

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

INTUITION MACHINES, INC. AND CLOUDFLARE, INC.,
Petitioners,

v.

HUMAN DIFFERENTIAL INTELLIGENCE, LLC,
Patent Owner.

Case No. IPR2023-00632

Patent No. 9,192,861

**PETITION FOR INTER PARTES REVIEW
UNDER 35 U.S.C. §§ 311-319 AND 37 C.F.R. § 42.1 et seq.**

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APPENDIX LISTING OF EXHIBITS

Exhibit	Description
1001	U.S. Patent No. 9,192,861 (“the ’861 Patent”)
1002	Declaration of Daniel P. Lopresti, Ph.D
1003	Curriculum vitae of Daniel P. Lopresti Ph.D
1004	File history of the ’861 Patent
1005	U.S. Provisional Application No. 61/076,495 (“HDI’s Provisional”)
1006	U.S. Patent No. 8,214,891 (“Seacat”)
1007	U.S. Patent Application Publication No. 2007/0259716 (“Mattice”)
1008	Sajad Shirali-Shahreza, <i>et al.</i> , “CAPTCHA for Children,” 2008 IEEE International Conference on System of Systems Engineering (SoSE), June 2-4, 2008 (“Shirali-Shahreza”)
1009	von Ahn, “Human Computation,” CMU-CS-05-193, Carnegie Mellon University School of Computer Science, December 7, 2005 (“vonAhn”)
1010	U.S. Patent Application Publication No. 2009/0113294 (“Sanghavi”)
1011	U.S. Patent No. 8,601,538 (“Qvarfordt”)
1012	U.S. Patent No. 8,510,795 (“Gargi”)
1013	U.S. Patent Application Publication No. 2007/0201745 (“Wang”)
1014	U.S. Patent Application Publication No. 2007/0250920 (“Lindsay”)
1015	Greg Kochanski, Daniel Lopresti, and Chilin Shih, “A Reverse Turing Test Using Speech,” Proceedings of the 7th International Conference on Spoken Language Processing, 1357-60, September 16-20, 2002 (“Kochanski”)
1016	Institute of Electrical and Electronics Engineers, Inc., <i>CAPTCHA for Children – IEEE Conference Publication</i> , at https://ieeexplore.ieee.org/document/4724188
1017	Yaoyao Zhu, Xiolei Huang, Daniel Lopresti, <i>et al.</i> , “Web-based Multi-observer Segmentation Evaluation Tool,” 21st IEEE International Symposium on Computer- Based Medical Systems, June 17-19, 2008

Exhibit	Description
1018	Sajad Shirali-Shahreza, <i>et al.</i> , “Bibliography of Works Done on CAPTCHA,” 2008 3rd International Conference on Intelligent System and Knowledge Engineering, November 17-19, 2008
1019	Library of Congress, <i>Public Catalog for 2008 IEEE International Conference on System of Systems Engineering (SoSE)</i> , at https://cocatalog.loc.gov/cgi-bin/Pwebrecon.cgi?Search_Arg=2008+IEEE+International+Conference+on+System+of+Systems+Engineering&Search_Code=TALL&PID=V1FL5zSeTrVcFdBaUaFwZkA1ayd0k&SEQ=20200904174316&CNT=25&HIST=1
1020	Excerpt from Institute of Electrical and Electronics Engineers, Inc., <i>2008 IEEE International Conference on System of Systems Engineering (SoSE)</i> , 343-48 (2008)
1021	Declaration of Mary K. Bolin, Ph.D., with attachments
1022	Declaration of Jessica Benner, Ph.D., with attachment
1023	Declaration of Professor Kawahara Tatsuya, with attachment
1024	Declaration of Gerard P. Grenier, with attachment
1025	<i>Human Differential Intelligence LLC v. Cigna Corporation</i> , No. 6:20-cv-00305-ADA (W.D. Tex.), D.I. 19 (Corrected First Amended Complaint)
1026	<i>Human Differential Intelligence LLC v. The Gap, Inc.</i> , No. 6:20-cv-00307-ADA (W.D. Tex.), D.I. 14 (Corrected First Amended Complaint)
1027	<i>Human Differential Intelligence LLC v. Bed Bath & Beyond, Inc.</i> , No. 6:20-cv-00310-ADA (W.D. Tex.), D.I. 13 (Corrected First Amended Complaint)
1028	<i>Human Differential Intelligence LLC v. CVS Health Corporation</i> , No. 6:20-cv-00311-ADA (W.D. Tex.), D.I. 18 (First Amended Original Complaint)
1029-1039	Reserved

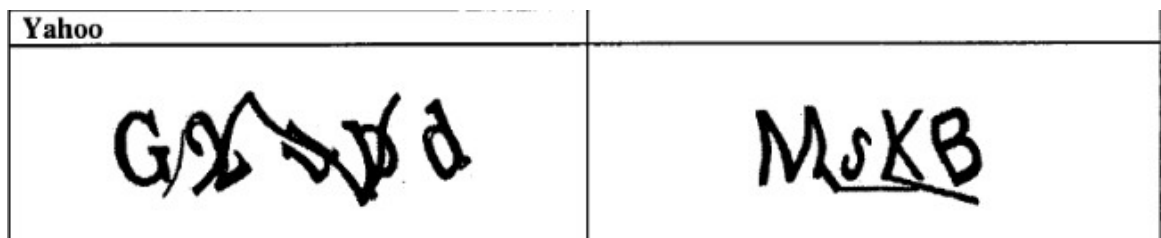
Exhibit	Description
1040	Merriam-Webster, Inc., “Threshold,” <i>Merriam-Webster’s Collegiate Dictionary</i> 1302 (11th ed. 2007)
1041	U.S. Patent Application Publication No. 2009/0319270 (“Gross”)
1042	U.S. Patent No. 8,542,251 (“Gossweiler”)
1043	U.S. Patent Application Publication No. 2009/0320123 (“Yu”)
1044	<i>Human Differential Intelligence LLC v. Cloudflare</i> , No. 1:22-cv-01334 (W.D. Tex.), D.I. 1 (Complaint)
1045	Declaration of Jessica Benner, Ph.D., with attachment (Feb. 17, 2023)
1046	Declaration of Kelley M. Hayes Greenhill, with attachments (Feb. 22, 2023)
1047	<i>Human Differential Intelligence LLC v. Cloudflare</i> , No. 1:22-cv-01334 (W.D. Tex.), D.I. 13 (Order Staying Case) (Jan. 18, 2023),
1048	<i>Human Differential Intelligence LLC v. Cloudflare</i> , No. 1:22-cv-01334 (W.D. Tex.), PACER Docket (Feb. 22, 2023)

Under 35 U.S.C. §§311-19 and 37 C.F.R. § 42.1, *et seq.*, Petitioners Intuition Machines, Inc. (“Intuition Machines”) and Cloudflare, Inc. (“Cloudflare”) (together, “Petitioners”), request *inter partes* review (“IPR”) of claims 1, 4-5, 9, 12, 14, and 16 (“Challenged Claims”) of U.S. Patent No. 9,192,861 (“’861 Patent”) (Ex. 1001).

I. INTRODUCTION

The ’861 Patent concerns “CAPTCHA,” or “Completely Automatic Public Turing Tests To Tell Computers And Humans Apart.” Ex1001, Title; 1:44-46. CAPTCHA was developed in the late 1990s to control access to computers on the Internet by requiring a user to pass a test—one humans can perform but computers generally cannot—before being granted access to a website. Ex1002 (“Lopresti”), ¶42. The ’861 Patent acknowledges using CAPTCHA challenges to control access to computers and Internet resources was “well-known.” Ex1001, 1:44-52; Lopresti, ¶42.

Early CAPTCHA tests involved displaying a distorted text image and requiring the user to type in the displayed word, as shown below:



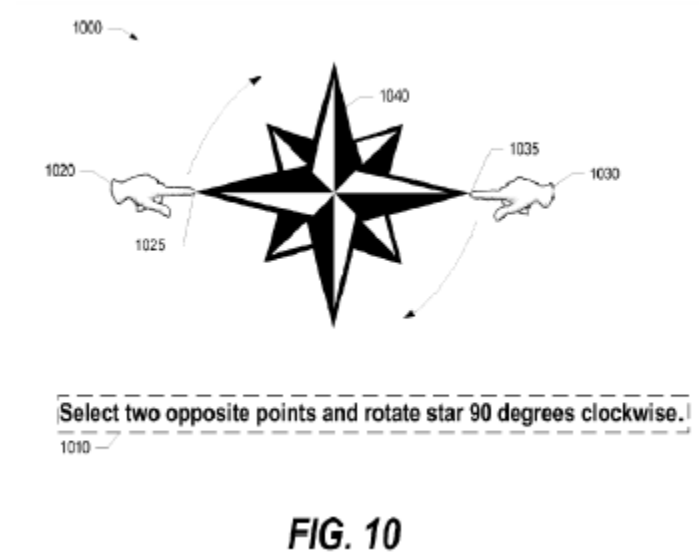
Ex1010; Lopresti, ¶43. In the early days of CAPTCHA, computers lacked sufficient optical character recognition to pass this type of test. Lopresti ¶¶43-44.

The '861 Patent alleges that while “conventional (distorted) text[-]type challenges” had proved fairly effective, the prior art failed to appreciate the potential for other, stronger types of challenges. '861 Patent, 1:52-57. To purportedly improve upon those earlier tests, the patent describes and claims CAPTCHA tests involving physical movement—like touching a computing device’s touchscreen or moving or orienting the device. The Challenged Claims are method claims that each require three steps: (i) “automatically electing” a manipulation challenge for a user including physical manipulation instructions, (ii) “automatically processing” sensory data from the user’s resulting actions, and (iii) “automatically determining” if the user’s movements satisfy the instructions. *Id.*, 5:11-24, 5:38-50, independent claims 1, 12.

But this type of physical manipulation CAPTCHA was well-known before June 2008, the patent’s earliest-claimed priority date.¹ *See, e.g.*, Lopresti ¶¶45, 65-214.

¹ None of the Challenged Claims are entitled to the provisional application’s filing date (*see* §V below), so none is entitled to a priority date before June 2009.

Seacat (Ex1006) discloses a touch-based CAPTCHA method on a portable device that automatically elects a manipulation challenge from a collection of such challenges and sends the challenge—including a set of physical touch instructions—to a user as shown (for example) in Figure 10 reproduced below. Seacat automatically processes sensory data associated with the user touching or moving her fingers across the device's screen, and Seacat automatically determines whether the user's movements satisfy the instructions (e.g., by rotating a star 90°) to qualify as a human. Seacat, Fig. 10, 1:32-37, 4:61-5:34, 8:24-37.



Seacat therefore anticipates and/or renders obvious the Challenged Claims that recite “touch-based” CAPTCHA, i.e., independent claim 12 and dependent claim 16 (Ground 1).

The other challenged independent claim (claim 1) recites “motion and/or orientation-based” CAPTCHA and “physical manipulation instructions for the portable computing device for the user.” In litigation, Patent Owner HDI maintains that claim 1 is not limited to movement or orientation of the device itself, but also covers physical movement or manipulation by the user interacting with the device’s graphical user interface (“GUI”), like touching or clicking a checkbox. A user touching Seacat’s screen engages in such physical movement or manipulation, as the user’s hands and/or fingers move to manipulate Seacat’s images (e.g., rotating the star) following Seacat’s CAPTCHA instructions. Seacat thus also anticipates and/or renders obvious claims 1, 5, and 9. Even if claim 1 required motion or orientation of the device itself, Seacat renders these claims obvious based on a POSA’s awareness of well-known and conventional uses of motion/orientation sensors as a user interface for a portable computing device; it would have been obvious to use this alternative, known interface with Seacat’s CAPTCHA system. These are the bases for Ground 2.

Mattice (Ex1007) discloses the conventional use of motion/orientation sensors in a portable device as a user interface. A POSA would have known to use Mattice’s motion/orientation sensor interface with Seacat’s CAPTCHA method, rendering claims 1, 5 and 9 obvious (Ground 3).

Claims 4 and 14 depend from claims 1 and 12, respectively, and recite presenting CAPTCHA instructions audibly using a text-to-speech engine. This was conventional and taught by Shirali-Shahreza (Ex1008). Based on Shirali-Shahreza, a POSA would have had numerous reasons to present Seacat's CAPTCHA instructions audibly, per Shirali-Shahreza's teachings. Seacat in combination with Shirali-Shahreza renders claims 4 and 14 obvious (Ground 4), and further in combination with Mattice renders claim 4 obvious (Ground 5).

II. MANDATORY NOTICES

A. Real Parties-In-Interest

Petitioners are the real parties-in-interest. Petitioners agree with and adopt herein the analyses previously submitted in IPR2020-01611, Google LLC's previous IPR challenging the '861 Patent, which was terminated via settlement before institution. No other entity was involved in finding and selecting prior art, substantive discussions regarding the content of this Petition, drafting this Petition, or filing this Petition. Petitioners have complete control over all petitioner-related aspects of this proceeding and are responsible for all petitioner-related costs and expenses associated with it.

Patent Owner HDI is a Texas corporation that allegedly owns U.S. Patent No. 9,192,861. Exs1025-1028, Ex1044.

Petitioner Cloudflare was served with a complaint alleging infringement of the '861 Patent on January 5, 2023, less than one year before this Petition. Ex1044; Ex1048. Petitioner Intuition Machines has never been served with such a complaint, although it is referenced in HDI's complaint against Cloudflare. Ex1044 ¶¶15-16, 26-29, 41-44. This Petition raises no time-bar implications for the Board's ability to institute trial under 35 U.S.C. §315(b).

B. Related Matters

A decision in this proceeding could affect or be affected by:

1. United States Patent & Trademark Office

The application from which U.S. Patent No. 9,192,861 issued as a divisional of U.S. Patent Application No. 12/494,083, now U.S. Patent No. 8,752,141 ("141 Patent"), filed June 29, 2009. Petitioners are filing a petition for IPR of several claims of the '141 Patent.

The '861 Patent claims priority to U.S. Provisional Application No. 61/076,495 ("HDI's Provisional"), filed June 27, 2008.

The following applications also claim the benefit of HDI's Provisional:

- U.S. Patent Application No. 15/268,309 (U.S. Patent No. 9,789,394), filed September 16, 2016;
- U.S. Patent Application No. 12/494,013 (U.S. Patent No. 9,266,023), filed June 29, 2009;

- U.S. Patent Application No. 12/494,065 (U.S. Patent No. 9,186,579), filed June 29, 2009;
- U.S. Patent Application No. 14/873,727 (U.S. Patent No. 9,474,978), filed October 2, 2015;
- U.S. Patent Application No. 12/494,083 (U.S. Patent No. 8,752,141) filed June 29, 2009; and
- U.S. Patent Application No. 14/223,824 (U.S. Patent No. 9,295,917), filed March 24, 2014.

