

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

FACEBOOK, INC.,
Petitioner,

v.

PALO ALTO RESEARCH CENTER LLC.,
Patent Owner.

IPR2021-01264
Patent 7,043,475 B2

Before KARL D. EASTHOM, SHEILA F. McSHANE, and
CHRISTOPHER L. OGDEN, *Administrative Patent Judges*.

EASTHOM, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
35 U.S.C. § 318(a)

I. INTRODUCTION

Petitioner, Facebook, Inc., filed a Petition (Paper 2, “Pet.”); for *inter partes* review of claims 1–3, 5, 7, 10–12, 15, and 16 of U.S. Patent No. 7,043,475 B2 (Ex. 1001, the “‘475 patent”), along with the Declaration of Dr. Edward A. Fox. (Ex. 1002). Patent Owner, Palo Alto Research Center LLC (formerly Palo Alto Research Center Inc. (Paper 36)) (“PARC”), filed a Preliminary Response (Paper 10) and a Declaration of Dr. David Martin (Ex. 2003).

After the Institution Decision (Paper 13, “Inst. Dec.”), Patent Owner filed a Response (Paper 21, “PO Resp.”), and a Declaration of Joshua Moore (Ex. 2026); Petitioner filed a Reply (Paper 25) and a Reply Declaration of Dr. Edward A. Fox (Ex. 1022); and Patent Owner filed a Sur-reply (Paper 27). Thereafter, the parties presented oral arguments via a video hearing, and a transcript of the hearing is in the record. Paper 34. For the reasons set forth in this Final Written Decision pursuant to 35 U.S.C. § 318(a), we determine that Petitioner demonstrates by a preponderance of evidence that the challenged claims are unpatentable.

A. Related Matters and Real Parties in Interest

Each party identifies itself as the real party in interest. Pet. 2; Paper 4, 2; Paper 36, 1. Patent Owner also states that it is a wholly owned subsidiary of Xerox Corp., which is a wholly owned subsidiary of Xerox Holdings Corp. Paper 36, 1.

The parties indicate this *inter partes* proceeding relates to the following district court litigations: *Palo Alto Research Center Inc. v. Snap Inc.*, No. 2:20-CV-10755-AB-MRW (C.D. Cal.); *Palo Alto Research Center Inc. v. Twitter, Inc.*, No. 2:20-CV-10754-AB-MRW (C.D. Cal.); *Palo Alto*

Research Center Inc. v. Facebook, Inc., No. 2:20-CV-10753-AB-MRW
(C.D. Cal.). Pet. 1; Paper 4, 2–3.

B. The '475 Patent

The '475 patent describes creating user profiles for users who visit web pages and classifying such users using clustering techniques. *See* Ex. 1001, code (57), Fig. 3. The system classifies “user types based on . . . multiple modes of information” collected as a user visits different web sites along a user path. *See id.* at 1:53–54. The system defines a plurality of user paths based on a collection of content portions or web sites that users visit. *Id.* at 1:60–67, 4:48–6:22. The technique involves combining information, for example in the form of “feature vector[s],” which include “URL feature vector[s],” “proximal cue vectors,” “content feature vectors,” and other vectors “for each document or web page on the user path.” *See id.* at 6:4–20. The system combines and weights the different vectors into a “multi-modal vector,” which represents a “user profile.” *Id.* “The multi-modal vector allows different types of information representing the document collection to be combined and operated upon using a unified representation.” *Id.* at 6:20–23.

The “content portions [that a user may visit] may be documents, web pages and so forth.” Ex. 1001, 3:6–7. “In various exemplary embodiments, a content feature vector reflects the content of the words contained by each document or web page in the path.” *Id.* at 8:60–63.

The proximal cue vector includes “[p]roximal terms” on a web page, which “represent information cues that convey information to the simulated user” who visits the page. *See* Ex. 1001, 4:37–38. “For example, a text 202 associated with a link 204 may provide proximal cues as to the nature of the

linked information.” *Id.* at 3:43–45; *see also infra* § II.B (Claim Construction for proximal information). As another example, in the following exemplary link on a web page, “<http://www.xerox.com/products/support/index.html>,” “the words http, www, xerox, com, products, support and index are considered as proximal cue words for” that link. *Id.* at 3:55–59; *see also id.* at 8:31–32 (“In various exemplary embodiments, proximal cue words include for example, the text of the link structure.”). The specification indicates proximal information is broad: “It will be apparent that *any feature* of the proximal document or web page may be used to provide proximal cue words in the practice of this invention.” *Id.* at 8:38–41 (emphasis added).

C. Illustrative Claim

Illustrative independent claim 1 follows (with bracketed letters added to limitations for reference purposes):

1. A computer implemented method for clustering user sessions using multi-modal information and proximal information, comprising:
 - [a] selecting a plurality of user paths in a collection of content portions, and for each user path:
 - [b] determining multi-modal information for content portions associated with the user path;
 - [c] determining proximal information for content portions associated with the user path;
 - [d] combining the multi-modal information for content portions and the proximal information for content portions associated with the user path to form a user profile having a unified representation; and
 - [e] clustering multi-modal information and proximal information of user profiles based on similarity.

D. Asserted Grounds of Unpatentability

Petitioner asserts that claims 1–3, 5, 7, 10–12, 15, and 16 are unpatentable based on the following grounds:

Claim(s) Challenged	35 U.S.C §	Reference(s)/Basis
1–3, 5, 7, 10–12, 15, 16	103(a) ¹	Konig, ² Millhollon, ³ Chang, ⁴ Callihan, ⁵ Viswanathan ⁶
1–3, 5, 7, 10–12, 15, 16	103(a)	Heer, ⁷ Chang, Callihan

Pet. 3.

II. ANALYSIS

A. Level of Ordinary Skill in the Art

Relying on the testimony of Dr. Fox, Petitioner proposes that a person of ordinary skill in the art at the time of the '475 patent (i.e., December, 2002) “would have possessed at least a bachelor’s degree in electrical engineering or computer science, and at least two years of experience in

¹ The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) (effective March 16, 2013) (“AIA”), amended 35 U.S.C. § 103. Because the '475 patent’s effective filing date (December 19, 2002) precedes the effective date of the applicable AIA amendment, the pre-AIA version of § 103 applies. *See* Ex. 1001, code (22).

² US Patent No. 6,981,040 B1, filed June 20, 2000, issued Dec. 27, 2005. Ex. 1003.

³ Millhollon et al., MICROSOFT INTERNET EXPLORER 3.0 FRONTRUNNER (1996). Ex. 1004.

⁴ Chang et al., MINING THE WORLD WIDE WEB AN INFORMATION SEARCH APPROACH (2001). Ex. 1006.

⁵ Steven E. Callihan, LEARN HTML IN A WEEKEND (1998). Ex. 1007.

⁶ U.S. Patent No. 6,345,253 B1, filed June 18, 1999, issued February 5, 2002. Ex. 1008.

⁷ Jeffrey Heer and Ed H. Chi, *Identification of Web User Traffic Composition Using Multi-Modal Clustering and Information Scent*, Proceedings of the Workshop on Web Mining, First SIAM Conference on Data Mining (SMD 2001), Chicago, Ill. (Apr. 7, 2001). Ex. 1009.

systems for retrieval and processing of information, such as web pages obtained over the Internet.” Pet. 5–6 (citing Ex. 1002 ¶¶ 18–23). Patent Owner does not dispute this proposed level. *See* PO Resp. 29 (“For the purposes of this proceeding, PARC and its expert have applied this level of skill in the art.”).

Various factors in determining the level of ordinary skill in the art include the “type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field.” *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995) (citation omitted). The prior art of record also reflects the level of ordinary skill in the art. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001). We adopt the assessment offered by Petitioner, as it is consistent with the ’475 patent and the asserted prior art.

B. Claim Construction

In *inter partes* reviews, the Board construes claims using the same claim construction standard employed in a civil action under 35 U.S.C. § 282(b). *See* 37 C.F.R. § 42.100(b) (2021). Under the principles set forth by our reviewing court, the “words of a claim ‘are generally given their ordinary and customary meaning,’” as would be understood by a person of ordinary skill in the art in question at the time of the invention. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (en banc) (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)). “In determining the meaning of the disputed claim limitation, we look principally to the intrinsic evidence of record, examining the claim language itself, the written description, and the prosecution history, if in evidence.”

DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc., 469 F.3d 1005, 1014 (Fed. Cir. 2006) (citing *Phillips*, 415 F.3d at 1312–17).

Initially, Petitioner “does not believe express claim construction is necessary,” because “the prior art tracks the exemplary descriptions of [claim] terms in the ’475 patent.” Pet. 7. In Response, Patent Owner contends that two terms are in controversy, “proximal information,” and “multi-modal information.” PO Resp. 34–35. The challenged claims each recite these features. The constructions of claim 1’s terms are representative of all the claim construction issues.

1. Proximal Information

Patent Owner contends that “an appropriate plain meaning construction for ‘proximal information’ is ‘information near or derived from a link that characterizes the content accessible through the link in association with that link.’” PO Resp. 44 (citing Ex. 2003 (Martin Dec.) ¶ 104). Patent Owner also argues that Petitioner’s “prior art does not teach the ‘proximal information’ limitations, because . . . their prior art *does not store information* about links in association with those links.” *Id.* (emphasis added). Patent Owner relies on Dr. Martin, who testifies that “[t]he point is that the system uses proximity to gain knowledge about the role of the links.” *Id.* at 42 (quoting Ex. 2003 ¶ 97). To support this argument, Dr. Martin and Patent Owner refer to a passage in the specification that describes storage step 235 in Figure 4 of the ’475 patent, at which point in the disclosed method “proximal cue feature vector matrix stores information

about *which* proximal cue feature vectors are associated with which links.”
Id. (emphasis in original) (quoting Ex. 1001, 7:2–5).

Petitioner contends that “Patent Owner’s proposed construction can be divided into three separate portions: ‘[1] information near or derived from a link [2] that characterizes the content accessible through the link [3] in association with that link.’” Reply 2 (alterations in original) (quoting PO Resp. 44). Petitioner agrees with Patent Owner that proximal information at least includes “[1] information near or derived from a link.” *See* Reply 2–3. However, Petitioner asserts that “[w]ith respect to [2], nothing in the written description indicates that proximal information must actually “characterize[] the content accessible through the link.” *Id.* at 3. And with respect to “aspect [3] of Patent Owner’s construction,” Petitioner asserts that “Patent Owner’s proposal already recites ‘information near or derived from a link,’ so it is unclear what if anything ‘in association with that link’ actually adds to the proposed construction.” *Id.* at 4 (citing Ex. 1022 ¶ 24).

The record supports Petitioner. The plain meaning of “determining proximal information” in light of the specification does not require storing information about links in association with those links. In addition, requirement [3], “in association with the link” is superfluous to requirement [1], “information near or derived from a link.” Further, the plain meaning of

“determining proximal information” in light of the specification does not require aspect [2], characterizing the content accessible through the link.

