and receiving second data from a sensor external to the eyewear. Ex.1003, ¶98.

4. 1[c]

Asukai discloses, or at least renders obvious, 1[c]: “analyzing a state of the user, wherein the analyzing uses the first data and the second data.” Ex.1003, ¶¶99-108; *supra* §V (explaining that state includes health, wellbeing, safety, cognitive, physical, and emotional).

Asukai explains “recognition of the situation or action of the user, and the emotion estimation” is performed using “various sensing data,” including camera, microphone, acceleration, gyro, location, biological, gaze, and environmental-sensor data. Ex.1005, [0069]; *see* [0079], [0081]. These sensors may be in information processing device 10 or another wearable device, smartphone, or the like communicatively connected to it. *Id.*, [0069], [0103]. Consistent with that architecture, situation recognition unit 101 may use nearby external-sensor data “in addition to” sensor-unit data; action recognition unit 102 recognizes user action from sensor-unit data; and identification unit 103 identifies user emotion from the recognized situation/action. *Id.*, [0081], [0084]-[0085]. Asukai’s emotion-recognition embodiment likewise recognizes user emotion from sensing data. *Id.*, [0120], [0124]-[0126]. Because the ’339 patent’s “state” includes emotional state, Asukai’s emotion identification/recognition analyzes the user’s state. Ex.1003,

¶100. Accordingly, Asukai discloses analyzing emotional state using the first and second data. *Id.*

To the extent PO argues that an embodiment does not expressly state that emotion analysis uses both eyewear-sensor and external-sensor data, that implementation would have been obvious because their joint use was a predictable use of complementary, known sensor inputs that would improve confidence and reduce ambiguity: user-worn data reflects motion, speech, gaze, biological signals, or head orientation, while external data supplies location, room-camera, or room-audio context. *Id.*, ¶¶101-103; *see* Ex.1005, [0079]-[0085], [0097], [0124], [0196]-[0197]; *see also* Ex.1009, [0012], [0045]-[0046]. That implementation also follows from Asukai’s pipeline, where situation recognition may use external-sensor data in addition to sensor-unit data, action recognition uses sensor-unit data, and emotion is identified from the resulting situation/action. Ex.1003, ¶101; Ex.1005, [0081], [0084]-[0085]. A POSA would have expected success because the implementation uses Asukai’s disclosed sensor data with its recognition and emotion-identification units without changing the control-unit architecture. Ex.1003, ¶101.

The commuting and parenting examples confirm this understanding.

i. Commuting Example

Asukai’s commuting example, described with at least embodiment 10a, discloses or renders obvious this limitation. Ex.1003, ¶¶105-106. Identification unit

103 identifies user emotion as positive or negative, including when the user is “walking with his/her head down during commuting” (Ex.1005, [0114]-[0116]), and that emotion is a claimed user “state” (Ex.1003, ¶105). The emotion is analyzed from a situation/action combination derived from location information and acceleration-sensor information. Ex.1005, [0115]. As explained for 1[a]-1[b], acceleration-sensor data corresponds to first data from the eyewear-incorporated sensor, and location information corresponds to second data from an external sensor/device. *Supra* §§VII.A.2-3. To the extent PO disputes that placement, Asukai renders it obvious by teaching sensors in the spectacle-type HMD and connected external devices. Ex.1003, ¶106. A POSA would have used those data together because location identifies the commuting context, acceleration identifies the walking/head-down action, and Asukai associates that combined situation/action with negative emotion. *Id.*; see Ex.1005, [0115]-[0116].

ii. Parenting Example

Asukai’s parenting example, described with at least embodiment 10e, at least renders this limitation obvious. Ex.1003, ¶¶107-108. Asukai recognizes “user emotion,” a claimed user “state,” based on user-sensing data, including through emotion recognition unit 105, which uses sensing data acquired by sensor unit 122 “and the like.” Ex.1005, [0120], [0124], Fig.7; Ex.1003, ¶107. Asukai analyzes a parent’s negative emotion using multiple sensor inputs, including facial-expression

information from a room camera, pulse-rate data from a smart band, and voice data from a room microphone and/or parent-worn HMD microphone. Ex.1005, [0196]-[0197]. Given Asukai’s teaching that sensor unit 122 may be in both the information processing device and an external device, a POSA would have been motivated to analyze the parent’s emotion using HMD microphone data together with external room-camera, smart-band, and/or room-microphone data because those inputs provide complementary information about the same parenting episode: utterance, facial expression/room context, physiological arousal, and/or ambient audio. Ex.1003, ¶108; *see* Ex.1005, [0103], [0196]-[0197].

5. 1[d]

Asukai discloses, or at least renders obvious, 1[d]: “determining a context of the user, wherein determining uses the first data and the second data.” Ex.1003, ¶¶109-117; *supra* §V (explaining that context includes physical orientation, activity, or environment).

As explained for 1[c], Asukai’s sensor architecture uses inputs from both information processing device 10 and external sensors. *Supra* §VII.A.4. Situation recognition unit 101 recognizes the user’s situation, including “an environment in which the user is placed,” and may use nearby external-sensor data “in addition to” sensor unit 122 data. Ex.1005, [0079], [0081]. Action recognition unit 102 recognizes actions from sensor-unit data, including “stand, sit, walk, run, lie, fall, or

talk.” *Id.*, [0084]. Because the ’339 patent’s “context” includes activity, physical orientation, or environment, Asukai’s situation/environment recognition and action recognition determine user context. Ex.1003, ¶110. Accordingly, where sensor-unit data includes first data from the eyewear-incorporated sensor and external-sensor data includes second data, Asukai discloses determining context using both. *Id.*

To the extent PO disputes that an example uses that pairing, Asukai renders it obvious by teaching sensor data from both information processing device 10 and external devices, a known-input combination that predictably improves confidence and reduces ambiguity. *Id.*, ¶111; *see* Ex.1005, [0069], [0081], [0103]. A POSA would have been motivated to use those data together because user-worn data provides motion, orientation, speech, or activity information, while external data supplies complementary location, room, or environmental context. Ex.1003, ¶¶111-112; *see also* Ex.1009, [0012], [0045]-[0046]. That implementation also follows from Asukai’s task division: situation recognition may use external-sensor data in addition to sensor-unit data, while action recognition uses sensor-unit data, so the resulting context reflects both environmental/situation information and user action/activity. Ex.1003, ¶111; Ex.1005, [0081], [0084]. A POSA would have expected success because the implementation uses Asukai’s disclosed sensor inputs with its situation- and action-recognition units for their intended functions. Ex.1003, ¶111.

Asukai’s commuting and parenting examples confirm that Asukai discloses this limitation or, at minimum, renders it obvious.

i. Commuting Example

Situation recognition unit 101 recognizes from location information that user U2 is in a “commuting” situation, and action recognition unit 102 recognizes from acceleration-sensor information that the user is walking and facing downward. Ex.1005, [0115]. The commuting situation (environment), walking (activity), and downward-facing head (physical orientation) are claimed user “context.” Ex.1003, ¶113.

As explained for 1[a]-1[b], acceleration-sensor data corresponds to first data from the eyewear-incorporated sensor, and location information corresponds to second data from an external sensor/device. *Supra* §§VII.A.2-3. To the extent PO disputes that placement, Asukai renders it obvious by teaching sensors in the spectacle-type HMD and connected external devices. Ex.1003, ¶114; *see* Ex.1005, [0069], [0072], [0103]. A POSA would have used those data together because location identifies the commuting environment, while head-mounted acceleration identifies walking activity and downward head orientation. Ex.1003, ¶114; *see* Ex.1005, [0115].

ii. Parenting Example

Situation recognition unit 101 analyzes video from a camera in the child's room to recognize the room's condition before and after cleaning, and action recognition unit 102 analyzes the parent's uttered voice to recognize that "the parent is scolding the child." Ex.1005, [0196]-[0197]. These determinations identify the child's room/room condition (environment) and scolding (activity). Ex.1003, ¶115. To the extent PO disputes whether the parenting example determines physical orientation, Asukai at least renders that determination obvious. *Id.*, ¶116. Given Asukai's video-based analysis of the parent/child scene, voice-based recognition that the parent is scolding, and facial-expression/other sensor data characterizing the parent's conduct in the same episode, a POSA would have understood Asukai's system to determine the parent's physical orientation, or at minimum would have found it obvious to do so, including that the parent is oriented toward the child while scolding. *Id.*; see Ex.1005, [0196]-[0197]. A POSA would have been motivated to configure Asukai's system to determine the parent's orientation because that information would improve the system's ability to attribute the recognized scolding, facial expression, and conduct to the relevant parent-child interaction, and would have reasonably expected success because the orientation determination could be made using the same camera-based scene analysis and sensor data Asukai already employs. Ex.1003, ¶116.

Asukai determines that context using room-camera video and microphone voice data; the parent's voice may be collected from the parent-worn HMD microphone and/or room microphone. Ex.1005, [0196]-[0197]. As explained for 1[a]-1[b], HMD microphone data corresponds to first data, and room-camera/microphone data corresponds to second data. *Supra* §§VII.A.2-3. Given Asukai's teaching that sensor unit 122 may be in both the information processing device and an external device, a POSA would have been motivated to determine context using HMD microphone data together with external room-camera and/or room-microphone data because those inputs provide complementary information about the same episode: utterance/activity, room condition/visual scene, and/or ambient audio. Ex.1003, ¶117; *see* Ex.1005, [0103], [0196]-[0197].

6. 1[e]

Asukai discloses, or at least renders obvious, 1[e]: “providing assistance to the user, wherein the assistance is in a form of feedback, and wherein the feedback is related to the state and the context.” Ex.1003, ¶¶118-123.

As explained for 1[c]-1[d], Asukai analyzes state by identifying emotion and determines context by recognizing situation/action. *Supra* §§VII.A.4-5. It uses those results to select and provide feedback: the processing flow recognizes situation/action, identifies positive or negative emotion, selects feedback, and provides it. Ex.1005, Fig.5; *see also* [0066]-[0067], [0085]-[0089]. Feedback

selection unit 104 selects feedback based on identification unit 103's result, and the feedback databases associate feedback with situation/action, positive/negative state, type, and content. *Id.*, [0089], Figs.4, 14, 17.

Asukai's feedback assists by improving quality of life through promoting or suppressing an action or presenting a positive interpretation of a situation/action. *Id.*, [0066]-[0067]. The feedback may be sound, image, text, or tactile stimulation, including through a user-worn HMD. *Id.*, [0068], [0074], [0099]. Thus, Asukai discloses assistance related to the user's state and context. Ex.1003, ¶¶119-120.

i. Commuting Example

When the user is “facing down & walking” while “commuting” with negative emotion, feedback selection unit 104 presents visual or auditory feedback through the see-through HMD, such as video on display unit 131 or uncomfortable sound from sound output unit 132, to suppress head-down walking. Ex.1005, [0115]-[0117]; *see also* [0085]-[0089], [0099], Fig.14. This feedback relates to the user's state (negative emotion) and context (commuting/walking/head down) and assists by suppressing or reducing that negative action/situation pattern. Ex.1003, ¶121.

ii. Parenting Example

After recognizing that the parent is scolding a child for not cleaning a room and has a negative emotion, Asukai presents reframing feedback, such as an objective evaluation that the room is cleaner than before. Ex.1005, [0198], Fig.17;

see also [0085]-[0089], [0099]. This feedback relates to the user’s state (emotion) and context (child’s room/scolding/physical orientation toward child) and assists by presenting a positive interpretation of the situation/action to improve the parent’s state or quality of life. Ex.1003, ¶122. To the extent PO argues the parenting example does not expressly deliver feedback through the parent’s HMD, that would have been obvious because Asukai discloses HMD sound, image, or text feedback, and the example includes a parent-worn HMD and suitable reframing feedback. *Id.*, ¶123; Ex.1005, [0068], [0074], [0099], [0197]-[0198].

Thus, claim 1 is unpatentable based on Asukai. Ex.1003, ¶¶86-124.

B. Claims 2-4

Asukai renders claims 2-4 unpatentable for the reasons explained for 1[d]. *Supra* §VII.A.5 (explaining that Asukai discloses or renders obvious context elements recited by claims 2-4, including physical orientation for claim 2 (e.g., lying, facing downward, or obvious determination in parenting example that parent is oriented toward child), activity for claim 3 (e.g., standing, sitting, walking, running, lying, falling, talking, or scolding), and environment for claim 4 (e.g., environment in which user is placed, including commuting situation or child’s room in parenting example)); Ex.1003, ¶¶125-127.

C. Claim 5

Asukai renders claim 5 unpatentable. Ex.1003, ¶¶128-129.

As explained for 1[e], Asukai discloses providing assistance to the user in the form of feedback, including “in a form of sound output.” *Supra* §VII.A.6; Ex.1005, [0074]. In Asukai, output unit 130 of information processing device 10a includes sound output unit 132, which “outputs an agent voice, music, a melody, a sound effect, and the like.” Ex.1005, [0099]. Asukai explains that “a sound may be presented from an earphone of a [HMD]...worn by the user.” *Id.*, [0068].