2. U.S. District Court for the Western District of Texas

- *Human Differential Intelligence LLC v. Cloudflare, Inc.*, No. 1:22-cv-0134 (W.D. Tex.)
- *Human Differential Intelligence LLC v. Cigna Corporation*, No. 6:20-cv-00305 (W.D. Tex.) (dismissed);
- *Human Differential Intelligence LLC v. The Gap, Inc.*, No. 6:20-cv-00307 (W.D. Tex.) (dismissed);
- *Human Differential Intelligence LLC v. Bed Bath & Beyond Inc.*, No. 6:20-cv-00310 (W.D. Tex.) (dismissed); and
- *Human Differential Intelligence LLC v. CVS Health Corporation*, No. 6:20-cv-00311 (W.D. Tex.) (dismissed).

C. Counsel and Service Information – 37 C.F.R. § 42.8(b)(3) and (4)

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Powers of attorney are submitted with the Petition.

D. Grounds for Standing

Petitioners certify that the '861 Patent is available for IPR and that Petitioners are not barred or estopped from requesting review of the Challenged Claims. 37 C.F.R. § 42.104(a).

E. Grounds for Unpatentability

Petitioners request cancellation of claims 1, 4-5, 9, 12, 14, and 16. The table below identifies the references, claims, and basis for unpatentability.

Ground Number and Reference(s)		Claims	Basis
1	Seacat	12, 16	§102/§103
2	Seacat	1, 5, 9	§102/§103
3	Seacat + Mattice	1, 5, 9	§103
4	Seacat + Shirali-Shahreza	4, 14	§103
5	Seacat + Mattice + Shirali-Shahreza	4	§103

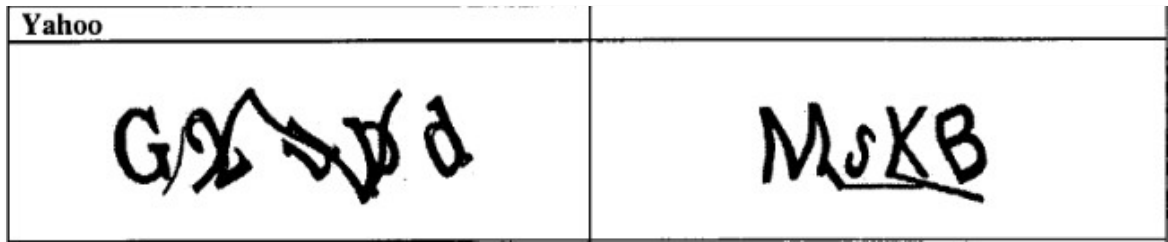
III. '861 PATENT OVERVIEW

A. Technology Background

The '861 Patent's claims relate to using CAPTCHA to protect websites and other networked devices from automated access, an area in the field of access control in computer security. Ex1001, Title, 1:44-46; Lopresti ¶42. CAPTCHAs were first developed in the late 1990s to control access to computers on the Internet and prevent automated hacking attacks from computer “bots.” Ex1009, 12-14²; Lopresti ¶42. A CAPTCHA prevents automated attacks by requiring users to perform tasks that humans can perform well, but computers generally cannot, before accessing the site. Ex1009, 12-14; Lopresti ¶42.

Early CAPTCHA tests involved displaying a distorted text image and required the user to type the displayed word, as shown below:

² Petitioners cite internal pagination of Ex1009.



Ex1010; Lopresti ¶43. While distorted-text CAPTCHAs succeeded for a time, by the mid-2000s computers could solve certain text-based CAPTCHAs with reasonable success, so the industry was developing CAPTCHAs based on other tasks computers could not perform well, such as non-text image recognition, audio recognition, and motion, orientation, and touch-based challenges. Ex1009, 15-17; Lopresti ¶¶44-45.

B. The '861 Patent

1. The State of CAPTCHA

The '861 Patent is one of seven patents claiming priority to HDI's Provisional. That provisional focuses primarily on an electronic Pictionary™-like game, and most of the other patents claim aspects of that game. *Supra* §II.B.1. The '861 Patent specification likewise focuses on the electronic Pictionary™-like game, and mentions CAPTCHA in only three passages largely absent from HDI's Provisional. '861 Patent, 1:44-57, 4:36-5:62, 14:1-67; Lopresti ¶46.

The '861 Patent concedes CAPTCHA was “well-known for controlling access to computers and resources on the Internet.” '861 Patent , 1:44-49. While acknowledging “conventional (distorted) text type challenges,” the '861 Patent

(incorrectly) suggests the prior art allegedly did not appreciate the potential for image-based challenges, and states “images can be incorporated as part of a picture[-]based game to develop appropriate challenges.” *Id.*, 1:52-57; Lopresti ¶47.

2. The Purported Improvements to CAPTCHA

The '861 specification describes two CAPTCHA embodiments. One progressively reveals non-text images (Ex1001, 4:36-5:3) and is the focus of a different patent's claims (the '141 Patent). Lopresti ¶48.

The claims of the '861 Patent focus on the other CAPTCHA embodiment: physical manipulation. '861 Patent, 5:11-50, 14:26-67. For instance, for “an iPhone[-]like” mobile device “capable of motion/orientations sensing,” the user could be asked to move or orient the device itself (e.g., “rotating it to the right, to the left, in a complete circle, picking it up and putting it down N times, shaking it in different directions,...rotating it 90 degrees,...moving it in a FIG. 8 pattern”) or to manipulate “objects within the screen...based on sensing the movement of the device.” *Id.*, 14:19-49. Alternatively, on a “touchscreen” device, a CAPTCHA challenge can involve “the user [being] required to physically touch or manipulate icons or other objects to achieve some result,” such as the user being “asked to orient an object into its correct position by moving it with their fingers,” or “to physically touch or manipulate icons or other objects to achieve some result.” *Id.*, 14:50-61, 5:4-62; *see* Lopresti ¶49.

The physical-manipulation CAPTCHA embodiments and '861 claims all require three elements:

1. “automatically electing” a manipulation challenge for the user, where the challenge includes physical manipulation or touch instructions (e.g., moving or orienting the device, touching the device);
2. “automatically processing” sensory data associated with the user’s movements and/or manipulations; and
3. “automatically determining” if the data meets a required threshold for satisfying the instructions to qualify the user as a human.

Id., 5:11-24, 5:38-50, claim 1, 12; Lopresti ¶50.

C. Summary of Challenged Claims

Independent claims 1 and 12 share a similar structure, with differences highlighted below:

[1PRE] A method of providing a <i>motion and/or orientation based</i> Completely Automatic Public Turing Test To Tell Humans And Computers Apart (CAPTCHA) challenge on a portable computing device comprising:	[12PRE] A method of providing a <i>touch-based</i> Completely Automatic Public Turing Test To Tell Humans And Computers Apart (CAPTCHA) challenge on a portable computing device comprising:
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[1A]	a. automatically electing a manipulation challenge for a user with the portable computing device, wherein said manipulation challenge includes a set of physical <i>manipulation</i> instructions for the portable computing device for the user;	[12A]	a. automatically electing a manipulation challenge for a user with the portable computing device, wherein said manipulation challenge includes a set of physical <i>touch</i> instructions for the portable computing device for the user,
[1B]	b. automatically processing sensory data associated with user movements and/or	[12B]	b. automatically processing <i>touch</i> sensory data associated with user movements and/or manipulations <i>of objects within a</i>
	manipulations of the portable computing device; and		<i>Graphical interface</i> of the portable computing device; and
[1C]	c. automatically determining if said user <i>movements and/or manipulations from the user</i> meet a required threshold for satisfying said set of <i>manipulation</i> instructions to qualify said user as a human.	[12C]	c. automatically determining if said user <i>touch sensory data</i> meets a required threshold for satisfying said set of <i>physical touch</i> instructions to qualify said user as a human.

The challenged dependent claims add implementation details known in the art. Ex1001, claims 4 and 14 (presenting instructions “in audible form by a text[-]to[-]speech engine”), claim 5 (having the user move a “portable computing device so as to manipulate objects presented in an interface”), claims 9 and 16 (embodying the CAPTCHA challenge “in computer[-]readable form and implemented as a routine executing” on the device, a feature that the ’861 Patent concedes was known in the art (25:65-26:5)); Lopresti ¶¶53-55.

D. Prosecution History

The application that resulted in the '861 Patent, filed March 24, 2014, was a division of U.S. App. No. 12/494,083 (now the '141 Patent), filed June 29, 2009, which claims priority to HDI's Provisional, filed June 27, 2008. Ex1001.

The Challenged Claims were not subject to *any* prior art-based rejections. Besides saying that two dependent claims lacked antecedent basis, the first office action found all pending claims allowable because the prior art allegedly did not disclose the independent claims' steps (b) or (c): "automatically processing" data associated with user movements and/or manipulations [1B/12B]), and "automatically determining" if the data "meets a required threshold" [1C/12C]. Ex1004, 94-101. After the applicant submitted amendments correcting the two dependent claims and making other minor changes, a Notice of Allowance issued with no further discussion. Ex1004, 24-29, 58-65. Nothing indicates that the Examiner analyzed whether any Challenged Claim is entitled to the filing date of HDI's Provisional. *Id.*, 24-29, 94-101; Lopresti ¶¶51-52.

E. Level of Ordinary Skill in the Art

The '861 Patent claims priority to HDI's Provisional, filed June 27, 2008. Ex1001, 1:6-10. No Challenged Claim is entitled to that date (§V below), but that does not impact the level of ordinary skill.

A person of ordinary skill in the art (“POSA”) in mid-2008 (or mid-2009 when the ’861 Patent’s non-provisional was filed) would have had at least a bachelor’s degree in Computer Science or a related field, along with at least two years of work or research experience in computer security, and some experience with CAPTCHA. More education could substitute for less experience, and vice versa. Lopresti ¶¶35-41.

IV. CLAIM INTERPRETATION

This Petition construes claim terms using the *Phillips* standard. 37 C.F.R. §42.100(b).³ There is an issue regarding whether claim 1 is limited to motion/orientation of the device itself, or whether it also covers physical interactions with the device’s GUI, as HDI contends in litigation. The grounds demonstrate claim 1 is unpatentable under either interpretation. §§VI.B-C.

V. THE HDI PROVISIONAL DOES NOT SUPPORT ANY CHALLENGED CLAIM

A. HDI Bears the Burden of Production To Show Its Provisional Supports the Challenged Claims

HDI bears the burden of production to demonstrate support in HDI’s Provisional for any Challenged Claim. *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1379-80 (Fed. Cir. 2015). HDI’s Provisional must “contain a *written description* of the invention, and of the manner and process of making and

³ There have been no prior claim construction determinations.

using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art...to make and use the same.” 35 U.S.C. § 112.⁴ It does not.

B. HDI’s Provisional Does Not Support Any Challenged Claim

HDI’s Provisional focuses almost entirely on an electronic PictionaryTM-style game. Ex1005. The *only* disclosure relating to CAPTCHA is a single paragraph, saying that in “some applications a CAPTCHA challenge system (*not shown*) could introduce visual content to be reviewed by humans to determine what appropriate tags/concepts are presented for the image in question.” *Id.*, 17-18. The information could then “be used to augment a library of challenge test images” for an image-based CAPTCHA system. *Id.* There is *no* disclosure, mention, or suggestion of “motion and/or orientation”-based CAPTCHA (Challenged Claim 1) or “touch”-based CAPTCHA (Challenged Claim 12). Lopresti ¶¶58-61.

The non-provisional application in June 2009 contains disclosure not found in HDI’s Provisional. Ex1004, 139-40, 155-56. No Challenged Claim is entitled to the date of HDI’s Provisional, which lacks written description support for the terms “motion and/or orientation,” “physical manipulation instructions,” “user movements and/or manipulations,” “sensory data,” “touch-based,” “physical touch instructions,” and “touch sensory data”—one or more of which appears in every Challenged Claim

⁴ Emphasis and annotations added, and quotations and citations omitted, except as noted.

either directly or via dependency. 35 U.S.C. §112, ¶¶1, 4; Lopresti ¶62; *see New Railhead Mfg. v. Vermeer Mfg.*, 298 F.3d 1290, 1294 (Fed. Cir. 2002); *Smith & Nephew, Inc. v. Arthrex, Inc.*, IPR2016-00487, Paper 8, 14-15 (P.T.A.B. July 27, 2016).

To support a Challenged Claim, HDI's Provisional would need to describe the claimed invention "in sufficient detail that one skilled in the art can clearly conclude that the inventor invented the claimed invention as of the filing date sought." *Lockwood v. Am. Airlines*, 107 F.3d 1565, 1572 (Fed. Cir. 1997); *see also SynQor, Inc. v. Artesyn Techs., Inc.*, 709 F.3d 1365, 1377 (Fed. Cir. 2013) (citing *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (*en banc*). Complete silence on "motion and/or orientation," "physical manipulation instructions," "user movements and/or manipulations," "sensory data," "touch-based," "physical touch instructions," and "touch sensory data" does not provide such "sufficient detail." Lopresti ¶¶63-64. Therefore, no Challenged Claim is entitled to a priority date earlier than the non-provisional filing in June 2009. *See Dynamic Drinkware*, 800 F.3d at 1381.

As explained below, all references relied upon would still be prior art to the '861 Patent under pre-AIA 35 U.S.C. §102(a) and (e) even if the Challenged Claims were entitled to the benefit of HDI's Provisional. If post-AIA law applies, the

references would still be prior art under post-AIA §102(a) even if the Challenged Claims were entitled to that benefit.

VI. CLAIM-BY-CLAIM EXPLANATION OF GROUNDS FOR UNPATENTABILITY

Claims 1, 4-5, 9, 12, 14, and 16 of the '861 Patent are anticipated by and/or obvious over the prior art, as explained in detail below and supported by Professor Lopresti (Ex1002), an expert with over fifteen years' experience in computer security and related areas. *See* Ex1003; Lopresti ¶¶2-20, 41, 65-214.

The Petition demonstrates unpatentability of claims 1, 5, and 9 under alternative claim constructions. *10X Genomics, Inc. v. Bio-Rad Labs., Inc.*, IPR2020-00086, Paper 8, 22 (P.T.A.B. Apr. 27, 2020) (“The regulatory history...expressly contemplates that a petitioner may rely on alternative claim constructions.”) (collecting cases). Namely, Ground 2 demonstrates unpatentability under both a claim construction consistent with HDI’s infringement allegations and a narrower construction, while Ground 3 demonstrates unpatentability under only a narrower construction. Grounds 1, 4, and 5 are unaffected by this issue.

A. Ground 1: Seacat Anticipates and/or Renders Obvious Claims 12 and 16

1. Seacat (Ex1006)

a. Seacat Is Prior Art

The '861 Patent application was filed on March 24, 2014 (after the AIA went into effect) but, as mentioned in §III.D above, claims priority to the '141 Patent's application and to HDI's Provisional, both filed before the AIA's enactment. Hence pre-AIA law applies. Pub. L. No. 112-29, 125 Stat. 288. Seacat is a U.S. patent filed March 26, 2008, and qualifies as prior art under pre-AIA §102(e). Seacat, (22).

If the Board were to determine that post-AIA law applies, Seacat would be post-AIA §102(a)(1)-(2) prior art. Thus, Seacat is prior art regardless of whether pre-AIA or post-AIA law applies.