Figure 2 of the '475 patent follows:

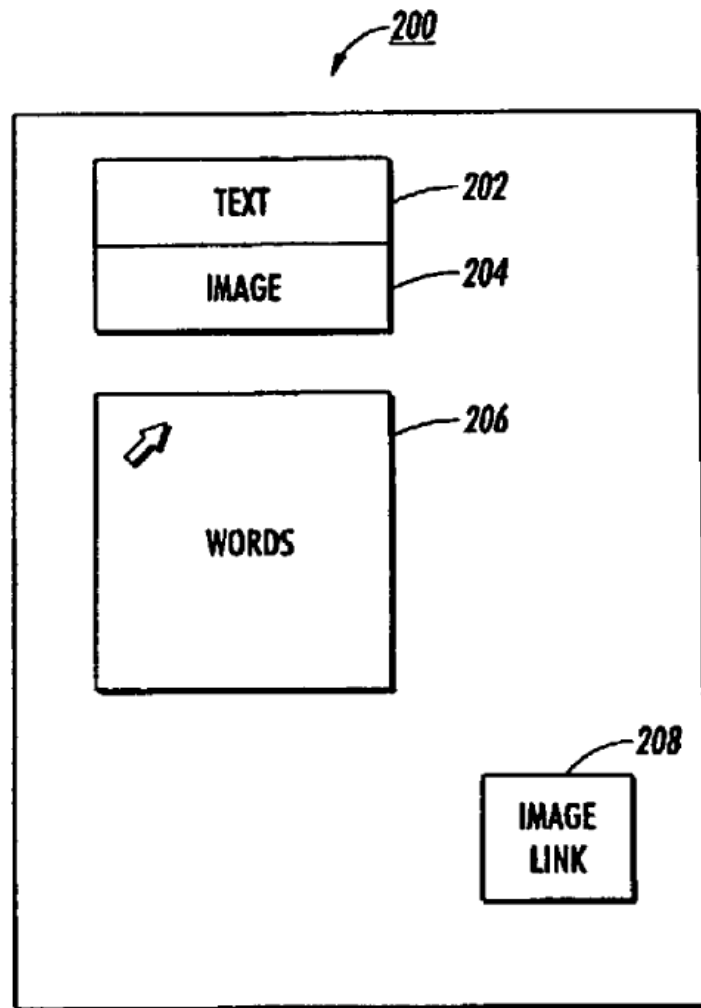


Figure 2 above “illustrates various exemplary links and proximal terms in a typical content portion 200.” Ex. 1001, 3:40–41. “The proximal cue words may include portions of the text 202 surrounding the link 204.” *Id.* at 3:40–41. “Proximal terms represent information cues that convey information to the simulated user.” *Id.* at 3:41–43. “So for example, if the text 202 says ‘Buy a gift certificate’, then the words ‘buy’, ‘a’, ‘gift’, and ‘certificate’ are used at words that describe the proximal cues.” *Id.* at 3:46–

48. In addition, “if the link 204 . . . ‘http://www.xerox.com/products/support/index.html’ is processed, the words http, www, xerox, com, products, support and index are considered as proximal cue words for the relevant link 204.” *Id.* at 3:55–59. The disclosed system also may assign weights to the proximal cue words, according certain words “higher up in the structure of a content portion” more weight. *Id.* at 3:60–65.

The specification also describes using inlinks and outlinks. “From the reference of a content portion, a link that sends the user to another content portion is defined as an ‘outlink’ and a link that brings the user to the content portion is defined as an ‘inlink’.” Ex. 1001, 3:35–39. These descriptions show that an “outlink” and “proximal information” both involve a link on a given content portion, and as discussed above, the latter “proximal information” involves stripping or determining words near or in the link. And some of the information near or in a link, which the system describes as proximal cue words, such as “com,” “www,” and “a,” do not provide much, if any, information about what content exists at the content portion at the distal end of the link. These disclosures support Petitioner’s claim construction and argument with respect to requirement [2].

The parties agree that “proximal information” includes proximal cues. *Compare* Sur-reply 6 n.1 (“The ’475 [p]atent treats ‘proximal information’ and ‘proximal cues’ synonymously.” (citing Ex. 1001, codes (54, 56); Ex. 2003 ¶¶ 93–95; Ex. 1010, 69)), 40 (arguing that “the term ‘proximal information’ appears as ‘proximal cue information’ in various parts of the ’475 [p]atent”), *with* Reply 6–7 (arguing that Figure 3 reveals an embodiment that includes proximal cue words without storing same and that

Patent Owner’s “expert treats [proximal cue words] as an example” of proximal information (citing Ex. 1022 ¶26; Ex. 1023, 64:7–12)).

Regarding storage or requirement [3], as Petitioner argues, “Patent Owner’s arguments fail because the challenged claims recite *determining* proximal information—not *representing* or *storing* proximal information, let alone in a particular format.” Reply 5. As Petitioner also argues, Patent Owner relies on “an exemplary embodiment in which proximal information is stored in a ‘proximal cue feature vector matrix’ at step S235 in Figure 4.” Reply 5 (citing Ex. 1001, Fig. 4). As Petitioner shows, the “same embodiment also shows a preceding step S230 in which proximal information is actually *determined*.” *Id.* Figure 4 supports Petitioner, because step S230 states “DETERMINE PROXIMAL CUE WORDS,” and then, separately, step 235 states “ADD PROXIMAL CUE WORDS TO PROXIMAL CUE FEATURE VECTOR MATRIX.” Ex. 1001, Fig. 4. Therefore, as Petitioner persuasively argues, according to the specification, the claim step at issue here, “determining proximal information” (*see* Fig. 4, S230), is a separate and distinct feature than any unclaimed step of storing information about a link’s association (*see* Fig. 4, S235).

In its Sur-reply, Patent Owner presents an alternative to “storing” and urges that “the information about a link associated with the link itself—must be at least temporarily *stored or tracked*.” Sur-reply 5 (emphasis added). Patent Owner similarly argues that Petitioner’s “evidence shows that the ’475 [p]atent requires information about a link to be associated with the link itself and at least temporarily stored or tracked to permit a combination.” *Id.* at 6. Patent Owner explains that other limitations in the challenged claims require tracking, “[o]therwise, *the combining and clustering limitations*

would have no proximal information to use as inputs.” *Id.* at 5 (emphasis added). Even if Patent Owner correctly characterizes these other claim limitations (limitations 1d and 1e), this shows that “determining proximal information” is a separate requirement from tracking it as a predicate for the other claim limitations involving combining and clustering. In any event, as determined below, Petitioner shows that the combined teachings of Heer, Chang, and Callihan teach or suggest the combining and clustering limitations, and therefore, Petitioner shows the required “tracking” of proximal information as urged by Patent Owner in its Sur-reply.

Further regarding argued feature [2], characterizing the distal content accessible through the link, Patent Owner relies on an original paragraph (i.e., ¶ 27) that the Examiner “errantly replaced” during prosecution. *See* PO Resp. 42–43 n.10. Patent Owner argues that this original paragraph, which is not in the ’475 patent specification as issued, supports its claim construction such that “words in the linked to or distal document 130 may be associated with the link 124 in the source document” (*id.* at 42–43 (quoting Ex. 2003 ¶¶ 98–99; citing Ex. 1010 (prosecution history), 8, 123–125)).

Petitioner argues that it is improper for Patent Owner to rely on omitted paragraph 27 as supporting its construction. *See* Reply 6 (citing *MPHJ Tech. Investments, LLC v. Ricoh Ams. Corp.*, 847 F.3d 1363, 1369 (Fed. Cir. 2017) (“In this case, it is the deletion . . . that contributes understanding of the intended scope of the final application” and “conclud[ing] that a person of skill in this field would deem the removal of these limiting clauses to be significant”).

We need not decide the propriety of relying on a deleted paragraph in our claim construction analysis. That is, even if it is proper to consider

omitted paragraph 27 as originally filed, that paragraph is not dispositive to our claim construction because it is merely directed to one embodiment, even if that embodiment involves analyzing words surrounding, or in, a link and also content portions to which the link points. *See* PO Resp. 43 (quoting Ex. 1010, 124). As summarized above, several broader descriptions of proximal information apart from the embodiment in paragraph 27 are in the specification in connection with Figure 2. For example, the specification states that “[i]f the link structure is an image, proximal cue words *surrounding a link frequently* provide some cue words.” *Id.* at 8:41–43. The specification explicitly states that “[i]t will be apparent that *any feature* of the proximal document *or web page* may be used to provide proximal cue words *in the practice of this invention*.” *Id.* at 8:38–41 (emphasis added). These broad disclosures for proximal information show that the disclosed and claimed method contemplates that words in, or surrounding, a link are proximal information or proximal cue words that may, but do not necessarily, accurately describe content to which the link points. As Petitioner argues, “[t]he ’475 patent confirms that proximal information may be more subtle than providing an outright characterization; it can for example merely ‘provide cues as to the nature of the linked information.’” Reply 3–4 (quoting Ex. 1001, 3:43–46).

Further supporting this interpretation, the ’475 patent specification also states that “a text 202 associated with a link 204 *may provide proximal cues* as to the nature of the linked information.” Ex. 1001, 4:16–20 (emphasis added). The specification also states that “[p]roximal terms represent information cues that convey information to the simulated user.” *Id.* at 4:16–18. Patent Owner does not direct us to a process disclosed in the

specification that describes how the system measures how accurate the proximal information is with respect to describing the content on the page to which the link points, and then based on that accuracy (as compared to a threshold for example), determines that certain cue words pass muster and represent proximal information.

As noted above in connection with Figure 2, the specification describes what proximal information encompasses by stating that “[t]he proximal cue words may include portions of the text 202 *surrounding* the link 204.” Ex. 1001, 4:20–21 (emphasis added). It provides another example of text 202 that “says, ‘Buy a gift certificate,’” and explains that “then the words ‘buy’, ‘a’, ‘gift’, and ‘certificate’ are used as words that describe the proximal cues.” *Id.* at 4:22–25. As indicated above, the word “a” is not descriptive. The specification provides another example that involves words in a link, stating that “if the link 204 is processed, typical words such as http, www, Xerox, com, products, support and index are considered as proximal cue words for the relevant link.” *Id.* at 4:30–34. Like the word “a,” the letters “www” and “com” are not descriptive of any content to which the link points. Therefore, it is clear from the specification that processing a link involves stripping words from either the link or text surrounding the link without requiring the words to describe distal page content to which the link points.

Original paragraph 28 of the as-filed application, which Patent Owner also reproduces, states that “[i]n *various exemplary embodiments*, the linked to or distal information used may include the distal content portion title and the content portion text either alone or in combination *with proximal cue information such as the cue words from the text surrounding the image*

link.” PO Resp. 42–43 (quoting Ex. 1010, 124) (emphasis added). The word “may” in combination with the description of “various exemplary embodiments” signals that this disclosure is not a claim requirement. *See* Ex. 1010, 124; *accord* Ex. 1001, 4:42–46 (same as original paragraph 28).

Based on the foregoing discussion, in light of the specification and prosecution history, “determining proximal information for content portions associated with the user path,” means “finding words in text near or within a link within content portions associated with the user path.” Moreover, as discussed further below, as Petitioner argues, even if we adopt Patent Owner’s construction, Petitioner shows “determining proximal information for content portions associated with the user path” would have been obvious. *See* Reply 11–16.

2. Multi-Modal Information

Patent Owner also argues that the claim term “multi-modal information” as recited in the challenged claims requires “multiple modalities—such as those in the ’475 Patent, or others that properly distinguish between the respective modalities.” PO Resp. 35–36. Patent Owner provides an example of a web page that includes the same word (e.g., “Wiktionary”) in the content and also “in a link to the Wiktionary.org site,” and explains that “the word ‘Wiktionary’ would be represented at least twice [as] . . . multi-modal information: once for the web page content, and once separately for its outlinks.” *Id.* at 38 (citing Ex. 2003 ¶ 87). It is clear from this example by Patent Owner that a textual word appearing in different

parts of a web page (e.g., on the page or in a link on the page) may represent different modalities.

