

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

FACEBOOK, INC.,
Petitioner,

v.

PALO ALTO RESEARCH CENTER LLC,
Patent Owner.

IPR2021-01467
Patent 8,606,781 B2

Before KARL D. EASTHOM, DANIEL J. GALLIGAN, and
CHRISTOPHER L. OGDEN, *Administrative Patent Judges*.

GALLIGAN, *Administrative Patent Judge*.

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

I. INTRODUCTION

In this *inter partes* review, Facebook, Inc. (“Petitioner”) challenges the patentability of claims 1–36 of U.S. Patent No. 8,606,781 B2 (“the ’781 patent,” Ex. 1001), which is assigned to Palo Alto Research Center LLC (“Patent Owner”).

We have jurisdiction under 35 U.S.C. § 6. This Final Written Decision, issued pursuant to 35 U.S.C. § 318(a), addresses issues and arguments raised during the trial in this *inter partes* review. For the reasons discussed below, we determine that Petitioner has proven by a preponderance of the evidence that claims 1–36 of the ’781 patent are unpatentable. *See* 35 U.S.C. § 316(e) (2018) (“In an *inter partes* review instituted under this chapter, the petitioner shall have the burden of proving a proposition of unpatentability by a preponderance of the evidence.”).

A. Procedural History

Petitioner filed a Petition (Paper 2, “Pet.”) challenging claims 1–36 of the ’781 patent on the following grounds:

Claims Challenged	35 U.S.C. §	References/Basis
1–16, 19–34	103(a)	Konig, ¹ Manber, ² Van Vleet ³
10–12, 28–30	103(a)	Konig, Manber, Van Vleet, Khan ⁴
17, 18, 35, 36	103(a)	Konig, Manber, Van Vleet, Cradler ⁵

¹ US 6,981,040 B1, issued Dec. 27, 2005 (Ex. 1003).

² Udi Manber et al., “WebGlimpse – Combining Browsing and Searching,” *USENIX 1997 Annual Technical Conference* (Ex. 1004).

³ US 7,565,425 B2, issued July 21, 2009 (Ex. 1005).

⁴ US 6,546,393 B1, issued Apr. 8, 2003 (Ex. 1007).

⁵ Dan Cradler, *Hacker’s Guide to Navigator* © 1997 (Ex. 1006).

Pet. 3. Patent Owner filed a Preliminary Response. Paper 8. We instituted trial on the asserted grounds of unpatentability. Paper 10 (“Inst. Dec.”) at 17.

During the trial, Patent Owner filed a Response (Paper 18, “PO Resp.”), Petitioner filed a Reply (Paper 21, “Pet. Reply”), and Patent Owner filed a Sur-reply (Paper 24, “PO Sur-reply”).

An oral hearing was held on December 7, 2022, a transcript of which appears in the record. Paper 32.

Petitioner relies on testimony from Dr. Edward A. Fox. Exs. 1002 (Declaration), 1017 (Reply Declaration). Patent Owner relies on testimony from Dr. David Martin. Ex. 2003. The parties have entered in the record transcripts of the depositions of these declarants. Exs. 2010 (Fox First Deposition), 2012 (Fox Second Deposition), 1018 (Martin Deposition).

B. Real Parties in Interest

Petitioner identifies itself as the real party in interest. Pet. 1. Patent Owner identifies itself, Xerox Corp., and Xerox Holdings Corp. as real parties in interest. Paper 4 at 2; Paper 30 at 1 (noting change of name from Palo Alto Research Center Inc. to Palo Alto Research Center LLC).

C. Related Matters

As required by 37 C.F.R. § 42.8(b)(2), the parties identify various related matters. Pet. 1; Paper 4 at 2–3.

D. The ’781 Patent and Illustrative Claim

The ’781 patent is generally directed to techniques for providing personalized search results to a user. Ex. 1001, code (57). Claims 1 and 19 are the only independent claims. Claim 1 is illustrative and is reproduced below.

1. A method for personalized search comprising the steps of:
 - receiving a query from a user;
 - identifying the user;
 - retrieving a user history for the user comprising access patterns identifying linked information elements previously accessed by the user within an information repository;
 - identifying a user profile comprising keywords relevant to the access patterns in the user history;
 - determining a proximal neighborhood using the user history in the user profile, wherein the proximal neighborhood comprises only linked information elements previously unseen by the user that are within a threshold distance of the linked information elements in the user history; and
 - applying the query to the unseen linked information elements in the proximal neighborhood and determining search results comprising the unseen linked information elements that match the query.

II. ANALYSIS

A. *Principles of Law*

A patent claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter 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. *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) any secondary considerations, if in evidence. *Graham v. John Deere Co. of Kan. City*, 383 U.S. 1, 17–18 (1966).

B. Level of Ordinary Skill in the Art

Citing the testimony of its declarant, Edward A. Fox, Ph.D., Petitioner contends that a person of ordinary skill in the art “would have possessed at least a bachelor’s degree in electrical engineering or computer science, and at least two years of experience in systems for search, retrieval, and processing of information, such as web pages obtained over the Internet.” Pet. 4–5 (citing Ex. 1002 ¶¶ 18–23).

In the Institution Decision, we accepted Petitioner’s uncontested assessment of the level of ordinary skill, except that we deleted the qualifier “at least” to eliminate vagueness as to the amount of education and experience. Inst. Dec. 5. Patent Owner applies this level of skill in its analysis. PO Resp. 7–8 (citing Inst. Dec. 5).

Thus, Petitioner’s proposed level of skill in the art, as qualified in the Institution Decision, is uncontested. We apply this skill level, as the references of record and the ’781 patent support it.

C. Claim Construction

We interpret claim terms using “the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. 282(b).” 37 C.F.R. § 42.100(b) (2021).

Both parties assert that there are no claim construction issues that need to be addressed to resolve the patentability challenges. Pet. 9; PO Resp. 11. We agree that no claim terms require express construction. *See Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019) (“The Board is required to construe ‘only those 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))).

*D. Obviousness over
Konig, Manber, and Van Vleet
(Claims 1–16, 19–34)*

Petitioner asserts that claims 1–16 and 19–34 are unpatentable under 35 U.S.C. § 103(a) over the combined teachings of Konig, Manber, and Van Vleet. Pet. 3, 12–59. Patent Owner opposes. PO Resp. 12–33; PO Sur-reply 1–13.

1. Overview of the Prior Art

Konig “relates generally to methods for personalizing a user’s interaction with information in a computer network” and more particularly “to methods for predicting user interest in documents and products.” Ex. 1003, 1:13–18.

Manber is a publication that discusses a software product called WebGlimpse that allows a web search to be limited to a certain “neighborhood.” Ex. 1004, 7 (p. 195).⁶ Petitioner presents evidence that Manber was published before the earliest possible effective filing date for the ’781 patent. *See* Pet. 9 (citing Ex. 1009 ¶¶ 39–44).

Van Vleet relates to storing information from a user’s web browsing sessions. Ex. 1005, code (57). Van Vleet discloses using information from previous web browsing sessions to restrict the scope of a search to items not previously viewed by a user. Ex. 1005, 11:54–58.

We discuss additional pertinent details of the references below.

⁶ For this and other non-patent references, we cite the exhibit page numbers followed parenthetically by a reference’s internal page numbers when they are different.

2. *Claim 1*

a) Preamble and steps of “receiving a query” and “identifying the user”

Petitioner contends that “Konig discloses a ‘Personal Search’ feature that performs a personalized search” and therefore, teaches a “method for personalized search,” as recited in the preamble. Pet. 12 (citing Ex. 1003, 7:48–50, 27:13; Ex. 1002 ¶ 95). Patent Owner does not dispute this contention. Petitioner’s contention for the preamble is persuasive, and we find Konig teaches this subject matter.⁷ See Ex. 1003, 27:13–15 (“Personal Search[.] In this application, both the collection and filtering steps of searching are personalized.”).

For the step of “receiving a query from a user,” Petitioner relies on Konig’s disclosure of a user submitting a query. Pet. 12–13 (citing Ex. 1003, 7:46–50, 27:42–45; Ex. 1002 ¶ 96). Patent Owner does not dispute this contention. Petitioner’s contentions for this step are persuasive, and we find Konig teaches this subject matter. See Ex. 1003, 7:46–48 (“Client 18 performs a search using Personal Web 12 by submitting a query and receiving personalized search results.”).