Seacat was not of record during prosecution, but its published application (No. 2009/024947) was among over 150 references that were. '861 Patent, (56). The Examiner did not cite or comment on Seacat's application, nor use it in any rejection. Ex1004; Lopresti ¶¶69-70. That weighs heavily against discretionary denial. *See infra* §VII.B.

b. Seacat's Disclosure

Seacat, titled "Using Multi-Touch Gestures To Protect Sensitive Content Using a Completely Automated Public Turing Test To Tell Computers and Humans Apart (CAPTCHA)," teaches CAPTCHAs using a multi-touch device, like an

iPhone or other portable device with a touchscreen. Seacat, Title, 1:33-35, 3:59-67; Lopresti ¶71. By “multi-touch,” Seacat refers to gestures that require the user to touch the device in multiple places simultaneously. Seacat, 1:10-15. A “multi-touch manager” provides a “multi-touch test” to the device, and “receives a multi-touch response” back. Seacat, 1:33-37. The manager compares the multi-touch response “with a multi-touch answer and authorizes the device based upon the comparison.” *Id.*, 1:37-39; Lopresti ¶71.

Seacat recognizes that “computer networks, such as the Internet,” have difficulty “determining whether a human or Spam robot is requesting information,” e.g., to access a website. Seacat, 1:20-23. Seacat notes the need for various “security features” to deal with this problem, and that CAPTCHA acts as “this type of security feature,” for example by challenging “a user to enter a response based upon viewing an image.” *Id.*, 1:24-27. Seacat notes multi-touch devices have additional capabilities, such as “a computerized surface that uses cameras and near-infrared light to identify objects placed upon it and to allow simultaneous multiple points of touch interaction.” *Id.*, 1:16-20; *see* Lopresti ¶72.

Seacat describes CAPTCHAs based on physical manipulation and touch. *Id.*, Abstract; 1:33-39, 7:6-13, 7:62-8:37, Figs. 8-10. It discloses CAPTCHAs using a multi-touch computing device for “accessing pages of data located on a computer network such as the Internet.” *Id.*, 4:52-65. The device can be “portable,” like a

“laptop, ... portable telephone device, ... (PDA), gaming device, ... handheld computer,” or “mobile telephone.” *Id.*, Fig. 2, 3:59-67, 4:16-25. The device sends a page request to a multi-touch manager. *Id.*, 4:52-5:6. In response, the multi-touch manager automatically selects a multi-touch CAPTCHA challenge or test to send to the device. *Id.*, 4:61-5:10, 5:40-51. *See* Lopresti ¶73.

Next, the device displays the test, which will include an image and one or more instructions for the user to touch the image. *Seacat*, 5:10-13. The user must manipulate or orient the image in various ways through physical touch, e.g., zooming in on part of the image, placing fingers within specific parts of the image, or rotating the image. *Id.*, Figs. 8-10, 7:6-13, 7:62-8:37. Figures 8-10 are examples of *Seacat*’s touch-based CAPTCHA challenges requiring the user to physically manipulate and/or orient images. *See* Lopresti ¶74.

In Figure 8 (reproduced below), multi-touch instruction 810 tells the user to “zoom in on the soccer ball” by having her hands 820 and 830 “contact the display at two points” (825/835, respectively). *Seacat*, 7:62-8:4. The user’s hands then “move inward towards soccer ball 840 until the user is satisfied with the zoom area,” at which point the user clicks complete. *Id.*, 8:2-10; Lopresti ¶75.

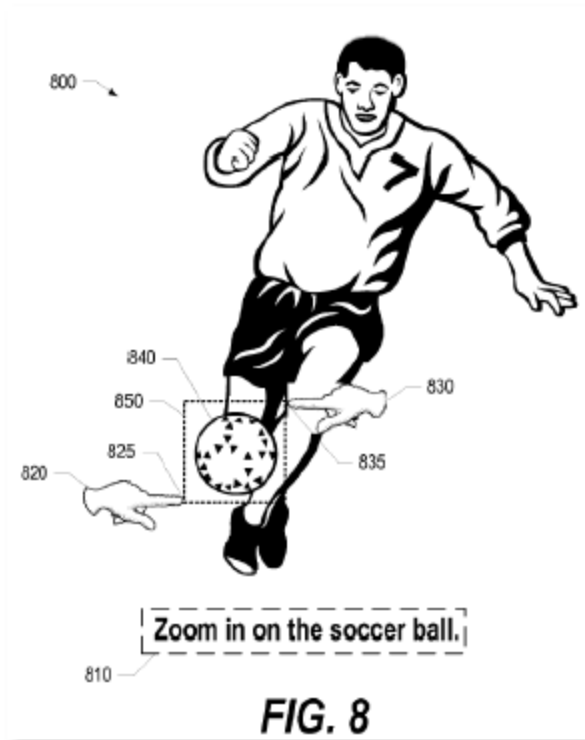


Figure 9 (reproduced below) likewise provides a multi-touch instruction, in this case “to select two locations,” one “inside wheel 940” and another “inside wheel 950” of the tractor. Seacat, 8:11-23; Lopresti ¶76.

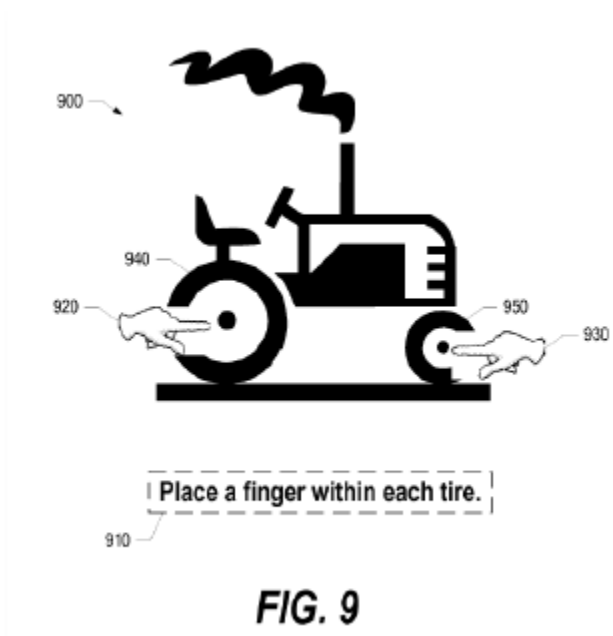
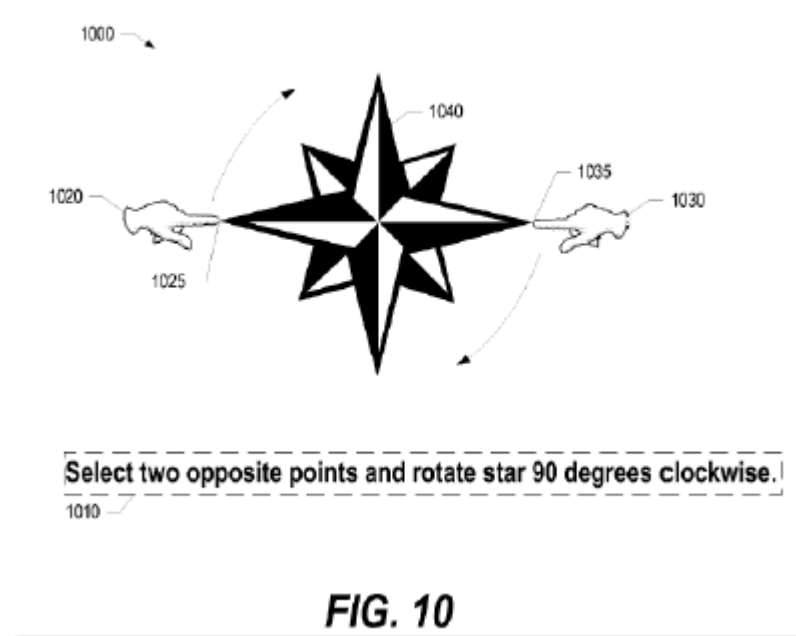


Figure 10 (reproduced below) is a third example that instructs the user to contact the display on two opposite points of a compass star and “move in a clockwise direction 90 degrees, which subsequently rotates [the] star.” Seacat, 8:24-29. The test allows “a user to rotate a picture between 85 and 95 degrees instead of exactly 90 degrees,” yet still meet the required threshold for “an acceptable range of test answers.” *Id.*, 5:24-29, 6:1-6, 7:34-42; Lopresti ¶77.



After the user completes the task, the device sends the multi-touch response to the manager. Seacat, 5:13-22, 5:52-62, 7:14-24. The manager compares that touch response to a known answer. *Id.*, 5:24-28, 5:63-6:40, 7:34-62. If the touch response data is correct (or close enough), the manager concludes the user is human and authorizes the device; otherwise, the manager may send another test to the device. *Id.*, 5:29-34; 5:63-6:40; Lopresti ¶78.

2. Seacat Anticipates Claims 12 and 16

a. Claim 12

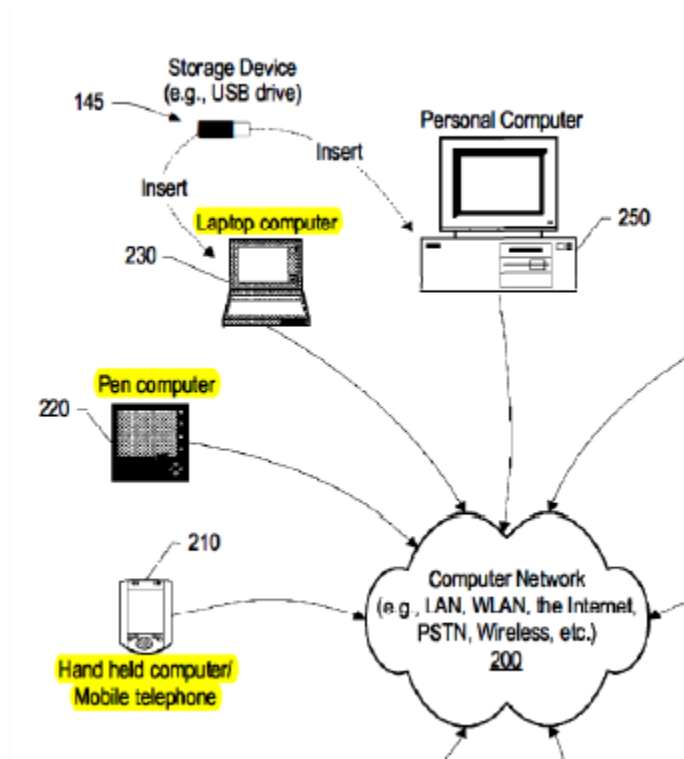
(1) [12Pre]

To the extent claim 12's preamble is limiting, Seacat meets it because Seacat discloses "[a] method of providing a touch-based Completely Automatic Public Turing Test To Tell Humans And Computers Apart (CAPTCHA) challenge on a portable computing device," as recited. Lopresti ¶¶79-82.

Seacat's title is "Using Multi-*Touch* Gestures To Protect Sensitive Content Using a *Completely Automated Public Turing Test To Tell Computers and Humans Apart (CAPTCHA)*." Seacat repeatedly describes using touch for CAPTCHA. Seacat, Abstract ("The invention described herein uses a multi-touch manager for authorizing multi-touch devices by first providing a multi-touch test to a multi-touch device"), 1:25-29 ("(CAPTCHA) is this type of security feature"), 4:51-60 ("FIG. 3 is a diagram of a server providing a multi-touch test to a multi-touch device and authorizing the multi-touch device based upon a user's response ... (CAPTCHA) is one such security mechanism."), 5:16-22; 5:40-51 ("the multi-touch test may correspond to a...(CAPTCHA) format."), 7:6-13, Fig. 5, items 350, 500, Fig. 7, items 350, 700, 730, Figs. 8-10, 7:62-8:37, claim 2. Lopresti ¶¶79-80.

Seacat provides its touch-based CAPTCHA challenge on a portable computing device, like a portable laptop, PDA or mobile telephone. Seacat, 3:59-67 (Seacat's "information handling system may take many forms," including a

“*portable*[] laptop, notebook, ... (PDA), a gaming device, ... [or] a *portable* telephone device.”); Lopresti ¶81. Figure 2 shows how “the methods described herein can be performed on ... small *handheld* devices, such as handheld computer/*mobile* telephone 210 personal digital assistants (PDAs), personal entertainment devices, such as MP3 players, *portable* televisions, and compact disc players ... pen, or tablet, computer 220, laptop, or notebook, computer 230.” Seacat, 4:12-25.



Id., Fig. 2 (excerpt). Lopresti ¶81 (Seacat, Fig. 2 (excerpted, annotated)).

(2) [12A]

Seacat discloses “a. automatically electing a manipulation challenge for a user with the portable computing device, wherein said manipulation challenge includes a set of physical touch instructions for the portable computing device for the user,” per limitation [12A]. Lopresti ¶¶83-96.

First, the election of Seacat’s manipulation challenges is done “automatically.” The “CA” in CAPTCHA stands for “Completely Automated.” Seacat, 1:3-5, 23-25; Lopresti ¶84. Seacat repeatedly refers to its touch-based CAPTCHA test as “automated.” Seacat, Title (“...using a completely *automated* public Turing test to tell computers and humans apart...”), 1:24-29 (“Completely *Automated*...(CAPTCHA) is this type of security feature...”), 4:58-60 (“[CAPTCHA] is one such security mechanism.”), 5:43-45 (“the multi-touch test [of Seacat’s invention] may correspond to a Completely *Automated*...format”), claim 2 (“the multi-touch test is based upon a Completely *Automated*...(CAPTCHA).”). By characterizing its method as CAPTCHA, a POSA would have understood Seacat to disclose that all steps in administering its CAPTCHA challenge are automated. Lopresti ¶84.

Alternatively, if the Board does not consider Seacat to expressly disclose that its CAPTCHA steps are automated, that would have been the conventional and obvious way to implement a CAPTCHA method of the type Seacat describes.

Lopresti ¶¶85-88 (citing Exs1009 and 1015 as describing the advantages of fully-automated CAPTCHAs); Exs1022-1023 (establishing authenticity and public accessibility of Exs1009 and 1015); Declaration of Mary Bolin, Ex1021 (“Bolin”), ¶¶25-37 (same); Ex1045 (same); Ex1046 (same), ¶¶24-33.

Second, Seacat discloses “electing a manipulation challenge for a user” as claimed when it elects its multi-touch CAPTCHA test from a collection of such tests. Lopresti ¶89. The multi-touch manager “pseudo-randomly selects a multi-touch test from multi-touch test store 350,” which “instructs a user to perform specific multi-touch gestures.” Seacat, 4:66-5:2, 5:41-51 (“the server pseudo-randomly selects a multi-touch test to send to the multi-touch device,” which can be a CAPTCHA challenge), 6:48-52 (same). If the user fails the challenge, the multi-touch manager “may provide another multi-touch test to multi-touch device 310 up to a certain number of times.” *Id.*, 5:30-34, 5:45-50, 6:10-40, 7:50-62. Seacat selects challenges from “Multi-Touch CAPTCHA Test Store 350.” *Id.*, Fig. 7, 6:48-52.