Nevertheless, Patent Owner also argues that “multi-modal and proximal information may not start in the same format.” PO Resp. 39 (citing Ex. 1001, 15:33–36; 16:10–15; Ex. 2003 ¶ 101). To support this argument, Patent Owner states that forming user profiles requires “combining distinct types of information” into a multi-modal vector, with content, inlink, and other portions occupying different positions in the vector. *See id.* at 38–39. Yet, Patent Owner fails to show how a requirement for “distinct types of information” requires the information to start in a different “format.” *See id.* Patent Owner also fails to explain what “not . . . the same format” encompasses. *See id.* Patent Owner otherwise argues that different modalities must be “distinguishable modalities [able to be] represented together.” *Id.* 39. Being “distinguishable” as combined information does not require a “different format” for text in URLs, links, or other content on a web page, because, as Patent Owner argues, the ’475 patent system is able to distinguish different sources of information (and, for example, put each information piece in a vector sub-space and/or assign different weights thereto) without requiring a different format. *See* PO Resp. 38–39; Ex. 1001, Fig. 10, step 3527 (FEATURE WEIGHTING CIRCUIT); *id.* at 6:20–23 (“The multi-modal vector allows different types of information representing the document collection to be combined and operated upon using a unified representation.”); *supra* § I.B (summarizing the ’475 patent disclosure). Heer supports this interpretation by referring to “each source of information (or modality),” thereby indicating different sources of information on a web page correspond to different modalities under

nomenclature used by PARC scientists. *See* Ex. 1009, 4 (“All available information on items is embedded into this single large multimodal vector space, where each modality occupies a sub-space.”);

As Patent Owner notes, Dr. Martin testifies that “proximal information [is] . . . a . . . form of multi-modal information in which the . . . proximal information has been incorporated” in the ’475 patent. *See* PO Resp. 40 (quoting Ex. 2003 ¶ 101). The record supports this characterization insofar as it describes combining the types of information disclosed and claimed. *See, e.g.,* Ex. 1001, code (57). Claim 1 recites “determining proximal information” prior to “combining the multi-modal information . . . and the proximal information,” indicating that there is no specific or relative format requirement for any of the claimed information prior to or after the combining step. The “Wiktionary” text example that Patent Owner supplies as summarized above also supports this characterization.

In any event, there is no need on this record to construe “multiple modalities” explicitly, because Patent Owner does not dispute that Heer discloses “multiple modalities,” according to Petitioner’s showing in the Heer-based ground. Patent Owner’s argument, instead, addresses Petitioner’s showing in the Konig-based grounds, which we do not reach because our determination in the Heer-based grounds is dispositive of the challenged claims. *See* PO Resp. 52–59 (arguing that Konig does not disclose multiple modalities); *Boston Sci. Scimed, Inc. v. Cook Grp. Inc.*, 809 F. App’x 984, 990 (Fed. Cir. Apr. 30, 2020) (non-precedential) (recognizing that the “Board need not address issues that are not necessary to the resolution of the proceeding” and the Board has “discretion to decline

to decide additional instituted grounds once the petitioner has prevailed on all its challenged claims”).

3. Other Terms

Additionally, there is no need to construe any other claim terms expressly to resolve the parties’ disputes on the current record. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (“[W]e need only construe terms ‘that are in controversy, and only to the extent necessary to resolve the controversy.’” (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

C. Principles of Law

A patent claim is unpatentable under 35 U.S.C. § 103 if “the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.” 35 U.S.C. § 103 (2011); *see also KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) when in evidence (as alleged here), objective indicia of nonobviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

D. Asserted Obviousness of Claims 1–3, 5, 7, 10–12, 15, and 16 over Heer, Chang, and Callihan

Petitioner contends claims 1–3, 5, 7, 10–12, 15 and 16 are unpatentable under 35 U.S.C. § 103(a) as obvious over Heer, Chang, and Callihan. In support, Petitioner also relies upon the Fox Declaration

(Ex. 1002) and the Fox Reply Declaration (Ex. 1022). Patent Owner argues that the asserted combination does not teach certain limitations of independent claims 1 and 10, focusing on the “determining proximal information” limitation and asserting secondary considerations of nonobviousness, with reliance on the Martin Declaration (Ex. 2003). PO Resp. 44, 47–52, 59–62. Patent Owner argues the challenged claims together. *See, e.g., id.* at 3 (grouping independent claims 1 and 10 together), 47–52, 59 (grouping limitations of claims 1 and 10 together), 60–62 (arguing secondary considerations without specifying a claim).

1. Heer (Ex. 1009)

The authors of Heer (Heer, Chi) are named inventors of the ’475 patent. *Compare* Ex. 1009, 1, *with* Ex. 1001, code (75). Heer teaches computer-implemented techniques involving “a form of clustering, called Multi-Modal Clustering (MMC), which utilizes multiple sources of information (modalities) to generate user groupings.” Ex. 1009, 2.

Figure 1 of Heer follows:

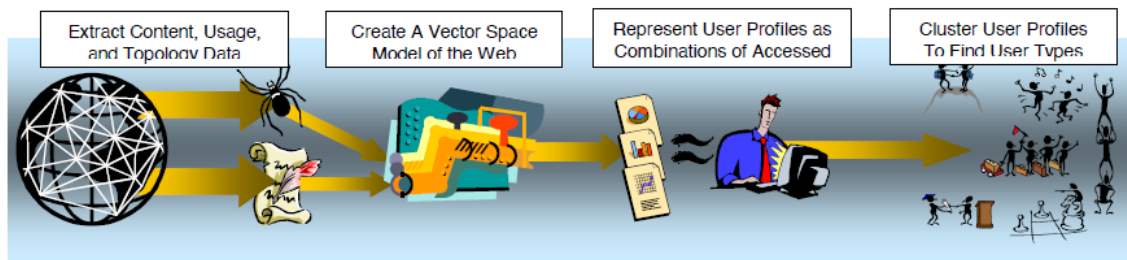


Figure 1: Architectural Data Flow of the Multi-Modal Clustering System for Identifying Web User Types.

Heer’s Figure 1 above, Heer’s method of multi-modal clustering of user types on the web. Ex. 1009, 1, 4. To model each user type, Heer uses different modalities to represent each web page in a user’s path, “page content, URLs, inlinks, and outlinks.” *Id.* at 5.

Heer refers to a prior art “LRS” technique to define surfing paths as follows:

[A] Web-mining technique . . . extracts significant surfing paths by the identification of longest repeating subsequences (LRS). A longest repeating subsequence (LRS) is a sequence of items where (1) subsequence means a set of consecutive items, (2) repeated means the item occurs more often than some threshold T , where T typically equals one, and (3) longest means that although a subsequence may be part of another repeated subsequence, there is at least one occurrence of this subsequence where this is the longest repeating.

Ex. 1009, 4.

Heer states that “the LRS technique extracts surfing paths that are likely to re-occur and reduces noise in the usage data,” and Heer’s system “use[s] the LRS data mining technique to identify significant surfing paths in Web usage data.” Ex. 1009, 5. Then, “[e]ach significant surfing path is treated as a user profile.” *Id.* “[E]ach user profile is essentially a list of documents that represent a significant user history through the Web site.” *Id.* (emphasis added). “To represent this profile,” Heer’s system “build[s] up a feature vector of each Web page, and then construct[s] the profile as a weighted combination of the feature vectors.” *Id.*

Heer’s system generally “represent[s] each user path profile as a combination of multi-modal feature vectors describing each Web page,” and then “appl[ies] the clustering technique to these user profile vectors.”

Ex. 1009, 4. In Heer, as indicated above,

[e]ach significant surfing path is treated as a user profile. Thus, *each user profile is essentially a list of documents that represent a significant user history through the Web site.* To represent this profile, we build up *a feature vector of each Web page*, and then construct the profile as a weighted combination of the feature vectors.

Ex. 1009, 5 (emphasis added). In other words, due to the threshold and the requirement for repeating the subsequence (LRS) in a user path, user profiles do not include all web pages visited by a user, but represent a “significant user history.” *See id.* Heer’s method strives to “accurately represent the information at hand,” and “also provide a readily calculable similarity metric, without which any clustering is impossible.” *Id.* at 5.

Like the ’475 patent, Heer’s method uses not only “content words,” but “other forms of document information such as hyperlinks, and URL tokens.” Ex. 1009, 6. Heer states that its “idea . . . *is to use as much information as we have* on each item to cluster the items.” *Id.* at 4 (emphasis added). Heer states that “[f]or example, the content keywords for a Web page can have their own feature vector (e.g., the frequency of each keyword’s occurrences on that page), which can be combined with *feature vectors that describe the images* on that page (e.g., the color of each pixel).” *Id.* at 4 (emphasis added).

In summary, Heer’s method involves embedding “[a]ll available information on items” into a “single large multi-modal vector space,” defining a “similarity metric for the combined multi-modal feature vectors” for each individual modality, and then “apply[ing] traditional clustering algorithms.” Ex. 1009, 4.

2. *Chang (Ex. 1006)*

Chang includes excerpts from a book entitled “Mining the World Wide Web: An Information Search Approach.” Ex. 1006 (title page). Chang states that on HTML pages on the web, “text close to an image . . . may be useful for characterizing and describing the content of the image,” as follows:

Multimedia content, especially images, can be incorporated into HTML documents. The ability to link either text or images to another document or section of a document makes HTML very powerful. Very importantly, every image on the Web has a unique Web address (URL) and possibly some associated text that describes the image. The text close to an image therefore may be useful for characterizing and describing the content of the image.

Id. at 54 § 1.1.⁸ Chang also states that “[d]ocument text surrounding an image in a Web page may also be relevant to identifying image content,” and “[i]mage captions can occur before, after, or both before and after an image.” *Id.* at 58.

3. *Callihan (Ex. 1007)*

Callihan includes excerpts from a book entitled “Learn HTML in a Weekend.” Ex. 1007 (title page). Callihan explains that one type of image link in standard HTML is “an inline image that functions as a hypertext link, where clicking on the image will activate the link.” *Id.* at 134.⁹

Figure 3.16 of Callihan follows (Ex. 1007, 135):

⁸ Page citations refer to the original page numbers in accordance with Petitioner’s citations.

⁹ Page and section citations refer to the original page and section numbers in accordance with Petitioner’s citations.

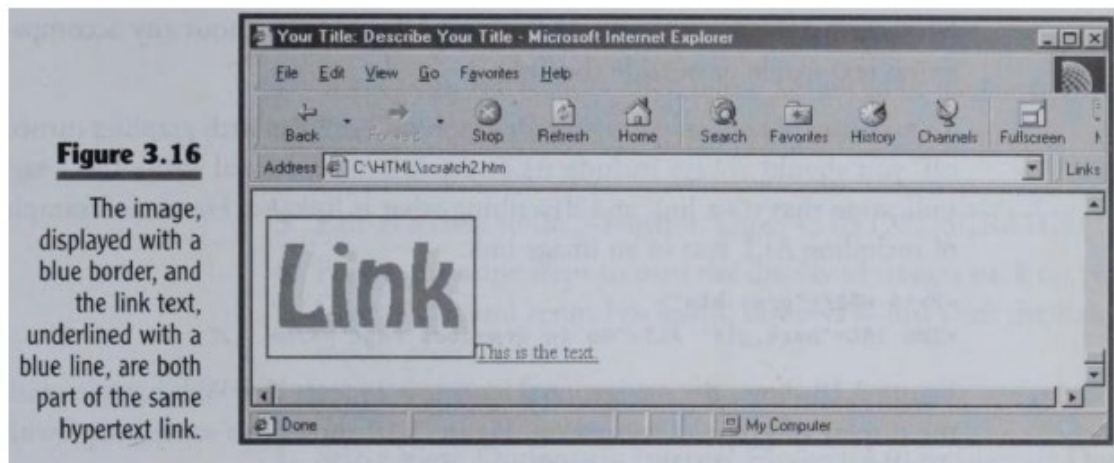


Figure 3.16 includes both an image (square box with stylized “Link”) and the accompanying text (“This is the text”). Ex. 1007, 135. Both are clickable to navigate to the other web page (“link.html”). *Id.*

4. Obviousness Analysis

a. Claims 1 and 10

Petitioner asserts that the combined teachings of Heer, Chang, and Callihan would have rendered claims 1 and 10 obvious. Pet. 46–61, 65–66. Patent Owner disagrees. PO Resp. 47–52, 60–62. For purposes of this trial, independent “computer implemented method” claim 1 is materially similar to independent “computer system” claim 10. *See* Pet. 65–66 (addressing similarities and differences and largely relying on its showing for claim 1); PO Resp. 45, 47–52, 56, 59–62 (grouping claims 1 and 10 together); *compare* Ex. 1001, 15:28–42 (claim 1), *with id.* at 16:5–23 (claim 10).

i. Preamble

The preamble of claim 1 recites “[a] computer implemented method for clustering user sessions using multi-modal information and proximal information.” Petitioner contends that “[t]he preamble does not appear to be limiting,” but even if it is, the prior art teaches it. *See* Pet. 46–47.