For the step of “identifying the user,” Petitioner argues that Konig’s disclosures of finding documents of interest to the user teach that the user is identified. Pet. 13–14 (citing Ex. 1003, 9:40–42, 27:15–17, 27:30–41, 27:45–48, 27:55–28:17; Ex. 1002 ¶¶ 96–98). Patent Owner does not dispute this contention. Petitioner’s contention for this step is persuasive, and we

⁷ Because we determine that the cited evidence supports Petitioner’s undisputed contentions regarding the preamble, we need not decide whether the preamble is limiting.

find König teaches this subject matter. *See* Ex. 1003, 27:15–17 (disclosing that a “set of documents of interest to the user is collected”).

b) “Retrieving a user history”

The next step of claim 1 recites “retrieving a user history for the user comprising access patterns identifying linked information elements previously accessed by the user within an information repository.” Petitioner relies on König’s disclosure relating to a user’s previous browsing history to teach this subject matter. Pet. 14–18 (citing Ex. 1003, 5:15–18, 7:27–31, 8:46–67, 17:19–30, 17:33–40, 27:21–24; Ex. 1002 ¶¶ 100–112, 129). More particularly, Petitioner argues that a user’s browsing history shows access patterns and that the web pages previously accessed by a user “are linked and accessible via URLs,” i.e., “linked information elements,” as recited in claim 1. Pet. 16–17 (citing Ex. 1003, 17:33–40; Ex. 1002 ¶¶ 107–108, 110; Ex. 1001, 5:34–38). Petitioner also argues that websites from which the web pages are accessed are an “information repository.” Pet. 17 (citing Ex. 1002 ¶¶ 111–112; Ex. 1001, 1:18–20, claim 6). Patent Owner does not dispute these contentions. Petitioner’s contentions for this step are persuasive, and we find König teaches this subject matter. *See* Ex. 1003, 17:33–40 (“The Internet Temporary folder contains all of the web pages that the user has opened recently (e.g., within the last 30 days). . . . [T]he history file contains links to all pages that the user has opened within a set time period.”).

c) “Identifying a user profile”

Claim 1 next recites “identifying a user profile comprising keywords relevant to the access patterns in the user history.” Petitioner argues that König’s “User Model” and the user history information discussed for the

preceding limitation together teach the claimed “user profile.” Pet. 18–19 (citing Ex. 1003, 3:48–51, 7:48–50, 17:19–40, 27:20–23; Ex. 1002 ¶¶ 114–115). Petitioner contends that Konig’s Figure 13 shows how documents accessed by a user are parsed to identify keywords, which are then stored in the User Model. Pet. 19–23 (citing Ex. 1003,⁸ 5:15–18, 6:13–14, 7:48–50, 10:52–55, 17:19–40, 17:48–18:16, 27:21–24, 27:33–34, 27:45–46, 27:55–56, Figs. 4A, 13; Ex. 1002 ¶¶ 101–102, 116–120; Ex. 1001, 6:40–45). Patent Owner does not dispute these contentions. Petitioner’s contentions for this step are persuasive, and we find Konig teaches this subject matter. For example, Konig discloses that “[t]he personal search feature collects, indexes, and filters documents, and responds to the user query, all based on the user profile stored in the User Model.” Ex. 1003, 7:48–50. Konig discloses how the “User Model” is initialized and updated with reference to Figure 13, explaining that “documents 80 are parsed and separated into text, images and other non-text media 88, and formatting” and that “[f]urther processing is applied to the text, such as stemming and tokenization to obtain a set of words and phrases 86.” Ex. 1003, 17:55–60. Konig explains that “user informative words or phrases 98 are obtained from document words and phrases 86.” Ex. 1003, 18:9–11.

d) “Determining a proximal neighborhood”

Claim 1 further recites “determining a proximal neighborhood using the user history in the user profile, wherein the proximal neighborhood

⁸ Page 19 of the Petition includes the following citation: “’781, e.g., 5:15-18, 17:19-40.” Based on the context, we view the reference to the ’781 patent as a typographical error. For example, column 17 of the ’781 patent ends at line 21 with dependent claim 29. Thus, we understand these citations to refer to Konig.

comprises only linked information elements previously unseen by the user that are within a threshold distance of the linked information elements in the user history.” Petitioner relies on a combination of the references’ disclosures to teach this subject matter. Pet. 23–34. Patent Owner argues that Petitioner has not shown the “previously unseen” and the “threshold distance” aspects of this subject matter. PO Resp. 12–33. We address each below.

(1) “Previously unseen”

Petitioner argues that König teaches a proximal neighborhood having only information previously unseen by the user. Pet. 23–28 (citing Ex. 1003, 27:14–41, 24:52–54, 24:60–61, Fig. 18; Ex. 1002 ¶¶ 106, 109, 122–132; Ex. 1001, 5:57–62, Fig. 4). More particularly, Petitioner relies on certain steps in König’s Figure 18, which is reproduced below.

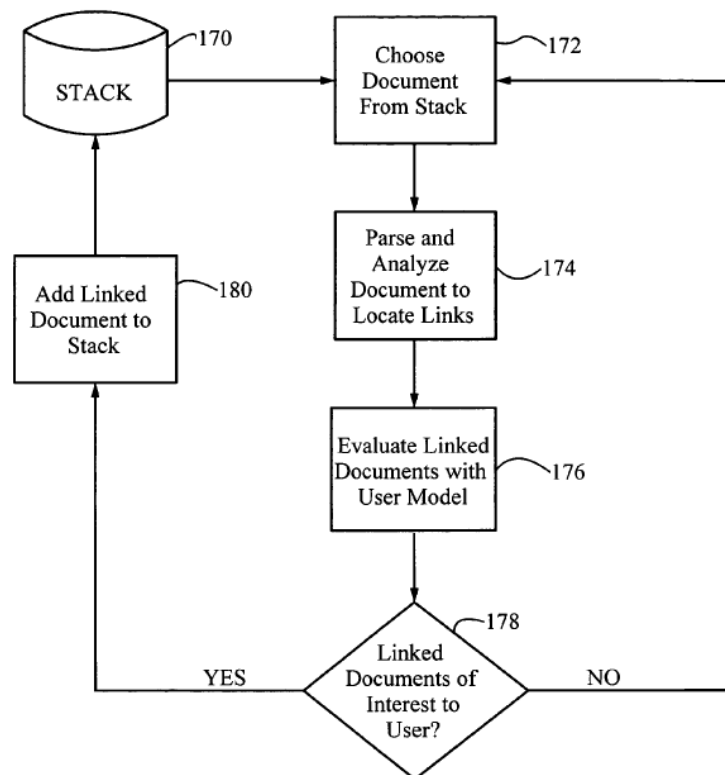


Fig. 18

Konig's Figure 18, reproduced above, is a block diagram showing how documents of interest to a user are collected by what Konig calls the "Personal Crawler." Ex. 1003, 27:15–21. Konig explains that "stack 170 is initialized with documents of high interest to the user, such as documents in the bookmarks file or documents specified by the user." Ex. 1003, 27:21–24. Petitioner contends, therefore, that stack 170 includes the documents in the "user history" discussed above. Pet. 25 (citing Ex. 1002 ¶¶ 122–123). Konig further explains the operation of the Personal Crawler in Figure 18 as follows:

In step 172, the crawler selects a document from the top of the stack to begin crawling. The document is parsed and analyzed (step 174) to identify any links to other documents. If there are links to other documents, each linked document is scored using the User Model (176). If the linked document is of interest to the user (178), i.e., if $P(u|d)$ exceeds a threshold level, then it is added to the stack in step 180, and the crawler continues crawling from the linked document (step 172). If the document is not of interest to the user, then the crawler selects the next document on the stack to continue crawling.

Ex. 1003, 27:30–41. Konig defines " $P(u|d)$ " as the "probability . . . that a document is of interest to the user." Ex. 1003, 4:31–34. Petitioner argues that steps 174–178 create a "proximate neighborhood" because they result in "a set of documents determined to be interesting to the user according to the User Model." Pet. 26 (citing Ex. 1002 ¶ 125). Petitioner further argues that Konig's disclosure of applying $P(u|d)$ only to unseen documents teaches that "the proximal neighborhood comprises only linked information elements previously unseen by the user," as recited in claim 1. Pet. 27–28 (citing Ex. 1003, 24:52–54, 24:60–61, 27:35–36; Ex. 1002 ¶¶ 131–132).

Patent Owner argues that Petitioner's contentions fail because König "never expressly limits P(u|d) to just unseen documents." PO Resp. 13–14 (citing Ex. 1003, 4:31–34, 5:34–47, 9:40–46, 9:62–66, Fig. 3; Ex. 2003 ¶¶ 67–68, 70–71); *see also* PO Resp. 12–19 (additional arguments that König is not limited to unseen documents). We disagree with Patent Owner. König states that the "term P(u|d) represents the user interest in the document regardless of the current information need, and is calculated using the User Model." Ex. 1003, 28:10–12. König further states that each linked document is scored using the User Model in step 176 of Figure 18 and that the "User Model is applied to *unseen documents* to determine the probability that a document is of interest to the user, or the probability that a document is of interest to a user in a particular context." Ex. 1003, 27:33–34, 24:53–56 (emphasis added). Thus, we find that König discloses limiting the P(u|d) calculation to only unseen documents.