Third, Seacat discloses that the CAPTCHA test can be done on a “portable computing device,” like a laptop, PDA, or mobile telephone. *Supra* §VI.A.2.a(1); Seacat. 3:59-67; 4:12-25, Fig. 2; Lopresti ¶90.

Fourth, Seacat’s manipulation challenge “includes a set of physical touch instructions for the portable computing device for the user.” Lopresti ¶91. The point of Seacat’s CAPTCHA challenge is that it “instructs a user to perform specific

multi-touch gestures, such as touching a screen at two locations and zooming in on an object or rotating an object.” Seacat, 4:67-5:3. Seacat calls out Figures 8-10 (reproduced with highlighting added below) as detailing such instructions. Lopresti ¶91.

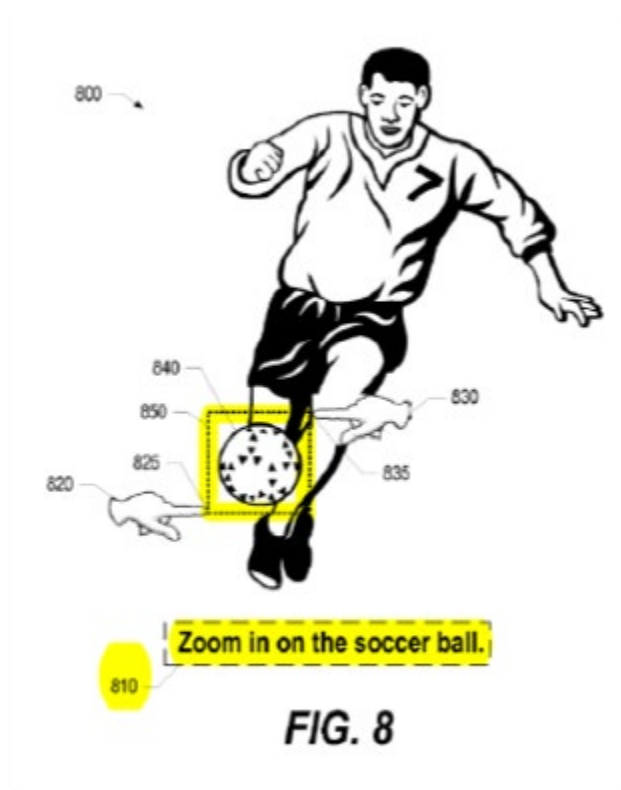


Figure 8 is an “example of a multi-touch test that a server provides to a multi-touch device,” and “includes an image and **multi-touch instruction 810.**” Seacat, 7:62-65. It “instructs a user to zoom in on soccer ball 840,” which is a physical touch instruction. *Id.*, 7:64-67. The user follows the instruction by physically moving, orienting, and manipulating his hands and fingers 820-830 “inward towards soccer ball 840 until the user is satisfied with the zoom area.” *Id.*, 8:1-4; Lopresti ¶92.

Figure 9 (reproduced with highlighting added below) provides “an image of a vehicle and **multi-touch instruction 910**” that “instructs a user to select two locations,” by placing a “finger within each tire.” Seacat, 8:11-16, Fig. 9. The user achieves this by physically touching each tire. *Id.*, 8:17-23; Lopresti ¶93.

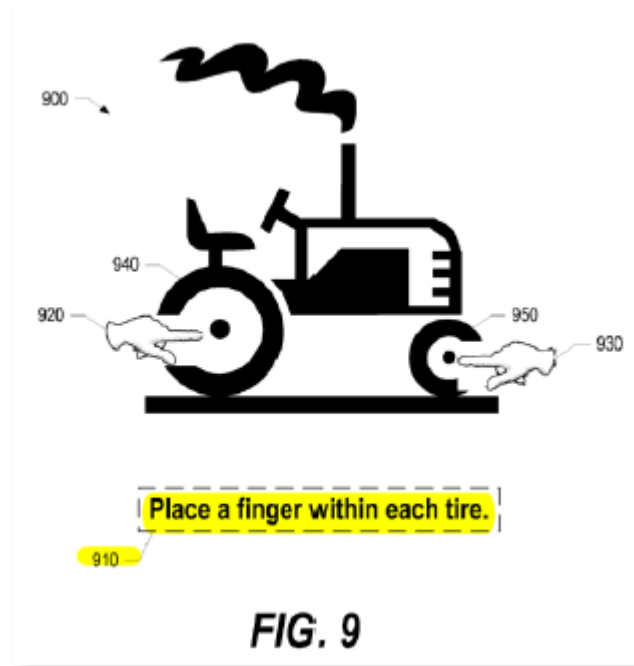
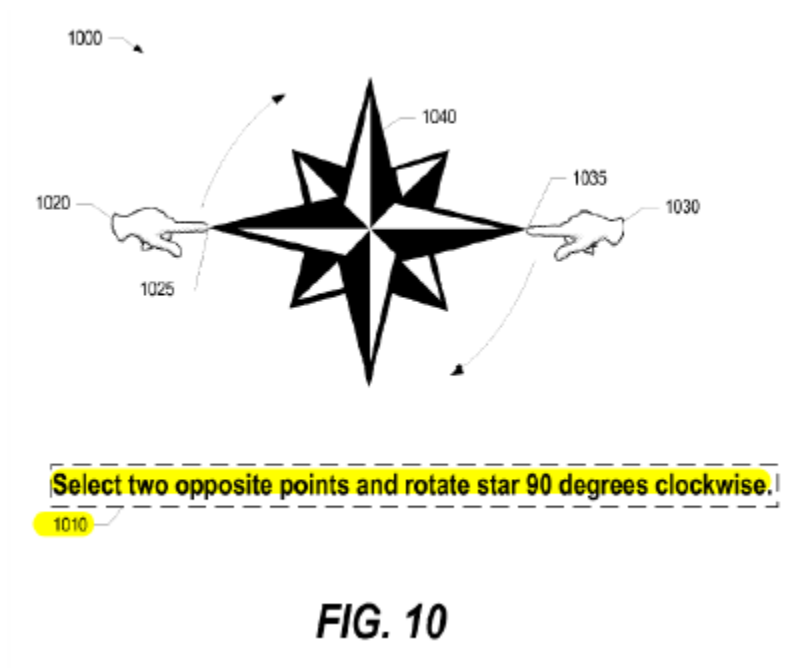


Figure 10 is “another example of a multi-touch test that a server provides to a multi-touch device,” with a compass star and “**multi-touch instruction 1010**” that “instructs a user to select two opposite points of star 1040 and rotate star 1040 90 degrees in a clockwise direction.” Seacat, 8:24-29. The user follows the instruction by “contact[ing]” the display, and then moving and orienting her hands to manipulate and orient the object on the device to complete the task. *Id.*, 8:30-38. This is **identical** to an allegedly inventive ’861 embodiment, where the user is “asked

to orient an object into its correct position by moving it with [her] fingers.” ’861 Patent, 14:55-59; Lopresti ¶¶94.



Seacat claims 1, 7, and 11 all recite “providing a multi-touch test to the multi-touch device.” They also all require an image and “one or more *instructions* that specify an action to perform on the image requiring a user to simultaneously *contact* a display at a plurality of locations.” *Id.*; Lopresti ¶¶95.

As detailed above, Seacat meets limitation [12A]. Lopresti ¶¶83-96.

(3) [12B]

Seacat discloses “automatically processing touch sensory data associated with user movements and/or manipulations of objects within a graphical interface of the portable computing device,” per limitation [12B]. Lopresti ¶¶97-101.

First, Seacat repeatedly refers to its physical motion CAPTCHA test as “automated,” as discussed above. Seacat, Title, 1:24-29, 4:58-60, 5:43-45, claim 2. As discussed above (§VI.A.2.a(2)), a POSA would have understood that all Seacat’s CAPTCHA steps are completely automatic, or alternatively that would have been the conventional and obvious way to implement the CAPTCHA steps Seacat discloses. Seacat, 1:3-5, 23-25; Lopresti ¶98.

Second, as also discussed above (§VI.A.2.a(1)), Seacat discloses a “portable computing device,” like a laptop, PDA, or mobile telephone. *Supra* §VI.A.2.a(1); Seacat, 3:59-67, Fig. 2, 4:12-25; Lopresti ¶99.

Third, Seacat discloses “processing touch sensory data associated with user movements or manipulations of objects within a graphical interface of the portable computing device.” Lopresti ¶100. As discussed above, Seacat’s CAPTCHA challenges involve the user touching and orienting the device to move, manipulate, and/or orient objects within a graphical interface, for example those in Figures 8-10. Seacat, Figs. 8-10, 7:62-8:37, Lopresti ¶100. Seacat’s multi-touch manager “receives a multi-touch response from the multi-touch device,” i.e., the touch sensory data associated with those touches, movements, and/or manipulations. Seacat, 1:35-37; Lopresti ¶100. Then, the “multi-touch manager compares the multi-touch response with a multi-touch answer.” Seacat, 1:37-39; Lopresti ¶100.

In this fashion, Seacat “process[es]” the “touch sensory data” it receives from the device. Lopresti ¶101. Seacat describes this processing several times. Seacat, 5:37-66 (“Multi-touch device *processing* commences ... the server *compares* the multi-touch response with a multi-touch answer and provides a pass/fail/retest result back to the multi-touch device...”), 7:25-47 (“FIG. 7 is a flowchart showing steps taken in a server *analyzing* a multi-touch response.... *Processing* compares the multi-touch response with the multi-touch answer and multi-touch answer parameter sat step 730, and a determination is made as to whether the multi-touch response passed based upon the comparison...”), claims 1, 3-4, 7-9, 11-13 (“*comparing* the multi-touch response with a multi-touch answer for the multi-touch test”). A POSA would have understood the repeated references to “comparing,” “analyzing,” and “processing” the multi-touch response as describing the processing of touch sensory data. Lopresti ¶101.

(4) [12C]

Seacat discloses claim 12’s last limitation, “automatically determining if said user touch sensory data meets a required threshold for satisfying said set of physical touch instructions to qualify said user as a human.” Lopresti ¶¶102-109.

First, as discussed above (§VI.A.2.a(2)), a POSA would have understood that all of Seacat’s CAPTCHA steps are completely automatic, or alternatively that

would have been the conventional and obvious way to implement the CAPTCHA steps Seacat discloses. Lopresti ¶103.

Second, Seacat determines if the user's touch sensory data meets a required threshold for satisfying the physical touch instructions to qualify the user as human. Lopresti ¶104. The "user touch sensory data" [12B] is compared to the multi-touch answer (*supra* §VI.A.2.a(3)), and the multi-touch manager "authorizes the device based upon the comparison," and "provides a pass/fail/retest result back to the multi-touch device" to determine if the user is human. Seacat, 1:37-39, 5:63-67.

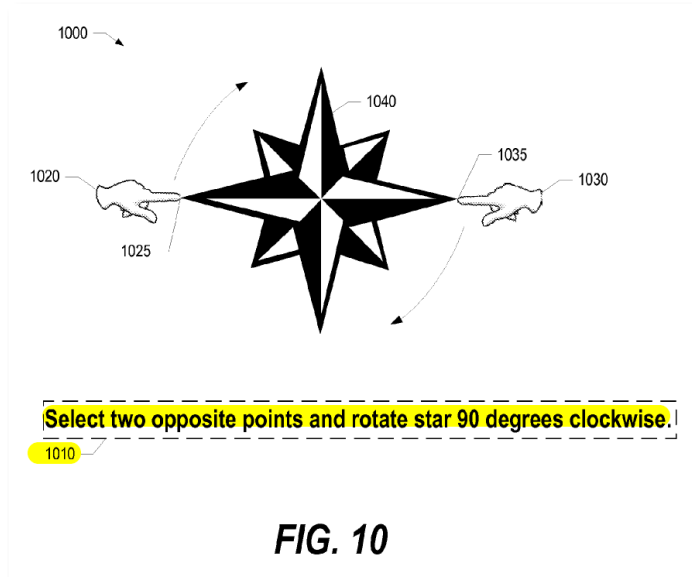
A "pass" result means the user has passed the threshold to meet the instructions and qualify as a human, as the purpose of Seacat's "invention" is "to determine whether a **human** is requesting information." *Id.*, 1:27-30, 1:62-67 (method includes "authorizing the multi-touch device based upon a user's response."), 5:62-6:23 ("A determination is made at the server as to whether the multi-touch response passed (decision 485). If the multi-touch response passed, decision 485 branches to 'Yes'.... [I]f the multi-touch response did not pass, decision 485 branches to 'No'"), 7:25-62 (in "determining whether to authorize the device based upon a multi-touch answer," if the data fails to meet the threshold, "processing denies authorization to the multi-touch device"), claims 1, 3-4, 7-9, 11-13 ("authorizing the device based upon the comparison" between the user's touch-based manipulations of the device and the multi-touch answer); Lopresti ¶105.

Indeed, Seacat's CAPTCHA method qualifies a user as a human when the user passes the test, yet a "bot" would fail because it would perform poorly and not pass. Lopresti ¶105 (noting the "TCHA" in CAPTCHA stands for "Turing Test To Tell Computers and Humans Apart.").

Figures 8-10 show three manipulation challenges, where the method determines if the user's touch sensory data meets a required threshold for satisfying the physical touch instructions to qualify the user as human. Seacat, Figs. 8-10, 7:62-8:37; Lopresti ¶106. The '861 Patent does not discuss "threshold" beyond what is in the claim language, and describes numerous embodiments where the determination is binary (the response is either correct or not) with no degrees of correctness assessed. '861 Patent, 5:3, 24, 49; 10:39-41; 14:1-4; Lopresti ¶106. Hence a POSA would have understood that "threshold" just refers to a point at which the user passes as human. Lopresti ¶106 (citing Ex1040).

For example, in Figure 10 the set of physical touch instructions tell the user to "[s]elect two opposite points" and "rotate the star 90 degrees." Seacat, 8:26-38. If the touch sensory data meets that required 90° threshold, the user qualifies as human. *Id.*; Lopresti ¶107. Seacat's "parameters may allow a user to rotate a picture between 85 and 95 degrees instead of exactly 90 degrees," yet still accept the answer, which a POSA would understand establishes a threshold for satisfying the instruction. Seacat, 5:24-29; 6:1-6, 7:34-42; Lopresti ¶107. The "parameters may specify an

acceptable range of test answers” (Seacat, 7:36-38), so any touch data showing movement between 85°-95° meets the required 90° threshold to satisfy the physical touch instructions and qualify the user as a human. Lopresti ¶107.



Lopresti, ¶107 (Seacat, Fig. 10, annotated).