Assuming the preamble is limiting, Petitioner contends that Heer's computer-implemented method involves "a form of clustering, called Multi-Modal Clustering (MMC), which utilizes multiple sources of information (modalities) to generate user groupings." Pet. 46. Petitioner generally relies on Heer as disclosing user sessions, multi-modal information, and clustering further in discussing other limitations of claim 1, as summarized below. *See id.* at 46–47. Petitioner relies on the combined teachings of Heer, Chang, and Callihan to suggest proximal information, as discussed below in the context of limitation 1c.

Patent Owner presents no arguments specifically directed to the preamble. *See generally* PO Resp. Based on the record, including after considering Patent Owner's arguments with respect to secondary considerations of nonobviousness as discussed further below, we determine that Petitioner persuasively shows that Heer, or Heer, Chang, and Callihan, teaches or suggests the preamble. Therefore, we need not decide whether the preamble is limiting.

ii. Limitation 1a

Limitation 1a recites "selecting a plurality of user paths in a collection of content portions." Petitioner contends that Heer teaches this limitation. *See* Pet. 47–49.

Petitioner asserts that "[t]he 'user paths' extracted in Heer are within a '**collection of content portions**,' as they reflect web pages accessed by users across one or more websites." Pet. 48. To support its showing, Petitioner quotes Heer as follows: "To identify Web user types, we create a representation (or profile) of user interests based on the documents that lie on each user's surfing history." *Id.* (quoting Ex. 1009, 5 ("Each significant

surfing path is . . . essentially a list of documents that represent a significant user history through the Web site.”); citing Ex. 1002 ¶¶ 202–203)).

Petitioner also quotes Heer as stating that “[e]ach significant surfing path is treated as a user profile To represent this profile, we build up a feature vector of each Web page, and then construct the profile as a weighted combination of the feature vectors.” *Id.* at 48–49 (quoting Ex. 1009, 5; citing Ex. 1002 ¶ 204).

Patent Owner presents no arguments directed specifically to limitation 1a. *See generally* PO Resp. Based on the record, including after consideration of Patent Owner’s arguments with respect to secondary considerations of nonobviousness as discussed further below, we determine that Petitioner persuasively shows that Heer discloses limitation 1a.

iii. Limitation 1b

Limitation 1b recites, for each user path, “determining multi-modal information for content portions associated with the user path.” Petitioner states that “Heer determines ‘multi-modal information’ for content portions associated with the user path by representing web pages (content portions) found along each significant user path using a vector space model.” Pet. 49 (citing Ex. 1002 ¶ 131). Specifically, Petitioner asserts that Heer determines “multi-modal information” by determining “feature vectors representing the content, URLs, inlinks, and outlinks of each page associated with a significant user path.” *Id.* (citing Ex. 1009, 5). Petitioner asserts that Heer teaches “construct[ing] user profile vectors as weighted combinations of accessed pages” for each user path. *Id.* at 51 (quoting Ex. 1009, 6; citing Ex. 1002 ¶ 209).

Petitioner annotates Heer’s Figure 1 as follows:

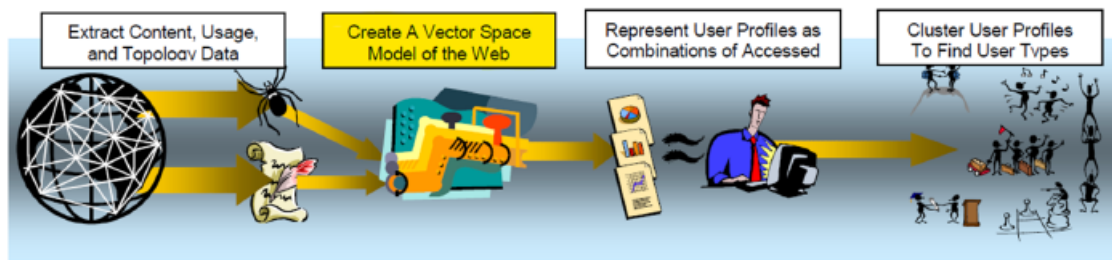


Figure 1: Architectural Data Flow of the Multi-Modal Clustering System for Identifying Web User Types.

Pet. 49. Figure 1 illustrates the architectural data flow in Heer's multi-modal clustering system. Ex. 1009, 4, Fig. 1. Petitioner annotates the second step above (yellow) of Figure 1 above, which states "Create a Vector Space Model of the Web," to signify that Heer teaches limitation 1b. Pet. 49. According to Petitioner, "[u]sing the vector space model, each web page associated with a significant user path is represented as a feature vector." *Id.* (citing Ex. 1009, 5 ("We must first develop a way to represent each page as a feature vector in order to represent each user profile as a combination of these page feature vectors.")).

Patent Owner presents no arguments directed specifically to limitation 1b. *See generally* PO Resp. Based on the record, including after consideration of Patent Owner's arguments with respect to secondary considerations of nonobviousness as discussed further below, we determine that Petitioner persuasively shows that Heer discloses limitation 1b.

iv. Limitation 1c

Limitation 1c recites, for each user path, "determining proximal information for content portions associated with the user path." Petitioner quotes the '475 patent, which states that "[p]roximal terms represent information cues that convey information to the simulated user." Pet. 52 (quoting Ex. 1001, 3:41–43, 4:16–18). Petitioner maintains that "**proximal information**" . . . corresponds to textual information associated with links

and image links in web pages.” *Id.* Petitioner relies on the combination of Heer, Chang, and Callihan to teach or suggest this limitation. *Id.* (citing Ex. 1002 ¶¶ 211–212).

Referring to its showing for limitation 1b and annotated Figure 1 of Heer, Petitioner asserts that as part of creating a vector space, Heer’s system represents each web page visited by a user “as a ‘multi-modal vector that is comprised of four modalities in the current implementation: page content, URLs, inlinks and outlinks.’” *Id.* at 53 (quoting Ex. 1009, 8; citing Ex. 1002 ¶ 213). Petitioner also asserts that Heer’s system “determines features representing both the textual content and hyperlinks present on a page found along a user path.” *Id.*

Petitioner quotes Heer for explicit motivation to use as much information as possible, noting that Heer specifically states that the “idea” behind its “new way to create groupings” for its “Multi-Modal Clustering (MMC),” “is to use as much information as we have on each item to cluster the items.” Pet. 55 (quoting Ex. 1009, 4). Petitioner notes that Heer tracks URLs, textual content keywords, and generic descriptions of images and other information on web pages of a user’s paths to create user profile models in the form of a multi-modal vector. *Id.* at 53 (citing Ex. 1009, 3; Ex. 1002 ¶ 213). For example, Petitioner asserts that “textual information included within links and image links would have provided additional information from which informative words and phrases could be obtained, giving the system more information it can use to identify the user’s interests.” *Id.* at 29 (citing Ex. 1002 ¶¶ 160–161).

Petitioner turns to Chang and contends that it “confirms that text associated with links and images can provide potentially useful information

about the web pages on which they appear.” Pet. 54. Petitioner notes that Chang states that “[t]here is a variety of information available on an HTML page to be used as a basis for assigning keywords to images,’ from which key terms and other information can be extracted,” and “[t]he text close to an image therefore may be useful for characterizing and describing the content of the image.” *Id.* (alteration in original) (quoting Ex. 1006, 54 § 1.1). At the cited page, Chang states that “[t]he ability to link either text or images to another document or section of a document makes HTML very powerful.” Ex. 1006, 54. Petitioner similarly relies on Callihan to describe an HTML link as “an inline image that functions as a hypertext link, where clicking on the image will activate the link.” *Id.* at 53 (quoting Ex. 1007, 134, Fig. 3.16).

Petitioner also notes that Heer teaches that “the content keywords for a Web page can have their own feature vector (e.g., the frequency of each keyword’s occurrences on that page), *which can be combined with feature vectors that describe the images on that page* (e.g., the color of each pixel).” Pet. 56 (quoting Ex. 1009, 4) (emphasis added). In addition, Petitioner notes that Heer states that “[a]ll available information on items is embedded into this single large multi-modal vector space.” *Id.* (quoting Ex. 1009, 4). Petitioner explains that Heer’s disclosure of “feature vectors that describe the images on [a] page” suggests “‘proximal information’ as described by the ’475 patent.” *Id.* (citing Ex. 1002 ¶ 221; Ex. 1001, 8:43–46, Fig. 1). According to Petitioner, “an ordinarily skilled artisan would have appreciated that systems like Heer, which are designed to cluster user paths based on similarity, operate better when they have more, and not less, information on which to operate.” *Id.* at 57 (citing Ex. 1002 ¶¶ 223, 160–

162). Petitioner also asserts that “[a]n ordinarily skilled artisan implementing Heer would thus have appreciated that textual information included within links and image links could provide additional information *to improve the quality of similarity clustering.*” *Id.* (emphasis added). Petitioner also asserts that it would have been obvious to include “text surrounding an image link, i.e., proximal information,” based on added teachings in Chang and Callihan regarding text near images and links, “because such proximal information represents information likely to be relevant to a user’s interests.” *Id.* at 56 (citing Ex. 1002 ¶ 219); *see also id.* at 53–56 (discussing Callihan and Chang).

Patent Owner generally argues that the claimed invention was “[n]ot [o]bvious to [the i]nventors.” *See* PO Resp. 48. In particular, Patent Owner contends that determining proximal information would not have been obvious to “Heer and Chi, the authors of the Heer reference.” *See id.* at 49. For example, Patent Owner argues that “as Dr. Martin explains, ‘the idea of using “proximal information” to improve their system was clearly not obvious to them, since they did not mention it in their paper in spite of having cited other modalities such as content, URLs, inlinks, and outlinks in Heer and proximal information in the Chi (Ex. 2018) paper.’” *Id.* (quoting Ex. 2003 ¶ 113). In other words, Patent Owner and Dr. Martin indicate that proximal information was known and used by PARC researchers, with reference to the Chi paper (Ex. 2018).¹⁰

¹⁰ The title page of this paper and Patent Owner indicate it is prior art, with a publication date of early 2001, published in the March 31–April 5, 2001 issue of Proceedings of ACM CHI 2001 Conference on Human Factors in Computing Systems—i.e., prior to the filing date of the ’475 patent, December 19, 2002. *See* Ex. 2018, 1; PO Resp. iv, 18; Ex. 1001,

This line of argument does not undermine Petitioner’s showing as summarized above, which is persuasively based on the combined teachings of the references with factual underpinnings and an articulated rationale for the combination. Patent Owner’s arguments reduce to the assertion that Petitioner does not show obviousness because there is no anticipatory reference. *See* PO Resp. 49. “Heer, Chi, and the others at PARC . . . ‘did not mention [proximal information with other limitations] in their paper[s].’” (quoting Ex. 2002 ¶ 113). Contrary to this argument and testimony, Petitioner need not show anticipation to show obviousness. As Petitioner also persuasively notes, “this argument is based on a subjective inquiry irrelevant to obviousness.” Reply 12 (citing *Ryko Mfg. Co. v. Nu-Star, Inc.*, 950 F.2d 714, 718 (Fed. Cir. 1991) (“Instead of ascertaining what was subjectively obvious to the inventor at the time of invention, the court must ascertain what would have been objectively obvious to one of ordinary skill in the art at such time.”). This type of subjective analysis in an obviousness inquiry is not only “irrelevant,” relying on it is “erroneous as a matter of law.” *See Amazon.com, Inc. v. Barnesandnoble.com, Inc.*, 239 F.3d 1343, 1364 (Fed. Cir. 2001) (“Whatever Dr. Lockwood did or did not personally realize at the time based on his actual knowledge is irrelevant. The relevant inquiry is what a hypothetical ordinarily skilled artisan would have gleaned from the cited references at the time that the patent application leading to the ’411 patent was filed.” (citing *Kimberly–Clark Corp. v. Johnson &*

code (22). Further describing the paper, Patent Owner contends that “in 2001, Ed Chi, Peter Pirolli, Kim Chen, and James Pitkow published a paper called ‘Using Information Scent to Model User Information Needs and Actions on the Web.’” PO Resp. 14.