Petitioner also argues that the "previously unseen" aspect of claim 1 would have been obvious in view of Van Vleet's disclosures of using an event history to limit a search to items that a user has not previously seen. Pet. 28 (citing Ex. 1005, code (57), 1:67–2:5, 10:25–28, 11:55–56; Ex. 1003, 17:46–49, 27:14–15; Ex. 1002 ¶¶ 134–140). For example, Van Vleet discloses an event history system that stores information, such as URLs selected by a user, from browsing sessions. Ex. 1005, code (57), 1:66–2:5. Van Vleet explains that a personalized search application can use this data to allow a "user to restrict the scope of the search to items previously viewed, *items not previously viewed*, or items viewed within a particular time period (e.g., the last seven days)." Ex. 1005, 10:25–28, 11:54–58 (emphasis added). Petitioner argues that it would have been obvious to a person of

ordinary skill in the art to combine the teachings of Van Vleet and Konig so that “the Personal Crawler of Konig [is] adapted to restrict the scope of documents added to the stack to those previously unseen by the user.”

Pet. 29 (citing Ex. 1002 ¶ 136). According to Petitioner, a person of ordinary skill in the art “would have appreciated that unseen documents are likely to be more relevant and interesting to the user because the user has not previously seen them,” which would have furthered Konig’s goals of providing personalized searches and which is consistent with Konig’s own disclosure of identifying unseen documents. Pet. 29–30 (citing Ex. 1002 ¶¶ 138–140; Ex. 1003, 17:46–49, 27:14–15).

Patent Owner disputes Petitioner’s obviousness contentions based on Van Vleet. PO Resp. 20–24. Patent Owner argues that Van Vleet does not teach determining a set of unseen documents but, rather, runs a query against a set of documents and then allows filtering to hide previously viewed documents. PO Resp. 20–21 (citing Ex. 1005, 11:54–61; Ex. 2003 ¶¶ 87–89). This characterization of Van Vleet, however, is consistent with Petitioner’s contentions, which simply rely on Van Vleet’s teachings of restricting a search to items not previously viewed by a user. Pet. 28–30. Petitioner argues that it would have been obvious to restrict the documents that Konig’s Personal Crawler adds to the stack of documents in steps 174–180 of Figure 18 to those that have not been previously viewed. Pet. 29–30. Petitioner does not assert that Van Vleet alone teaches the “proximal neighborhood” subject matter of claim 1.

Patent Owner also argues that Petitioner’s rationale to combine falls short because Petitioner “does not explain why personalization requires results to be unseen” and because “there are situations where users may be

more interested in documents they have seen.” PO Resp. 21–23 (citing Ex. 2003 ¶¶ 91–99). We find Petitioner’s reasoning to combine persuasive. As discussed above, Konig already discloses applying its User Model to unseen documents. Ex. 1003, 24:53–56, 27:33–34. Van Vleet’s disclosure of limiting a search to items not previously viewed by a user simply underscores that there are situations in which users would want to see only unseen documents in search results, even if there are other situations in which seen documents would be desirable as well, as Patent Owner asserts. See PO Resp. 21–22.

Therefore, in addition to agreeing with Petitioner’s contention that Konig’s disclosures teach limiting the documents to those unseen by the user, we agree with Petitioner’s additional contention that Konig in combination with Van Vleet teaches this limitation.

(2) “*Threshold distance*”

Petitioner argues that the combination of Konig and Manber teaches linked information elements “that are within a threshold distance of the linked information elements in the user history.” Pet. 30–34 (citing Ex. 1004, 7 (p. 195), 9–10 (pp. 197–98), 12 (p. 200), 15 (p. 203); Ex. 1002 ¶¶ 142–150). Petitioner argues that Manber discloses looking for documents within a certain distance of a root document. Pet. 31 (citing Ex. 1004, 10 (p. 198)). For example, Manber discloses “[s]tarting with a set of root URLs” and “travers[ing] local and remote pages reachable by a path of links of a given maximum distance from the initial set.” Ex. 1004, 10 (p. 198) (emphasis and footnote omitted). Manber discloses a default distance of two links. Ex. 1004, 12 (p. 200), *cited in* Pet. 31. Petitioner argues that a person of ordinary skill in the art would “have appreciated from the express

disclosures of Manber that some limit or ‘threshold distance’ must be placed on the collection process of Konig to avoid having to crawl through potentially thousands, millions, or even billions, of linked pages.” Pet. 33 (citing Ex. 1002 ¶ 147).

Patent Owner disputes Petitioner’s Konig–Manber contentions. PO Resp. 24–33. Patent Owner presents a hypothetical scenario involving five documents that are linked (d_1 to d_2 to d_3 to d_4 to d_5) and scored as reflected in the table below:

Document	P	Links to
d_1		d_2
d_2	$P(u d_2) = 0.4$	d_3
d_3	$P(u d_3) = 0.8$	d_4
d_4	$P(u d_4) = 0.9$	d_5
d_5	$P(u d_5) = 0.8$	

PO Resp. 26. In this hypothetical, Patent Owner initializes document d_1 in stack 170 from the user history, and each successive document links to the previous document. Patent Owner assigns a threshold $P(u|d)$ of 0.7 to determine if a document is of interest to a user and should be added to the stack. PO Resp. 25–26. Patent Owner argues that, in Petitioner’s combination, document d_2 would be excluded from the stack because its 0.4 score is below the 0.7 threshold and, consequently, documents d_3 – d_5 , which link from document d_2 , would also be excluded even though they score above the 0.7 threshold. PO Resp. 26. According to Patent Owner, this is different from the ’781 patent, which would include documents d_1 , d_2 , and d_3 because they are within two links of document d_1 . PO Resp. 27–28 (citing Ex. 2003 ¶¶ 101, 105, 106).

Patent Owner's argument is based on the misconception that the proximal neighborhood includes all unseen documents within a threshold distance. The relevant claim language recites "determining a proximal neighborhood using the user history in the user profile, wherein the proximal neighborhood comprises only linked information elements previously unseen by the user that are within a threshold distance of the linked information elements in the user history." Assuming the open-ended term "comprises" followed by the qualifier "only" means that the proximal neighborhood cannot have documents other than those that are previously unseen and that are within a threshold distance, this does not mean that the proximal neighborhood must have all unseen documents that are within a threshold distance. Thus, even if Konig, as modified by Manber in Petitioner's combination, would exclude certain documents, the documents that the Personal Crawler adds to the stack are unseen documents within a threshold distance, as recited in the claim. This is consistent with the '781 patent specification, which explains that additional "crawling parameters" may be used to specify which documents are part of the proximal neighborhood. Ex. 1001, 5:57–64.

Patent Owner also argues that Petitioner's reasoning to combine is lacking. PO Resp. 28–33. Patent Owner argues that there is no need to limit the link distance in Konig, as proposed by Petitioner, because "Konig already controls the number of possible results by comparing a document's $P(u|d)$ score to a threshold to decide if it should be kept in the set of documents D for later searching." PO Resp. 28 (citing Ex. 1003, 27:30–46; Ex. 2003 ¶ 107). According to Patent Owner, Konig's use of a threshold

score to add documents to the proximal neighborhood actually “teaches away from the ’178 Patent.” PO Resp. 58 (citing Ex. 2003 ¶¶ 176–177).

We disagree with Patent Owner’s arguments. Konig does not suggest that additional criteria, such as a link distance limit, would be unsuitable and does not even mention a link distance limit, let alone “criticize, discredit, or otherwise discourage” using one. *See In re Fulton*, 391 F.3d 1195, 1201 (Fed. Cir. 2004). Furthermore, although Konig’s threshold score does limit the documents added to the stack, we agree with Petitioner that a person of ordinary skill in the art would have found it obvious to additionally limit the link distance traversed, as taught in Manber. *See* Pet. 31–33 (citing Ex. 1002 ¶¶ 147–149). Petitioner’s declarant, Dr. Fox, testifies that it was well known to persons of ordinary skill in the art that link distance limits must be placed on searches when traversing linked sets of information. Ex. 1002 ¶ 147 (citing Ex. 1004, 15 (p. 203)). We credit this testimony because it is based on Manber’s disclosure of an experiment in which a neighborhood had a link distance of three, which was “too much” because the “neighborhood files became too big and search was not sufficiently restricted; the indexing stage was also too slow as a result.” Ex. 1004, 15 (p. 203). Thus, Manber’s disclosure underscores computational complexities that arise as the universe of searched documents grows. Manber defaults to a link distance of two. Based on this evidence, we agree with Dr. Fox that a person of ordinary skill in the art would “have been motivated to restrict the scope of Konig’s Personal Crawler by a ‘threshold link distance’ in order to improve indexing speeds and limit the size of the stack.” Ex. 1002 ¶ 147.