D. Claim 6

1. 6[pre]

To the extent limiting, Asukai discloses 6[pre]. Ex.1003, ¶¶130-131.

Asukai discloses “a computer program can also be created for causing hardware such as a CPU, a ROM, and a RAM built in the information processing device 10 to function as the information processing device 10,” and further states that “a computer-readable storage medium storing the computer program is also provided.” Ex.1005, [0201]; *see also* [0076]-[0078], [0101]. Asukai likewise discloses that “a recording medium recording a program is provided that causes a computer to function as a control unit.” *Id.*, [0016]; *see also* claim 15.

2. 6[a]-[b]

For the reasons explained for 1[a]-1[b], Asukai discloses, or at least renders obvious, 6[a]-6[b]. *Supra* §§VII.A.2-3; Ex.1003, ¶132.

3. 6[c]-[d]

For the reasons explained for 1[d]-1[e] and claim 5, Asukai discloses, or at least renders obvious, 6[c]-6[d]. *Supra* §§VII.A.5-6, VII.C; Ex.1003, ¶133.

Thus, claim 6 is unpatentable based on Asukai. Ex.1003, ¶134.

E. Claims 7-9

For the reasons explained for claims 2-4, respectively, Asukai renders claims 7-9 unpatentable. *Supra* §VII.B; Ex.1003, ¶135.

F. Claim 10

For the reasons explained for claims 1 and 5, Asukai renders claim 10 unpatentable. *Supra* §§VII.A, VII.C; Ex.1003, ¶136.

G. Claim 11

1. 11[pre]

To the extent limiting, Asukai discloses 11[pre]. Ex.1003, ¶¶137-138.

As explained for 1[pre], Asukai's information processing device 10 provides assistance to a user through an eyewear device. *Supra* §VII.A.1.

The components of information processing device 10a include control unit 100a, input unit 120, output unit 130, storage unit 140; control unit 100a controls the overall operation of the information processing device 10a according to various programs, thereby executing the disclosed assistance functions. Ex.1005, [0076]-[0078]; *see also* [0073], [0101], [0036], [0258].

2. 11[a]

Asukai discloses, or at least renders obvious, 11[a]. Ex.1003, ¶¶139-142.

Asukai discloses a voice interface having a microphone and speaker. Asukai’s “input unit 120 acquires input information for the information processing device 10a,” and sensor unit 122 includes a “microphone.” Ex.1005, [0095], [0097]. Asukai’s output unit 130 outputs feedback to the user and includes sound output unit 132, which outputs “an agent voice, music, a melody, a sound effect, and the like,” and “may be a directional speaker.” *Id.*, [0099]; *see also* [0068], [0072].

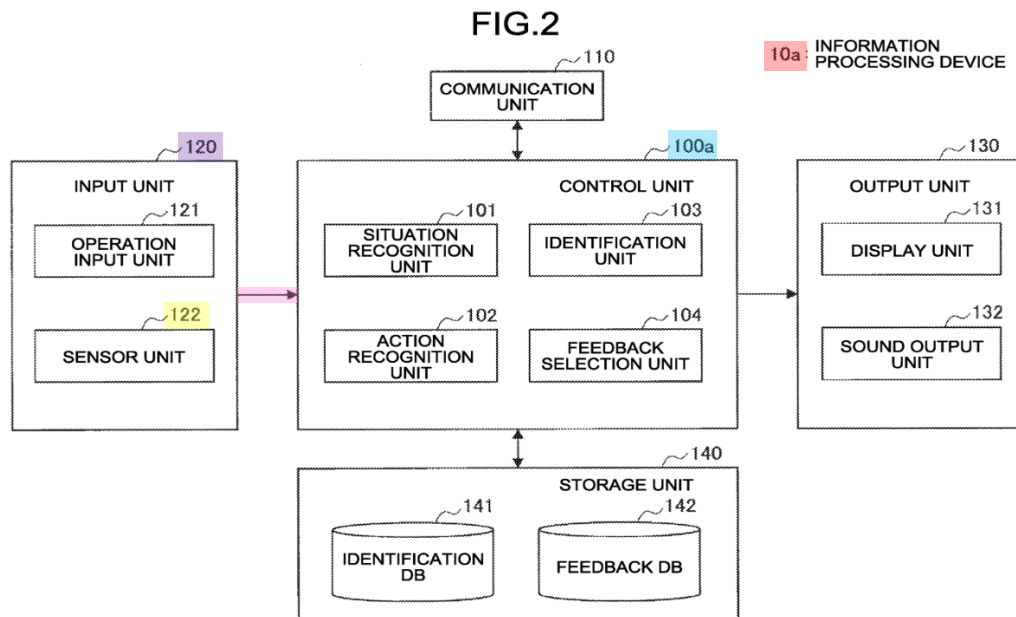
Asukai also discloses receiving user commands under the ’339 patent’s usage, which includes a voice interface that “convert[s] the user’s voice signals to commands” to the device, such as “select caller,” “place call,” “volume up,” “volume down,” and “end call.” Ex.1003, ¶141; *see* Ex.1001, 14:18-24. 11[a] recites a voice interface “to receive user commands.” Asukai likewise receives user voice signals and uses them to drive system action: in the parenting example, action recognition unit 102 analyzes the parent’s uttered voice collected from a microphone to recognize that the parent is scolding the child, and the system uses that recognized voice-based action to select and provide reframing feedback. Ex.1005, [0197]-[0198]. Thus, Asukai’s microphone-based interface—which collects user utterances used by the system to trigger responsive assistance—satisfies the claimed voice interface configured to receive user commands. Ex.1003, ¶141.

At minimum, to the extent Asukai does not expressly disclose the voice interface receiving user commands, implementing Asukai’s microphone/speaker interface to receive spoken user commands and provide assistance would have been obvious. *Id.*, ¶142. Asukai identifies known voice-agent functionality in which an agent “recognizes an uttered voice of the user” and responds to a user “question or request,” improves that agent framework by selecting feedback based on the user’s situation, action, and emotion, and further teaches that feedback processing may be terminated by “an explicit termination instruction from the user.” Ex.1005, [0061]-[0068], [0111], [0144]. A POSA would have understood such user questions, requests, and instructions to be user commands, and would have been motivated to receive those commands through Asukai’s disclosed HMD microphone and provide responsive assistance through Asukai’s disclosed sound output unit, including “agent voice” output, because spoken commands provide a natural hands-free interface for a spectacle-type HMD that already receives audio input and provides auditory feedback. Ex.1003, ¶142; *see* Ex.1005, [0068], [0072], [0097], [0099]. A POSA would have had a reasonable expectation of success because the implementation uses Asukai’s disclosed components for their ordinary functions without changing Asukai’s feedback-assistance architecture. Ex.1003, ¶142.

3. 11[b]

Asukai discloses 11[b]. Ex.1003, ¶¶143-145.

As explained for 1[a], Asukai’s input unit 120 includes sensor unit 122, acquires input information for information processing device 10a, and outputs that input information to control unit 100a. *Supra* §VII.A.2. Asukai further explains that “sensor unit 122 is a sensor that senses various types of sensing data for recognizing a user situation or a user action,” including data from a camera, microphone, acceleration sensor, biological sensor, location information acquisition unit, and environment sensor. Ex.1005, [0097]. Figure 2 shows input unit 120 (purple), including sensor unit 122 (yellow), providing such sensor-derived input information (pink) to control unit 100a (blue):



Ex.1003, ¶145(annotating Ex.1005, Fig.2); *see also* Ex.1005, [0095].

4. 11[c]

Asukai discloses, or at least renders obvious, 11[c]. Ex.1003, ¶¶146-150.

Asukai discloses a processor. *Id.*, ¶147. Control unit 100a “functions as an arithmetic processing device and a control device,” “controls an overall operation” of information processing device 10a “according to various programs,” and is implemented by “a central processing unit (CPU) or a microprocessor.” Ex.1005, [0077].

Asukai’s processor is in electrical communication with the sensor-data and voice-interface components. Ex.1003, ¶¶148-149. As explained for 11[a]-[b], input unit 120 includes sensor unit 122, which may include a microphone, acquires input information, and outputs that information to control unit 100a. *Supra* §§VII.G.2-3; Ex.1005, [0095], [0097]. Control unit 100a uses sensor-derived information for situation recognition, action recognition, and emotion identification. Ex.1005, [0078]-[0085]. Output unit 130 includes sound output unit 132 and “output[s] feedback to the user under the control of the control unit 100a.” *Id.*, [0099]. Figure 2 likewise shows input unit 120 and output unit 130 connected to control unit 100a. *Id.*, Fig.2. A POSA therefore would have understood the processor to be in electrical communication with the sensor-data input and microphone/speaker voice-interface components. Ex.1003, ¶149.

To the extent PO argues Asukai does not use the phrase “electrical communication,” such communication would have been obvious. *Id.*, ¶150. A POSA would have understood Asukai’s CPU/microprocessor to receive electrical

signals or data representing sensor/microphone input and to control the sound output unit/speaker to provide feedback in order to operate Asukai's recognition and feedback functions. *Id.*; see Ex.1005, [0077]-[0085], [0095], [0097], [0099], Fig.2. Implementing those ordinary electrical/data connections would have been a predictable use of known processor-interface connections for their ordinary functions. Ex.1003, ¶150.

5. 11[d]

Asukai discloses 11[d]. Ex.1003, ¶¶151-152.

As explained for 6[pre], Asukai discloses a computer program that causes a computer to function as the disclosed control unit, and, as explained for 11[c], control unit 100a is a CPU or microprocessor that controls the overall operation of information processing device 10a according to various programs. *Supra* §§VII.D.1, VII.G.4. For the reasons explained for 1[c]-1[d], Asukai's computer program and processor cause the data processing system to perform the recited processing steps. *Supra* §§VII.A.4-5; Ex.1003, ¶152.

6. 11[e]-11[i]

For the reasons explained for 1[a]-1[e], Asukai discloses, or at least renders obvious, 11[e]-11[i]. *Supra* §§VII.A.2-6; Ex.1003, ¶153.

Thus, claim 11 is unpatentable based on Asukai. Ex.1003, ¶154.

H. Claim 12

Asukai renders claim 12 unpatentable. Ex.1003, ¶¶155-157.

As explained for 1[c], and incorporated through claim 11, Asukai renders obvious analyzing the user’s emotional state. *Supra* §§VII.A.4, VII.G. Asukai further describes identifying the user’s emotion as positive or negative. Ex.1005, [0021], [0135].

In Asukai’s commuting and parent-scolding examples, the analyzed state includes the user’s state (emotion), as explained for 1[c]. *Supra* §VII.A.4; *see also* Ex.1005, [0081], [0103], [0105], [0115]-[0117].

I. Claim 13

Asukai renders claim 13 unpatentable. Ex.1003, ¶¶158-162.

As explained for claim 12, Asukai discloses analyzing the user’s emotional state and identifying it as negative. *Supra* §VII.H. Asukai explains that “an excessive negative emotion leads to stress and may adversely affect an immune system or the like.” Ex.1005, [0061]. That is a negative condition within the meaning of claim 13. Ex.1003, ¶159; *see also* Ex.1001, 20:57-61.

Asukai also discloses providing assistance designed to correct that negative condition. Ex.1003, ¶160. Asukai explains that “it is possible to make a state of a user better and improve quality of life by providing feedback corresponding to an emotion of the user.” Ex.1005, [0066]. When the user’s emotion is negative,

feedback selection unit 104 selects feedback to “suppress the action” of the user. *Id.*, [0090]. Asukai further discloses “reframing” feedback that “presents a positive interpretation with respect to a situation or action that the user perceives as negative.” *Id.*, [0067]-[0068]. Therefore, Asukai discloses feedback that is expressly designed to improve the user’s negative state and thereby help correct the underlying negative condition. Ex.1003, ¶160.

In Asukai’s commuting example, Asukai’s control unit provides assistance to suppress the action of walking with his/her head down while commuting. Ex.1005, [0115]-[0117]; *see also* [0099], [0081], [0103], [0105], [0115]-[0117].

In Asukai’s parenting example, Asukai’s control unit provides assistance including reframing feedback to correct the negative condition. *Supra* §VII.A.6; Ex.1005, [0197]-[0198]; *see also* Ex.1005, [0099].

J. Claim 14

Asukai renders claim 14 unpatentable. Ex.1003, ¶¶163-167.

As explained for claim 12, Asukai discloses analyzing the user’s emotional state and identifying it as positive. *Supra* §VII.H. Asukai explains that “having a positive emotion has a good influence on the immune system or the like, and can be said as a more favorable state.” Ex.1005, [0061]. That is a positive condition within the meaning of claim 14. Ex.1003, ¶164; *see also* Ex.1001, 20:63-66.