Johnson, 745 F.2d 1437, 1453 (Fed.Cir.1984) (discussing the origin and significance of the hypothetical ordinarily skilled artisan in detail)).

Patent Owner also argues that “it is not true that more information is always better, or leads to a more accurate system, in the context of the invention.” PO Resp. 49 (citing Ex. 1002 ¶ 219; Ex. 2003 ¶ 114). At the cited paragraph, Dr. Martin testifies that “a poorly chosen modality can offset a more accurate one.” *Id.* at 50 (quoting Ex. 2003 ¶ 114). Patent Owner relies on an example of an “Outlink modality,” which “performed more poorly than others,” according to a publication that Patent Owner refers to as “Heer and Chi’s 2002 paper.” *Id.* at 50 (citing Ex. 2023, 5, Table 1). In Sur-reply, Patent Owner argues that “[s]imply throwing together a suboptimal system would not drive a POSITA.” Sur-reply 14.

These arguments tend to support Petitioner’s showing that an artisan of ordinary skill would have been able to choose types of information such as proximal information to improve clustering with a reasonable expectation of success using routine methods. *See* Reply 14–15; Pet. 55–57. As the Petition states, “it was well-known that the text associated with (i.e., proximal to) links (and image links) could provide useful information.” Pet. 53. Also, the Petition shows that Heer itself “discloses identifying both hyperlinks and text on a web page.” *Id.* (arguing each web page is represented as a “multi-modal vector that is comprised of four modalities in the current implementation: page content, URLs, inlinks and outlinks” (quoting Ex. 1009, 3)). As the Petition also states, “[a]n ordinarily skilled artisan implementing Heer would thus have appreciated that textual information included within links and image links could provide additional information *to improve the quality of similarity clustering.*” *Id.* at 57. In

other words, Petitioner generally shows that proximal information improves clustering, whereas Patent Owner argues that all types of information do not improve clustering, which does not undermine Petitioner's showing.

So even though Heer generally states that “we believe the practice of utilizing all available information in clustering can significantly improve on more traditional unimodal techniques” (Ex. 1009, 2), this is in the context of an artisan of ordinary skill using information to improve clustering. Given Heer's explicit teachings, as Petitioner argues, an artisan of ordinary skill would “would have been capable of [adding proximal information] in an appropriate manner,” by testing or otherwise, even if the claims require accuracy. *See* Reply 14–15 (citing Ex. 1022 ¶¶ 54, 55, 58).¹¹ Accordingly, as the Petition asserts, modifying Heer's vector clustering system would have been obvious “because such proximal information represents information likely to be relevant to a user's interests.” Pet. 56 (citing Ex. 1002 ¶ 219).

It is worth noting that none of the challenged claims even imply that adding proximal information must improve accuracy, as Petitioner argues. *See* Reply 14 (arguing that “[t]he '475 patent does not recite accuracy as a

¹¹ Patent Owner alleges arguments related to “building and testing” by Petitioner are improper as “not included in the Petition” and “were thus waived.” Sur-reply 31 (citing Reply 14–15). Contrary to this allegation, the Reply properly responds to Patent Owner's arguments that adding proximal information would not have been obvious and that “it is not true that more information is always better.” *See* PO Resp. 49. The Petition posits that adding proximal information to Heer's clustering system would have improved Heer's clustering with a reasonable expectation of success, so that Petitioner's Reply arguments about building and testing fill in gaps in reply to the Response. *See* Pet. 56–57 (citing Ex. 1002 ¶¶ 160–162, 222–223); Reply 13–14.

requirement, or even an advantage, of the system”); *see also In re Self*, 671 F.2d 1344, 1348 (CCPA 1982) (“Many of appellant's arguments fail from the outset because . . . they are not based on limitations appearing in the claims.”). As the specification describes and as noted above, for example, textual items in a proximal link such as “www” and “com” do not appear to provide specific or accurate information about content at a link, yet the ’475 patent describes using such words as proximal cues, further suggesting that the argued accuracy is not a claim feature. *See supra* § I.B (describing the following exemplary link on a web page, <http://www.xerox.com/products/support/index.html>,” wherein “the words http, www, xerox, com, products, support and index are considered as proximal cue words for” that link. (quoting Ex. 1001, 3:55–59)).

In any event, even if accuracy is implicated as a concern as a reason to combine the reference teachings, contrary to Patent Owner’s arguments, Petitioner does not rely on adding Heer’s outlink modality as proximal information, as indicated above. As Petitioner argues, “[a] skilled artisan would have understood that words near or derived from a link could have provided useful information to a system designed to cluster users based on their web browsing behavior.” Reply 13 (citing Ex. 1002 ¶¶ 158–163; Ex. 1022 ¶ 52); *see also* Pet. 56–57 (contending that proximal information improves the quality of clustering).

Patent Owner’s reliance on accuracy regarding outlinks does not undermine Petitioner’s showing based on proximal information. For example, in the cited “Heer and Chi’s 2002 paper” (Ex. 2023), which Patent Owner relies upon (PO Resp. 50, 60), the authors state that “[t]he Outlink vector of a page describes which pages are reachable *from* this page,” and

that “all schemes involving the Outlink modality performed more poorly than others.” Ex. 2023, 3, 5. The ’475 patent verifies that “an outlinks feature vector indicates outward connections or outlinks for each document or web page along the selected user path.” Ex. 1001, 9:9–13. Dr. Martin agrees that “outlinks” are “links pointing from the pages elsewhere.” Ex. 2003 ¶ 42. So even if outlinks do not always provide accurate information for clustering, it is immaterial to Petitioner’s showing, because Petitioner does not rely on such outlinks for the limitation at issue here, “determining proximal information.”

As discussed above (§ II.B, Claim Construction), an outlink is not the same as proximal information, even if there is some overlap in that both involve links pointing to other web pages, according to the ’475 patent specification. *See, e.g.*, Ex. 1001, 8:31–46 (“[P]roximal cue words include for example, the text of the link structure” and “[t]ext surrounding the link structure.”); *compare id.* at 9:11–13 (proximal information), *with id.* at 8:31–46 (outlinks). Unlike a proximal link, the ’475 patent does not describe analyzing text *surrounding* a link to determine an outlink. It is not entirely clear how the ’475 patent tracks or determines outlinks, but as noted above, Dr. Martin contends that “outlinks” are simply “links pointing from the pages elsewhere.” Ex. 2003 ¶ 42. None of the challenged claims explicitly require outlinks and proximal information.

Under this background, the authors of the “Heer and Chi’s 2002 paper” (Ex. 2023) “summarize” by observing that “crawling the site and *using the page content to help cluster user sessions greatly increases algorithm accuracy. This is far from surprising; intuitively, the words that the user sees during each session are good indicators of their information*

need.” *Id.* at 5 (emphasis added). This further signifies that the method as described in “Heer and Chi’s 2002 paper” does not analyze text (or at least text that a user sees) associated with an outlink.

In other words, according to Patent Owner’s cited literature, outlinks, which “describe[] which pages are reachable” and do not necessarily involve ascertaining “content words” that a user sees on a web page, unsurprisingly are not useful in providing accurate clustering. *See* Ex. 2023, 3, 5. In contrast, words on a given page visited by a user include words around a link as a subset thereof, so they are some of “*the words that the user sees during each session [and unsurprisingly] are good indicators of their information need.*” *See id.* at 5 (emphasis added).

Patent Owner also argues that Petitioner fails to “explain[] why Heer’s passing interest in *images* would lead a person of ordinary skill in the art to include information about *links* (and associating that information with the links).” PO Resp. 52 (quoting Ex. 2003 ¶ 120). This generic argument does not identify alleged deficiencies in Petitioner’s specific showing based on specific teachings in the combined references, including Chang and Callihan’s link and textual teachings, and Heer’s teaching of using image descriptive information with as much information as available, as summarized above. For example, as noted above, the Petition shows that “Heer discloses identifying both hyperlinks and text on a web page.” Pet. 53 (citing Ex. 1009, 3). This generally suggests or includes text near a hyperlink on a webpage. And as the Petition notes, Heer states that “the content keywords for a Web page can have their own feature vector (e.g., the frequency of each keyword’s occurrences on that page), which can be combined with feature vectors that describe the images on that page (e.g.,

the color of each pixel). All available information on items is embedded into this single large multi-modal vector space.” *Id.* at 56 (quoting Ex. 1009, 4). In context, the latter catch-all sentence describing “all available information” includes information that describes images and the frequency of key words and hyperlinks, and is not limited to the color of pixels, which Heer indicates is a mere example.

In its Sur-reply, Patent Owner similarly argues that the “Chang and Callihan citations [Petitioner] provides—Ex. 1006 at 54; Ex. 1007 at 136—relate to **images** and **image tags** and not links.” Sur-reply 8. Patent Owner also argues that Chang’s disclosure that “every image on the Web has a unique Web address (URL)” (*id.* (quoting Ex. 1006, 54)), “is where a Web browser will look to retrieve the image so that it can draw the image into the Web page—there is no evidence it is a link to another Web page” (*id.*). These arguments do not account for the combined teachings of the references and the knowledge of the artisan of ordinary skill.

That is, Petitioner persuasively shows that “there is . . . no dispute that words near a link or image link, such as those determined according to Petitioner’s invalidity grounds, would ‘characterize[] the content accessible through that link.’” Reply 7–8 (quoting Ex. 1022 ¶ 38). In support, Petitioner points out that “Patent Owner’s expert acknowledged at his deposition that an ordinarily skilled artisan would have understood this basic principle before the conception date of the ’475 patent.” *Id.* at 8 (citing Ex. 1023, 84:15–87:8). The deposition testimony supports Petitioner. For example, Dr. Martin testifies that “in the late 1990s, a person of ordinary skill in the art would understand well that information that they put around a link on a web page is information that a user of the web page would use in

deciding whether to follow the link or not.” Ex. 1023, 87:5–12. Dr. Martin also testifies that “in the late 1990s, . . . web page designers would often attempt to [surround] links that they put in web pages *with information that concerns the links*.” *Id.* at 85:15–19 (emphasis added). In addition, the Petition quotes Chang as stating that “[t]he ability to link either *text or images to another document* or section of a document makes HTML very powerful.” Pet. 27 (emphasis added) (quoting Ex. 1006, 54); *see also* Pet. 54 (citing Ex. 1006, 54). Contrary to Patent Owner’s arguments, Chang’s disclosure of linking to “another document” suggests another web page. Therefore, even if we adopt Patent Owner’s claim construction to require the proximal information to describe the content at the distal end of the link in the form of images, text, or both, Petitioner persuasively shows that it would have been obvious to an artisan of ordinary skill based on the combined teachings of Heer, Chang, and Callihan.

Patent Owner similarly argues that combining Heer with Chang to suggest proximal information is unsupported because Petitioner’s “reliance on Chang relates to *images* and not *image* links.” Sur-reply 16. This is a new argument directed to Petitioner’s reason for combining Chang with Heer, which Patent Owner does not raise in the Response. *See* Resp. 47–52 (addressing Heer’s disclosure of images and advancing other arguments without addressing Petitioner’s reliance on Chang and Callihan). Therefore, Patent Owner forfeited this particular argument.