Patent Owner further argues that, if a limit on crawling were needed in Konig, a person of ordinary skill in the art would have simply set an

arbitrary limit on the total number of documents. PO Resp. 31–33 (citing Ex. 2003 ¶¶ 112–114). This is certainly one option, but a person of ordinary skill is not limited to just one option. Rather, “a person of ordinary skill has good reason to pursue the known options within his or her technical grasp” to solve a given problem. *KSR*, 550 U.S. at 421. Moreover, an obviousness showing “does not require that a particular combination must be the preferred, or the most desirable, combination described in the prior art in order to provide motivation for the current invention.” *Novartis Pharms. Corp. v. West-Ward Pharms. Int’l Ltd.*, 923 F.3d 1051, 1059 (Fed. Cir. 2019) (quoting *Fulton*, 391 F.3d at 1200). Thus, even if a different solution, such as setting an arbitrary limit on the number of documents crawled (PO Resp. 31–32), were superior to Petitioner’s proposed combination, this does not undermine Petitioner’s rationale to combine, which we find to be supported by evidence in the record as discussed above.

(3) *Determination for “determining a proximal neighborhood”*

Based on Petitioner’s persuasive argument and evidence, summarized and addressed above, we determine that the step of “determining a proximal neighborhood using the user history in the user profile, wherein the proximal neighborhood comprises only linked information elements previously unseen by the user that are within a threshold distance of the linked information elements in the user history” would have been obvious to a person of ordinary skill in the art based on the asserted combination of prior art.

e) *“Applying the query”*

The final step of claim 1 recites “applying the query to the unseen linked information elements in the proximal neighborhood and determining

search results comprising the unseen linked information elements that match the query.” Petitioner argues that Konig discloses running a search based on a user query after collecting documents during the crawling phase. Pet. 34–35 (citing Ex. 1003, 7:46–50, 27:42–45; Ex. 1002 ¶ 152). Petitioner argues that Konig does not limit the application of the query only to unseen elements, but Petitioner contends this is not required because the claim does not prohibit searching additional documents. Pet. 35–36. Patent Owner does not dispute these contentions.

Petitioner’s contentions for this step are persuasive, and we find the asserted combination teaches this subject matter. *See* Ex. 1003, 27:42–45 (“The subsequent searching step is illustrated in FIG. 19. In response to a query 190, a set of search results is located from the set containing all documents D and user documents obtained during personal crawling.”). We agree with Petitioner that claim 1 does not prohibit searching additional documents. *See* Pet. 35–36. Thus, a reference that discloses applying the query as recited in the claim teaches the subject matter, even if the reference teaches applying the query to additional information elements.

Petitioner further argues that, if the claim requires limiting the query only to unseen documents, this would have been obvious in view of Van Vleet for the reasons discussed with respect to the “previously unseen” recitation of claim 1. Pet. 36–37 (citing Ex. 1005, 10:25–28, 11:54–58; Ex. 1002 ¶¶ 138–139; 156–159). Although the claim is not limited to applying the query to only unseen documents, we are persuaded that it would have been obvious to apply the query only to unseen documents in view of Van Vleet’s disclosure of “restrict[ing] the scope of the search to . . . items not previously viewed.” Ex. 1005, 11:54–58.

f) Objective evidence of non-obviousness

We must consider any evidence of objective indicia of non-obviousness before reaching our conclusion on obviousness. *WBIP, LLC v. Kohler Co.*, 829 F.3d 1317, 1328 (Fed. Cir. 2016). This is one of the factual considerations underlying an obviousness determination. *Graham*, 383 U.S. at 17. Objective evidence may include long-felt but unsolved needs, failure of others, unexpected results, commercial success, copying, licensing, and praise. *See Graham*, 383 U.S. at 17. “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.” *ClassCo, Inc. v. Apple, Inc.*, 838 F.3d 1214, 1220 (Fed. Cir. 2016) (quotations and citation omitted). “A nexus may not exist where, for example, the merits of the claimed invention were readily available in the prior art.” *Id.* (quotations and citation omitted). Ultimately, “[t]he patentee bears the burden of showing that a nexus exists.” *WMS Gaming, Inc. v. Int’l Game Tech.*, 184 F.3d 1339, 1359 (Fed. Cir. 1999).

Here, Patent Owner identifies three purported “secondary considerations” that allegedly show non-obviousness. PO Resp. 58–59; PO Sur-reply 23–25. First, Patent Owner argues that “Konig itself teaches away from the ’781 Patent,” citing the threshold link distance issue discussed with respect to Manber. PO Resp. 58 (citing Ex. 2003 ¶¶ 176–177); PO Sur-reply 23–24. This is simply an argument against the combination, which we address above in Section II.D.2.d(2).

Second, Patent Owner argues that “others had failed to arrive at the inventors’ solution despite a chance to do so over many years” and that Petitioner “points to no prior art that teaches the determining a proximal

neighborhood limitation here, or anything that came shortly after the inventors.” PO Resp. 59; PO Sur-reply 25. This argument suggests that the lack of an anticipating reference demonstrates non-obviousness, which is incorrect. In its Sur-reply, Patent Owner states that it is not arguing that the “lack of an anticipating reference is dispositive” but, rather, that Petitioner’s “failure to show that anyone (contemporaneously or otherwise) came up with the claimed determining a proximal neighborhood limitation undermines [Petitioner]’s argument that modifying Konig was obvious.” PO Sur-reply 25. For the reasons explained above in Section II.D.2, Petitioner has provided persuasive reasoning to support its contentions of obviousness based on Konig, Van Vleet, and Manber. The lack of a reference that discloses all of the claimed subject matter does not undermine Petitioner’s persuasive showing of obviousness. *See Iron Grip Barbell Co. v. USA Sports, Inc.*, 392 F.3d 1317, 1325 (Fed. Cir. 2004) (“Absent a showing of long-felt need or the failure of others, the mere passage of time without the claimed invention is not evidence of nonobviousness.”).

Third, Patent Owner argues the following: “[T]he U.S government recognized the value of the research being done by the inventors. This demonstrates praise by others. Specifically, as the ’781 Patent notes, the U.S. government funded the inventors’ research.” PO Resp. 59 (citing Ex. 1001, 1:8–10; Ex. 2003 ¶ 179); *see also* PO Sur-reply 25 (similar assertion). The cited passage of the ’781 patent states the following: “This invention was made with U.S. government Support under ARDA NIMD Contract No. HMDA904-03-C-0404. The U.S. government may have certain rights in the invention.” Ex. 1001, 1:8–10. Patent Owner does not put forth any argument to establish a nexus between this government

funding and the merits of the claimed invention. *See ClassCo*, 838 F.3d at 1220. Furthermore, as Petitioner points out (Pet. Reply 26), the identified grant was not even awarded to the inventors of the '781 patent. Ex. 1017 ¶ 90 (citing Ex. 1019, 48); *see* Ex. 1019, 48 (p. 402) (“Advanced Research and Development Activity, Novel Intelligence from Massive Data Program Contract No. MDA904-03-C-0404 to S.K. Card and Peter Pirolli”). Thus, the '781 patent's statement that the U.S. government may have certain rights in the patent based on a grant does not weigh against a conclusion of obviousness.

g) Conclusion for Claim 1

We have considered the full trial record, and, for the reasons discussed above and based on Petitioner's contentions and evidence, we conclude that the subject matter of claim 1 would have been obvious to a person of ordinary skill in the art based on the combined teachings of Konig, Van Vleet, and Manber.

3. Independent Claim 19

Independent claim 19 is directed to a “system for personalized search” having a memory and a processor and various circuits that perform operations that correspond to the steps of claim 1. Petitioner argues that “each of the recited circuits and processors in claim 19 corresponds to the hardware and software in Konig for carrying out the functions described for” the steps of claim 1 and, therefore, that claim 19 is unpatentable for the same reasons as claim 1. Pet. 57–58 (citing Ex. 1003, 7:11–16, 7:28; Ex. 1002 ¶¶ 203–208). Patent Owner does not raise any additional arguments for claim 19 but, rather, makes the same arguments for both claims, which we address for claim 1 above. *See* PO Resp. 12 n.7 (“PARC focuses on

Facebook’s claims 1–18 analysis. Facebook’s claims 19–36 analysis relies on its claims 1–18 analysis, Petition at 57, and has the same issues.”).