While Seacat does not expressly use the word “threshold,” a POSA would have understood that in Seacat’s CAPTCHA system, some user responses will “pass” and others will “fail,” to differentiate responses from a human user from those from a computer. Lopresti ¶108. A POSA would have understood that differentiating some responses as passing and others as failing uses a threshold. *Id.* Indeed, Seacat describes comparisons between the user’s sensory touch data and a test answer as determining whether the data qualifies the user as human. *Supra* §VI.A.2.a(3). Seacat allows relaxed parameters to accept “close enough” data, like rotating a star between 85°-95° to meet instructions to rotate 90°. *Id.* A POSA

would have understood these disclosures to show whether the user data meets a “threshold” of compliance with the instructions. Lopresti ¶108. Indeed, the ‘861 applicant/inventor referred to such “thresholds” for identifying an acceptable CAPTCHA response in another patent application filed the same week of 2008. Gross (Ex1041), [0135], [0160]; Lopresti ¶108.

Alternatively, to the extent the Board believes that Seacat does not teach a “threshold” of compliance with the instructions, using a threshold would have been the conventional and obvious way to implement the CAPTCHA method Seacat discloses to differentiate human from computer input. Seacat, 1:27-30, 1:37-39, 1:62-67, 5:62-6:23, 7:25-67; Lopresti ¶109; Lindsay (Ex1014), [0297]; Gross, [0135], [0160]. It was well-known to implement CAPTCHA systems using a threshold to differentiate human versus computer input. *See* Lindsay, [0297] (describing multiple “*threshold* value[s]”); Gross, [0135] (using “*thresholds*” for answers “would allow detecting machine impostors...”), [0160] (“a set of *thresholds* identifying an acceptable response” to see if “entity attempting access” is human); Gossweiler, Ex1042, 13:42-46 (if user’s orientation data “is within a predetermined *threshold*,” access is granted); Lopresti ¶109.

b. Claim 16

Seacat discloses “wherein the touch[-]based CAPTCHA challenge is embodied in computer[-]readable form and implemented as a routine executing on the portable computing device,” per dependent claim 16. Lopresti ¶¶110-112.

First, Seacat explains that a “preferred implementation” is a “client application, namely, a set of instructions (program code)” that can be “resident in the random[-]access memory of the computer.” Seacat, 8:38-42. The CAPTCHA “client application” presents the touch-based CAPTCHA challenge and is in a computer-readable form as claimed. *Id.*, 8:46-60 (client application can be “implemented as a computer program product for use in a computer,” and carried out in “software.”); Lopresti ¶111. The client application can be stored on a hard disk, optical disk, floppy disk, or other storage media. Seacat, 4:67-5:6, 5:22-23 (describing computer implementation details), 8:42-46, 10:62-63, claim 11 (reciting “A computer program product stored in a non-transitory computer[-]readable storage medium, comprising...”); Lopresti ¶111.

Second, as discussed above (§VI.A.2.a(1)), Seacat discloses that the “information handling system” that receives the page request from a multi-touch device and provides the touch-based CAPTCHA challenge may take the form of a portable computing device, like a laptop, PDA, or mobile telephone. Seacat, Fig. 2, 3:59-67, 4:12-25, claim 11; Lopresti ¶112.

3. Seacat Renders Claims 12 and 16 Obvious

The analysis above demonstrates that Seacat anticipates claims 12 and 16, which also renders those claims obvious. *Sony Corp. v. Yissum Research Development Co. of the Hebrew Univ. of Jerusalem*, IPR2013-00219, Paper 16, 24-25 (P.T.A.B. Sept. 23, 2013) (“*Sony*”) (“a disclosure that anticipates under 35 U.S.C. § 102 also renders the claim unpatentable under 35 U.S.C. § 103, for anticipation is the epitome of obviousness.”).

To the extent that the Board believes that Seacat does not explicitly disclose that the CAPTCHA steps are “automatic” and/or does not disclose the use of a “threshold” as claim 12 recites, §VI.A.2.a above demonstrates that these limitations would have been met by the conventional and obvious implementation of the method Seacat discloses. Hence claims 12 and 16 would have been obvious over Seacat for this alternative and additional reason. *See* Lopresti, ¶¶113-114.

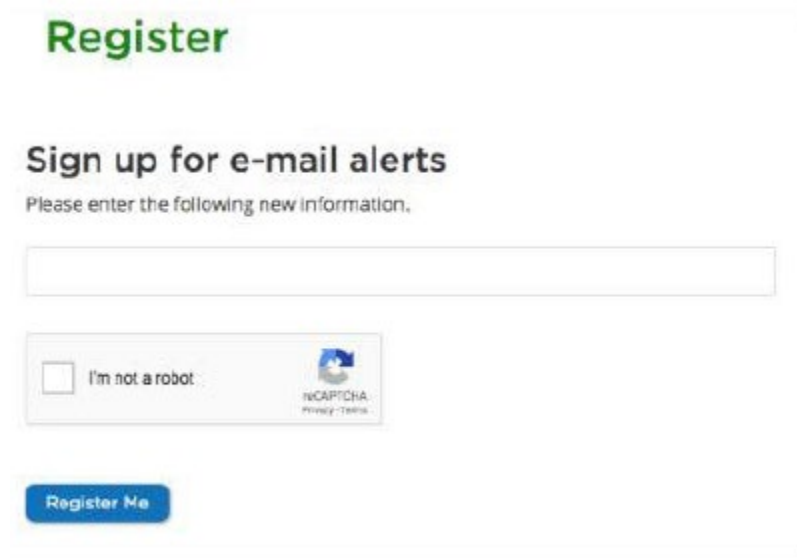
B. Ground 2: Seacat Anticipates and/or Renders Claims 1, 5, and 9 Obvious Under HDI’s Proposed Interpretation, or a Narrower Interpretation

1. Seacat Anticipates and/or Renders Claims 1 and 9 Obvious Under HDI’s Proposed Interpretation

a. HDI’s Proposed Interpretation

As shown in §III.C above, independent claim 1 has a similar structure to claim 12 but recites a “motion and/or orientation-based” CAPTCHA using “physical manipulation instructions.”

In litigation, HDI maintains that claim 1 covers not only movement or orientation of the device itself, but also manipulation or physical movement by the user via interacting with the device's touchscreen or GUI, such as touching or clicking a checkbox. Ex1025, 6-7; Ex1044, 6 (¶18). Specifically, HDI alleges that claim 1's "motion and/or orientation-based" CAPTCHA is met when the system "automatically loads a checkbox labeled 'I'm not a robot'" and "instructs and requires the user to check the box in order to access the protected record and processes, for example, the user's *mouse movements and click manipulation.*" Ex1025, 6-7. HDI thus alleges that a CAPTCHA method that requires the user to select the checkbox shown below by touching or clicking infringes "claim 1 of the '861 Patent." *Id.*, 11-16. HDI further alleges that only if "such movements and/or manipulation *from the user* [in selecting the box] meet a required threshold, the user is deemed human." *Id.*, 7.



So under HDI’s interpretation, “motion and/or orientation-based” challenges, “physical manipulation instructions for the portable computing device for the user,” “user movements and/or manipulations of the portable computing device,” and “user movements and/or manipulations from the user” in claim 1 all are broad enough to read on a user’s touch-based or mouse-based interactions with a user interface of the portable computing device and do not require that the user move or manipulate the device itself.⁵

Under HDI’s interpretation of claim 1, Seacat anticipates claims 1 and 9. As discussed below, Seacat’s CAPTCHA employs “user movements and/or manipulations,” as it is based on motion and/or manipulation of the user’s hands and fingers. Seacat, Figs. 8-10, 7:62-8:37; Lopresti ¶¶115-120.

b. Seacat Anticipates Claim 1

The analysis in this section applies Seacat’s disclosure to claim 1 construed under HDI’s interpretation that does not require movements and/or manipulations of the device itself, and requires only user movements in interacting with the device’s touchscreen or other GUI. Lopresti ¶¶121-135.

⁵ Section VI.B.3 below and Ground 3 demonstrate unpatentability of claim 1 under an alternate construction that requires movements and/or manipulations of the portable device itself.

(1) [1Pre]

To the extent claim 1’s preamble is limiting, Seacat meets it. Lopresti ¶¶122-124.

First, “motion *and/or* orientation” covers motion alone, orientation alone, or both; it allows but does not *require* both. *Cochlear Bone Anchored Sols. AB v. Oticon Med. AB*, 958 F.3d 1348, 1359 (Fed. Cir. 2020); Lopresti ¶123.

Second, claim 1’s preamble is word-for-word identical to claim 12’s, except claim 1 recites “motion and/or orientation based” CAPTCHA instead of “touch-based” CAPTCHA. *Supra* §III.C. Seacat meets the aspects of claim 1’s preamble identical to claim 12’s preamble (e.g., a method for providing a CAPTCHA challenge on a portable computing device) for the same reasons discussed in connection with Ground 1. *Supra* §VI.A.2.a(1); Lopresti ¶124. Seacat’s CAPTCHA is a “motion and/or orientation”-based CAPTCHA under HDI’s interpretation, because Seacat’s CAPTCHA is based on motion and/or orientation of the user’s hands and fingers. Seacat, Figs. 8-10, 7:62-8:37; Lopresti ¶124.

(2) [1A]

Seacat discloses “automatically electing a manipulation challenge for a user with the portable computing device, wherein said manipulation challenge includes a set of physical manipulation instructions for the portable computing device for the user,” per limitation [1A]. Lopresti ¶¶125-129.

Limitation [1A] is the same as limitation [12A] except that [1A] recites physical “manipulation” instructions instead of physical “touch” instructions. §III.C. Seacat meets the aspects of [12A] that are identical to [1A] (e.g., the manipulation challenge is automatically elected for a user with the portable computing device) for the same reasons discussed in connection with Ground 1. §VI.A.2.a(2) above; Lopresti ¶126.

Seacat’s manipulation challenge includes a set of physical “manipulation” instructions under HDI’s interpretation because its physical touch instructions tell the user to physically manipulate using his hands and/or fingers to interact with objects in the device’s GUI. As discussed above, Seacat “instructs a user to perform specific multi-touch gestures, such as touching a screen at two locations and zooming in on an object or rotating an object.” Seacat, 4:67-5:3, Figs. 8-10, 7:62-8:37; Lopresti ¶127.

For example, as discussed above regarding Figure 8, Seacat “instructs a user to zoom in on soccer ball 840,” which is a physical manipulation instruction. Seacat, 7:64-65. The user follows the instruction by physically moving, orienting, and manipulating her hands 820-830 “inward towards soccer ball 840 until the user is satisfied with the zoom area.” *Id.*, 8:1-4. Likewise, in Figure 10 Seacat “instructs a user to select two opposite points of star 1040 and rotate star 1040 90 degrees in a clockwise direction,” which is a physical manipulation instruction. *Id.*, 8:26-29. The

user follows the instruction by contacting the screen with her hands and moving them “in a clockwise direction 90 degrees, which subsequently rotates” the star. *Id.*, 8:30-34. Lopresti ¶128.

Thus, Seacat meets limitation [1A] under HDI’s interpretation. *Supra* §VI.A.2.a(2); Lopresti ¶¶125-129.

(3) [1B]

Seacat discloses “b. automatically processing sensory data associated with user movements and/or manipulations of the portable computing device,” as limitation [1B] recites. Lopresti ¶¶130-132.

All the language in limitation [1B] is in limitation [12B] discussed above, such that Seacat meets these limitations in [1B] for the same reasons discussed in §VI.A.2.a(3). [12B] adds narrowing limitations: (1) that the processed sensory data be “touch” sensory data, and (2) that the manipulation be “of objects within a graphical interface” of the portable computing device. Lopresti, ¶131. Because Seacat meets the narrower [12B] (*supra* §VI.A.2.a(3)), it also meets the broader [1B]. *See Ex Parte Mulvey*, No. 2013-002554, 2015 WL 5836588, at *4 (P.T.A.B. Sept. 21, 2015) (as “the prior art collectively meets the narrower limitation of claim 1,” it also “meet[s] the broader limitation found in claim 14.”); *Rackspace Hosting, Inc., v. Rotatable Techs. LLC*, IPR2013-00248, Paper 32, 25 (P.T.A.B. Sept. 19, 2014) (if the prior art meets limitation in one claim, it will also meet limitations in

other claims “that are similar to, but not narrower than, the aforementioned limitation”); Lopresti ¶131.

Seacat discloses processing “sensory data” associated with “user movements and/or manipulations” under HDI’s interpretation because “touch” sensory data is a type of sensory data, and because Seacat’s touch-based interactions instruct the user to engage in “user movement and/or manipulation.” *Supra* §VI.B.1.a; Lopresti ¶132. The user touching and/or moving Seacat’s CAPTCHA images with her hands and fingers are movements or manipulations, and Seacat’s method processes the resulting sensory data. Seacat, Figs. 8-10, 1:35-39, 5:37-66, 7:25-8:37, claims 1, 3-4, 7-9, 11-13; Lopresti ¶132. Seacat thus meets limitation [1B]. *Supra* §VI.A.2.a(3); Lopresti ¶¶130-132.

(4) [1C]

Seacat discloses limitation [1C], “automatically determining if said user movements and/or manipulations from the user meet a required threshold for satisfying said set of manipulation instructions to qualify said user as a human” under HDI’s interpretation. Lopresti ¶¶133-135.

Limitation [1C] is the same as limitation [12C] except that [1C] recites determining whether “movements and/or manipulations from the user” (instead of “touch sensory data”) meet the required threshold and refers back to said set of “manipulation” instructions (instead of “physical touch” instructions). Seacat meets

the aspects of [12C] that are identical to [1C] (e.g., “automatically determining” and using a “required threshold”) for the same reasons discussed in connection with Ground 1. *Supra* §VI.A.2.a(4); Lopresti ¶134.

Seacat also discloses determining “movements and/or manipulations from the user” under HDI’s interpretation. *Supra* §VI.B.1.a; Lopresti ¶135. Seacat’s physical touch instructions tell the user to physically move the user’s hands and fingers to touch the image in two locations in each of Figs. 8-10, and to manipulate the images with her hands and fingers in Fig. 8 (to zoom in on the ball) and Fig. 10 (to rotate the star). Seacat, Figs. 8-10, 7:62-8:37; Lopresti ¶135; *supra* §VI.A.2.a(4).

Hence Seacat meets limitation [1C] under HDI’s interpretation. *Supra* §VI.A.2.a(4); Lopresti ¶¶133-135.

c. Seacat Anticipates Claim 9

For the same reasons shown above regarding claim 16 in Ground 1, Seacat discloses that the motion and/or orientation-based CAPTCHA challenge relied upon to meet claim 1 under HDI’s interpretation is “embodied in computer readable form and implemented as a routine executing on the portable computing device,” as dependent claim 9 recites. *See supra* §VI.A.2.b; Lopresti ¶¶110-112, 136.

2. Seacat Renders Claims 1 and 9 Obvious

The analysis above demonstrates that Seacat anticipates claims 1 and 9, which also renders those claims obvious. *Sony*, Paper 16, 24-25 (“anticipation is the epitome of obviousness.”).

To the extent that the Board believes that Seacat does not explicitly disclose that the CAPTCHA steps are “automatic,” and/or does not disclose the use of a “threshold” as claim 1 recites, as shown in §§VI.A.2.a and VI.B.1.b above, these limitations would have been met by the conventional and obvious implementation of the method Seacat discloses. *Lopresti* ¶¶85-88, 137-138. Hence claims 1 and 9 would have been obvious over Seacat for this alternative and additional reason.