Asukai discloses providing assistance designed to encourage a positive condition. Ex.1003, ¶165. Asukai explains that “it is possible to make a state of a user better and improve quality of life by providing feedback corresponding to an emotion of the user.” Ex.1005, [0066]. When the user’s emotion is positive, feedback selection unit 104 selects feedback to “reinforce the action” of the user. *Id.*, [0090]. Asukai likewise discloses positive feedback promoting a user’s action. *Id.*, [0014], [0067]. This feedback is expressly designed to encourage and reinforce the user’s positive state. Ex.1003, ¶165.

In the commuting example, when the user is walking with his/her head up and in a positive emotional state, Asukai’s control unit provides assistance to reinforce that action by playing favorite music. Ex.1005, [0114], [0116]-[0117]; *see also* [0099], [0081], [0103], [0105], [0115].

In the parenting example, Asukai’s control unit provides assistance including reframing feedback to encourage a positive condition. *Id.*, [0197]-[0198]; *see also* [0099]. Asukai explains that such reframing “presents a positive interpretation with respect to a situation or action that the user perceives as negative.” *Supra* §VII.A.6; Ex.1005, [0067]-[0068].

K. Claim 15

Asukai renders claim 15 unpatentable. Ex.1003, ¶¶168-169.

As explained for 11[pre], Asukai's information processing device may be implemented by a spectacle-type HMD. *Supra* §VII.G.1. Asukai further discloses its system “may be implemented by a plurality of devices” and that “an arbitrary output device may provide feedback as appropriate.” Ex.1005, [0073]. For example, “while the user is at home, a speaker device or display device...in the room mainly provides the feedback, but while the user is outside the home, a smartphone, a smart band, a smart earphone, or the like mainly provides the feedback.” *Id.* Asukai also discloses that communication unit 110 “is connected to an external device in a wired...manner” and “transmits and receives data to and from the external device.” *Id.*, [0093]. As explained for 1[e], Asukai's feedback is the claimed “assistance” because it is feedback related to the user's state and context. *Supra* §VII.A.6. These disclosures describe an external device, external to the eyewear device, that is in electrical communication with the eyewear device and used to provide the assistance to the user. Ex.1003, ¶169.

L. Claim 16

Asukai renders claim 16 unpatentable. Ex.1003, ¶¶170-177.

As explained for 11[b] and 1[a], Asukai discloses receiving data from plural embedded sensors. *Supra* §§VII.G.3, VII.A.2. Information processing device 10 may be a spectacle-type HMD, sensor unit 122 may be provided in device 10, and “[t]he number of respective sensors may be plural.” Ex.1005, [0069], [0072],

[0097], [0103]. Sensor unit 122 includes, e.g., camera, microphone, acceleration, gyro, gaze, location-information acquisition unit, biological, and environmental sensors. *Id.*, [0069], [0097]. Thus, Asukai’s HMD receives data from a plurality of embedded HMD sensors.³ Ex.1003, ¶171.

Asukai uses such data to determine context and analyze state. *Id.*, ¶172. As explained for 1[c]-1[d], situation/action recognition units 101/102 determine the user’s situation/action, i.e., context, and identification unit 103 identifies emotion, i.e., state, based on that situation/action. *Supra* §§VII.A.4-5; Ex.1005, [0079]-[0085]. The emotion-recognition embodiment likewise recognizes emotion from sensing data acquired by sensor unit 122 “and the like.” Ex.1005, [0120], [0124]-[0126]. The first data may be from one embedded HMD sensor, such as an acceleration sensor or HMD microphone, and the third data from additional embedded HMD sensors, such as camera, gaze, gyro, and/or biological sensors. Ex.1003, ¶172.

To the extent PO argues Asukai lacks an express same-data disclosure in each example, using the same first/third data for both determining and analyzing would have been obvious. Ex.1003, ¶173. Asukai discloses a multi-sensor HMD

³ The ’339 patent discloses that “embedded” sensors are “embedded in an eyewear device.” Ex.1001, 23:13-14.

architecture for recognizing situation, action, and emotion from sensing data. A POSA would have been motivated to use multiple embedded HMD sensors together for complementary information about motion, orientation, gaze, speech, visual environment, and biological condition. *Id.*; see Ex.1005, [0069], [0079]-[0085], [0097], [0124]-[0126]. Success was reasonably expected because this uses Asukai's sensors and recognition units for their intended functions and predictably improves context/state accuracy and reliability. Ex.1003, ¶173.

In the commuting example, acceleration-sensor data may be the first data, and the third data may include additional embedded-HMD data, such as gaze, camera, gyro, and biological data. *Id.*, ¶¶174-175. Using the same data for context and state would have been obvious: acceleration with gaze/camera/gyro data would identify or confirm walking and downward head/eye orientation while commuting, supporting context; the same data would support identifying negative emotion because Asukai associates walking with the head down during commuting with negative emotion and teaches emotion recognition from biological, gaze/eye-movement, brain-wave, and other sensing data. *Id.*; see Ex.1005, [0097], [0115]-[0116], [0124]-[0126].

The parenting example confirms the same point. HMD-microphone voice data may be the first data, and the third data may include additional embedded-HMD data, such as biological, gaze, camera, gyro, and/or orientation data. Ex.1003, ¶176;

see Ex.1005, [0069], [0097], [0103]. Those data would help recognize scolding and determine the parent’s conduct, orientation, and child-room scene for context; the same microphone, biological, gaze, and/or other sensor data would help identify the parent’s negative emotion, consistent with Asukai’s use of uttered-voice, facial-expression, and pulse-rate data. Ex.1003, ¶176; *see* Ex.1005, [0196]-[0197].

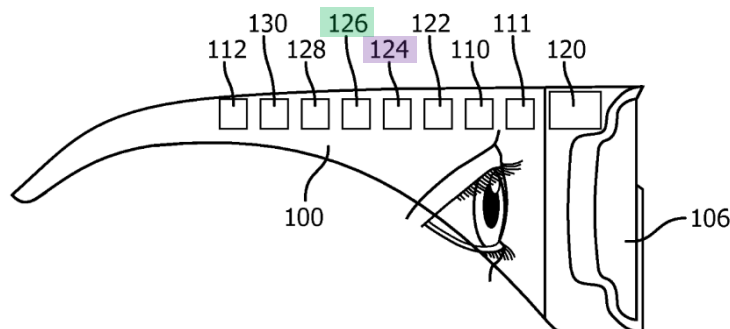
Accordingly, Asukai discloses, or at least renders obvious, receiving third data from a plurality of embedded sensors and using both the first data and the same third data to determine the user’s context and analyze the user’s state. Ex.1003, ¶177.

VIII. GROUND 2: CLAIMS 11-16 ARE OBVIOUS BASED ON ASUKAI AND SHAN

To the extent PO contends that Asukai does not disclose “voice interface to receive user commands,” it would have been obvious to implement Asukai’s HMD-based microphone/speaker voice interface to receive user commands in further view of Shan. Ex.1003, ¶¶178-183.

A. Overview of Shan

Shan discloses a head-mountable computing device having “a microphone 124 [purple] for capturing the wearer’s spoken instruction or the conversations...[and] a speaker 126 [green] for allowing the wearer to hear the audio information generated by the head-mountable computing device 100.” Ex.1007, [0037]; *see also* Abstract, [0007]-[0014], [0031]-[0039].



Ex.1003, ¶179(annotating Ex.1007, Fig.2). Shan’s wearer controls the head-mountable device using spoken or audio commands: a starting command may be triggered by “spoken instruction via the microphone 124,” and the wearer may choose assistance information by “sending audio commands to the head-mountable computing device 100.” Ex.1007, [0041], [0051].

B. Claims 11-16

Shan’s HMD includes a microphone for capturing the wearer’s “spoken instruction” and a speaker for providing audio information to the wearer. Ex.1007, [0037]. Shan further describes user commands received through that microphone, including a starting command triggered by “spoken instruction via the microphone 124” and user selection of assistance information by “sending audio commands to the head-mountable computing device 100.” *Id.*, [0041], [0051].

A POSA would have been motivated to implement Asukai’s HMD-based microphone/speaker voice interface to receive spoken user commands, as taught by Shan, because both references disclose head-mounted assistance devices and spoken commands provide natural, hands-free control for such systems. Ex.1003, ¶180; *see*

Ex.1005, [0068], [0072], [0097], [0099]; Ex.1007, [0001], [0010]-[0014], [0037], [0041], [0051]. A POSA would have recognized the teachings’ compatibility because Asukai already discloses a voice-enabled HMD, and Shan applies spoken-instruction functionality to the same type of head-mounted user-assistance device. Ex.1003, ¶180. The implementation would predictably improve usability by allowing instructions without manual input in a portable, hands-free eyewear system. *Id.*

A POSA would have had a reasonable expectation of success because the combination uses Shan’s known HMD spoken-command functionality with Asukai’s disclosed HMD microphone, speaker/sound-output unit, and feedback-assistance architecture for their ordinary purposes. *Id.*, ¶181. It would not require substantial redesign or change Asukai’s principle of operation, but would use conventional audio acquisition, speech processing, and command-interpretation techniques within Asukai’s existing voice-enabled HMD architecture to predictably receive and process spoken user commands. *Id.*, ¶182.

Accordingly, Asukai and Shan render claim 11 obvious. *Id.*, ¶183. Claims 12-16 are obvious for the same reasons set forth in Ground 1 because Shan is relied on for the “voice interface to receive user commands” of 11[a], and the combination does not alter Asukai’s disclosure of the remaining limitations. *Id.*; *supra* §§VII.H-L.

**IX. GROUND 3: CLAIMS 1-10
ARE OBVIOUS BASED ON LIU**

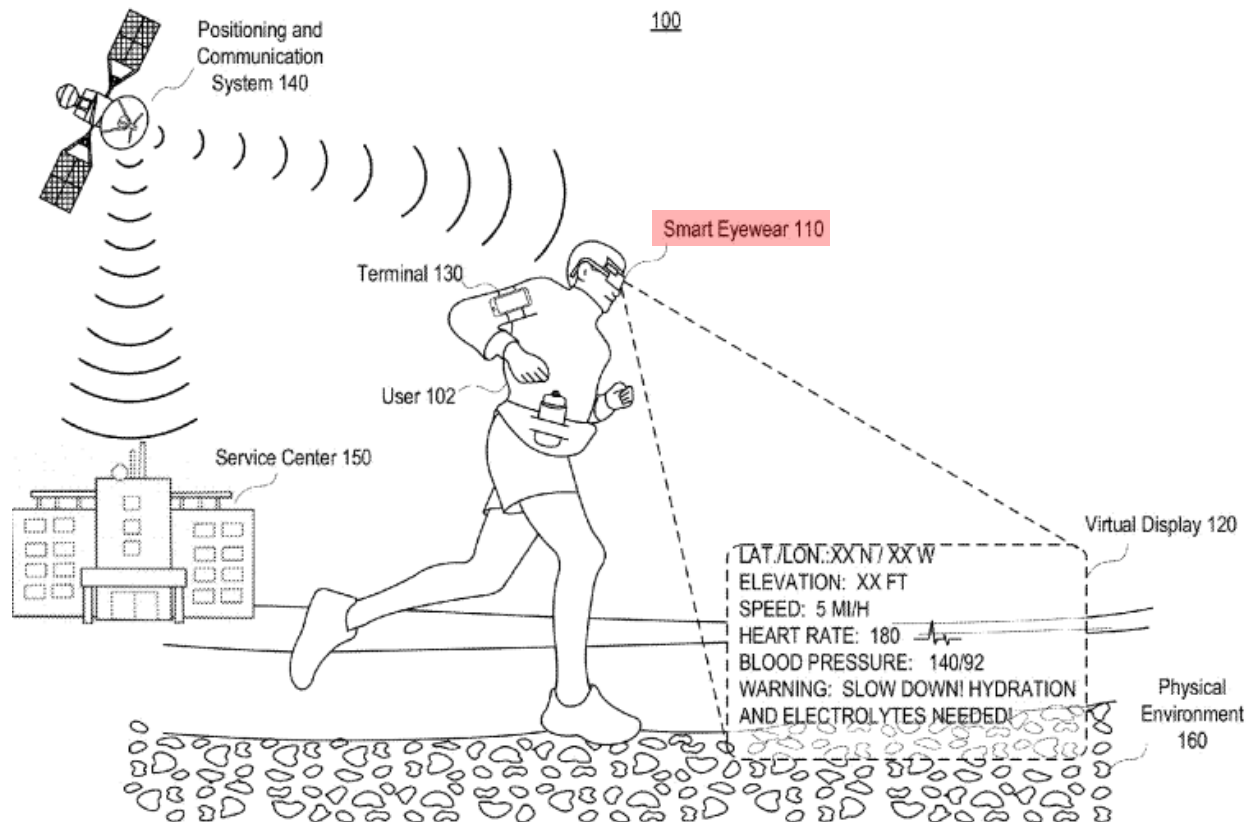
Liu renders claims 1-10 unpatentable. Ex.1003, ¶¶184-237. Liu discloses smart sports eyewear with eyewear-incorporated sensors and a separate terminal having additional external sensors, which together collect physiological, movement, position, orientation, location, and environment data. Ex.1006, [0016]-[0024], [0034]-[0038], [0047], [0059]-[0062]. Liu uses that data to evaluate the user’s physiological condition/status, determine the user’s movement/activity, physical orientation, location, and environment, and provide health-, safety-, navigation-, warning-, and emergency-related feedback through the eyewear. *Id.*, [0016]-[0018], [0020], [0046], [0050], [0060]-[0062].