We agree with Petitioner that König’s disclosure teaches a memory, and hardware and software to perform its search functionality and that, in combination with Manber and Van Vleet, it teaches the subject matter of claim 19. Thus, for the reasons explained with respect to claim 1, based on Petitioner’s contentions and evidence, we conclude that the subject matter of claim 19 would have been obvious to a person of ordinary skill in the art based on the combined teachings of König, Van Vleet, and Manber.

4. Undisputed Dependent Claims 2, 4–7, 13–16, 20, 22–25, and 31–34

Claims 2 and 20 depend, respectively, from claims 1 and 19 and recite “wherein the proximal neighborhood further comprises the linked information elements and is determined by applying a crawling strategy.” Petitioner argues that König’s Personal Crawler applies a crawling strategy, as described for claim 1, to collect documents such as web pages (linked information elements) that make up the proximal neighborhood. Pet. 37–38 (citing Ex. 1003, 27:15–16, 27:20–40, Fig. 18; Ex. 1002 ¶ 162).

Claims 4 and 22 depend, respectively, from claims 2 and 20 and recite “wherein a threshold link distance is set for the crawling strategy.” Petitioner refers to its contentions for claim 1 in which a threshold link distance is set based on Manber’s teachings. Pet. 39–40 (citing Ex. 1002 ¶¶ 143–145, 168–169).

Claims 5 and 23 depend, respectively, from claims 1 and 19 and recite “wherein the user history comprises at least one of a web access log, a library manager, a web proxy server log, a browser history file, and a server access log.” Petitioner argues that König discloses a “browser history file”

from which the User Model is initialized. Pet. 40 (citing Ex. 1003, 5:15–17, 17:22–23, 17:28–30; Ex. 1002 ¶ 170).

Claims 6 and 24 depend, respectively, from claims 1 and 19 and recite “wherein the information repository comprises at least one of a website, a document repository, and a hard drive.” Petitioner argues that König discloses a website having web pages previously accessed by the user and that such a website qualifies as an information repository and a document repository. Pet. 40–41 (citing Ex. 1003, 9:14–17; Ex. 1002 ¶¶ 112, 172–174).

Claims 7 and 25 depend, respectively, from claims 6 and 24 and recite “wherein the document repository comprises at least one of a digital library, a document management system, and a server.” Petitioner argues that König discloses websites on servers. Pet. 41 (citing Ex. 1003, 12:32–40, 29:20–21; Ex. 1002 ¶ 175).

Claims 13 and 31 depend, respectively, from claims 1 and 19 and recite “wherein the linked information elements comprise at least one of audio, video, and textual information.” Claims 15 and 33 depend, respectively, from claims 1 and 19 and similarly recite “wherein the proximal neighborhood comprises at least one of audio, video, and textual information.” Petitioner cites König’s disclosure that a document can have text, sound, and video. Pet. 54 (citing Ex. 1003, 9:14–17; Ex. 1002 ¶ 196).

Claims 14 and 32 depend, respectively, from claims 1 and 19 and recite that “the linked information elements comprise linked documents.” Petitioner cites König’s disclosure of selecting a webpage document (i.e., a linked document) during the collection phase. Pet. 54–55 (citing Ex. 1003, 27:30–34; Ex. 1002 ¶ 197).

Claims 16 and 34 depend, respectively, from claims 1 and 19 and recite “wherein the search results are ordered based on the keywords relevant to the access patterns in the user history.” Petitioner argues that Konig discloses sorting search results in order of interest, which is done based on a keyword list. Pet. 55–57 (citing Ex. 1003, 6:13–14, 10:52–55, 17:19–40, 17:55–60, 27:43, 27:45–48, Fig. 4A; Ex. 1002 ¶¶ 117, 200–202).

Patent Owner does not raise additional arguments for these claims. We have reviewed Petitioner’s arguments and evidence, and we find them persuasive. Therefore, having considered the full record developed during the trial, we conclude that claims 2, 4–7, 13–16, 20, 22–25, and 31–34 are unpatentable as obvious over the combined teachings of Konig, Van Vleet, and Manber.

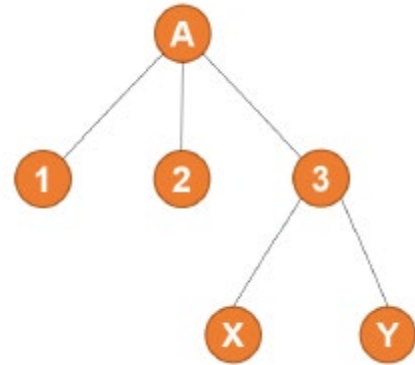
5. Dependent Claims 3 and 21

Claims 3 and 21 depend, respectively, from claims 2 and 20 and recite “wherein the crawling strategy comprises at least one of a link ranking function, a backlink function, and a breadth first search.” Petitioner argues that both Konig and Manber teach a “breadth first search.” Pet. 38–39. As to Konig, Petitioner argues that Konig’s “Personal Crawler utilizes a ‘breadth first search’ crawling strategy” because it identifies all links in one document before proceeding to the next document in the stack to crawl. Pet. 38–39 (citing Ex. 1003, 27:30–31, 27:33–37, 27:40–41; Ex. 1002 ¶¶ 163–164).

Patent Owner disputes this contention and argues that the example on the right shows that Konig allegedly uses a depth first search crawling strategy. PO Resp. 35–36 (citing Ex. 2003 ¶¶ 122–123).

The figure on the right shows document A with links to documents 1, 2, and 3 and document 3 linked to documents X and Y.

Patent Owner argues Konig performs a depth first search in this example because document 3 is pushed onto the stack last, which means that X and Y, which are linked from document 3, are put into the stack next and therefore analyzed before documents 1 and 2. PO Resp. 36. Thus, the crawling order in this example is A, 3, Y, X, 2, 1, according to Patent Owner. PO Resp. 36 (citing Ex. 2003 ¶¶ 123, 126 n.6).



Petitioner responds that Patent Owner’s example shows that Konig teaches the claimed subject matter because the search locates links to documents 1, 2, and 3 in document A first and, thus, does a “breadth first search” of document A, “even if subsequent aspects of the crawling process in Konig employ other search methodologies.” Pet. Reply 17. Thus, according to Petitioner, the search *strategy* need not be a breadth first strategy because all that is required is that the strategy comprise a breadth first search. Pet. Reply 16.

We need not resolve this dispute between the parties because we find Petitioner’s alternative argument based on Manber persuasive. Petitioner argues that Manber “expressly suggests the use of a ‘breadth first search’ in a future version of WebGlimpse,” and Petitioner argues that a “breadth first search is one of a finite number of identified and known techniques for

crawling web pages, and a particularly and useful one for finding documents most relevant to a root document.” Pet. 39 (citing Ex. 1004, 11 (p. 199); Ex. 1002 ¶¶ 165, 167).

Patent Owner argues that Petitioner’s reason to combine “makes no sense” because in Konig crawling is performed before searching and all documents from the crawling step are searched, regardless of how crawling is performed. PO Resp. 37–38 (citing Ex. 2003 ¶ 126). But this tends to show that other options are equally suitable because the end result is a set of documents that is searched. Patent Owner does not dispute that breadth first searching was a well-known option for crawling web pages. Indeed, the ’781 patent provides no detail on how to implement a breadth first search, thus confirming that this was within the knowledge and skill of a person of ordinary skill in the art. *See* Ex. 1001, 5:5–14 (“[I]n a breadth first search environment, a value of 2 provides a good link threshold distance. . . . It will be apparent that other crawling parameters such as a link ranking function, the backlink ranking function, breadth-first search and/or any known or later developed link ranking and/or ordering strategy may also be used in the practice of this invention.”), 5:23–26 (“[D]ifferent types of crawling algorithms, such as breadth first search, link ranking, backlink and various other graph search strategies may also be used to determine documents within the proximal neighborhood.”). We credit Dr. Fox’s testimony that an “ordinarily skilled artisan would . . . have appreciated that a breadth first search is among the most popular of identified and known techniques for accessing linked information such as websites.” Ex. 1002 ¶ 167.

Based on the evidence of record, we agree with Petitioner that using a breadth first search to crawl in Konig would have been obvious as one of a finite number of options available to a person of ordinary skill in the art.

Patent Owner posits that a person of ordinary skill in the art “would prefer to leverage Konig’s User Model—which leverages document paths of high interest first instead of ignoring that knowledge—instead of adopting” a breadth first search. PO Resp. 38 (citing Ex. 2003 ¶ 127). A person of ordinary skill in the art can certainly follow Konig’s express disclosure, but this does not foreclose a conclusion of obviousness based on variations from that disclosure. “Because a person of ordinary skill ‘has good reasons to pursue the known options within his or her technical grasp,’ § 103 bars the patentability of such obvious variations.” *Uber Technologies, Inc. v. XOne, Inc.*, 957 F.3d 1334, 1340 (Fed. Cir. 2020) (quoting *KSR*, 550 U.S. at 417).