3. Seacat Renders Claims 1, 5, and 9 Obvious Under a Narrower Interpretation Requiring Motion and/or Orientation of the Device Itself

a. Motion and/or Orientation of the Device

To the extent claim 1 is interpreted more narrowly than HDI contends in litigation, i.e., to require “motion and/or orientation” of the device itself, claim 1 is rendered obvious by Seacat alone (Ground 2’s alternative basis) and in combination with Mattice (Ground 3). *Lopresti* ¶¶139-155.

CAPTCHA challenges a user to provide input via a user interface and uses that input to tell computers and humans apart. *Lopresti* ¶140. Prior-art CAPTCHAs used various inputs and user interfaces. *Id.* Some CAPTCHAs were based on visual

recognition of text or numbers (*Id.*; Ex1009; Ex1010) and others on visual recognition of non-text images. Lopresti ¶¶45, 140; Ex1011-13. Some CAPTCHAs used text-to-speech interfaces. Lopresti ¶¶45, 140; Ex1015. Yet other CAPTCHAs used touch interfaces using motion of the user’s hands and fingers. Lopresti ¶¶45, 140; Seacat, 8:24-37.

Another well-known type of user interface for portable devices used motion and/or orientation of the device itself (detected by accelerometer or inclinometer sensors in the device) to allow the user to provide input. Lopresti, ¶141. The ’861 Patent acknowledges the iPhone (launched in June 2007, a year before the earliest-claimed priority date) contains “motion sensors which can be used to determine the attitude of the device.” ’861 Patent, 12:45-63. A POSA would have known the iPhone’s accelerometer, which detected the attitude and/or orientation of the device, was useful in many different applications. Lopresti ¶141; ’861 Patent, 12:45-63, 14:26-49. Yu (Ex1043) describes using motion sensors to “perform CAPTCHA” by having users trace distorted-text characters “on the air” in response to a CAPTCHA challenge. Yu, Title, [0008], [0020-33], [0043-45], Fig. 8; Lopresti ¶141.

Similarly, Mattice describes a handheld device with motion/orientation sensors, and a method that interprets movement and orientation of the device to provide a user interface. Mattice, Abstract, Fig. 10, [0003], [0037-39], [0046-49], [0128-152], [0228-33]; Lopresti ¶142. One use Mattice describes for its

motion/orientation data is to increase “authentication” and “security,” which are CAPTCHA’s goals. Mattice, [0110], [0113], [208-10], [0275], [0375], [0381], Lopresti ¶142.

Lindsay likewise describes security systems that use motion/orientation of a mobile device. Lindsay, Title, Abstract, [0255], [0341]; Lopresti ¶143. Lindsay describes CAPTCHA as one such security system. Lindsay, Fig. 14. [0117-18], [167-190], Lopresti ¶143. Lindsay also describes the advantages of combining security systems on a cell phone, including motion and orientation “based on the use of sensor chips (accelerometers, inclinometers) or other sensing means that can provide information for use in accessing...an account.” Lindsay, [0255]; Lopresti ¶143. Lindsay describes a “dual-channel security system,” where the user of a cell phone is expected to take action to confirm who she is. Lindsay, [0341]. In a phone “equipped with an accelerometer, inclinometer, or vibration-sensitive sensor, a physical motion may be used to provide input such as shaking the phone once or twice, turning the phone upside down, tilting the phone at a new angle (e.g., a 45 degree angle), etc.” *Id.* The system transmits this motion/orientation information, along with other interactions, like “touch[ing]...a contact-sensitive screen,” to provide dual-factor security. *Id.*; Lopresti ¶143.

A POSA had numerous reasons to apply the well-known and conventional user input of motion/orientation of the device itself (as shown, e.g., by the original

iPhone, Yu, Mattice, and Lindsay) to Seacat's touch-based CAPTCHA method, for example to implement Seacat's Fig. 10 embodiment by rotating the device 90° to rotate the star 90°, and would have had a reasonable expectation of success in doing so. Lopresti ¶144.

First, Yu expressly teaches using the device's motion/orientation for CAPTCHA. Yu, [0043-45]; Lopresti ¶141.

Second, a limited number of user interfaces were known (e.g., keyboard, mouse, touch, voice, motion/orientation), and it would have been a matter of design choice to determine which to use for Seacat's CAPTCHA system. *Id.*, ¶145.

Third, using a motion/orientation user interface with a CAPTCHA method like Seacat's would have been nothing more than the combination of familiar elements according to known methods to yield predictable results. *Id.*, ¶146; *KSR Int'l. Co. v. Teleflex, Inc.*, 550 U.S. 398, 416 (2007).

Fourth, a POSA would have understood that sensor data reflecting motion/orientation of a device is difficult for a computer to mimic, and thus is a good candidate for an effective CAPTCHA challenge. Lopresti ¶¶147-148 (discussing Mattice).

Fifth, a POSA would have found it intuitive for a user to use rotation of a mobile device with Seacat's Figure 10 embodiment to rotate the mobile device and cause Seacat's star to correspondingly rotate. Lopresti ¶149.

b. Claim 1

Under the narrower interpretation of claim 1 requiring motion and/or orientation of the device itself, Seacat discloses all of the claim's limitations when combined with the well-known and conventional user interface that interprets moving/orienting of the device itself. Lopresti ¶¶150-155.

[1Pre]: To the extent claim 1's preamble is limiting, Seacat performs the method recited when combined with the conventional user interface that interprets the user moving/orienting the device itself. Under the narrower interpretation, the combination performs Seacat's CAPTCHA method and meets all of [1Pre]'s language other than the CAPTCHA being "motion and/or orientation based" for at least the same reasons Seacat alone does. *See supra* §VI.B.1.b(1); Lopresti ¶152. As discussed above (§VI.B.3.a), a user interface that interprets the user moving/orienting the device itself was well-known and conventional, as a POSA would have known from multiple sources (e.g., Yu, Mattice, Lindsay, original iPhone). Lopresti ¶152; Yu, [0043-45]; Mattice, Title, Abstract, [0003], [0005-6], [0037-39], [0046-49], [0053-65], [0128-152], [0228-33], Figs. 1, 10; Lindsay, [0117-18], [167-190], [0255], [0341]; '861 Patent, 12:45-63, 14:26-49. A POSA also would have had many reasons to apply this familiar and established technology to Seacat, with a reasonable expectation of success. Lopresti ¶152. The combination thus performs "motion and/or orientation based" CAPTCHA.

[1A]: Under the narrower interpretation, the combination performs Seacat's CAPTCHA method and meets all of [1A]'s language other than the instructions being "physical manipulation instructions" for at least the same reasons Seacat alone does. *See supra* §VI.B.1.b(2); Lopresti ¶153. The combination's instructions require manipulation via moving/orienting the device itself when Seacat is combined with that well-known and conventional user interface (§VI.B.3.a above) and are thus "manipulation" instructions as claimed. Lopresti ¶153.

[1B]: Under the narrower interpretation, the combination performs Seacat's CAPTCHA method and meets all of [1B]'s language for at least the same reasons Seacat alone does. *See supra* §VI.B.1.b(3); Lopresti ¶154. To the extent "user movements and/or manipulations of the portable computing device" requires movement and/or manipulation of the portable computing device itself, in the combination the sensory data is associated with movement and/or orientation of the portable computing device. *See supra* §VI.B.3.a; Lopresti ¶154. The combination's instructions require manipulation via moving/orienting the portable computing device itself when Seacat is combined with that well-known and conventional user interface (§VI.B.3.a above) and are thus "manipulation" instructions as claimed. Lopresti ¶154.

[1C]: Under the narrower interpretation, the combination performs Seacat's CAPTCHA method and meets all of [1C]'s language other than the determination

being of user “movements and/or manipulations from the user” for at least the same reasons Seacat alone does. *See supra* §VI.B.1.b(4); Lopresti ¶155. To the extent “user movements and/or manipulations from the user” requires moving/orienting the device itself, the combination automatically determines such movements and/or orientations when Seacat is combined with that well-known and conventional user interface. *Supra* §VI.B.3.a; Lopresti ¶155.

c. Claim 5

Under the narrower interpretation, the combination of Seacat with a conventional user interface that interprets moving/orienting the device discloses “wherein said set of physical manipulation instructions requires the user to move the portable computing device so as to manipulate objects presented in an interface,” as recited in claim 5. Lopresti ¶156. As discussed in §VI.B.3.a above, this combination’s instructions can require the user to move (e.g., rotate) the mobile device to manipulate objects (e.g., by rotating the points of the star in Seacat Figure 10) in the device’s user interface. *Id.*

d. Claim 9

Under the narrower interpretation, the combination of Seacat with a conventional user interface that interprets moving/orienting the device discloses dependent claim 9’s requirement of “embod[ying] the CAPTCHA challenge “in computer[-]readable form and implemented as a routine executing on the portable

computing device.” Lopresti ¶157. Seacat’s method is implemented on “computer readable media” on a portable device. *Supra* §VI.B.1.c. The addition of the well-known and conventional user interface that interprets moving/orienting the device itself does not affect that implementation, as it was conventional to implement the aspects of the user interface that interpret moving/orienting of the device via software also stored on a computer-readable medium on the portable device. Lopresti ¶157. For instance, Mattice discloses moving/orienting the device itself, and that “computer readable media...may be used for storing and executing program instructions” on a portable device. Mattice, [0037-45], [0337]; Lopresti ¶157. The combination’s CAPTCHA challenge therefore is embodied in a computer-readable medium form for much the same reason Seacat’s CAPTCHA challenge is. *Supra* §VI.B.1.c; Lopresti ¶157.

C. Ground 3: Seacat and Mattice Render Claims 1, 5, and 9 Obvious

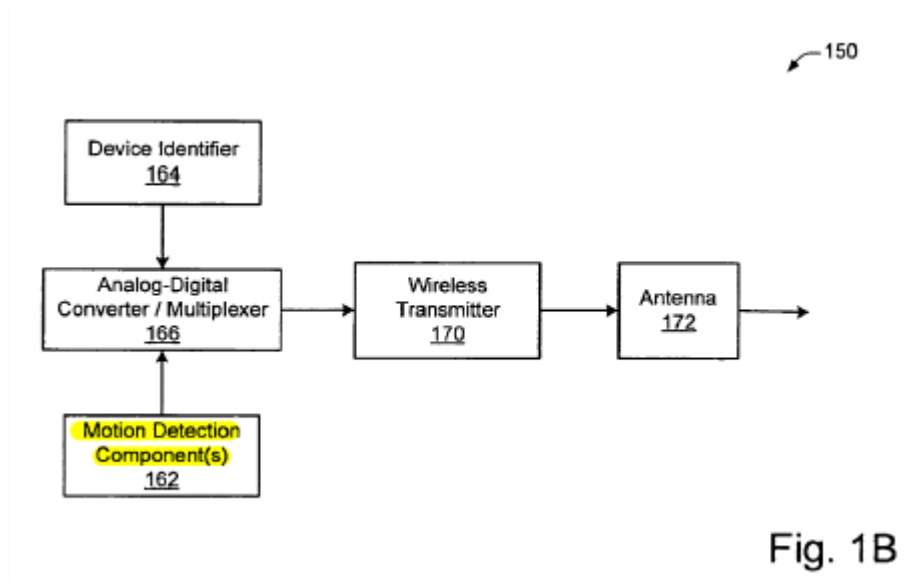
1. Mattice (Ex1007)

Mattice is pre-AIA §102(a) and (e) prior art due to its June 18, 2004 priority claim, its July 6, 2007 filing, and its November 8, 2007 publication. Mattice, (22), (43), (63). As HDI’s Provisional supports no Challenged Claim (§V above), Mattice is also pre-AIA §102(b) prior art. As mentioned above (§III.D), the ’861 Patent claims priority to the ’141 Patent’s application and to HDI’s Provisional, both filed before the AIA’s enactment. Hence pre-AIA law applies. Pub. L. No. 112-29, 125

Stat. 288. But if the Board were to determine that post-AIA law applies, Mattice would be post-AIA §102(a)(1)-(2) prior art.

Mattice was not of record during prosecution.

Mattice describes a gesture-based method implemented on “portable computing devices” (e.g., cellphones) having motion-detection and orientation-detection capabilities:



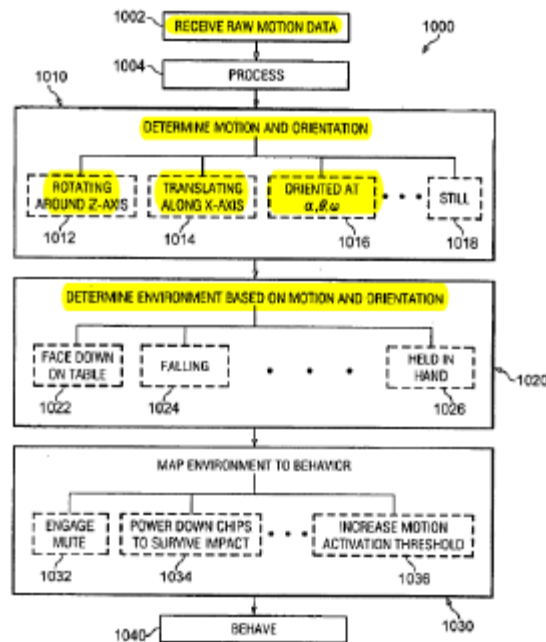


Fig. 10

Mattice, Title, Abstract, Figs. 1, 10, [0003], [0005-6], [0038], [0103-04]. Lopresti ¶162.

Mattice describes a method to interpret the movement and orientation of the device itself to provide input from the user. *Id.*, [0037-39], [0046-49], [0053-65], [0128-152], [0228-33]; Lopresti ¶163. Examples include “travel[ing] in the path of an ‘O’” ([0048]), “tilt[ing] the handheld device forward, backwards or to e[i]ther side” to scroll or navigate through menus ([0129-30]), changing volume, speed, or settings “via tilting motions and/or other gestures performed by the user” ([0131-33]), fast advancing “by the user accelerating the handheld device” ([0134]), using a “thump” as a “button” ([0135]), applying menu overlays by tilting the device

([0136]), and playing various games in the device's GUI by moving and orienting the device (0137-46]).

Mattice describes using motion/orientation data to increase “authentication” and “security.” Lopresti ¶164; Mattice, [0110], [0113], [208-11], [0275], [0326], [0375], [0381]. For instance, “a user’s signature may be represented in three dimensions and may thus comprise a ‘spatial signature’...a three-dimensional gesture ‘written’ in space using the handheld device and detected at motion detector component(s).” *Id.*, [0208-09]. This motion and orientation information is used to “authentica[t]e” the user and increase security. *Id.*, [0208-11].

2. Implementing Seacat in View of Mattice

Mattice teaches that motion and orientation detection in portable computing devices was well-known. Mattice, [0005-6], [0078], [0103-04], [0122]. Seacat and Mattice both describe techniques for improved access control and security. Seacat, 1:20-27; Mattice, [0110], [0113], [208-11], [0275], [0326], [0375], [0381]; Lopresti ¶165.