A. Claim 1

1. 1[pre]

Liu discloses 1[pre]. Ex.1003, ¶¶189-191.

Liu describes “a sports management system 100” in which “smart eyewear 110” (red) is worn by “user 102” and performs a sports management method. Ex.1006, [0016], [0007]; *see also* [0014], [0017]-[0018], [0058], Title, Fig.5 (illustrating flowchart of sports management method performed by smart eyewear 110).



Ex.1003, ¶190(annotating Ex.1006, Fig.1).

Liu’s method assists the user with smart eyewear 110 (eyewear device) by “provid[ing] alert, advise, navigation, and rescue assistance to the user, so as to ensure the exercise safety for the user.” Ex.1006, [0062]. Specifically, Liu “monitor[s] and collect[s] information regarding the physiological reactions of a user 102,” “analyze[s] the physiological reactions in real time and provide health and safety-related advice to user 102,” “collect[s] information regarding the surrounding physical environment and the position of user 102, and provide navigation for user 102,” and “enable[s] the communication between user 102 and a third party, such as a rescue team or a doctor, so as to facilitate the search, rescue, and medical treatment

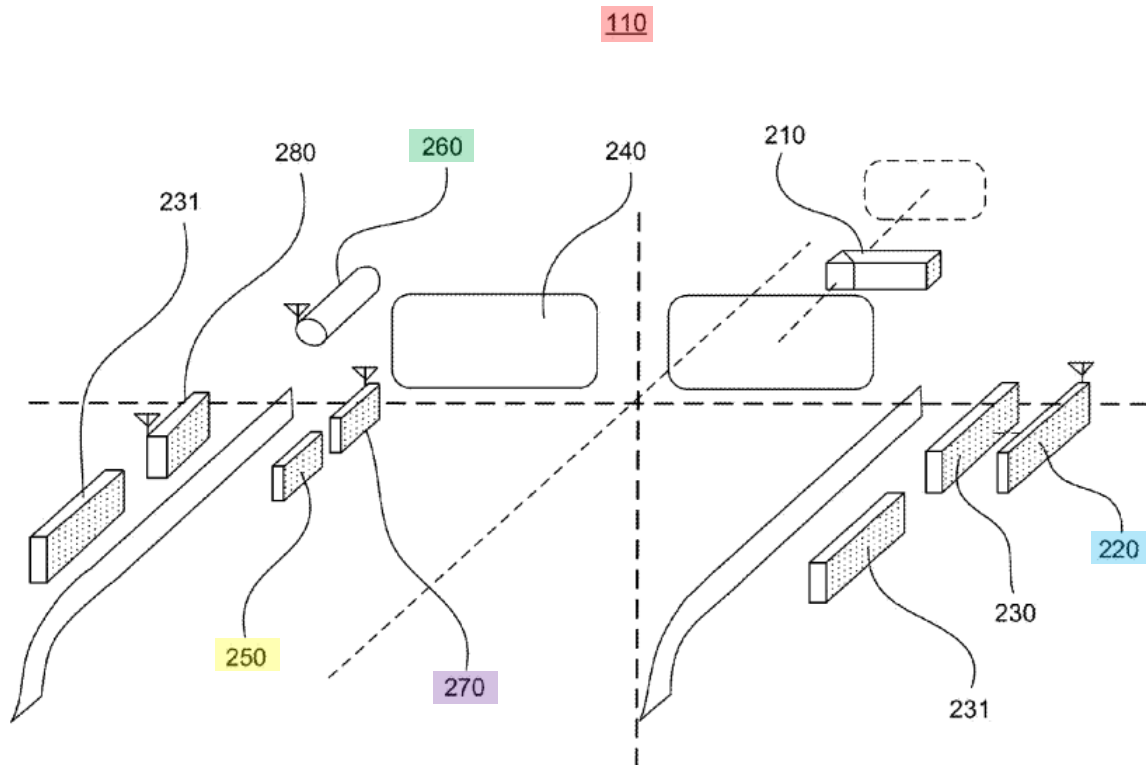
of user 102 during an emergency.” *Id.*, [0016]. Liu provides assistance through the eyewear 110 by “display[ing] a combination of graphics and texts to describe user 102’s real-time physiological conditions, to provide exercise advices [sic], to indicate user 102’s location, etc.” and when the user has over exercised and is dehydrated, “display[ing] a warning message alerting user 102 to slow down and take water and electrolytes.” *Id.*, [0018].

2. 1[a]

Liu discloses 1[a]. Ex.1003, ¶¶192-195.

Liu’s smart eyewear 110 (red) includes sensor module 250 (yellow) with “one or more biosensors configured to generate various signals quantitatively indicative of the [user’s] physiological conditions” (Ex.1006, [0034]) and “one or more sensors to provide status assessments of the [user’s] movement” including the eyewear’s position, orientation, acceleration, or velocity (*id.*, [0035]). *Id.*, Fig.2 (reproduced below), [0026]; *see also* [0017]. Liu discloses smart eyewear 110 with imaging module 260 (green), which includes an “outward-facing camera/image sensor to generate image data about physical environment 160” or “user-facing eye tracking sensors configured to monitor and/or track a viewing direction of user 102 based on the position of one or both of user 102’s eyes.” *Id.*, [0036]-[0037]. Liu’s smart eyewear 110 further includes a locating module 270 (purple), which “include[s] any device capable of providing a signal that indicates the location of smart eyewear

110,” such as a GNSS receiver or a GPS device, and provides data to improve accuracy of position and velocity computations. *Id.*, [0038].



Ex.1003, ¶193(annotating Ex.1006, Fig.2).

Any of these biosensors, status-assessment sensors, cameras/image sensors, or locating devices meet the claimed first sensor and measure a parameter related to the user, including the user’s physiological parameters, status assessments, location, and eye direction. *Id.*, ¶194. Moreover, these sensors are incorporated into the eyewear 110 because they are “attached, for example, to a temple or brow bar of the frame” (Ex.1006, [0028]), or positioned in the smart eyewear’s “slots, ports, and/or

interfaces” for “allow[ing] convenient installation and uninstallation” (*id.*, [0040]).

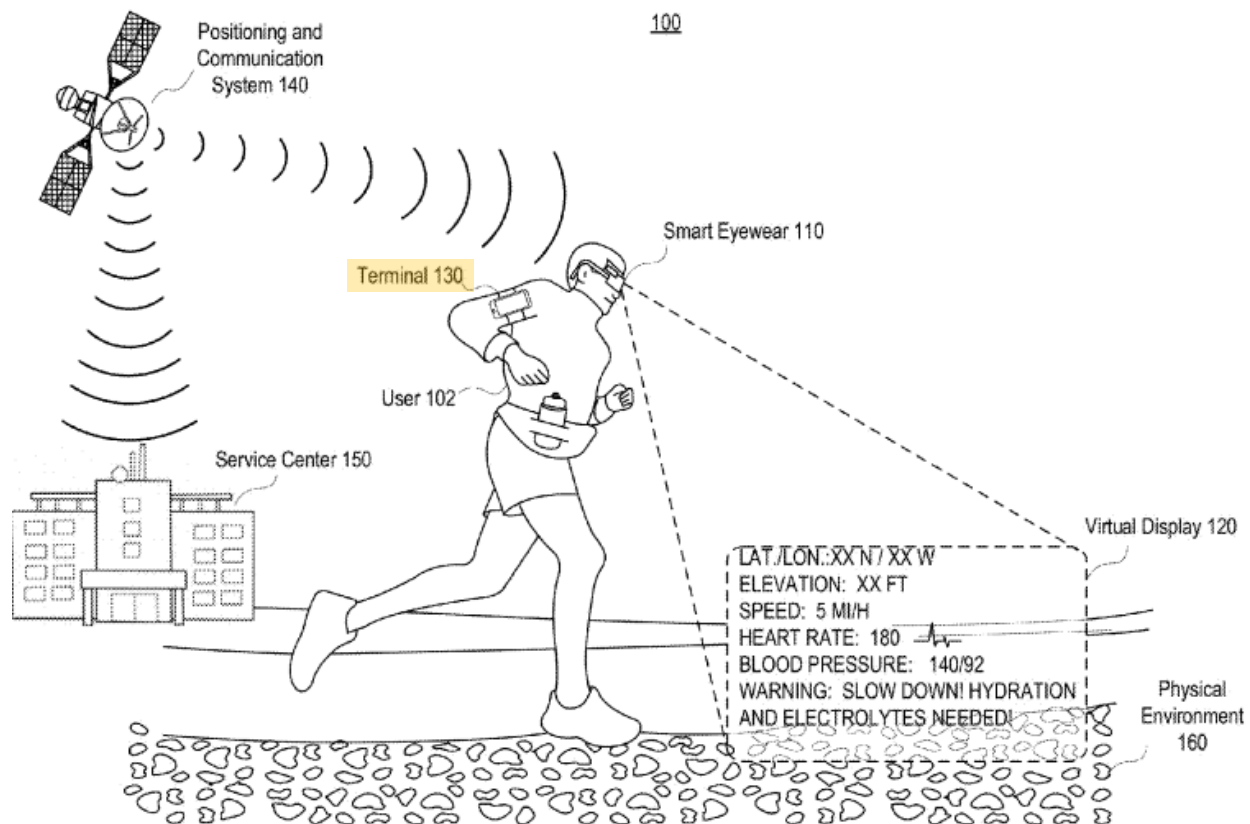
See id., [0062] (“[S]mart eyewear is integrated with multiple sensors.”).

Liu’s controller 220 (blue) receives data from the sensor module 250, imaging module 260, and locating module 270 by “establish[ing] wireless or wired communication” and “exchang[ing] data, signals, and commands with these components and/or devices.” *Id.*, [0030]; *see also* [0059], [0044]-[0045].

3. 1[b]

Liu discloses 1[b]. Ex.1003, ¶¶196-198.

Liu discloses second sensors external to smart eyewear 110. Ex.1003, ¶197. Liu’s sports management system 100 includes smart eyewear 110 and a separate terminal 130, such as “a smart phone..., a smart watch, a smart bracelet, a smart camera,...a medical device.” Ex.1006, [0021], Fig.1. Liu explains terminal 130 (orange) includes “various biosensors configured to detect physiological reactions of user 102 during exercise” and “high-resolution cameras configured to film physical environment 160” (*id.*, [0022]).



Ex.1003, ¶197(annotating Ex.1006, Fig.1). Those sensors in terminal 130, including the terminal’s camera and biosensors, each satisfy the claimed second sensor, and they are external sensors because terminal 130 is separate from smart eyewear 110. *Id.*

Liu discloses receiving second data from the external sensor. Ex.1003, ¶198. Terminal 130 communicates with smart eyewear 110, including “in a wired or wireless manner,” and transmits “various information, such as the detected physiological reactions,” to smart eyewear 110. Ex.1006, [0023]; *see also* [0024]. Liu’s controller 220 receives data from the external sensors by “establish[ing] wireless or wired communication with...(for example, terminal 130), and exchange

data, signals, and commands with these components and/or devices.” *Id.*, [0030]; *see also, e.g.*, [0041]-[0043], [0053], Fig.3.

4. 1[c]

Liu discloses, or at least renders obvious, 1[c]. Ex.1003, ¶¶199-207.

Liu analyzes the user’s “state” by evaluating physiological condition and exercise status. Ex.1003, ¶200. Liu’s sports management system “monitor[s] and collect[s] information regarding the physiological reactions of a user 102 during indoor or outdoor sports activities” and “analyze[s] the physiological reactions in real time.” Ex.1006, [0016]. Liu teaches smart eyewear integrated with “multiple sensors and devices” to provide a “comprehensive evaluation of a user’s status during exercises.” *Id.*, [0062]. This “status” corresponds to the claimed user “state” and includes determining, for example, that the user is over-exercised or dehydrated, has suffered injury or an adverse reaction, has abnormal physiological conditions, or is experiencing an emergency. Ex.1003, ¶200; *see* Ex.1006, [0018], [0025], [0050], [0060]-[0061], Fig.5, claims 14, 22. Those conditions correspond to the ’339 patent’s “state” categories, including health, wellbeing, safety, and physical state. Ex.1003, ¶200; *see* Ex.1001, 23:19-24, Fig.21.