We have considered the full trial record, and, for the reasons discussed above and based on Petitioner’s contentions and evidence, we conclude that the subject matter of claims 3 and 21 would have been obvious to a person of ordinary skill in the art based on the combined teachings of Konig, Van Vleet, and Manber.

6. Dependent Claims 8, 9, 26, and 27

Claims 8 and 26 depend, respectively, from claims 1 and 19 and recite “wherein user histories, user profiles, and proximal neighborhoods are determined for a first user and at least one other user, and in which at least one of the user history, the user profiles and the proximal neighborhoods form a combination.” Claims 9 and 27 depend, respectively, from claims 8 and 26 and recite “wherein the combination comprises at least one of union, intersection, addition, and subtraction.”

Petitioner argues that König discloses that its system can be used by multiple users and that a user history, user profile, and proximal neighborhood are determined for those users as described with respect to claim 1. Pet. 41–42 (citing Ex. 1003, 7:27–28, 19:16–17; Ex. 1002 ¶¶ 177–180). Petitioner contends that König’s disclosure of clustering user profiles teaches a combination of user profiles. Pet. 42–44 (citing Ex. 1003, 14:29–31, 14:39–42, 14:44–47, 14:61–66, 19:17–18, 20:23–25, Figs. 5A, 6A; Ex. 1002 ¶¶ 176–179). For claims 9 and 27, Petitioner relies on König’s disclosure that the cluster model is generating by averaging, which includes addition, and also that the cluster model is obtained from a “union” of users’ information. Pet. 46–47 (citing Ex. 1003, 10:42–14:24, 20:24–25, 25:40–45; Ex. 1002 ¶¶ 181–182).

Patent Owner disputes Petitioner’s contentions for these claims, arguing that “[c]ombining in the context of the ’781 Patent requires that at least two users’ user histories, user profiles, or proximal neighborhoods are brought together to generate a new user history, user profile, and/or proximal neighborhood, respectively.” PO Resp. 40 (citing Ex. 2003 ¶ 132). Patent Owner cites nothing in the ’781 patent to support this argument. Nor does Dr. Martin, whom Patent Owner cites in support of this argument. *See* Ex. 2003 ¶ 132. The claim does not require generating anything based on the combination. The specification provides little guidance, stating that, “[i]n still other exemplary embodiments according to this invention, one or more user profiles and/or proximal neighborhoods are combined using union, intersection and various other operators to perform personalized searches.” Ex. 1001, 3:42–46. It further states that “the user profile of first, second and/or any number of other users, can be combined with their own

and/or other user's proximal neighborhoods to provide collaborative personalized searches." Ex. 1001, 13:64–67. These passages generally mention combining but provide no further detail than the claims. Apart from the claims, the specification does not even mention "subtraction," let alone how a combination of user profiles is formed by subtraction, as recited in claim 9.

Patent Owner contends that "Konig's 'Cluster Model' is not an actual 'user' as required by the claims." PO Resp. 43 (citing Ex. 2003 ¶ 137). Petitioner, however, relies on Konig's cluster model to show that a combination of user profiles of actual users is formed. Pet. 44 ("Because a 'user profile' in Konig includes the User Model, Konig discloses that 'at least . . . the user profiles . . . form a combination.'" (emphasis omitted; alterations in original)).

Patent Owner also argues that Petitioner "has not explained how the allegedly combined user history, user profile, or proximal neighborhood it points to for claims 8 and 26 would be used in the remaining limitations of those independent claims." PO Resp. 44. Such analysis is not required because claims 8 and 26 do not require any additional operations with respect to the independent claims. For example, claims 8 and 26 recite "a first user" and "at least one other user," rather than referring back to "the user" of claims 1 and 19. Thus, the recitations of these dependent claims are essentially untethered to any particular step or operation recited in the respective independent claims. Indeed, claims 8 and 26 do not even require a step or operation of forming a combination. Rather, these claims merely recite that certain data "form a combination." Thus, we disagree with Patent Owner's argument that a "conceptual[]" combination is not enough to satisfy

the claims. *See* PO Resp. 46 (“But these dependent claims are not satisfied by someone ‘conceptually’ envisioning a cluster model.”). In any event, as explained below, Petitioner’s contention that König discloses forming a combination is persuasive.

König discloses multiple users because it states that a User Model for “each user” is stored and updated. Ex. 1003, 7:27–31; *see also* Ex. 1003, 19:16–17 (“After the User Models are initialized for all users, cluster membership can be obtained.”). Thus, each of the multiple users of König has a user history and a user profile, which are used to determine a proximal neighborhood for the user, as discussed for claim 1. Regarding obtaining cluster memberships, König further explains that “[e]ach cluster has a Group or Cluster Model that is analogous to a User Model. Cluster Models are generated by averaging each component of its members’ User Models.” Ex. 1003, 20:23–25. As discussed above for claim 1, König discloses that “[t]he personal search feature collects, indexes, and filters documents, and responds to the user query, all based on the *user profile stored in the User Model*.” Ex. 1003, 7:48–50 (emphasis added). Thus, generating a Cluster Model by averaging each component of the user models of the cluster members involves combining or adding the user profiles of each of the cluster members. Patent Owner acknowledges this. PO Resp. 43 (“A [person of ordinary skill in the art] would understand König’s ‘averaging’ to involve summing the (numerical) components and dividing by the total number of them.”).

Petitioner also argues that König renders obvious forming combinations of user histories and proximal neighborhoods. Pet. 44–46. Because König’s disclosure of combining user profiles is sufficient to teach

the claimed subject matter, we need not address these additional arguments or Patent Owner's arguments regarding an alleged teaching away. *See* PO Resp. 43–44 (arguing that Konig teaches away from an implementation suggested by Petitioner for combining user histories and proximal neighborhoods).

We have considered the full trial record, and, for the reasons discussed above and based on Petitioner's contentions and evidence, we conclude that the subject matter of claims 8, 9, 26, and 27 would have been obvious to a person of ordinary skill in the art based on the combined teachings of Konig, Van Vleet, and Manber.

7. Dependent Claims 10–12 and 28–30

Claims 10 and 28 depend, respectively, from claims 1 and 19 and recite “wherein a first user history is associated with a first user and a second user history is associated with a second user and the first user history is used by the second user.” Claims 11 and 29 depend, respectively, from claims 10 and 28 and recite “wherein a first user proximal neighborhood is associated with the first user and a second user proximal neighborhood is associated with the second user and the first user proximal neighborhood is used by the second user.” Claims 12 and 30 depend, respectively, from claims 10 and 28 and recite “wherein a first user profile is associated with the first user and a second user profile is associated with the second user and the first user profile is used by the second user.”

As an initial matter, we reject Patent Owner's argument that Petitioner was required to explain “how its reading of dependent claims 10 and 28 would comport with its analysis of their respective independent claim.” PO Resp. 50; *see also* PO Resp. 53–54 (similar argument for claims 11 and 29),

56 (similar argument for claims 12 and 30). Similar to claims 8 and 26 discussed above, dependent claims 10–12 and 28–30 are untethered to any particular step or operation recited in the respective independent claims. For example, claims 10–12 and 28–30 recite “a first user” and “a second user” but do not refer back to “the user” of claims 1 and 19. Thus, Petitioner need not explain how its analysis of claims 10–12 and 28–30 relates to its analysis of claims 1 and 19.

Furthermore, as discussed for claims 8, 9, 26, and 27 in the previous section, König discloses multiple users each having a user history and a user profile, which are used to determine a proximal neighborhood for each user. The parties’ disputes, addressed below, center on these claims’ recitations that the user history, user profile, and proximal neighborhood of one user are used by another user.

a) Claims 10 and 28

Petitioner argues that König teaches the subject matter of claims 10 and 28 in several ways. Pet. 47–50. First, Petitioner argues that a user can choose to use a different profile on a temporary basis to perform a search. Pet. 48 (citing Ex. 1003, 20:44–49; Ex. 1002 ¶ 184). König gives an example of a venture capitalist using a “teenage girl profile” to search for a gift for a teenager. Ex. 1003, 20:44–49. Second, Petitioner argues that König’s disclosure of clustering teaches this subject matter because information from other users is input to a user’s User Model. Pet. 48–50 (citing Ex. 1003, 10:10–14, 14:34–35, 20:23–25, 25:41–44, Fig. 3; Ex. 1002 ¶¶ 180, 185–187). Third, Petitioner argues that König’s disclosure of borrowing characteristics from another user’s User Model teaches this subject matter. Pet. 50 (citing Ex. 1003, 10:13–17; Ex. 1002 ¶ 188).