A POSA had numerous reasons to apply Mattice’s motion/orientation user interface to Seacat’s CAPTCHA system, including those discussed in Section VI.B.3.a above, and those below. Lopresti ¶166. The resulting combination (“Seacat-Mattice”) would allow the user to move or orient the device to perform

Seacat's CAPTCHA instructions. *Id.* For example, the user could be required to rotate the device 90° to rotate the star 90° in Seacat's Figure 10. *Id.*

First, using a motion/orientation user interface in Seacat would have improved flexibility by not limiting Seacat's CAPTCHA to requiring the touchscreen. Lopresti ¶167. This would have provided more options for input and expanded people who could use the device (e.g., persons with cerebral palsy, who might have difficulty with touch-based CAPTCHA but not device tilting). *Id.*

Second, using motion/orientation sensing in Seacat would increase security by allowing a user to be challenged by two forms of CAPTCHA. Lopresti ¶168. For example, a user could be challenged to perform a touch-based CAPTCHA as in Figures 8 and 9 and a motion/orientation-based CAPTCHA like using rotation of the device to rotate the star in Figure 10. *Id.* A POSA would have known the advantages of implementing more than one CAPTCHA method in a device. *Id.* For instance, Lindsay teaches the benefits of combining multiple forms of security to protect an asset, including CAPTCHA and motion/orientation of the portable device, while Yu teaches combining CAPTCHA (using the device's motion/orientation) with user authentication. Lindsay, Abstract, Fig. 14, [0117-18], [167-190], [0255], [0341]; Yu, [0043-45]; Fig. 8; *supra* §VI.B.3.a; Lopresti ¶168. To implement both forms of security on one device is no more than a predictable variation. *KSR*, 550 U.S. at 417 (“predictable variation[s]” are obvious).

Third, the implementation would have involved no more than using a known technique (a user interface that interprets motion/orientation of a portable computing device) to improve similar devices (other portable computing devices) in the same way (interpreting movement/orientation data) to yield a predictable result (improved CAPTCHA flexibility and security). Lopresti ¶169. Such an improvement would have been obvious. *KSR*, 550 U.S. at 417.

Adapting Seacat to incorporate Mattice's conventional motion/orientation sensors was well within a POSA's capabilities. Lopresti ¶170. The adaptation would have involved (a) implementing Seacat's CAPTCHA on a mobile device (e.g., an iPhone) that has motion/orientation sensors, and (b) updating the CAPTCHA software to process the motion/orientation sensors' data. *Id.* As Mattice confirms, devices with such sensors were conventional by June 2008. Mattice, [0005-6], [0078], [0103-04], [0122]; Lopresti ¶170. The '861 Patent admits devices with such sensors were known. '861 Patent, 12:45-48; Lopresti ¶170. Updating the CAPTCHA software would have been straightforward and well within a POSA's abilities, as a POSA would have known how to program various CAPTCHA interfaces. Lopresti ¶170.

3. Seacat-Mattice Meets All the Limitations of Claims 1, 5 and 9, Rendering Them Obvious

a. Claim 1

Seacat-Mattice discloses all of claim 1's limitations. Lopresti ¶¶171-175.

[1Pre]: To the extent claim 1’s preamble is limiting, Seacat-Mattice performs it. Seacat-Mattice performs Seacat’s CAPTCHA method and meets all of [1Pre]’s language other than the CAPTCHA being “motion and/or orientation based” for at least the same reasons Seacat alone does. *See supra* §VI.B.1.b(1); Lopresti ¶172. As discussed in §VI.C.2 above, Seacat-Mattice uses “motion and/or orientation” of the device itself, as taught by Mattice (Mattice, Title, Abstract, [0003], [0005-6], [0037-39], [0046-49], [0053-65], [0128-152], [0228-33], Figs. 1, 10), as the user interface and thus performs “motion and/or orientation based” CAPTCHA.

[1A]: Seacat-Mattice performs Seacat’s CAPTCHA method and meets all of [1A]’s language. The instructions in Seacat-Mattice require manipulation via movement and/or orientation of the portable computing device itself as taught by Mattice (see *supra* §VI.C.2) and are thus “manipulation” instructions as claimed. Lopresti ¶173. Seacat-Mattice satisfies all the other [1A] limitations for at least the same reasons Seacat alone does. *See supra* §VI.B.1.b(2); Lopresti ¶173.

[1B]: Seacat-Mattice performs Seacat’s CAPTCHA method and meets all of [1B]’s language for at least the same reasons Seacat alone does. *See* §VI.B.1.b(3) above; Lopresti ¶174. To the extent “user movements and/or manipulations of the portable computing device” requires movement and/or manipulation of the portable computing device itself, the sensory data in Seacat-Mattice is associated with movement and/or orientation of the portable computing device. *See* §VI.C.1 above;

Lopresti ¶174. The instructions in Seacat-Mattice require manipulation via movement and/or orientation of the portable computing device itself as taught by Mattice (see *supra* §VI.C.2) and are thus “manipulation” instructions as claimed. Lopresti ¶174.

[1C]: Seacat-Mattice performs Seacat’s CAPTCHA method and meets all of [1C]’s language other than the determination being of user “movements and/or manipulations from the user” for at least the same reasons Seacat alone does. See *supra* §VI.B.1.b(4); Lopresti ¶175. To the extent “user movements and/or manipulations from the user” requires movements and/or manipulations of the portable computing device itself, Seacat-Mattice automatically determines such movements and/or orientations. See *supra* §VI.C.2; Lopresti ¶175.

b. Claim 5

Seacat-Mattice meets “wherein said set of physical manipulation instructions requires the user to move the portable computing device so as to manipulate objects presented in an interface.” Lopresti ¶176. As discussed in §VI.B.3.c above, in Seacat-Mattice the instructions can require the user to move (e.g., rotate) the mobile device to manipulate objects (e.g., by rotating the points of the star in Seacat Figure 10) in the device’s user interface. Lopresti ¶176.

c. Claim 9

Seacat-Mattice meets dependent claim 9’s requirement of “embod[ying] the CAPTCHA challenge “in computer[-]readable form and implemented as a routine executing on the portable computing device.” Lopresti ¶177. Like Seacat (§VI.B.1.c above), Mattice’s method is implemented on “computer readable media” on a portable device. Mattice, [0037-45], [0337]. Thus, in Seacat-Mattice, the CAPTCHA challenge is embodied in a computer readable medium form for the same reasons discussed in Ground 2 in connection with Seacat modified to employ a movement/orientation user interface. §VI.B.3.d above; Lopresti ¶177.

D. Ground 4: Seacat and Shirali-Shahreza Render Claims 4 and 14 Obvious

Dependent claims 4 and 14 further require that the manipulation instructions for the motion and/or orientation-based challenge (claim 4) and the touch-based challenge (claim 14) be in “audible form by a text to speech engine.” Lopresti ¶¶178-179.

1. Shirali-Shahreza (Ex1008)

The Institute of Electrical and Electronics Engineers (“IEEE”) published Shirali-Shahreza by June 4, 2008. It was publicly available at IEEE’s International Conference on System of Systems Engineering by June 4, 2008, and publicly accessible via IEEE’s website by December 22, 2008. Bolin, ¶¶6-24; Ex1024, ¶¶6-

11; Lopresti ¶¶181-182, Ex1046, ¶23. The Proceedings were added to OCLC's database on March 6, 2009, and a copyright registered on March 5, 2009, giving a December 2008 publication date. Bolin ¶17; Lopresti ¶191; *see* Ex1046, ¶23. The hardcopy proceedings containing Shirali-Shareza say the conference occurred June 2-4, 2008, and give a 2008 copyright date. Lopresti ¶192 (citing Ex1020). A CAPTCHA "Bibliography" published later in 2008 (Ex1018) cited Shirali-Shareza, and provided a "one-stop-shop" for CAPTCHA-related publications. Lopresti ¶¶189-190. Shirali-Shareza was available publicly at least by June 4, 2008, and in any event no later than December 22, 2008, and a POSA could have retrieved it. Bolin ¶¶17-24; Lopresti ¶¶181-194; Exs1016-20, 1024; Ex1046, ¶23

As discussed above (§III.D), the '861 Patent claims priority to the '141 Patent's application and to HDI's Provisional, both filed pre-AIA. Hence pre-AIA law applies. Pub. L. No. 112-29, 125 Stat. 288. HDI's Provisional does not support claims 1 or 12 from which claims 4 and 14 depend and fails to describe the text-to-speech limitations of those claims. Ex1005, 17-18. Shirali-Shahreza therefore is prior art under pre-AIA §102(a), as it predates the non-provisional's June 29, 2009 filing.

If the Board were to determine that post-AIA law applies, Shirali-Shahreza would be post-AIA §102(a)(1) prior art.

Shirali-Shahreza was not of record during prosecution.

Shirali-Shahreza describes a method of making CAPTCHA more accessible to children and the elderly based on choosing an object on the screen. Shirali-Shahreza, Abstract, 7. Some of the objects “are chosen randomly and the pictures of these topics are downloaded from the Internet.” Shirali-Shahreza, Abstract. Effects like rotation are applied to the images, the images are shown, and the user must choose an object. *Id.*, 6-7; Lopresti ¶197.



Figure 6. Our Children CAPTCHA method

The challenge is presented “using a TTS (Text-To-Speech) system.” Shirali-Shahreza, 4-7. Previous methods played a sound “which has been obtained by converting text to speech by certain programs,” and the user had to “recognize and

type the word.” *Id.*, 4. Shirali-Shahreza avoids reading or typing, and converts the challenge to audio via Text-To-Speech, by asking the user to pick the correct picture. *Id.*, 5. It might show four images and say “rabbit” to instruct the user to click on the rabbit. *Id.* “If the user clicks on the picture of the rabbit we can conclude that a human user has done the click and the user is not a computer,” because the computer likely could neither understand the spoken word “rabbit” nor recognize the shape and location of the rabbit image. *Id.* These are hard tasks for computers, but easy for humans, including those who cannot read or have impaired vision or motor skills. *Id.*, Abstract, 5-6; Lopresti ¶198.

Both the Shirali-Shahreza CAPTCHA method and the earlier methods it describes use “TTS (Text-To-Speech)” to present their manipulation instructions in an audible form by a text-to-speech engine operating on the device. Shirali-Shahreza uses “FreeTTS as [the] TTS engine.” Shirali-Shahreza, 6. Shirali-Shahreza further teaches that because it avoids typing, its method is particularly suitable for portable computing devices, “such as PDA’s or mobile phones.” *Id.*, 7; Lopresti ¶199.

2. Implementing Seacat in View of Shirali-Shahreza

Seacat and Shirali-Shahreza both disclose CAPTCHA systems to improve security and authentication. Seacat, 1:16-29; Shirali-Shahreza, 3. Shirali-Shahreza recognizes the need for CAPTCHA more easily used by humans who have difficulty reading, like children or the elderly. Shirali-Shahreza, 3-5, 7. A POSA would have

had numerous reasons (discussed below) to use Shirali-Shahreza’s text-to-speech engine in Seacat’s CAPTCHA system. Lopresti ¶200. The proposed combination (“Seacat-Shirali-Shahreza”) uses the TTS engine to convert the instructions for Seacat’s CAPTCHAs into speech. *Id.* For example, the engine would convert text instructions 810/910/1010 in Figures 8-10 into speech, which would play in addition to or instead of displaying the text. *Id.* The user must follow the instructions to complete the CAPTCHA, as Seacat teaches (5:52-6:6, 7:63-8:37) and Shirali-Shahreza confirms. Shirali-Shahreza, 3-6.

A POSA would have had many reasons to implement Seacat’s CAPTCHA method with Shirali-Shahreza’s text-to-speech engine. Lopresti, ¶¶201-203.

First, audio instructions would have improved flexibility by allowing a broader range of users. Lopresti ¶201. This would have provided more options for input, expanding the people who could use the device, e.g., those with impaired vision or motor skills, and preliterate children and the elderly, as Shirali-Shahreza teaches. Shirali-Shahreza, 3-4, 7; Lopresti ¶201. A POSA would have known that sound- or speech-based CAPTCHA “is often done...to assist those with impaired vision.” Lindsay, [0169]; Lopresti ¶201.

Second, a POSA would have appreciated that because neither method requires a keyboard, both methods are well-suited to portable computing devices. Lopresti ¶202; §VI.A.2.a(1) above; Seacat, 3:59-67, 4:12-25, Fig. 2; Shirali-Shahreza, 7 (“no

keyboard is needed....it can be run on devices without a keyboard or devices in which it is difficult to use their keyboard, such as PDA[]s or mobile phones.”).

Third, the implementation would have involved no more than using a known technique (a text-to-speech engine to convert CAPTCHA instructions for use in portable computing devices) to improve similar devices (CAPTCHA used in portable computing devices) in the same way (providing instructions to perform the CAPTCHA) to yield a predictable result (CAPTCHA whose instructions are spoken, written, or both). Lopresti ¶203. Such an improvement would have been obvious. *KSR*, 550 U.S. at 417.

Adapting Seacat to incorporate the text-to-speech engine in Shirali-Shahreza was well within a POSA’s capabilities. Lopresti ¶204. The adaptation would have involved no more than adding a TTS engine to Seacat’s device if it did not already have one, and updating Seacat’s software to send the CAPTCHA instruction text to the TTS engine. *Id.* Shirali-Shahreza uses “FreeTTS ... a small, fast, run-time speech engine” that can be easily implemented in multiple ways and devices. Shirali-Shahreza, 6; Lopresti ¶204. Seacat’s portable computing device already has the “[a]udio circuitry” and “internal speakers” to play the resulting audio. Seacat, 3:48-52, Fig. 1. As Shirali-Shahreza and other documents confirm, such text-to-speech engines were conventional by 2008. Shirali-Shahreza, 3-4, 6-7; Ex1015, 1; Lopresti ¶204. Updating the CAPTCHA software would have been straightforward and well

within a POSA's abilities, as a POSA would know how to program various CAPTCHA interfaces. Lopresti ¶204.

3. Seacat-Shirali-Shahreza Renders Claims 4 and 14 Obvious

Modifying Seacat to use a TTS as taught by Shirali-Shahreza would not change any of the aspects of Seacat relied upon to disclose and/or render obvious all limitations of claims 1 and 12, so Seacat-Shirali-Shahreza meets claims 1 and 12 for the same reasons Seacat does. *See supra* §§VI.A.2.a, VI.B.1.b. Seacat-Shirali-Shahreza also meets “wherein the set of physical [manipulation/touch] instructions for the [motion and/or orientation/touch-]based CAPTCHA challenge are presented in audible form by a text[-]to[-]speech engine operating on the portable computing device,” per dependent claims 4 and 14. Lopresti ¶205.