Liu discloses analyzing that state using sensor-derived physiological, movement, position/location, and image/environment data. Ex.1003, ¶201. For example, Liu determines whether an emergency occurred based on “the

physiological conditions, movement, and position of user 102, and/or images of physical environment 160.” Ex.1006, [0061]; *see also* [0050], Fig.5. Liu collects those data from smart eyewear 110, including biosensors, positioning/movement sensors, imaging sensors, and locating functionality, and from terminal 130, including additional biosensors, high-resolution cameras, and GPS/navigation functionality. *Id.*, [0017], [0022]-[0024], [0034]-[0038]. Terminal 130 forms a “binding relationship” with smart eyewear 110, communicates with it, and extends its functions by sharing data collection, storage, and processing. *Id.*, [0023]. Thus, Liu discloses analyzing the user’s state using first data from eyewear sensors together with second data from terminal 130’s external sensors. Ex.1003, ¶201.

To the extent PO argues Liu does not expressly state that eyewear- and terminal-sensor data are jointly used in the same state analysis, doing so would have been obvious. *Id.*, ¶202. Liu discloses a coupled eyewear/terminal system in which the terminal communicates with the eyewear and shares data collection, storage, and processing. Ex.1006, [0023], [0030], [0053]. Liu also teaches using multiple sensors/devices for a “comprehensive evaluation” of exercise status and discloses overlapping, complementary sensor categories. *Id.*, [0017], [0022]-[0024], [0034]-[0038], [0061]-[0062]. A POSA would have been motivated to configure Liu’s eyewear to jointly analyze eyewear- and terminal-derived data because they provide complementary information about the same exercise event from different sensing

perspectives. Ex.1003, ¶¶202-203; *see also* ¶¶185-186. Eyewear motion data would corroborate terminal position/environment data, and one device’s physiological data would be interpreted with corresponding data from the other. *Id.*, ¶202. That would improve accuracy, reliability, and completeness of Liu’s physiological/status determination while reducing ambiguity from missing or noisy single-device measurements. *Id.*; *see also* Ex.1009, [0012], [0045]-[0046].

A POSA would have reasonably expected success because Liu’s eyewear and terminal exchange data and both collect, process, and communicate user-related information, with overlapping sensor categories supporting interoperable acquisition and processing. Ex.1003, ¶204; *see* Ex.1006, [0022]-[0024], [0030], [0034], [0036], [0053]; *see also* Ex.1003, ¶¶187-188, 205-206. Using the data together would have involved conventional processing of known sensor inputs from connected devices for their ordinary purpose: improving Liu’s analysis of the user’s physiological condition and exercise status. Ex.1003, ¶204. Accordingly, Liu discloses, or at least renders obvious, analyzing a state of the user using both the first and second data. *Id.*, ¶207.

5. 1[d]

Liu discloses, or at least renders obvious, 1[d]. Ex.1003, ¶¶208-214.

Liu determines the user’s “context” by determining the user’s movement/activity, physical orientation, location, and surrounding environment.

Ex.1003, ¶209. Liu’s sports management system “collect[s] information regarding the surrounding physical environment and the position of the user 102” and provides navigation to the user. Ex.1006, [0016]. Liu determines the user’s “physiological conditions, movement, and location” during exercise and determines whether the user is in an outdoor environment. *Id.*, [0059]; *see also* [0061]. Those determinations correspond to context, including the user’s activity, location/environment, and surrounding physical environment. Ex.1003, ¶209.

Liu also determines the user’s physical orientation. Ex.1003, ¶210. Smart eyewear 110 includes positioning sensors/devices configured to detect the “position and movement” of the user, and sensor module 250 may include an IMU configured to measure “a position, an orientation, an acceleration, a velocity, a heading, or an angular rate of smart eyewear 110.” Ex.1006, [0017], [0035]. Liu further explains that processing component 326 uses IMU signals to determine the user’s movement and angular orientation, including “roll, heading, and pitch.” *Id.*, [0047]. Those orientation, heading, pitch, roll, position, movement, and activity determinations correspond to determining the claimed “context.” Ex.1003, ¶210.

Liu discloses determining that context using first data from the eyewear sensors together with second data from the external sensors in terminal 130. Ex.1003, ¶211. The context-related inputs include movement, position, angular-orientation, location, and physical-environment data from the eyewear sensors, as

well as image, location/GPS, and physical-environment data from terminal 130. Ex.1006, [0017], [0022]-[0023], [0034]-[0038], [0047]-[0049], [0059], [0061]. For example, Liu’s emergency analysis uses “movement,” “position,” and “images of the physical environment,” and Liu discloses collecting those same categories of information through smart eyewear 110 and terminal 130: smart eyewear 110 includes positioning/movement sensors and imaging sensors, while terminal 130 includes high-resolution cameras and GPS/navigation functionality. *Id.*, [0017], [0022], [0024], [0035]-[0038], [0061]. Terminal 130 forms a “binding relationship” with smart eyewear 110, communicates with it, and extends its functions by sharing the burden of “collecting, storing, and/or processing data.” *Id.*, [0023]. Thus, Liu discloses determining the user’s context using both the first and second data. Ex.1003, ¶211.

To the extent PO argues Liu does not expressly state that eyewear- and terminal-sensor data are jointly used in the same context determination, using them together would have been obvious. *Id.*, ¶212. Liu discloses a coupled eyewear/terminal system in which terminal 130 communicates and exchanges data with smart eyewear 110 and shares data collection, storage, and processing. Ex.1006, [0023], [0030], [0053]. Liu also discloses overlapping, complementary context-related sensor categories, including movement, orientation, position/location, image, and environment data. *Id.*, [0017], [0022]-[0024], [0034]-

[0038], [0047]-[0049], [0059], [0061]. A POSA would have been motivated to configure Liu's smart eyewear to evaluate the eyewear- and terminal-derived data together because those data provide complementary information about the same exercise event from different device locations and sensing perspectives. Ex.1003, ¶212; *see also* ¶¶185-186. For example, eyewear movement/orientation data would be evaluated with terminal position/location, image, or environment data to better determine context. *Id.*, ¶212. Using both sources would improve the accuracy, reliability, and completeness of Liu's context determinations while reducing ambiguity from missing or noisy single-device measurements. *Id.*; *see also* Ex.1009, [0012], [0045]-[0046].

A POSA would have had a reasonable expectation of success because Liu's eyewear and terminal are components of the same sports-management system, are designed to exchange data, and both collect, process, and communicate user-related information. Ex.1003, ¶213; *see* Ex.1006, [0023], [0030], [0053]; *see also* Ex.1003, 187-188. Liu's overlapping context-related sensor categories confirm support for interoperable acquisition and processing. Ex.1003, ¶213; *see* Ex.1006, [0022]-[0024], [0034]-[0038], [0047]-[0049], [0059], [0061]. Using the data together would involve conventional communication and processing of known sensor inputs from connected devices for their ordinary purpose: improving Liu's determination of the user's movement, orientation, location, and surrounding environment during

exercise. Ex.1003, ¶213. Accordingly, Liu discloses, or at least renders obvious, determining a context of the user using both the first and second data. *Id.*, ¶214.

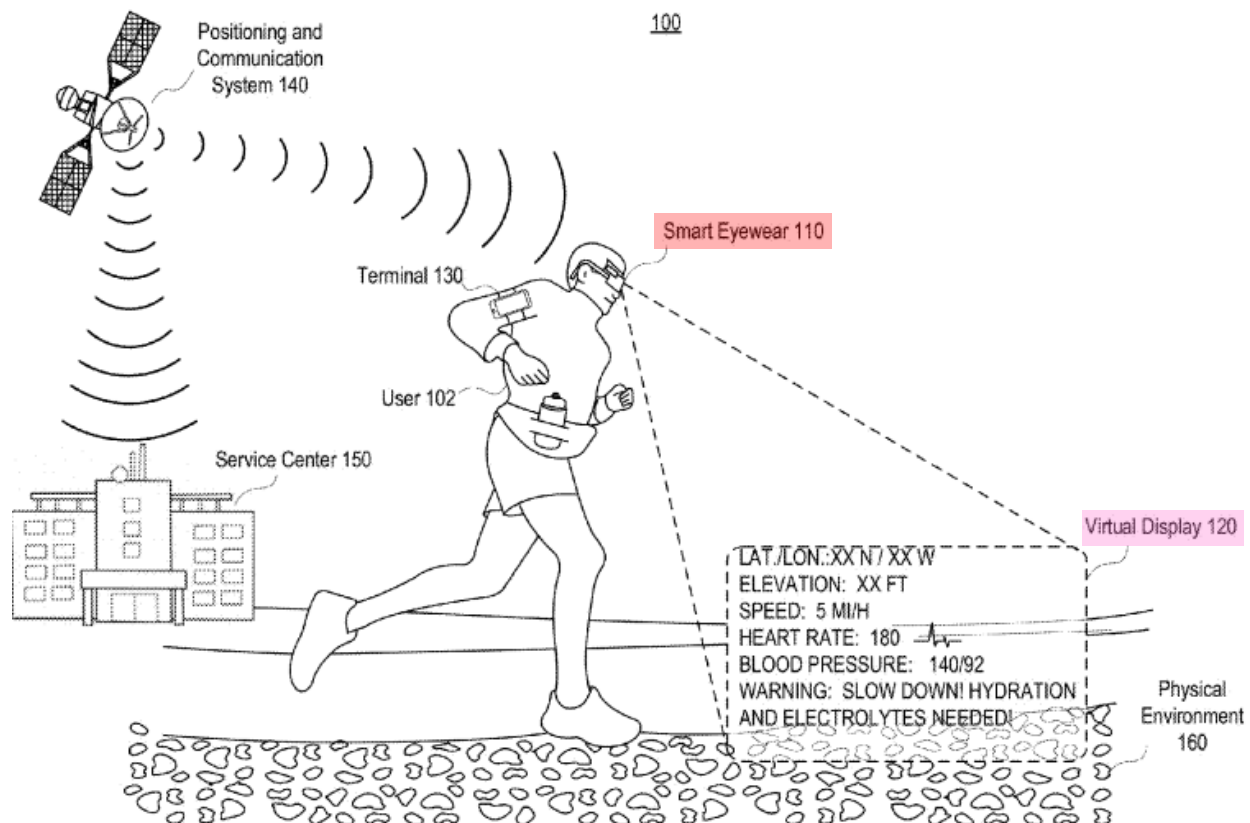
6. 1[e]

Liu discloses 1[e]. Ex.1003, ¶¶215-219.

As explained for 1[c]-1[d], Liu analyzes the user’s state by evaluating physiological condition/status and determines context by evaluating movement/activity, physical orientation, location, and surrounding environment. *Supra* §§IX.A.4-5. Liu provides assistance to the user as feedback related to that state analysis and context determination. Ex.1003, ¶216. For example, Liu’s sports management system “analyze[s] the physiological reactions in real time and provide[s] health and safety-related advice,” collects information about “the surrounding physical environment and the position of the user 102,” and “provide[s] navigation.” Ex.1006, [0016]. Smart eyewear 110 also provides “alert, advice, navigation, and rescue assistance to the user.” *Id.*, [0062]. Thus, Liu’s feedback is generated from, and related to, the user’s physiological condition/status plus movement/activity, physical orientation, location, and surrounding-environment information. Ex.1003, ¶216.

Liu provides this feedback through smart eyewear 110. Virtual display 120 “display[s] a combination of graphics and texts to describe user 102’s real-time physiological conditions, to provide exercise advices [sic], to indicate user 102’s

location, etc.” Ex.1006, [0018]; *see also* [0030]. Liu overlays virtual display 120 on physical environment 160, allowing the user to view physiological/navigation information while viewing the surroundings. *Id.*, [0020].



Ex.1003, ¶217(annotating Ex.1006, Fig.1). Liu further discloses warning messages, exercise advice, audible alarms, and/or vibration. Ex.1006, [0046], [0060]. Thus, Liu provides assistance as feedback related to state and context. Ex.1003, ¶217.

For example, while running, virtual display 120 displays the user’s “speed, heart rate, blood pressure, and location information, such as the latitude, the longitude, and the elevation.” Ex.1006, [0018]. If the user’s “physiological condition suggests that user 102 probably has over exercised and is in a dehydrated

state,” virtual display 120 may warn the user “to slow down and take water and electrolytes.” *Id.* This feedback relates to state, including over-exercise, dehydration, or abnormal physiological condition, and context, including running speed, location, elevation, exercise activity, and surrounding environment. Ex.1003, ¶218; *see* Ex.1006, [0020], [0059]-[0060].