In any event, as noted above, even if we consider the argument, it does not account for the combined teachings of the references and the knowledge of the artisan of ordinary skill. The challenged claims do not limit the type of content on a web page at the distal end of a proximal

information link to text (i.e., something other than images). As Petitioner shows, Callihan’s image link . . . includes both the image (square box with stylized ‘Link’) and the accompanying text (‘This is the text’). Pet. 54 (citing Ex. 1007, Fig. 3.16, 135). Callihan describes “standard HTML techniques” and does not limit its teachings of the hypertext link as pointing only to images. *See id.* (citing Ex. 1007, Fig. 3.16, 135). Petitioner quotes Chang for its teaching that “[t]he text close to an image therefore may be useful for characterizing and describing the content of the image,” and “[t]here is a variety of information available on an HTML page to be used as a basis for assigning keywords to images,’ from which key terms and other information can be extracted.” *Id.* (alterations in original) (quoting Ex. 1006, 54). As summarized above, Petitioner persuasively relies on the combined teachings of Heer, Chang, and Callihan and the understanding of an “ordinarily skilled artisan,” contending that such an artisan “implementing Heer would thus have appreciated that textual information included within links and image links could provide additional information to improve the quality of similarity clustering.” *Id.* at 57 (citing Ex. 1002 ¶¶ 222–223). Patent Owner does not dispute that Chang at least shows that artisans of ordinary skill knew that text close to an image would have been useful to characterize and describe image content. *See id.* at 55–56 (citing Ex. 1009, 4, 5; Ex. 1006, 58; Ex. 1002 ¶¶ 159, 220). In addition, as noted above, Chang specifically states that “[t]he ability to link either *text or images to another document* or section of a document makes HTML very powerful.” Ex. 1006, 54 (emphasis added); *see also* Pet. 27 (quoting same), 54 (citing same).

Moreover, as also noted above, Dr. Martin agrees that the concept of describing content at the distal end of a link with words surrounding the link was well-known. *See* Reply 8 (citing Ex. 1023, 84:15–87:8). As Petitioner persuasively shows, Heer teaches that processing text along user paths including text in page content and URLs, and generally using “as much information as we have” helps to describe page content as relevant to user’s interests and to cluster users together. *See* Pet. 55–56 (citing Ex. 1009, 4, 5; Ex. 1006, 58; Ex. 1002 ¶¶ 159, 220). Therefore, the combined teachings and knowledge of an artisan of ordinary skill show that such an artisan would have known that text surrounding a link likely describes content on a web page at the distal end of the link, whether it is an image, text, or both.

Regarding Patent Owner’s requirement for tracking under its claim construction of proximal information (*supra* § II.B), Petitioner notes that Heer’s system includes the ability to weight different modalities. *See* Pet. 51 (quoting Ex. 1009, 5 (“To represent this profile, we build up a feature vector of each Web page, and then construct the profile as a weighted combination of the feature vectors.”); quoting *id.* at 6 (“[W]e construct user profile vectors as weighted combinations of accessed pages.”)). Petitioner also argues “it . . . would have been obvious to adapt Heer such that text surrounding image links is extracted and processed using the techniques applied to the other textual content on a page.” *Id.* at 53. In other words, even if, as Patent Owner argues, proximal information requires “track[ing]” of an association with a link (Sur-reply 6), this tracking is such that the combined system of Heer, Chang, and Callihan treats proximal information differently from other information (e.g., representing it in a vector with other information and/or weighting it).

Petitioner persuasively summarizes that “Heer . . . already record[s] the text and links of the documents in the user path as explained in the Petition.” Reply 10; *see also id.* at 9–11 (discussing storage of links and link information in the prior art based on teachings in Chang). Patent Owner argues in its Sur-reply that Petitioner’s arguments “about Chang (on pages 9–11) are new and were not included in its Petition (*see generally* Petition), and were thus waived.” Sur-reply 9 (emphasis added). Patent Owner does not, however, address the Petition’s and the Reply’s reliance on Heer’s use of vectors for allowing weighting of modalities differently, which is persuasive, as discussed above and further below. *See infra* § II.D.v (addressing combining step and forming and weighting vectors with multi-modal information), II.D.vi (addressing clustering step). In summary, as discussed above, the Petition describes using different modes of information in a vector based on Heer and the combined teachings of the references.¹² To the extent the Reply cites new arguments and evidence about Chang regarding further suggestions for storing of associated link information in Heer’s combined system, the Reply properly fills in gaps in response to Patent Owner’s new claim construction arguments as advanced in the

¹² Patent Owner concedes that the “’475 [p]atent modalities are similar to those in the Heer paper.” Sur-reply 17 (citing Ex. 1009 at 5 (discussing “page content, URLs, inlinks, and outlinks”)). Patent Owner also argues that “it should be clear that the modes [in Heer and the ’475 patent] need to be distinguishable from each other.” *See id.* Patent Owner’s concessions, in combination with its claim construction arguments (*supra* § II.B) that the combining and clustering steps of the challenged claims require tracking, appear to acknowledge that Heer’s similar clustering system discloses or suggests tracking different modalities like the system described in the ’475 patent.

Response and are proper and persuasive, especially where Heer implies or suggests tracking multi-modal information. *See* Reply 9–11.

Based on the record, including after consideration of Patent Owner’s arguments with respect to secondary considerations of nonobviousness as discussed further below, we determine that Petitioner persuasively shows that the combination of Heer, Chang, and Callihan suggests limitation 1c.

v. Limitation 1d

Limitation 1d recites, for each user path, “combining the multi-modal information for content portions and the proximal information for content portions associated with the user path to form a user profile having a unified representation.” Petitioner refers to its showing, including motivation to combine Heer, Chang, and Callihan, regarding limitation 1b (“multi-modal information”) and 1c (“proximal information”). *See* Pet. 57–61. Petitioner acknowledges that Heer does not explicitly teach proximal information as noted with respect to limitation 1c, but contends it would have been obvious to employ it where Heer suggests employing more information “to improve the quality of similarity clustering.” *See* Pet. 57 (addressing limitation 1c).

For example, Petitioner asserts that Heer teaches using “more than . . . four modalities” and “as much information as we have,” as follows:

Heer combines the separate feature vectors representing each source of information about a web page (*i.e.*, multi-modal and proximal information) into a *single multi-modal vector representing a user profile*. (Heer, *e.g.*, pp.3 (“We then model user profiles as multi-modal vectors that are combinations of the pages they have accessed.”), 4 (“Then each modality’s feature vector is combined into a single multi-modal feature vector.”).) The combined vector comprises four modalities: content, URL, inlinks, and outlinks. (Heer, p.5.) However, as explained, the combined multi-modal vector may include additional information and Heer encourages utilizing as much information

as possible to describe each page associated with the user path. (Heer, pp.4 (“The idea . . . is to use as much information as we have on each item to cluster the items.”), 5 (“We can use more than just these four modalities.”), 7 (“By utilizing multi-modal clustering, we are able to include within our representation . . . a myriad of other information.”).)

Pet. 59. Petitioner explains that a single combined vector in Heer is “a unified representation,” as claimed. *See id.* at 59–61. Petitioner also asserts that “[i]mplementing the proposed combination would have been straightforward as proximal information could be represented in the same way as other feature vectors in Heer, *i.e.*, a vector weighted according to [a known technique].” *Id.* at 60 (citing Ex. 1009, 5; Ex. 1002 ¶¶ 228–229).

Patent Owner does not separately address Petitioner’s cited teachings and rationale, but instead relies on its arguments addressed above that Petitioner’s “Heer-based combinations do not disclose or render obvious the “determin[ing/e] proximal information” limitations.” PO Resp. 60. Therefore, according to Patent Owner, “[i]t follows that the art would not ‘combine’ the non-existent proximal information with any multi-modal information.” *Id.*

This argument is not persuasive for the same reasons discussed above regarding the “determining proximal information” limitation. As summarized above, Heer teaches using content, keywords, URLs, image descriptive information, and as much information as available on a web page, all of which, in light of Chang’s and Callihan’s teachings and suggestions, would have suggested adding proximal information to known other information to provide accurate clustering including by weighting. *See* Pet. 51, 55–57 (“An ordinarily skilled artisan implementing Heer would thus have appreciated that textual information included within links and image

links could provide additional information to improve the quality of similarity clustering.”). Therefore, Petitioner persuasively shows that the combined teachings of Heer, Chang, and Callihan teach or suggest tracking proximal and multi-modal information in the form of vectors sub-components or otherwise and combining the information to provide improved and accurate clustering of users based on similarity of interests with a reasonable expectation of success. *See id.*

Based on the record, including after consideration of Patent Owner’s arguments with respect to secondary considerations of nonobviousness as discussed further below, we determine that Petitioner persuasively shows that the combination of Heer, Chang, and Callihan suggests limitation 1d.

vi. Limitation 1e

Limitation 1e recites “clustering multi-modal information and proximal information of user profiles based on similarity.” Petitioner contends that “Heer discloses that the combined multi-modal vectors representing the user profiles are **clustered** to generate Web user types.” Pet. 61 (citing Ex. 1009, 6 (“Once we have these representations of the user surfing activities, we can cluster them into user type categories.”), 7 (“On this last step, we feed the collection of user profile multi-modal vectors into the Wavefront clustering algorithm to generate clusters representing Web user types.”)). As indicated above in connection with limitation 1d, Petitioner sufficiently shows that Heer, Chang, and Callahan, collectively teach combining “multi-modal and proximal information.” *See id.* at 62 (citing Ex. 1002 ¶¶ 233–235). According to Petitioner, Heer uses “multi-modal clustering” to cluster user profiles using K-Means and Wavefront clustering techniques, which clusters “items” based on similarities. *See id.*

(citing Ex. 1009, 6–7; Ex. 1002 ¶¶ 59, 170, 235). Petitioner relies on Heer’s teaching that its clustering techniques allow the system to generate Web user types using “a myriad of . . . information.” *See id.* at 61 (quoting Ex. 1009, 7). As set forth by Petitioner, implementing, combining, and clustering proximal information with other information such as multi-modal information improves the quality of similarity clustering with a reasonable expectation of success. *See id.* at 52–62.

Patent Owner relies on its arguments addressed above with respect to limitations 1c and 1d that Heer does not disclose or suggest proximal information or combining it with multi-modal information. PO Resp. 59–60.

Based on the record, including after consideration of Patent Owner’s arguments with respect to secondary considerations of nonobviousness as discussed further below, we determine that Petitioner persuasively shows that the combination of Heer, Chang, and Callihan suggests limitation 1e.

vii. Secondary Considerations of Nonobviousness

Objective evidence of non-obviousness “may often be the most probative and cogent evidence in the record” and “may often establish that an invention appearing to have been obvious in light of the prior art was not.” *Transocean Offshore Deepwater Drilling, Inc. v. Maersk Drilling USA, Inc.*, 699 F.3d 1340, 1349 (Fed. Cir. 2012) (quoting *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1538 (Fed. Cir. 1983)). Objective evidence may include long-felt but unsolved need, failure of others, unexpected results, commercial success, copying, licensing, and praise. *See Graham*,

383 U.S. at 17–18; *Leapfrog Enters., Inc. v. Fisher–Price, Inc.*, 485 F.3d 1157, 1162 (Fed. Cir. 2007).

“For objective evidence of secondary considerations to be accorded substantial weight, its proponent must establish a nexus between the evidence and the merits of the *claimed invention*.” *Wyers v. Master Lock Co.*, 616 F.3d 1231, 1246 (Fed. Cir. 2010)). “A nexus may not exist where, for example, the merits of the claimed invention were ‘readily available in the prior art.’” *ClassCo, Inc. v. Apple, Inc.*, 838 F.3d 1214, 1220 (Fed. Cir. 2016) (quoting *Richdel, Inc. v. Sunspool Corp.*, 714 F.2d 1573, 1580 (Fed. Cir. 1983)). “Additionally, there is no nexus unless the evidence presented is ‘reasonably commensurate with the scope of the claims.’” *Id.* (quoting *Rambus Inc. v. Rea*, 731 F.3d 1248, 1257 (Fed. Cir. 2013)). “There is no hard-and-fast rule for this calculus, as ‘[q]uestions of nexus are highly fact-dependent and, as such are not resolvable by appellate-created categorical rules and hierarchies as to the relative weight or significance of proffered evidence.’” *Id.* at 1221–1222 (quoting *WBIP, LLC v. Kohler Co.*, 829 F.3d 1317, 1331 (Fed. Cir. 2016) and reasoning that “because claims 2 and 14 are considerably broader than the particular features praised in the articles, it would be reasonable for the Board to assign this evidence little weight”).