Patent Owner argues that Petitioner's contentions fail for several reasons. First, Patent Owner argues that the "teenage girl profile" that Petitioner relies on is not a profile of an actual user but, instead, is a "prototype" user profile. PO Resp. 47–48 (citing Ex. 1003, 20:28–49; Ex. 2003 ¶¶ 154–158). Thus, according to Patent Owner, Petitioner does not show how one user uses the user history of another actual user. PO Resp. 48–49.

We disagree with Patent Owner. Assuming that the "teenage girl profile" is limited to a "prototype" user as Patent Owner's argument suggests, that prototype is based on actual user input. *See* Pet. Reply 22 (citing Ex. 1003, 23:60–61, 24:1–16; Ex. 1017 ¶ 71). For example, König discloses that "User Models for prototype users (hats) are also updated based on actions of similar users." Ex. 1003, 23:60–61. König also explains that "[a]ctions of expert users who have a high degree of interest in topics also of interest to the prototype user are incorporated into the prototype User Model." Ex. 1003, 24:16–18; *see also* Ex. 1003, 24:19–23 (noting that actions of users who are not using the prototype model may be used to update the prototype). Thus, the actions (user history) of actual users are incorporated into the prototype that a user then uses for a search. Claims 10 and 28 do not define any particular manner in which one user's user history must be used by another user, and we find that König's disclosures teach the recited subject matter.

Patent Owner also argues that Petitioner's second and third arguments fail because they allege that one user's User Model is used by another, not that one user's user history is used by another user. PO Resp. 48–49 (citing Ex. 2003 ¶ 159). We disagree with this argument because Petitioner

persuasively explains that user actions are an input to the User Model. Pet. 49–50 (citing Ex. 1003, 10:10–17, 14:34–35, Fig. 3; Ex. 1002 ¶¶ 180, 187). For example, Konig discloses that “[d]ata and actions of similar users are also incorporated into the User Model.” Ex. 1003, 10:10–12. Thus, the actions of other users (user history) are incorporated into the User Model for a user. Konig further discloses that, “if the user suddenly searches for information in an area that is new to him or her, the User Model borrows characteristics of User Models of users with similar interests.” Ex. 1003, 10:13–17. Because a User Model for a given user is “continuously and transparently updated based on the user’s interaction with the network” (Ex. 1003, 7:27–31), borrowing from another user’s User Model is certainly suggestive of using that other user’s history.

We have considered the full trial record, and, for the reasons discussed above and based on Petitioner’s contentions and evidence, we conclude that the subject matter of claims 10 and 28 would have been obvious to a person of ordinary skill in the art based on the combined teachings of Konig, Van Vleet, and Manber.

b) Claims 11 and 29

For claims 11 and 29, which recite that one user’s proximal neighborhood is used by another user, Petitioner argues that it would have been obvious to allow one user to use another user’s User Model to search based on Konig’s disclosures of borrowing characteristics of User Models and of clustering. Pet. 52–53 (citing Ex. 1003, 10:12–17, 19:17–18; Ex. 1002 ¶¶ 191–193). In particular, Petitioner argues that “[i]t would have been obvious that a first user’s User Model could be used by the second user to, for example, curate a ‘stack’ of documents for use by the Personal

Crawler,” especially in the situation contemplated by Konig in which a user is not familiar with a subject and borrows from another user’s User Model. Pet. 52–53. In this case, according to Petitioner, the borrowing user’s crawler would collect a proximal neighborhood of documents that is the same as the other user’s based on the same stack initialization. Pet. 52–53. Petitioner alternatively argues that Konig’s disclosures of the venture capitalist using a teenage girl profile teaches this subject matter. Pet. 51–52 (citing Ex. 1003, 20:44–49, 27:30–40; Ex. 1002 ¶¶ 177, 183, 189–190).

Patent Owner argues that Petitioner’s argument based on borrowing the User Model fails because the User Model differs from the proximal neighborhood and because Petitioner “provides no explanation as to how the first user’s proximal neighborhood is actually used by the second user.” PO Resp. 52 (citing Ex. 2003 ¶ 166). We agree with Patent Owner that the User Model is not the same as the proximal neighborhood, but Petitioner is not arguing that they are the same. Rather, Petitioner is arguing that, it would have been obvious to take information from one user’s User Model and curate a stack of documents for another user, such that the other user’s personal crawler collects the same proximal neighborhood of documents based on how the documents are collected. Pet. 52–53.

Petitioner’s argument is persuasive in view of Konig’s disclosures. As discussed for claim 1, Konig discloses that “stack 170 is initialized with documents of high interest to the user, such as documents in the bookmarks file or documents specified by the user.” Ex. 1003, 27:21–24. But, as Petitioner points out, there are times when a user searches for information in a new area. *See* Pet. 52 (citing Ex. 1003, 10:13–17). Konig discloses that, “if the user suddenly searches for information in an area that is new to him

or her, the User Model borrows characteristics of User Models of users with similar interests.” Ex. 1003, 10:13–17. Dr. Fox explains that “crawling based on the first user’s User Model would create a proximal neighborhood, . . . which would be the first user’s ‘proximal neighborhood’ because it was created by the first user’s User Model.” Ex. 1002 ¶ 193. Based on König’s disclosures and Dr. Fox’s credible testimony based on those disclosures and having considered the full trial record, we conclude that the subject matter recited in claims 11 and 29 would have been obvious to a person of ordinary skill in the art.

Based on our conclusion of obviousness, we need not rely on Petitioner’s alternative argument for claims 11 and 29 based on the use of the teenage girl profile.

c) Claims 12 and 30

For claims 12 and 30, which recite that one user’s user profile is used by another user, Petitioner argues that König’s disclosure of a venture capitalist using a teenage girl profile and its disclosures of clustering teach this subject matter, referring to its contentions for claim 10. Pet. 53–54 (citing Ex. 1002 ¶¶ 114–115, 177, 183, 189, 194–195). Patent Owner refers to its argument for claim 10 that the teenage girl profile is not the profile of an actual user. PO Resp. 55. Patent Owner also argues that a User Model is different from a user profile and that Petitioner does not explain “how the first user’s user profile is actually used by the second user.” PO Resp. 55 (citing Ex. 2003 ¶ 171).

We disagree with Patent Owner. As explained for claim 1, König discloses that “[t]he personal search feature collects, indexes, and filters documents, and responds to the user query, *all based on the user profile*

stored in the User Model.” Ex. 1003, 7:48–50 (emphasis added). Thus, König’s disclosure of borrowing characteristics from another user’s User Model, as discussed for claim 10, involves data in the user profile of that User Model. *See* Ex. 1003, 10:12–17 (“Clustering users allows estimation of user interests based on the interests of users similar to the user. For example, if the user suddenly searches for information in an area that is new to him or her, the User Model borrows characteristics of User Models of users with similar interests.”). Claims 12 and 30 do not define any particular manner in which one user’s user profile must be used by another user, and we find that König’s disclosures of borrowing a User Model teach the recited subject matter. Furthermore, as discussed for claim 10, even if the “teenage girl profile” is limited to a “prototype” user as Patent Owner’s argument suggests, that prototype is based on actual user input, such as input from “expert users” whose profiles are used in some respect to develop the prototype.

We have considered the full trial record, and, for the reasons discussed above and based on Petitioner’s contentions and evidence, we conclude that the subject matter of claims 12 and 30 would have been obvious to a person of ordinary skill in the art based on the combined teachings of König, Van Vleet, and Manber.

*E. Obviousness over
König, Manber, Van Vleet, and Khan
(Claims 10–12, 28–30)*

Petitioner asserts that claims 10–12 and 28–30 also are unpatentable under 35 U.S.C. § 103(a) over the combined teachings of König, Manber, Van Vleet, and Khan. Pet. 59–64.

Petitioner argues that Khan discloses sharing bookmarks with other users. Pet. 60 (citing Ex. 1007, 10:64–66, 11:1–16, 11:40–43, 16:16–35; Ex. 1002 ¶¶ 92, 213–214). For example, Khan discloses that “[t]he ability to bookmark a webpage or website that a user found particularly useful is an invaluable aid to surfing the web efficiently.” Ex. 1007, 10:64–66. Khan explains that “[a] bookmark is the result of an analysis of and positive judgment on a website by a visitor interested in a particular interest topic” but that this information is kept private on a user’s computer and not shared. Ex. 1007, 11:1–5. Thus, Khan proposes sharing bookmarks among multiple users to “unlock[] the knowledge hidden away in private bookmarks sets distributed across standalone computers worldwide.” Ex. 1007, 11:5–10.

Petitioner contends that it would have been obvious for one user to import bookmarks from another user and initialize the User Model with those bookmarks, arguing that Khan provides a motivation for the combination by explaining the benefits of sharing bookmarks between users. Pet. 61–63. Petitioner argues that this would have resulted in using the user history, user profile, and proximal neighborhood of the other user based on König’s disclosures of initializing the User Model with bookmarks. Pet. 61–62 (citing Ex. 1002 ¶¶ 216–217).