Liu also discloses emergency assistance. Controller 320 determines whether an emergency has occurred “based on the physiological conditions, movement, and position of user 102, and/or images of physical environment 160.” Ex.1006, [0061]; *see also* [0041], [0050], Fig.3. When an emergency occurs, smart eyewear 110 transmits a rescue request and user status to service center 150, including “the physiological conditions and position of user 102 and images of physical environment 160,” so assistance is provided quickly. *Id.*, [0061]. Smart eyewear 110 may also “establish a telephone call with service center 150 so that user 102 may receive advice and guidance from service center 150 to properly react to the adverse event.” *Id.*, [0025]. The displayed status/navigation information, warnings, advice, audible alarms, vibration, and telephone-call guidance are feedback to the user. Ex.1003, ¶219. That feedback relates to state, including physical condition, injury/adverse reaction, or emergency status, and context, including movement, physical orientation, position, location, and surrounding physical environment. *Id.*

Accordingly, Liu provides assistance to the user as feedback related to state and context. *Id.*

Accordingly, claim 1 is unpatentable based on Liu. *Id.*, ¶219.

B. Claim 2

Liu renders claim 2 unpatentable. Ex.1003, ¶¶221-222.

As explained for 1[d], Liu discloses determining the user’s context, including physical orientation. *Supra* §IX.A.5. Liu’s smart eyewear 110 includes positioning sensors/devices configured to detect the user’s “position and movement,” and sensor module 250 may include an IMU configured to measure “a position, an orientation, an acceleration, a velocity, a heading, or an angular rate of smart eyewear 110.” Ex.1006, [0017], [0035]. Liu further discloses that processing component 326 uses IMU signals to determine the user’s position and angular orientation, including “roll, heading, and pitch.” *Id.*, [0047]. Because smart eyewear 110 is worn by user 102, determining the eyewear’s orientation, heading, roll, and pitch corresponds to determining the user’s physical orientation. Ex.1003, ¶222; *see also* Ex.1006, [0037], [0061].

C. Claim 3

Liu renders claim 3 unpatentable. Ex.1003, ¶¶223-224.

As explained for 1[d], Liu discloses determining the user’s context, including activity, such as the user’s movement during exercise. *Supra* §IX.A.5.

D. Claim 4

Liu renders claim 4 unpatentable. Ex.1003, ¶¶225-226.

As explained for 1[d], Liu discloses determining the user’s context, including environment, such as whether the user is outdoors, the user’s location, and the user’s surrounding physical environment. *Supra* §IX.A.5.

E. Claim 5

Liu renders claim 5 unpatentable. Ex.1003, ¶¶227-228.

As explained for 1[e], Liu discloses providing assistance to the user through smart eyewear 110, including through an audible alarm or communication. *Supra* §IX.A.6. Liu further discloses that, in an adverse-event or emergency situation, smart eyewear 110 “establish[es] a telephone call with service center 150 so that user 102 may receive advice and guidance from service center 150 to properly react to the adverse event.” Ex.1006, [0025]. That telephone-call advice and guidance provides assistance in the form of audio communication for the user. Ex.1003, ¶228; *see also* Ex.1006, [0016] (disclosing communication between user 102 and third party during emergency), [0046] (smart eyewear 110 generating “alarm”).

F. Claim 6

1. 6[pre]

To the extent limiting, Liu discloses 6[pre]. Ex.1003, ¶¶229-232.

Liu discloses a computer readable storage medium. *Id.*, ¶230. Liu’s controller 320 includes processing component 326 and memory 328. Ex.1006, [0042], Fig.3. Liu explains that memory 328 includes “any type of computer-readable medium, such as flash memory, random access memory, or firmware, configured to store data and/or instructions to support the operation of smart eyewear 110.” *Id.*, [0053]; *see also* [0041] (“FIG. 3 is a block diagram of an exemplary smart eyewear 110, consistent with smart eyewear 110 depicted in FIG. 2.”). Liu further discloses that memory 328 “store[s] instructions used by the processing component 326 to process the received data,” and that those instructions “include various applications used to drive each of AR display module 310, sensor module 350, imaging module 360, locating module 370, and telecommunication module 380.” *Id.*, [0053].

Thus, Liu discloses a computer-readable storage medium storing program code (instructions) for causing a data processing system (controller 320 / processing component 326) to perform steps recited in claim 6, as addressed below. Ex.1003, ¶¶230-232.

2. 6[a]-[b]

For the reasons explained for 1[a]-1[b], Liu discloses 6[a]-6[b]. *Supra* §§IX.A.2-3; Ex.1003, ¶233.

3. 6[c]-[d]

For the reasons explained for 1[d]-1[e] and claim 5, Liu discloses, or at least renders obvious, 6[c]-6[d]. *Supra* §§IX.A.5-6; Ex.1003, ¶234.

Thus, claim 6 is unpatentable based on Liu. Ex.1003, ¶235.

G. Claims 7-9

For the reasons explained for claims 2-4, respectively, Liu renders claims 7-9 unpatentable. *Supra* §§IX.B-D; Ex.1003, ¶236.

H. Claim 10

For the reasons explained for claims 1 and 5, Liu renders claim 10 unpatentable. *Supra* §§IX.A, IX.E; Ex.1003, ¶237.

**X. GROUND 4: CLAIMS 11-16
ARE OBVIOUS BASED ON LIU AND SHAN**

Liu and Shan render claims 11-16 unpatentable. Ex.1003, ¶¶238-277. Liu discloses the smart-eyewear assistance architecture, including sensors, processing, feedback, display, and communication functions. Ex.1006, [0016]-[0018], [0025], [0039], [0060]-[0062]. This ground relies on Shan as an additional teaching of an HMD with a microphone-and-speaker interface for receiving spoken instructions and providing audio assistance, which a POSA would have found obvious to incorporate into Liu's smart eyewear. Ex.1003, ¶¶238-241.

A. Claim 11

1. 11[pre]

To the extent limiting, Liu discloses 11[pre]. Ex.1003, ¶¶242-243.

As explained for 1[pre], Liu’s sports management system 100 includes smart eyewear 110 (eyewear device) and provides assistance to the user through that eyewear device. *Supra* §IX.A.1. Liu’s Figure 3 depicts “an exemplary smart eyewear 110” having controller 320, which includes processing component 326 and memory 328. Ex.1006, [0041]-[0042], Fig.3. Memory 328 stores “instructions used by the processing component 326 to process the received data,” confirming that Liu’s system is executed by a data processing system. *Id.*, [0041]-[0042], [0053].

2. 11[a]

Liu and Shan render obvious 11[a]. Ex.1003, ¶¶244-251.

Liu discloses smart eyewear 110 that provides real-time assistance to the user, including alerts, advice, navigation, rescue assistance, and emergency-related communication. Ex.1006, [0016]-[0018], [0025], [0060]-[0062]. Liu also discloses telecommunication module 280 that establishes communication between the user and a third party, such as service center 150, “to enable user 102 to speak to a member of service center 150.” *Id.*, [0039]; *see also* [0025]. Thus, Liu already provides eyewear-based assistance and user interaction through smart eyewear 110. Ex.1003, ¶245.

Shan discloses a microphone-and-speaker interface for receiving user commands. Shan discloses a head-mountable computing device with “a microphone 124 for capturing the wearer’s spoken instruction or conversations” and “a speaker 126 for allowing the wearer to hear the audio information generated by the head-mountable computing device.” Ex.1007, [0037]. Shan further teaches that the device may be triggered by a “spoken instruction via the microphone 124,” and that the wearer may select assistance information by “sending audio commands to the head-mountable computing device 100.” *Id.*, [0041], [0051]. Shan’s spoken instructions and audio commands are user commands, and Shan’s speaker provides audio information/assistance to the wearer. Ex.1003, ¶246.

A POSA would have been motivated to incorporate a microphone-and-speaker interface like Shan’s into Liu’s smart eyewear 110 or terminal 130, including for the Ground 2 reasons. Ex.1003, ¶¶247-248; *see supra* §VIII. Both Shan and Liu teach eyewear-based real-time user assistance. Ex.1006, [0016]-[0018], [0062]; Ex.1007, [0004], [0010]-[0014], [0037]. An interface like Shan’s would allow Liu’s user to issue spoken commands and receive audible assistance while exercising, navigating, or during emergencies, when hands-free operation is useful. Ex.1003, ¶¶247-248. Liu already provides advice, alerts, navigation, rescue assistance, and service-center communication through smart eyewear 110; a microphone/speaker interface would provide a predictable hands-free input/output

mechanism for those functions. *Id.*; see Ex.1006, [0025], [0039], [0060]-[0062]; Ex.1007, [0037], [0041], [0051].

Liu also contemplates terminal 130 as a smart phone and eyewear 110 making telephone calls, including a telecommunication module enabling the user to “speak” on a call. Ex.1006, [0021], [0039]; Ex.1003, ¶249. Conventional audio components in Liu’s eyewear or phone would facilitate that functionality, and the same hardware could receive spoken commands and provide audio feedback in hands-free/mobile environments. Ex.1003, ¶249. Thus, configuring Liu’s eyewear or phone with a microphone and speaker would have been the predictable use of known components for their established functions. *Id.*

A POSA would have reasonably expected success because Shan discloses microphone/speaker components in a head-mountable device, Liu’s eyewear includes a controller, telecommunication module, display/feedback architecture, and communication links, Liu’s terminal may be a smartphone with conventional microphone/speaker functionality, and Liu’s telecommunication/service-center functions confirm audio input/output was present or readily implementable using routine techniques. Ex.1003, ¶¶249-250; see Ex.1006, [0021], [0030], [0039], [0041]-[0043], [0062]; Ex.1007, [0037]. Incorporating an interface like Shan’s into Liu’s eyewear or terminal would use known components and conventional audio/signal processing without changing Liu’s sports-management/assistance

architecture, yielding a voice interface that receives spoken commands and provides audible alerts, advice, navigation, emergency guidance, or service-center communication. Ex.1003, ¶¶250-251; *see* Ex.1006, [0025], [0039], [0046], [0060]-[0062]; Ex.1007, [0037], [0041], [0051].

3. 11[b]

Liu and Shan render obvious 11[b]. Ex.1003, ¶¶252-254.

As explained for 1[a]-1[b], Liu discloses sensor data generated by sensors incorporated in smart eyewear 110, including sensor module 250/350 and other smart-eyewear sensing components, as well as sensor data from external sensors in terminal 130. *Supra* §§IX.A.2-3. Liu further discloses that smart eyewear 110 includes controller 320, which has “a communication component 322” and “an input/output (I/O) interface 324.” Ex.1006, [0041]-[0042], Fig.3. “Communication component 322 may be configured to facilitate communication, wired or wirelessly, between controller 320 and other components of smart eyewear 110 or devices other than smart eyewear 110 (for example, terminal 130).” *Id.*, [0043]. “I/O interface 324 may include one or more digital and/or analog devices configured to consolidate data/signals it received from communication component 322 and relay the data/signals to processing component 326,” and “I/O interface 324 may send the signals generated by the sensor module 350 to processing component 326 for further processing.” *Id.*, [0044]. Processing component 326 is configured to receive and

process data generated by sensor module 350, imaging module 360, and locating module 370, and controller 320 receives, filters, analyzes, processes, and stores data/signals generated by those modules. *Id.*, [0045], [0059].

Thus, Liu’s I/O interface 324 and communication component 322 disclose the claimed sensor data input because they receive and relay sensor data from smart-eyewear sensors and connected external devices, including terminal 130, for processing by controller 320/processing component 326. Ex.1003, ¶254.

4. 11[c]

Liu and Shan render obvious 11[c]. Ex.1003, ¶¶255-259.

Liu discloses the claimed processor. Ex.1003, ¶256. Controller 220 “process[es]” information and “exchange[s] data, signals, and commands” with smart-eyewear components, including sensor module 250, imaging module 260, and locating module 270. Ex.1006, [0030]; *see also* [0034], [0036]. Controller 320 includes communication component 322, input/output interface 324, and processing component 326. *Id.*, [0042].

Liu also discloses the processor in electrical communication with the sensor-data input. Ex.1003, ¶257. Controller 320 and sensor, imaging, locating, and telecommunication modules 350, 360, 370, and 380 are connected by bus 390. Ex.1006, [0041]. Communication component 322 facilitates communication between controller 320 and other smart-eyewear components or external devices

such as terminal 130, while interface 324 consolidates received data/signals and relays them to processing component 326. *Id.*, [0043]-[0044]. Processing component 326 receives and processes data generated by sensor, imaging, and locating modules 350, 360, and 370. *Id.*, [0045], [0059].

In the Liu-Shan combination, the processor would have been in electrical communication with the voice interface. Ex.1003, ¶258. As explained for 11[a], a microphone and speaker like Shan’s would have been incorporated into Liu’s smart eyewear, satisfying the claimed voice-interface limitation. *Supra* §X.A.2. A POSA would have connected those audio components to Liu’s controller 320/processing component 326 using Liu’s existing communication, I/O, and/or bus architecture so the processor could receive spoken-command input from the microphone and control audible assistance through the speaker. Ex.1003, ¶258; *see* Ex.1006, [0041]-[0044]; Ex.1007, [0037]. Doing so would have been a predictable use of known processor-to-audio input/output connections in a head-mounted computing device. Ex.1003, ¶258.