“[A] patentee is entitled to a rebuttable presumption of nexus between the asserted evidence of secondary considerations and a patent claim if the patentee shows that the asserted evidence is tied to a specific product and that the product ‘is the invention disclosed and claimed.’” *Fox Factory, Inc. v. SRAM, LLC*, 944 F.3d 1366, 1373 (Fed. Cir. 2019) (quoting *Demaco Corp. v. F. Von Langsdorff Licensing Ltd.*, 851 F.2d 1387, 1392 (Fed. Cir. 1988)). Presuming nexus is not appropriate “[w]hen the thing that is

commercially successful is not coextensive with the patented invention.” *Id.* at 1373 (quoting *Demaco*, 851 F.2d at 1392). Presuming nexus may be appropriate if “the unclaimed features amount to nothing more than additional insignificant features.” *Id.* at 1374.

“A finding that a presumption of nexus is inappropriate does not end the inquiry into secondary considerations”; rather, “the patent owner is still afforded an opportunity to prove nexus by showing that the evidence of secondary considerations is the ‘direct result of the unique characteristics of the claimed invention.’” *Fox Factory*, 994 F.3d at 1374–75 (quoting *In re Huang*, 100 F.3d 125, 140 (Fed. Cir. 1996)). In other words, “[w]ithout the presumption, a patentee may establish nexus by showing the secondary considerations evidence is the ‘direct result of the unique characteristics of the claimed invention,’” *Magseis FF LLC v. Seabed Geosolutions (US) Inc.*, 860 F. App’x 746, 751 (Fed. Cir. 2021) (not for publication) (quoting *Huang*, 100 F.3d at 140), “rather than a feature that was ‘known in the prior art,’” *id.* (quoting *Ormco Corp. v. Align Tech., Inc.*, 463 F.3d 1299, 1312 (Fed.Cir.2006)).

Recently, in *Zaxcom*, the Federal Circuit indicated that *Fox Factory*’s “coextensiveness” requirement is pertinent to the “commensurate in scope” standard regarding the “presumption of nexus.” *See Zaxcom, Inc. v. Lectrosonics, Inc.*, 2022 WL 499843, at *2 (Fed. Cir. 2022). Specifically, *Zaxcom* held that “the Board determined that *Zaxcom*’s evidence of industry praise and long-felt need was entitled to a *presumption of nexus*, noting that these indicia were *commensurate in scope* with the claims as now narrowed, . . . a *determination that comports with the legal standards for a presumption.*” *Id.* (emphasis added) (citing *Fox Factory*, 944 F.3d at 1373;

Polaris Indus., Inc. v. Arctic Cat, Inc., 882 F.3d 1056, 1072 (Fed. Cir. 2018)).

Several cases prior to *Fox Factory* address the commensurate in scope requirement, without specifically addressing the presumption of nexus. Together, the cases suggest that coextensiveness, or the reasonably commensurate in scope requirement, is not met when significant unclaimed features exist. For example, in *MeadWestVaco Corp. v. Rexam Beauty and Closures, Inc.*, 731 F.3d 1258, 1264 (Fed. Cir. 2013), the court held that the district court erred by considering “secondary considerations of non-obvious [that] involved only fragrance-specific uses, but the claims now at issue [i.e., claims 15 and 19] are not fragrance-specific.” The district court erred because it “credited evidence advanced to show long-felt need and commercial success specific to the perfume industry” but some claims at issue “are not limited to fragrance-specific claims.” *See id.* at 1264–65 (reasoning that “objective evidence of non-obviousness must be commensurate in scope with the claims which the evidence is offered to support”) (quoting *Ayst Techs., Inc. v. Emtrak, Inc.*, 544 F.3d 1310, 1316 (Fed. Cir. 2008); *see also In re Law*, 303 F.2d 951, 954 (CCPA 1961) (“Thus, assuming the affidavits are a proper showing of commercial success, they do not show commercial success of dockboards covered by the appealed claims which are not limited to the bead of claim 13.”); *In re Tiffin*, 448 F.2d 791, 792 (CCPA 1971) (finding commercial success and long-felt need with respect to “ ‘cups’ used in vending machines” and “agree[ing] with “[t]he solicitor’s position . . . that the objective evidence of non-obviousness is not commensurate with the scope of claims 1–3 and 10–16,

reciting ‘containers’ generally, but establishes non-obviousness only with respect to ‘cups’ and processes of making them”).¹³

Patent Owner contends that “[s]everal secondary considerations are relevant here.” PO Resp. 61. Patent Owner asserts unexpected results, long-felt need and failure of others, and industry praise. *See id.* at 61–62.

Patent Owner first contends that “the inventors’ results were unexpected and resolved an ongoing need for a better solution.” PO Resp. 61. Patent Owner contends that “no one had previously thought to combine proximal information with multi-modal information for user session clustering as the inventors did.” *Id.* (citing Ex. 2003 ¶ 143). To support its arguments of secondary considerations, Dr. Martin and Patent Owner rely on Exhibit 2023, “Heer and Chi’s 2002 paper,” and Exhibit 2025, entitled “Invention Proposal,” a proposal submitted by the inventors of the ’475 patent to PARC (signed by the inventors on January 11, 2002, about 11 months before the filing date of the ’475 patent). *See id.* (citing Ex. 2003 ¶ 143; Ex. 2023; Ex. 2025); Ex. 2003 ¶ 143 (citing Ex. 2023, 5; Ex. 2025, 2, 5).

Petitioner replies with respect to unexpected results that Patent Owner shows “no results at all, let alone unexpected results.” Petitioner points out that “[i]n the words of the inventors [in the Invention Proposal], their ‘basic idea is that *terms found in and around the links actually traversed by the user* are more likely to represent the actual interests of the user.” Reply 23

¹³ To the extent the “commensurate in scope” cases are not directly on point as to presumption of nexus (notwithstanding the indication in *Zaxcom* that they are), we cite them to show that under similar reasoning, Patent Owner fails to show a presumption of nexus or a nexus, or at most shows a weak nexus.

(emphasis added) (quoting Ex. 2025, 2). And Petitioner points out that Dr. Martin confirms that this “basic idea” “would have been well-understood by an ordinarily skilled artisan before this invention disclosure was submitted.” *Id.* (citing Ex. 1023, 84:10–87:8). Petitioner’s point is persuasive. As noted above, Dr. Martin admits that “in the late 1990s, a person of ordinary skill in the art would understand well that information that they put around a link on a web page is information that a user of the web page would use in deciding whether to follow the link or not.” Ex. 1023, 87:5–12. Dr. Martin also admits that “in the late 1990s, . . . web page designers would often attempt to [surround] links that they put in web pages *with information that concerns the links.*” *Id.* at 85:15–19 (emphasis added). In addition, Heer and Chi’s 2002 paper shows that using content words in general (which includes content words near or around a link) to obtain accurate clustering results is “*far from surprising*; intuitively, the words that the user sees during each session are good indicators of their information need.” Ex. 2023, 5 (emphasis added).

Additionally, it is not clear what specific “unexpected results” Patent Owner relies upon. Patent Owner argues that “as the group found over the years, . . . not all information was actually helpful (e.g., Ex. 2023 at 5), and so it took even more time and work to realize that proximal information was helpful (as noted in the inventors’ invention disclosure, Ex. 2025 at 2, 5).” PO Resp. 60. But as indicated above, using content words to obtain accurate clustering results was not surprising. Therefore, little or no evidence exists to support the conclusory allegation of unexpected results. *See In re Wood*, 582 F.2d 638, 642, 199 USPQ 137, 140 (CCPA 1978) (“Mere lawyer’s

arguments and conclusory statements in the specification, unsupported by objective evidence, are insufficient to establish unexpected results.”).

In addition, Patent Owner admits that using and storing proximal words to predict surfing patterns was known as evidenced by a 2001 publication by Chi, Pirolli, Chen, and Pitkow (Ex. 2018). *See* PO Resp. 15 (noting that certain PARC “authors ‘obtain[ed] the proximal cues that are associated with that link, and put this information into a matrix *K*” (quoting Ex. 2018, 3) and “[t]he authors then used that information to predict user surfing patterns”). In its Sur-reply, Patent Owner contends that Exhibit 2018 “deal[s] with proximal information in a non-clustering context,” and “no evidence exists that anyone ever sought to utilize proximal information as the inventors did.” Sur-reply 13.

Again, this line of argument seeks to impose a requirement of anticipation in an obviousness inquiry. It does not account for the knowledge of the artisan of ordinary skill involved in an obviousness inquiry. Moreover, even though Exhibit 2018 describes using the proximal cues to predict surfing patterns as Patent Owner alleges, the authors note that “users typically forage for information by navigating from page to page along Web links.” Ex. 2018, 2. The authors further state that “[t]he content of pages associated with these links is usually presented to the user by some snippets of text or graphic. Foragers use these proximal cues (snippets; graphics) to assess the distal content (page at the other end of the link).” *Id.* Also, these authors rely on the same “IUNIS algorithm” as Heer (Ex. 1009), which “does not depend on the fact that the user path actually contains the information that the user is seeking, but merely that it contains the *kind* of information that the user is seeking.” *Id.* at 7. In Heer (Ex. 1009), the

inventors describe a similar goal to that of Exhibit 2018, namely “a method to discover major types of information goals of Web surfers automatically,” and “[a]s part of this technique,” using “Multi-Modal Clustering (MMC), the Longest Repeating Subsequences (LRS), and Inferring User Need by Information Scent (IUNIS) algorithms to extract significant user paths from the Web server logs, and then we represent these user path profiles using multi-modal vectors that encompass various sources of information, including Content, Topology, and URL.” Ex. 1009, 1. That both papers describe using similar IUNIS algorithms to further similar goals of providing predicted sought-after information to Web users further shows that artisans of ordinary skill would have known that there was nothing surprising about using proximal information with other information to obtain accurate clustering in the manner claimed.

Patent Owner relies on Dr. Martin’s testimony that “[t]hat the inventors and their colleagues continued to publish in the area for years—while journals and other mediums accepted their publications—shows that there was an unresolved need for a better solution.” PO Resp. 61 (quoting Ex. 2003 ¶ 145). Patent Owner relies on dates of publications from “PARC and Xerox” starting from 1997. *See id.* at 9 (citing Ex. 2026). This alleged unsolved need relates to publications by a limited number of artisans over about four to five years from the date of the invention (2002). Moreover, it is not clear how these “journals and other mediums accept[ing] their publications” serve to demonstrate that a persistent long-felt need existed that artisans of ordinary skill recognized. In addition, Patent Owner describes “the inventors and their colleagues” as “extraordinarily skilled individuals.” PO Resp. 61. Further, apart from a generic allegation of a

need for a “better solution,” Patent Owner fails to identify with specificity what the long-felt need was, or how the publications addressed these needs. *See id.*

The Invention Proposal relied upon by Patent Owner indicates that any alleged surprising results or solutions to long-felt need are not commensurate in scope with the claimed invention. Therefore, there is little or no evidence to support a presumption of nexus or nexus. For example, the Invention Proposal states that “[i]n both cases [of combining weighted proximal information with 1) content modality and 2) content modality and inlink], we see that *weighting the proximal scent terms* improves the accuracy of the method.” Ex. 2025, 5 (emphasis added); *see also* PO Resp. 26 (discussing and quoting the same passage).¹⁴ However, none of the challenged claims requires any weighting, let alone the specific weighting technique described in the Invention Disclosure.