Patent Owner argues that “bookmarks are not necessarily web pages a user has previously visited—they are not necessarily ‘previously accessed,’ but may simply be places users may plan to go.” PO Resp. 49 (citing Ex. 2003 ¶ 160). We disagree. Khan discloses that the “ability to bookmark a webpage or website that a user found particularly useful is an invaluable aid to surfing the web efficiently.” Ex. 1007, 10:64–66. König also discloses that “[u]sers denote frequently-accessed documents as bookmarks,

allowing them to be retrieved simply by selection from the list of bookmarks.” Ex. 1003, 17:26–28. Thus, both Khan and Konig teach that bookmarks denote sites that users previously accessed.

Patent Owner also argues that Khan’s “bookmarks are not a ‘user history’—‘comprising access patterns identifying linked information elements previously accessed by the user within an information repository’—as required by the independent claim limitations 1[c] and 19[d].” PO Resp. 49. Petitioner, however, does not rely on Khan to prove obviousness of claims 1 and 19. Although claims 1 and 19 recite a “a user history for the user comprising access patterns identifying linked information elements previously accessed by the user within an information repository,” claims 10 and 28 do not put limitations on the separately-recited “first user history” and “second user history.” As discussed above in § II.D.7, dependent claims 10–12 and 28–30 are untethered to any particular step or operation recited in the respective independent claims. Patent Owner offers similar arguments for claims 11, 12, 29, and 30. *See* PO Resp. 53 (Khan’s “bookmarks are not a ‘proximal neighborhood’—‘compris[ing] only linked information elements previously unseen by the user that are within a threshold distance of the linked information elements in the user history’—as required by the independent claim limitations 1[e] and 19[f].” (alteration in original)), 56 (Khan’s “bookmarks are not a ‘user profile’—‘comprising keywords relevant to the access patterns in the user history’—as required by the independent claim limitations 1[d] and 19[e].”). Claims 11 and 29 do not place the limits of the “proximal neighborhood” of claims 1 and 19 on the “first user proximal neighborhood” and the “second user proximal neighborhood.” Similarly, claims 12 and 30 do not limit the “first

user profile” and the “second user profile” in the way claims 1 and 19 limit the “user profile.” Thus, Patent Owner’s arguments are not commensurate in scope with the claims.

Petitioner’s contentions of obviousness are persuasive. Khan discloses that sharing bookmarks “unlocks the knowledge hidden away in private bookmarks sets distributed across standalone computers worldwide.” Ex. 1007, 11:5–10. We agree with Petitioner that Khan’s disclosure would have motivated a person of ordinary skill in the art to combine Khan’s bookmark sharing teachings with Konig so that the analysis and judgment that results in a bookmark is not “locked away in a user’s private bookmark set,” as disclosed in Khan. Ex. 1007, 11:1–5; *see* Pet. 63 (citing this discussion as a motivation to combine). We also agree with Petitioner that Khan’s bookmark sharing teachings would have been directly applicable to Konig’s disclosure of using other profiles to perform searches. *See* Pet. 63–64 (citing Ex. 1003, 7:51–55, 20:44–59; Ex. 1002 ¶ 220).

We agree with Petitioner that using another user’s bookmarks, which denote previously-accessed pages, teaches using another user’s “user history,” as recited in claims 10 and 28. Pet. 62. Konig discloses using bookmarks to initialize the User Model, which is then used to build a proximal neighborhood. Ex. 1007, 17:19–20, 17:24–30. Thus, in Petitioner’s combination, a user would use another user’s bookmarks to initialize a User Model. Pet. 61–64. We find this contention persuasive based on Khan’s teachings of the benefits of sharing bookmarks and based on Konig’s disclosures of using other user profiles to search, as discussed above. *See* Ex. 1007, 11:1–10 (“A bookmark is the result of an analysis of and positive judgment on a website by a visitor interested in a particular

interest topic. . . . Creating a web directory where each category contains not just sites recommended for listing by webmasters, but sites taken from within Internet user's bookmarks sets, unlocks the knowledge hidden away in private bookmarks sets distributed across standalone computers worldwide."); Ex. 1003, 20:44–49 ("Users can also choose profiles on a temporary basis, for a particular session only. For example, in a search for a birthday present for his or her teenage daughter, a venture capitalist from Menlo Park may be interested in information most probably offered to teenagers, and hence may choose a teenage girl profile for the search session."). We find persuasive, therefore, Petitioner's contention that "when the second user utilizes the bookmarks file obtained from the first user to initialize a User Model, and then runs a Personal Search using that User Model and user history, the second user is utilizing a user history, user profile, and proximal neighborhood associated with the first user." Pet. 62 (emphasis omitted; citing Ex. 1002 ¶ 217).

We have considered the full trial record, and, for the reasons discussed above and based on Petitioner's contentions and evidence, we conclude that the subject matter of claims 10–12 and 28–30 would have been obvious to a person of ordinary skill in the art based on the combined teachings of Konig, Van Vleet, Manber, and Khan.

*F. Obviousness over
Konig, Manber, Van Vleet, and Cradler
(Claims 17, 18, 35, 36)*

Claims 17 and 35 depend, respectively, from claims 1 and 19 and recite "wherein the user history is categorized." Claims 18 and 36 depend, respectively, from claims 17 and 35 and recite "wherein the categories comprise at least one of tasks, projects, and organizations." Petitioner

asserts that claims 17, 18, 35, and 36 are unpatentable under 35 U.S.C. § 103(a) over the combined teachings of Konig, Manber, Van Vleet, and Cradler. Pet. 64–67.

Cradler is a publication discussing the web browser Netscape Navigator. Ex. 1006, 1. Petitioner presents evidence that Cradler was published before the earliest possible effective filing date for the '781 patent. *See* Pet. 9 (citing Ex. 1009 ¶¶ 45–51). Patent Owner does not challenge the prior art status of Cradler. Based on Petitioner's evidence regarding the publication of Cradler, we determine that it is prior art to the '781 patent.

For claims 17 and 35, Petitioner argues that Cradler discloses creating folders to hold bookmarks, which teaches categorizing a user history. Pet. 65 (citing Ex. 1006, 10 (p. 59), 23 (p. 84); Ex. 1002 ¶¶ 221–222). For claims 18 and 36, Petitioner argues that “Cradler discloses that having more than one bookmarks menu ‘can be very handy for keeping sets of bookmarks for different tasks or projects. You just need to create a folder for each menu and move the appropriate bookmarks into it.’” Pet. 67 (emphasis omitted; quoting Ex. 1006, 23). Petitioner argues that a person of ordinary skill in the art would have been motivated to combine Cradler's bookmark folder teachings with Konig, which expressly discloses using Netscape Navigator and its bookmark features, and that “[o]rganizing those bookmarks into folders would have provided a useful categorization tool, facilitating later retrieval.” Pet. 66 (citing Ex. 1003, 17:18–20, 17:24–28; Ex. 1002 ¶¶ 225–226).

Patent Owner does not dispute these contentions.

Petitioner's contentions are persuasive. Konig discloses the use of bookmarks in Netscape Navigator. Ex. 1003, 17:24–28. Cradler discloses

how to organize Navigator bookmarks for different tasks or projects and that such organizing “[k]eep[s] your menu neat and orderly.” Ex. 1006, 23 (p. 84). We find that a person of ordinary skill in the art would have combined Konig’s express disclosure of using Navigator bookmarks with Cradler’s disclosure of organizing the same bookmarks in order to beneficially organize Konig’s bookmarks.

We have considered the full trial record, and, for the reasons discussed above and based on Petitioner’s contentions and evidence, we conclude that the subject matter of claims 17, 18, 35, and 36 would have been obvious to a person of ordinary skill in the art based on the combined teachings of Konig, Van Vleet, Manber, and Cradler.

III. CONCLUSION⁹

For the reasons discussed above, we determine that Petitioner has proven, by a preponderance of the evidence, that claims 1–36 of the ’781 patent are unpatentable, as summarized in the following table:

Claim(s)	35 U.S.C. §	Reference(s)/Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
1–16,	103(a)	Konig, Manber,	1–16, 19–34	

⁹ 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. 16,654 (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).

19–34		Van Vleet		
10–12, 28–30	103(a)	Konig, Manber, Van Vleet, Khan	10–12, 28–30	
17, 18, 35, 36	103(a)	Konig, Manber, Van Vleet, Cradler	17, 18, 35, 36	
Overall Outcome			1–36	

IV. ORDER

Accordingly, it is

ORDERED that claims 1–36 of the '781 patent have been shown to be 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.

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