Accordingly, Liu and Shan render obvious a processor in electrical communication with the voice interface and the sensor-data input. *Id.*, ¶259.

5. 11[d]

Liu and Shan render obvious 11[d]. Ex.1003, ¶¶260-261.

As explained for 6[pre], Liu’s memory 328 stores instructions used by processing component 326 to process received data, and those instructions include various applications used to drive the connected modules. *Supra* §IX.F.1.

6. 11[e]-11[i]

For the reasons explained for 1[a]-1[e], Liu and Shan render obvious 11[e]-11[i]. *Supra* §§IX.A.2-6; Ex.1003, ¶262.

Thus, claim 11 is unpatentable based on Liu and Shan. Ex.1003, ¶263.

B. Claim 12

Liu and Shan render claim 12 unpatentable. Ex.1003, ¶¶264-265.

As explained for claim 11 and 1[c], Liu analyzes the user’s status (the claimed state) during exercise. *Supra* §§X.A, IX.A.4. The analyzed status includes, for example, whether the user is “over exercised” and “in a dehydrated state” (Ex.1006, [0018]), whether the user’s physical conditions are “abnormal” (*id.*, [0060]), whether the user has suffered “an injury or adverse reaction” or an “adverse event” (*id.*, [0025]), and whether “an emergency” has occurred (*id.*, [0061]). Therefore, Liu’s state analysis includes health, wellbeing, and physical (which include physical conditions, dehydration, over-exercising) and safety (which includes injury, adverse reaction, adverse event, emergency). Ex.1003, ¶265.

C. Claim 13

Liu and Shan render claim 13 unpatentable. Ex.1003, ¶¶266-267.

As explained for claim 11 and 1[e], Liu provides user 102 condition-directed warnings and advice. *Supra* §§X.A, IX.A.6. Liu’s assistance is designed to help correct negative conditions, including over-exercise, dehydration, abnormal physiological conditions, injury, adverse reaction, or another adverse event. Ex.1003, ¶267; *see* Ex.1006, [0025] (user receiving “advice and guidance” from service center 150 “to properly react to the adverse event”). Liu discloses that “[s]ince the physiological condition suggests that user 102 probably has over exercised and is in a dehydrated state, virtual display 120 may further display a warning message alerting user 102 to slow down and take water and electrolytes.” Ex.1006, [0018]. Liu also discloses that, when user 102’s “physiological conditions are abnormal,” “smart eyewear 110 may alert user 102 to adjust the current exercise mode and generate an advice for user 102.” *Id.*, [0060].

D. Claim 14

Liu and Shan render claim 14 unpatentable. Ex.1003, ¶¶268-269.

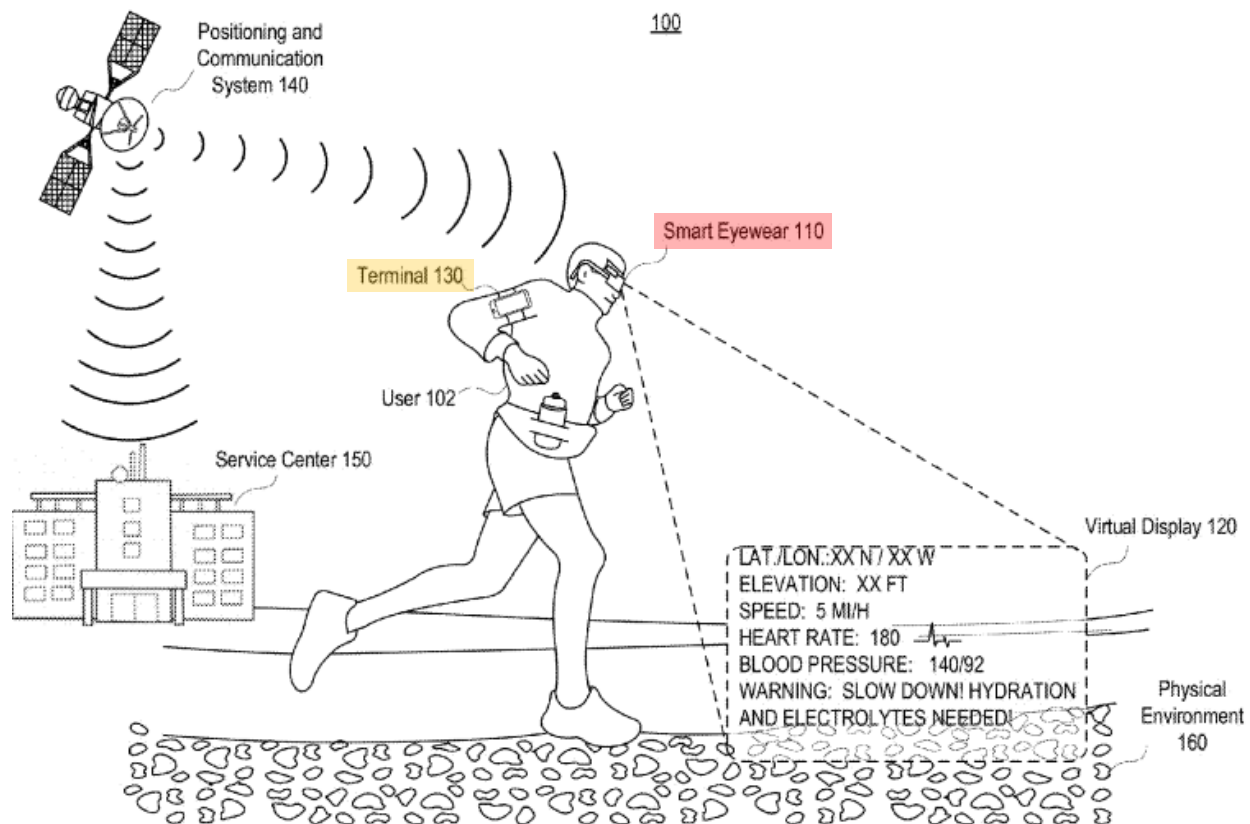
As explained for claim 11 and 1[e], Liu’s smart-eyewear assistance system provides exercise-related feedback and advice to the user based on the user’s condition. *Supra* §§X.A, IX.A.6. Liu explains that its sports-management system supports “a healthy and active lifestyle” (Ex.1006, [0003]) and provides user assistance in the form of “health and safety-related advice,” “navigation,” and “exercise advices” (*id.*, [0016], [0018], [0062]). Liu’s condition-based exercise and

feedback are designed to encourage positive conditions, including safe exercise, appropriate exertion, hydration, health, and a healthy and active lifestyle. Ex.1003, ¶269; *see* Ex.1006, [0018], [0060]. Such assistance encourages positive user conditions, including maintaining safe activity and avoiding over-exercise or dehydration. Ex.1003, ¶269.

E. Claim 15

Liu and Shan render claim 15 unpatentable. Ex.1003, ¶¶270-272.

Liu discloses an external device. Liu’s “sports management system 100 may include terminal 130 configured to collaborate with smart eyewear 110 [red] to provide various sports management functions.” Ex.1006, [0021]. Terminal 130 (orange) is a separate electronic device wearable by user 102, such as “a smart watch, a smart bracelet, a smart camera...[or] a medical device....” *Id.*



Ex.1003, ¶271(annotating Ex.1006, Fig.1). As a device separate from smart eyewear 110, terminal 130 is external to smart eyewear 110. *Id.*

“[T]erminal 130 may form a binding relationship with smart eyewear 110 and communicate with smart eyewear 110 in a wired...manner, such as through a connection cable” (Ex.1006, [0023]; *see also* [0030]), i.e., electrical communication (Ex.1003, ¶272). Terminal 130 also provides assistance: “[t]erminal 130 may transmits [sic] various information, such as the detected physiological reactions” or “the generated exercise advice...to smart eyewear 110 for displaying on virtual display 120.” Ex.1006, [0023]. Liu further discloses that “[t]erminal 130 can also conduct a telephone call with a third party device” and “provide communication

service to user 102.” *Id.*, [0022], [0024]. Accordingly, Liu’s terminal 130 is an external device in electrical communication with the eyewear device and used to provide assistance to the user. Ex.1003, ¶272.

F. Claim 16

Liu and Shan render claim 16 unpatentable. Ex.1003, ¶¶273-277.

As explained for 11[b] and 1[a], Liu discloses receiving data from multiple embedded smart-eyewear sensors, including biosensors, positioning/movement sensors, imaging sensors/cameras, and locating components. *Supra* §§X.A.3, IX.A.2. One embedded eyewear sensor, such as Liu’s positioning/movement/IMU sensor, may provide the claimed first data, while the claimed third data may be combined data from additional embedded eyewear sensors, such as biosensors, imaging sensors/cameras, and locating components. Ex.1003, ¶274. Because those sensors are incorporated into smart eyewear 110, they are embedded sensors. *Id.*

Liu discloses using both the first data and the same third data to determine context and analyze state. *Id.*, ¶275. For context, Liu determines the user’s movement/activity, position/location, physical orientation, and surrounding environment using eyewear sensor data, including movement, location, outdoor-environment, image/physical-environment, and IMU-derived roll, heading, and pitch information. Ex.1006, [0017], [0035]-[0038], [0047], [0059], [0061]. Thus,

movement/orientation first data, together with camera/image and locating third data from additional embedded sensors, determines the user’s context. Ex.1003, ¶275.

For state, Liu analyzes physiological condition/status during exercise using those same categories of embedded-sensor data. For example, Liu determines whether an emergency has occurred based on “the physiological conditions, movement, and position of user 102, and/or images of physical environment 160,” and also analyzes over-exercise, dehydration, injury/adverse reaction, and abnormal physiological conditions. Ex.1006, [0018], [0025], [0060]-[0061], Fig.5. Thus, Liu uses movement/position/orientation first data with the same third data—biosensor, image/environment, and locating data—to analyze the user’s state. Ex.1003, ¶276.

To the extent PO argues Liu lacks express same-data disclosure for both context determination and state analysis, that implementation would have been obvious. *Id.*, ¶277. Liu’s smart eyewear integrates “multiple sensors and devices” for a “comprehensive evaluation” of exercise status, and its controller receives and processes data from sensor, imaging, and locating modules. Ex.1006, [0045], [0059], [0062]. A POSA would have been motivated to use the same embedded multi-sensor data set for both context and state because it provides complementary information about the same exercise event, with a reasonable expectation of success because Liu already integrates and processes that data for exercise-status,

emergency, movement, position, location, and environment determinations.

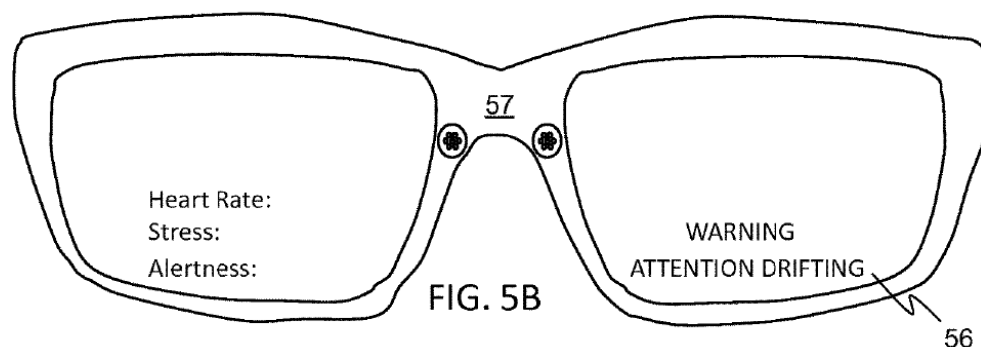
Ex.1003, ¶277.

XI. GROUNDS 5-8: CLAIMS 1-16 ARE OBVIOUS BASED ON GROUNDS 1-4 AND LISY

Grounds 1-4 independently render claims 1-16 unpatentable for the reasons explained above. *Supra* §§VII-X. Grounds 5-8 provide an additional obviousness basis to the extent PO disputes the joint use of sensor-derived data for the claimed state analysis and context determination, including the use of eyewear-sensor first data with external-sensor second data and, for claim 16, the use of first data with third data from a plurality of embedded sensors. Lisy confirms that fusing data from head-mounted sensors and other worn or connected sensors for user monitoring, feedback, recommendations, alerts, and warnings was known. Ex.1003, ¶¶278-279.

A. Overview of Lisy

Lisy discloses head-mounted systems, including “eyewear,” that collect physiological and ambient/environmental information and pair with other user-worn sensor systems, such as a smart watch or phone. Ex.1008, 2:58-3:14, 4:2-9.



Id., Fig.5B. Lisy discloses that the system may “fuse[] data” from sensors on the various devices to provide a “more complete and robust set of data,” recommendations, and warnings. *Id.*, 4:2-9; *see also* Figs.13-14. Lisy further describes using physiological and secondary/environmental sensors to derive user-condition metrics, such as stress, alertness, concentration, focus, and preparedness, and to provide feedback, alerts, or messages to the user. *Id.*, Figs.13-14.