Seacat-Shirali-Shahreza has a text-to-speech engine in its “Text-To-Speech (TTS) system,” such as “FreeTTS as [the] *TTS engine*.” Lopresti ¶206. Seacat-Shirali-Shahreza uses that engine to convert written CAPTCHA instructions into audible form. *Id.* Seacat Shirali-Shahreza's physical manipulation/touch instructions would be those in, e.g., Seacat Figures 8-10 (items 810/910/1010), as run through Shirali-Shahreza's TTS. *Id.* Seacat-Shirali-Shahreza presents those instructions in audible form when the audio is “played” for the user. Shirali-Shahreza, 4; Lopresti ¶206. Finally, the user follows the instructions by completing the CAPTCHA. Seacat, 7:63-8:37; Lopresti ¶206. Seacat-Shirali-Shahreza's

CAPTCHA method is implemented on portable computing devices, like mobile phones. *Supra* §VI.A.2.a(1); Seacat, 3:59-67, 4:12-25, Fig. 2; Shirali- Shahreza, 7; Lopresti ¶206.

In Seacat-Shirali-Shahreza, the “text[-]to[-]speech engine [is] operating on the portable computing device.” Lopresti ¶207. The TTS engine converts text created on the portable device and plays audio for the user on the device itself, and is thus operating on the device. Shirali-Shahreza, 6; Lopresti ¶207.

For example, the FreeTTS system used by Seacat-Shirali-Shahreza was implemented in various ways, including as code operable on any webpage a mobile device can load, using a client/server setup, and as a downloadable web application installable on a mobile device.⁶ Lopresti ¶208. Seacat-Shirali-Shahreza thus discloses claims 4 and 14.

E. Ground 5: Seacat, Mattice, and Shirali-Shahreza Render Claim 4 Obvious

All the above-discussed reasons why a POSA would have added a TTS engine (as taught by Shirali-Shahreza) to Seacat apply equally to Seacat-Mattice, and a POSA would have had the same expectation of success in using a TTS engine to audibly present Seacat-Mattice’s CAPTCHA instructions. §VI.D.2; Lopresti ¶¶209-

⁶ <https://freetts.sourceforge.net/>

214. The resulting Seacat-Mattice-Shirali-Shahreza combination renders claim 4 obvious. Lopresti ¶213.

Modifying Seacat-Mattice to use a TTS would not change any aspects of Seacat-Mattice relied upon to render obvious claim 1, so Seacat-Mattice-Shirali-Shahreza meets claim 1 for the same reasons Seacat-Mattice does. *See supra* §VI.C.3.a. Dependent claim 4’s additional text-to-speech limitations are met by Seacat- Mattice-Shirali-Shahreza for the same reasons they are met by Seacat-Shirali- Shahreza. §VI.D.3. Lopresti ¶214.

VII. NO BASIS FOR DISCRETIONARY DENIAL

A. Section 314(a): Parallel Litigation Does Not Weigh Against Institution

The related district court litigation, *Human Differential Intelligence LLC v. Cloudflare, Inc.*, No. 1:22-cv-0134 (W.D. Tex.) (*see* §II.B.2), does not warrant discretionary denial under §314(a). *See Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11, 7-8 (P.T.A.B. Mar. 20, 2020).

The first *Fintiv* factor favors institution. Petitioner Intuition Machines is not a party to the litigation. Moreover, Petitioner Cloudflare, which is a defendant in that case, may move to stay if institution here is granted, although whether the district court will grant such motions is unknown. Without “specific evidence” of how the court would rule, this factor is neutral. *Sand Revolution II, LLC v. Continental Intermodal Group-Trucking LLC*, IPR2019-01393, Paper 24, 7 (P.T.A.B. June 16,

2020) (informative, designated July 13, 2020); *Google LLC v. Jawbone Innovations, LLC*, IPR2022-00649, Paper 13, 7 (P.T.A.B. Oct. 31, 2022) (Board will not predict likelihood of stay absent “specific evidence.”). Nevertheless, the earlier in a litigation an IPR is filed, the higher the chances of a stay being granted. *Comm’cn Techs., Inc. v. Samsung Elecs. Am., Inc.*, 2023 WL 1478447, at *3 (E.D. Tex. Feb. 2, 2023) (considering “whether the defendant acted with reasonable dispatch” in filing IPRs). Given the exceptional earliness of this Petition—within two months of Cloudflare being served on January 5, 2023—this factor should favor institution.

The second *Fintiv* factor also favors institution. The related litigation is currently stayed pending further order of the court. Ex1047. Defendant Cloudflare’s response to the complaint was served the same day as the filing of this Petition, a trial date has not been set, no discovery requests have been served, and no claim construction activities have begun. Ex1048. If this Petition is instituted, a final written decision is likely due before September 2024. Given the current stay, lack of any substantive litigation activity, and possible delays during litigation, it is unlikely a trial would occur before a final written decision here. *Beckman Coulter v. Sirigen II Limited*, IPR2022-01205, Paper 12, 19-20 (P.T.A.B. Jan. 6, 2023) (noting the Board “will consider the speed with which the district court case may come to trial and be resolved.”).

The third *Fintiv* factor favors institution because the parties expended almost no resources in the related litigation, where contentions have been exchanged, no discovery has occurred, and no claim construction proceedings have even been scheduled. *See Cisco Sys. v. WSOU Investments, LLC*, IPR2021-01117, Paper 10, 16-17 (P.T.A.B. Jan. 10, 2022) (finding third factor weighs against denial even after claim construction ruling).

The fourth *Fintiv* factor favors institution. A final written decision would streamline the related litigation as Petitioners would not be able to raise the same grounds in any district court proceeding. *LinkedIn Corp. v. EBuddy Techs. B.V.*, IPR2022-00177, Paper 13, 11-12 (P.T.A.B. May 17, 2022); 35 U.S.C. §315(e)(2).

The fifth *Fintiv* factor favors institution because a final written decision here is nearly certain to issue before any trial in district court, where the case is currently stayed and trial has not been scheduled. *Kinaxis Inc. v. Blue Yonder Grp., Inc.*, IPR2021-01302, Paper 15, 30-31 (P.T.A.B. Feb. 9, 2021) (fifth *Fintiv* factor weighs against discretionary denial where final written decision precedes trial date); *Google LLC v. Parus Holdings, Inc.*, IPR2020-00846, Paper 9, 20-21 (P.T.A.B. Oct. 21, 2020) (where petitioner is defendant in parallel litigation, the fifth factor “depend[s] on which tribunal [is] likely to address the challenged patent first.”).

The sixth *Fintiv* factor favors institution because the merits are exceptionally strong for the reasons explained above.

B. Section 325(d) Provides No Basis To Deny Institution

Denial is also improper under Section 325(d). *Advanced Bionics v. Med-El Elektromedizinsche Geräte*, IPR2019-01469, Paper 6, 8 (P.T.A.B. Feb. 13, 2020) (precedential). Petitioners’ grounds here rely on not-of-record references (Seacat, Mattice, Shirali-Shahreza). While the applicant included Seacat’s application in a 17-page IDS including over 150 references, it was never cited or applied in any rejection. Ex1004, 71-87; ’861 Patent, (56). Indeed, the Examiner made **no** prior art-based rejections. §III.D above.

The Board has “**consistently held** that a reference [like Seacat] that was neither applied against the claims nor discussed by the Examiner does not weigh in favor of exercising[] discretion under §325(d).” *Bowtech, Inc. v. MCP IP, LLC*, IPR2019-00382, Paper 12, 12 (P.T.A.B. Aug. 6, 2019). *See Amber.io, Inc. v. 72Lux, Inc.*, IPR2020-00015, Paper 8, 19-20 (P.T.A.B. Apr. 1, 2020) (post-*Advanced Bionics* and instituting where art only cited in IDS); *Limelight Networks, Inc. v. MIT*, IPR2017-00249, Paper 9, 7 (P.T.A.B. May 18, 2017) (“We are not persuaded...a citation to prior art in an IDS, without substantive discussion...is sufficient reason to exercise our discretion.”); *Apotex, Inc. v. UCB Biopharma*, IPR2019-00400, Paper 17, 24-25 (P.T.A.B. July 15, 2019) (no reason to “deviate from” Board’s “practice” of declining §325(d) discretion “based on...mere citation”); *Reg Synthetic Fuels, LLC v. Neste Oil, Oyj*, IPR2018-01374, Paper 11,

27 (P.T.A.B. Feb. 19, 2019) (“[W]e cannot draw any particular inference from the mere inclusion of the reference on an [IDS].”).

Grounds 3-5 also combine Seacat with not-of-record references, with the combinations showing the alleged points of novelty—“automatically processing” sensory data associated with user movements and/or manipulations (step [1B/12B]), and “automatically determining” if the data “meets a required threshold” to qualify the user as human (step [1C/12C]). Ex1004, 96-97. The grounds thus raise materially different arguments than previously presented. *Axioma Metering UAB v. Kamstrup A/S*, IPR2019-01640, Paper 10, 10-11 (P.T.A.B. Apr. 8, 2020).

Finally, even if Seacat satisfied the test’s first part, the second strongly supports institution. Factors (c), (e)-(f) from *Becton Dickinson & Co. v. B. Braun Melsungen AG*, IPR2017-01586, Paper 8, 17-18 (P.T.A.B. Dec. 15, 2017) (precedential) apply. *Advanced Bionics*, IPR2019-01469, Paper 6, 10.

1. Factor (c): The Petition’s Art and Arguments Were Not Previously Evaluated

The Examiner never applied Seacat in rejecting any claim. Ex1004, 95-99. The Examiner made *no* prior art-based rejections. *Id.* Hence there is *no overlap* between the prosecution’s art and arguments and how Petitioners rely on Seacat. *See Comcast Cable Commc’ns, LLC v. Rovi Guides, Inc.*, IPR2019-01434, Paper 14, 11-12 (P.T.A.B. Feb. 12, 2020) (instituting where patent “was allowed with no [prior

art] rejections”); *Trans Ova Genetics v. XY*, IPR2018-00250, Paper 9, 18 (P.T.A.B. June 27, 2018) (instituting where the “Petition presents a substantially different argument than was articulated by the Examiner”); *Apple v. MPH Techs. Oy*, IPR2019-00819, Paper 10, 14-15 (P.T.A.B. Sept. 27, 2019) (instituting where “there is little, if any, overlap between the arguments made during examination and the manner in which Petitioner now relies on [the art]”); *Puma N. Am. v. Nike, Inc.*, IPR2019-01058, Paper 10, 18 (P.T.A.B. Oct. 31, 2019) (“Because...the manner in which Petitioner relies on the prior art does not overlap with arguments made during prosecution....this factor weighs against” denial); *Microsoft Corp. v. Parallel Networks Licensing LLC*, IPR2015-00486, Paper 10, 15 (P.T.A.B. July 15, 2015) (granting institution on grounds asserting references merely listed in an IDS where “there [was] no evidence that the Examiner considered the particular disclosures cited.”).

Even if Seacat were of record, the “Board has ***consistently declined*** exercising its discretion” where all “a Patent Owner can point to is that a reference was disclosed to the Examiner during the prosecution.” *Amgen Inc. v. Alexion Pharms. Inc.*, IPR2019-00740, Paper 15, 65-66 (P.T.A.B. Aug. 20, 2019) (cataloging cases). The Board often holds that reliance on cited-but-unapplied art “***weighs strongly against***” denial. *SolarEdge Techs. v. SMA Solar Tech.*, IPR2020-00021, Paper 8, 11 (P.T.A.B. Apr. 10, 2020); *Adobe Inc. v. RAH Color Techs.*, IPR2019-00629, Paper

44, 19 (P.T.A.B. Sept. 4, 2019) (“weighs strongly against”); *Intel Corp. v. Qualcomm Inc.*, IPR2019-00047, Paper 8, 10-15 (P.T.A.B. July 9, 2019) (same despite search report describing art’s relevance).

2. Factors (e)-(f): The Examiner Failed To Appreciate Seacat’s Teachings

The Examiner materially erred by failing to appreciate Seacat’s teachings. Again, the Examiner neither discussed nor rejected claims over Seacat. Ex1004, 96-97. The Examiner necessarily failed to appreciate Seacat’s teachings, including its express disclosure of the alleged points of novelty in [1B/12B] and [1C/12C]. As discussed above (§§VI.A.2.a, VI.B.1.b), Seacat discloses these limitations, contradicting the Examiner’s cursory conclusion of patentability. *Id.* Seacat’s application also entered the record *after* the Examiner found the claims allowable. Ex1004, 81, 87, 94-101. The Examiner could not appreciate Seacat’s scope when it was not before him.

“[M]ere citation to a reference” shows no substantive consideration. *Zip-Top, LLC v. Stasher, Inc.*, IPR2018-01216, Paper 14, 35 (P.T.A.B. Jan. 17, 2019). Where the Examiner failed to appreciate the prior art’s scope, the Board institutes. *Trans Ova Genetics*, IPR2018-00250, Paper 9, 18-19 (“the Examiner manifestly failed to appreciate [disclosures]...from [the art]”); *Apple*, IPR2019-00819, Paper 10, 15-16 (“the Examiner did not properly apply [the art’s] teachings”).

An expert declaration (from Dr. Lopresti) supports the Petition, explaining how a POSA would have understood Seacat, including that it discloses the allegedly novel steps. *See generally* Lopresti ¶¶65-214. This new evidence also weighs against denial. *See Puma*, IPR2019-01058, Paper 10, 19 (instituting where petition presented “new non-cumulative evidence”).

VIII. CONCLUSION

Petitioners request cancellation of claims 1, 4-5, 9, 12, 14, and 16.

Respectfully submitted,

February 27, 2023

/Elliot C. Cook/

Elliot C. Cook, Reg.# 61,769

FINNEGAN, HENDERSON, FARABOW,
GARRETT & DUNNER, LLP

CERTIFICATION OF COMPLIANCE

Pursuant to 37 C.F.R. § 42.24, the undersigned certifies that the foregoing Petition for *Inter Partes* Review contains 13,692 words excluding a table of contents, a table of authorities, Mandatory Notices under § 42.8, a certificate of service or word count, and appendix of exhibits or claim listing. Petitioner has relied on the word count feature of the word processing system used to create this paper in making this certification.

Date: February 27, 2023

/William Esper/
William Esper
Case Manager and PTAB Coordinator
FINNEGAN, HENDERSON, FARABOW,
GARRETT & DUNNER, LLP

CERTIFICATE OF SERVICE UNDER 37 C.F.R. §42.6(e)(4)

The undersigned certifies that, in accordance with 37 C.F.R. §42.6(e) and 37 C.F.R. §42.105, a copy of the foregoing **Petition for *Inter Partes* Review**; the associated **Powers of Attorney**; and **Exhibits 1001-1028, 1041-1048** are being served via Priority Mail Express on the 27 day of February 2023, the same day as the filing of the above-identified documents in the United States Patent and Trademark Office/Patent Trial and Appeal Board, upon the Patent Owner by serving the correspondence address of record with the USPTO as follows:

John Nicholas Gross
Law Office of J. Nicholas Gross, Prof. Corp.
PO BOX 9489
Berkeley, CA 94709

And upon the following counsel of record for the Patent Owner in litigation pending before the Western District of Texas Case No. 1:22-cv-01334 via FedEx Priority Overnight:

Andrew G. DiNovo
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Date: February 27, 2023

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