Therefore, the challenged claims are not commensurate in scope with the alleged evidence, indicating a lack of nexus. *See MeadWestVaco Corp.*, 731 F.3d at 1264 (holding it is error to consider “secondary considerations of

¹⁴ The “accuracy” pertains to showing fewer instances of user misclassifications (i.e., 3) in the cases using “Weighted Proximal” information as compared to the cases using “Proximal Only” and “No Proximal” information. *Id.* at 5. Patent Owner’s expert calculates this use of (weighted) proximal information as providing 97.1 % accuracy (104–3)/104, because only 3 users out of 104 were misclustered. *See* PO Resp. 26 (citing Ex. 2003 ¶ 59; Ex. 2025, 5); *see also id.* at 27 (similar). However, this alleged “accuracy” is less than the “99%” accuracy obtained from prior experiments that involved “choosing the correct data modalities and weighting schemes.” Ex. 2025, 4–5 (citing “[Heer02]”); *see id.* at 1 (describing “[Heer02]” as “a previous evaluation [that] suggests that these techniques work quite well” but involving “data models” that are “quite large”).

non-obvious [that] involved only fragrance-specific uses, but the claims now at issue [i.e., claims 15 and 19] are not fragrance-specific”); *cf. Zaxcom*, 2022 WL 499843, at *2 (holding that “the Board determined that Zaxcom’s evidence of industry praise and long-felt need was entitled to a presumption of nexus, noting that these indicia were commensurate in scope with the claims as now narrowed, . . . a determination that comports with the legal standards for a presumption”).

More specifically, the Invention Proposal states that “the proximal scent terms are given *an additional weighing proportional to the term frequency within the link region.*” Ex. 2025, 5 (emphasis added). “This idea is to make the proximal terms ‘stand out’ in the data.” *Id.* As determined above, the challenged claims do not require determining the term frequency of the proximal words, let alone weighting them so that the proximal words “stand out” in the data.¹⁵ Moreover, describing a previous experiment that

¹⁵ In addition, challenged claims 1 and 10, which recite “determining proximal information for content portions *associated with the user paths,*” do not require that the user actually follows or presses the proximal information link and then arrives at the next web page (which would be on the user path), whereas the Invention Proposal indicates this traversal is part of the Invention Proposal. *See id.* at 3 (“For each page a user accesses, we look up to see if we have stored any proximal scent information for the current source page *and the subsequent page the user visited.*”). Of course, as the Invention Proposal indicates, visiting a web page indicates user interest in that page. Challenged claims 1 and 10 do not *require* such visitation or accounting for it. Claim 2 further limits determining proximal information by reciting it includes “analyzing portions of a text associated with a link between content portions along the user path.” This appears to require that the proximal link cannot be on the last web page visited on the user path (because it is between content portions (or pages) along the user path), but it does not explicitly require pressing the proximal link, visiting

did not involve proximal information, the Invention Proposal states that the previous experiment was “*quite encouraging; by choosing the correct data modalities and weighting schemes* were able to achieve categorization accuracies *as high as 99%!*” *Id.* at 4–5 (emphasis added); *see also* PO Resp. 25 (referring to this previous experiment); *supra* note 14 (similarly describing “[Heer02]” in connection with the previous experiment). The Invention Proposal does not show that using proximal information provided anything surprising in the way of accuracy or otherwise, where Dr. Martin calculates a 97.1% accuracy when combining proximal scent information with content and inlink modality (*supra* note 14), but the noted prior experiments that the Invention Proposal describes show that an appropriate weighting for known data modalities achieved “categorization accuracies as high as 99%!”—i.e., without any proximal cues. Ex. 2025, 5; *see also* PO Resp. 25 (recognizing that the Invention Proposal describes the “previous experiment” as “quite successful” (quoting Ex. 2025, 5)).

And as discussed above, “Heer and Chi’s 2002 paper” (Ex. 2023) observes that “Inlink and Outlink performed poorly on their own.” Ex. 2023, 5. The authors “summarize” by observing that “crawling the site and *using the page content to help cluster user sessions greatly increases algorithm accuracy. This is far from surprising; intuitively, the words that the user sees during each session are good indicators of their information need.*” *Id.* Patent Owner’s citations reveal that there is nothing surprising about words on a web page, which includes words surrounding or within a link, being “good indicators” of an information need.

the next page at the distal end of the link, and then recording that visitation. Patent Owner does not argue claim 2 separately.

With further respect to the alleged long-felt need and failure of others, as Petitioner argues, Patent Owner does not establish a nexus. *See* Reply 23–24. As Petitioner argues, Patent Owner appears to rely on the allegation that other researchers at PARC did not arrive at the same invention, but this is not objective evidence of nonobviousness. *See id.* Patent Owner’s assertion of the resolution of “an ongoing need for a better solution” (PO Resp. 61) fails to show that that claimed determining and use of proximal information with multi-modal information, in the absence of weighting proximal cue words and/or other features noted in the Invention Proposal (e.g., traversal of the proximal information link), contributes to accuracy of clustering or provides a better solution. *See, e.g., supra* note 14 (noting that in general, choosing proper weighting for different modalities provides accuracy) (citing Ex. 2025)).

Patent Owner also argues that “the U.S Navy recognized the value of the research being done by the inventors and their colleagues.” PO Resp. 62 (citing Ex. 2003 ¶ 147). Patent Owner states that “[s]pecifically, as the ’475 Patent and the teams’ 2001 patent application note, the U.S. Office of Naval Research was funding the inventors’ research, which led to that entity getting a governmental license.” *Id.* (citing Ex. 2019 ¶ 2; Ex. 1001, 1:8–12).

However, as Petitioner notes, Patent Owner does not show a nexus between the funding and the claimed invention. *See* Reply 24. Rather, Petitioner shows that “to the extent the Naval Research funding shows ‘praise’ at all, that praise would also apply equally to the Heer prior art cited in Ground 2, which [was] funded by the exact same naval grant.” *See id.* at 25; *compare* Ex. 1009, 12 (citing Office of Naval Research Contract N00014-96-C-0097) *with* the ’475 patent, 1:8–12 (same).). Petitioner

supports this argument by noting that Heer refers to funding under the same Office of Naval Research Contract (N00014-96-C-0097) to Peter Pirolli and Stuart Card, i.e., “other PARC researchers not named on the ’475 patent.” *Id.* (citing Ex. 1009, 12). The funding of others under the same contract to perform research outside the scope of the claimed invention indicates no presumption of nexus, no nexus, or at most, a weak nexus, with respect to any alleged praise based on funding.

Patent Owner does not explain the significance of the “governmental license” in relation to the claimed invention and fails to show a nexus. *See* PO Resp. 62. Patent Owner indicates that the license is part of the consideration for the funding by the U.S. Office of Naval Research under the contract. *See id.*; 2019 ¶ 2. Exhibit 2019, cited by Patent Owner, is a copy of U.S. Patent App. Pub. No. 2002/0143802 (the ’802 patent publication”) to listed inventors Chi and Chen (filed Mar. 30, 2001). It lists the same U.S. Patent Office of Naval Research Contract N00014-96-C-0097, the same contract as noted above. *See* Ex. 2019 ¶ 2. In its Sur-reply, Patent Owner cites Exhibit 2019 as showing a nexus due to the “governmental license,” but concedes the “funding may have come earlier” (Sur-reply 24), apparently in response to Petitioner’s argument that no nexus to the claimed invention exists because “the funding was provided prior to Patent Owner’s claimed conception date [i.e., Dec. 19, 2002,] for the ’475 patent” (Reply 24–25). Patent Owner’s explanations fail to show how the license (or contract) has a nexus to the claimed invention of the ’475 patent, given that the Office of Naval Research awarded funding and obtained the same license as part of the “invention” of the ’802 patent publication (i.e., the license for the “invention . . . as provided for by the terms of Contract No. N00014-96-

C-0097 awarded by the Office of Naval Research”). Ex. 2019 ¶ 2.¹⁶ As Petitioner essentially argues, this contract and license arose prior to the claims of the ’475 patent.¹⁷

Finally, a license generally pertains to evidence of commercial success, not industry praise. *See, e.g., Iron Grip Barbell Co. v. USA Sports, Inc.*, 392 F.3d 1317, 1324 (Fed. Cir. 2004) (“Our cases specifically require affirmative evidence of nexus where the evidence of commercial success presented is a license, because it is often ‘cheaper to take licenses than to defend infringement suits.’” (quoting *EWP Corp. v. Reliance Universal Inc.*, 755 F.2d 898, 908 (Fed. Cir. 1985))). Patent Owner does not allege commercial success.

viii. Summary

As indicated above, the record shows that no presumption of nexus exists and no nexus exists. Even if some weak nexus exists, Petitioner’s showing of obviousness outweighs the evidence of nonobviousness. On the full record, after weighing the arguments and evidence, including evidence

¹⁶ Patent Owner amended the specification during prosecution of the ’475 patent on February 17, 2006 to include the contract and licensing information and also amended the claims to place them in condition for allowance (i.e., in their as-issued form). *See* Ex. 1010, 3 (Notice of Allowability); 15–23 (Supplemental Amendment).

¹⁷ Claim 1 of the ’802 patent publication recites, *inter alia*, “determining the connection topology of the collection of content portions, for each connection determined, determining proximal information cue words associated with each connection,” and “storing at least one of the proximal information cue words based on the connection.” Ex. 2019, 13. These claims specifically recite storing proximal information and do not recite clustering or other multi-modal information. Patent Owner does not argue that any overlap or similarities between the claims of the ’802 patent publication and the ’475 patent claims shows a nexus.

of secondary considerations of nonobviousness, we determine that Petitioner shows by a preponderance of evidence that claims 1 and 10 would have been obvious over the combination of Heer, Chang, and Callihan.

b. Claims 2, 3, 5, 7, 11, 12, 15, and 16

Petitioner presents evidence and argument in support of its contentions that dependent claims 2, 3, 5, 7, 11, 12, 15, and 16 would have been obvious over the combination of Heer, Chang, and Callihan. Pet. 62–65, 67–68. A review of the record reveals that the Petition provides persuasive evidence and rationale to support its challenges. *See id.* Patent Owner does not contest these claims separately. *See generally* PO Resp.

Accordingly, after weighing the arguments and evidence, including evidence of secondary considerations of nonobviousness, we determine that Petitioner persuasively demonstrates by a preponderance of evidence that claims 2, 3, 5, 7, 11, 12, 15, and 16 would have been obvious over the combination of Heer, Chang, and Callihan.

III. CONCLUSION

For the reasons discussed above, Petitioner has shown by a preponderance of the evidence that claims 1–3, 5, 7, 10–12, 15, and 16 of the '475 patent are unpatentable as summarized in the table below.

Claims	35 U.S.C. §	Reference(s)/Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
1–3, 5, 7, 10–12, 15, 16	103	Konig, Millhollon, Chang, Callihan, Viswanathan ¹⁸		

¹⁸ As noted above, we do not reach the Konig-based grounds given our determination of obviousness over the Heer-based grounds.

1–3, 5, 7, 10–12, 15, 16	103	Heer, Chang, Callihan	1–3, 5, 7, 10– 12, 15, 16	
Overall Outcome			1–3, 5, 7, 10– 12, 15, 16	

IV. ORDER

Accordingly, it is

In consideration of the foregoing, it is hereby

ORDERED that Petitioner has shown that challenged claims 1–3, 5, 7, 10–12, 15, and 16 are unpatentable; and

FURTHER ORDERED that, because this is a Final Written Decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.¹⁹

¹⁹ Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner’s attention to the April 2019 Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding. *See* 84 Fed. Reg. 16654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. *See* 37 C.F.R. §§ 42.8(a)(3), (b)(2).

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