B. Ground 5: Claims 1-16 are Obvious Based on Asukai and Lisy

A POSA would have been motivated to apply Lisy’s multi-sensor fusion teachings to Asukai’s eyewear-based information-processing system. Ex.1003, ¶¶280-282. Asukai already discloses using “various sensing data” to recognize the user’s situation/action and estimate emotion, including data from cameras, microphones, acceleration sensors, gyro sensors, location-information acquisition units, biological sensors, gaze sensors, and environmental sensors. Ex.1005, [0069]. Asukai also discloses that those sensors may be provided in information processing device 10 or in another wearable device, smartphone, or the like communicatively connected to information processing device 10. *Id.*; *see also* [0097], [0103].

Applying Lisy’s fusion approach would have predictably enhanced Asukai’s situation/action recognition, emotion/state analysis, context determination, and feedback selection by jointly using complementary sensor inputs, including eyewear/HMD sensor data, external-sensor data, and, for claim 16, data from

multiple embedded HMD sensors. Ex.1003, ¶283; *see* Ex.1008, 4:2-9, Figs.13-14.

A POSA would have had a reasonable expectation of success because Asukai already includes the communication and processing architecture for receiving sensor data from the information processing device and external connected devices, and Lisy's fusion teachings use known sensors and data-processing steps for their ordinary purposes. Ex.1003, ¶284; *see* Ex.1005, [0069], [0093], [0097], [0103]; Ex.1008, 4:2-9, Figs.13-14.

C. Ground 6: Claims 11-16 are Obvious Based on Asukai, Shan, and Lisy

For the reasons explained in Grounds 2 and 5, a POSA would have been motivated to combine Asukai, Shan, and Lisy, with a reasonable expectation of success. Ex.1003, ¶¶285-286; *supra* §§VIII, XI.B. Shan provides a known HMD voice-command interface for interacting with an assistance system, while Lisy enhances the multi-sensor analysis underlying Asukai's situation/action recognition, emotion/state analysis, context determination, and feedback selection. Ex.1005, [0069], [0072], [0097], [0099], [0103]; Ex.1007, [0037], [0041], [0051]; Ex.1008, 4:2-9, Figs.13-14. Because Asukai already discloses an HMD-based agent system with sensors, microphone/speaker components, processing, connected-device inputs, and feedback, adding Shan's spoken-command functionality and Lisy's sensor-fusion teachings would have been a predictable use of known components and data-processing techniques for their ordinary purposes. Ex.1003, ¶¶285-286.

D. Ground 7: Claims 1-10 are Obvious Based on Liu and Lisy

A POSA would have been motivated to apply Lisy's multi-sensor fusion teachings to Liu's smart-eyewear sports-management system. Ex.1003, ¶¶287-288. Liu discloses smart eyewear 110 with biosensors, positioning/movement sensors, imaging sensors/cameras, locating components, and computing power, and terminal 130 with additional biosensors, high-resolution cameras, GPS/navigation, exercise-advice generation, and wired/wireless communication with the eyewear. Ex.1006, [0016]-[0023], [0034]-[0038], [0059]-[0062]. Lisy confirms that fusing data from multiple physiological, secondary, and environmental sensors was known to provide a more complete and robust data set, feedback, warnings, alerts, and recommendations. Ex.1003, ¶287; *see* Ex.1008, 4:2-9, Figs.13-14.

Applying Lisy's fusion approach would have predictably enhanced Liu's user-state and context determinations, including determinations of physiological condition/status, over-exercise, dehydration, abnormal conditions, emergencies, movement, position/location, and surrounding environment, and the corresponding warnings, advice, navigation, and rescue assistance. Ex.1003, ¶¶287, 289; *see* Ex.1006, [0016]-[0018], [0023], [0059]-[0062]. A POSA would have had a reasonable expectation of success because Liu already provides an eyewear/terminal communication and processing architecture for exchanging data and sharing collection, storage, and processing functions, while Lisy uses known sensors and

processing steps for their ordinary purposes. Ex.1003, ¶¶289-290; *see* Ex.1006, [0023], [0030], [0041]-[0044], [0053]; Ex.1008, 4:2-9, Figs.13-14.

E. Ground 8: Claims 11-16 are Obvious Based on Liu, Shan, and Lisy

For the reasons explained in Grounds 4 and 7, a POSA would have been motivated to combine Liu, Shan, and Lisy, with a reasonable expectation of success. Ex.1003, ¶¶291-292; *supra* §§X, XI.D. Shan provides a known hands-free voice-command interface for interacting with an eyewear-based assistance system, while Lisy enhances the sensor-data analysis underlying Liu's user-status, context, warning, recommendation, and assistance determinations. Ex.1006, [0016]-[0023], [0059]-[0062]; Ex.1007, [0037], [0041], [0051]; Ex.1008, 4:2-9, Figs.13-14. Because Liu already provides smart-eyewear processing, communication, sensor-data, and feedback architecture, adding an audio-command interface like Shan's and Lisy's sensor-fusion would have been a predictable use of known components and data-processing techniques for their ordinary purposes. Ex.1003, ¶¶291-292.

XII. SECONDARY CONSIDERATIONS

Petitioners are not aware of any evidence of secondary considerations. *See* Ex.1003, ¶¶293-294. If PO identifies evidence of secondary considerations, Petitioners request an opportunity to respond.

XIII. STIPULATION

Petitioners stipulate that, if *inter partes* review is instituted, Petitioners will not pursue in *Solos Technology Limited v. Meta Platforms, Inc. et al.*, No. 1:26-cv-10304 (D. Mass. 2026) (“Litigation”), against any challenged claim of the ’339 patent: (1) any invalidity ground that was raised or reasonably could have been raised in this IPR; or (2) any invalidity ground under 35 U.S.C. §§ 102 or 103 that relies on any prior-art reference asserted in Grounds 1-8 of the Petition, whether alone or with system art or other prior art unavailable in IPR. If institution is denied or later vacated, this stipulation has no effect.

**XIV. MANDATORY NOTICES,
GROUNDS FOR STANDING, AND FEE PAYMENT**

A. Real Parties-In-Interest (37 C.F.R. §42.8(b)(1))

The real parties in interest for Petitioners are: Luxottica of America Inc.; Oakley, Inc.; EssilorLuxottica USA Inc.; and Meta Platforms, Inc.

Luxottica of America Inc. further identifies the following entities without conceding that these entities are, in fact, real parties in interest: EssilorLuxottica America SAS; Luxottica Group SPA; Essilor International SAS; EssilorLuxottica S.A.; Luxottica SRL; Luxottica Tristar (Dongguan) Optical Co. Ltd.; and EssilorLuxottica (Thailand) Ltd.

Meta Platforms, Inc. further identifies the following entity without conceding that this entity is, in fact, a real party in interest: Meta Platforms Technologies, LLC (formerly known as Facebook Technologies, LLC, which was formerly known as Oculus VR, LLC).

B. Related Matters (37 C.F.R. §42.8(b)(2))

The parties are engaged in district court litigation in *Solos Technology Limited v. Meta Platforms, Inc. et al.*, No. 1:26-cv-10304 (D. Mass. 2026). In that action, PO asserts the '339 patent.

C. Lead and Backup Counsel (37 C.F.R. §42.8(b)(3))

Petitioners provide the following designation of counsel.

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	Facsimile: +1-212-230-7833 <i>Attorneys for Petitioner Meta Platforms, Inc.</i>
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D. Service Information (37 C.F.R. §42.8(b)(4))

Please direct all correspondence to lead counsel and back-up counsel at the addresses shown above. Petitioners also consent to electronic service by email to:

MLB-Luxottica-IPR-339@morganlewis.com; and

PH-Meta-Solos-IPR@paulhastings.com.

E. Standing

The '339 patent is available for IPR, and no bar or estoppel applies.

The Office may charge any fees due to Deposit Account 50-0310.

XV. CONCLUSION

Petitioners request institution and cancellation of all claims of the '339 patent.

Dated: June 18, 2026

By: /Jacob L. Peterson/

Jacob L. Peterson (Reg. No. 65,096)

MORGAN, LEWIS & BOCKIUS LLP

*Attorney for Petitioner,
Luxottica of America Inc.*

APPENDIX: LISTING OF CLAIMS FROM U.S. PATENT NO. 12,216,339

Claim 1

- 1[pre]** A method to provide assistance to a user through an eyewear device, comprising;
- 1[a]** receiving first data from a first sensor, the first sensor is incorporated into the eyewear device, the first sensor measures a parameter related to the user;
- 1[b]** receiving second data from a second sensor, wherein the second sensor is an external sensor;
- 1[c]** analyzing a state of the user, wherein the analyzing uses the first data and the second data;
- 1[d]** determining a context of the user, wherein determining uses the first data and the second data; and
- 1[e]** providing assistance to the user, wherein the assistance is in a form of feedback, and wherein the feedback is related to the state and the context.

Claim 2

The method of claim 1, wherein a first element of the context is a physical orientation of the user.

Claim 3

The method of claim 2, wherein a second element of the context is an activity that the user is doing.

Claim 4

The method of claim 2, wherein a third element of the context is the user's environment.

Claim 5

The method of claim 1, wherein the assistance is in a form of audio communication for the user.

Claim 6

- 6[pre]** A computer readable storage medium storing program code for causing a data processing system to perform steps comprising:
- 6[a]** receiving first data from a first sensor, the first sensor is incorporated into an eyewear device, the first sensor measures a parameter related to a user;
- 6[b]** receiving second data from a second sensor, wherein the second sensor is an external sensor;
- 6[c]** determining a context of the user, wherein the determining uses the first data and the second data; and
- 6[d]** providing assistance to the user, wherein the assistance is related to the context, and wherein the assistance is in a form of audio communication to the user.

Claim 7

The computer readable storage medium of claim 6, wherein a first element of the context is a physical orientation of the user.

Claim 8

The computer readable storage medium of claim 6, wherein a second element of the context is an activity that the user is doing.

Claim 9

The computer readable storage medium of claim 6, wherein a third element of the context is the user's environment.

Claim 10

The computer readable storage medium of claim 6, further comprising: analyzing a state of the user, wherein the analyzing uses the first data and the assistance is related to both the state and the context.

Claim 11

- 11[pre]** A system for execution by a data processing system to provide assistance to a user through an eyewear device, comprising:
- 11[a]** a voice interface, the voice interface has a microphone and a speaker, the voice interface to receive user commands and to provide assistance to the user;
- 11[b]** a sensor data input, the sensor data input to receive sensor data;
- 11[c]** a processor, the processor is in electrical communication with the voice interface and the sensor data; and
- 11[d]** a computer program for processing the sensor data, the computer program and the processor to cause the data processing system to perform steps comprising:
- 11[e]** receiving first data from a first sensor, the first sensor is incorporated into the eyewear device, the first sensor measures a parameter related to the user;
- 11[f]** receiving second data from a second sensor, wherein the second sensor is an external sensor;
- 11[g]** determining a context for the user, wherein the determining uses the first data and the second data;
- 11[h]** analyzing a state of the user, wherein the analyzing uses the first data and the second data; and

- 11[i]** providing assistance to the user, the assistance is related to the context and the state.

Claim 12

The system of claim 11, wherein the analyzing considers a category selected from the group consisting of health, wellbeing, safety, cognitive, physical, and emotional.

Claim 13

The system of claim 11, wherein the assistance is designed to help the user correct a negative condition.

Claim 14

The system of claim 11, wherein the assistance is designed to help the user by encouraging a positive condition.

Claim 15

The system of claim 13, the system further comprising: a device, the device is external to the eyewear device, the device is in electrical communication with the eyewear device and the device is used to provide the assistance to the user.

Claim 16

The system of claim 11, the steps further comprising: receiving third data from a plurality of embedded sensors, the determining uses both the first data and the third data and the analyzing uses both the first data and the third data.

CERTIFICATE OF COMPLIANCE

Pursuant to 37 C.F.R. §42.24(d), the undersigned certifies that this **PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT NO. 12,216,339** contains 13,986 words according to the word-processing program used to prepare this paper. The foregoing word count complies with the 14,000-word type-volume limit specified by 37 C.F.R. §42.24(a)(1).

Dated: June 18, 2026

By: /Jacob L. Peterson/

Jacob L. Peterson (Reg. No. 65,096)

MORGAN, LEWIS & BOCKIUS LLP

CERTIFICATE OF SERVICE

The undersigned hereby certifies that on the date below copies of this **PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT NO. 12,216,339, PETITIONERS’ POWERS OF ATTORNEY, AND EXHIBITS 1001-1018** are being served by FedEx on the Patent Owner at the correspondence address of record for the subject patent as follows:

Caldwell LLC
200 Clarendon Street
59th Floor
Boston, MA 02116

A courtesy copy is being sent by email on this day to Patent Owner’s counsel of record in the Litigation as follows:

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