IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

COMCAST CABLE COMMUNICATIONS, LLC,
Petitioner

v.

VEVEO, INC.,
Patent Owner

Patent No. 8,122,034
Filing Date: October 7, 2005
Issue Date: February 21, 2012
Title: METHOD AND SYSTEM FOR INCREMENTAL SEARCH WITH REDUCED TEXT ENTRY WHERE THE RELEVANCE OF RESULTS IS A DYNAMICALLY COMPUTED FUNCTION OF USER INPUT SEARCH STRING CHARACTER COUNT

Inter Partes Review No.: Unassigned

PETITION FOR *INTER PARTES* REVIEW UNDER 35 U.S.C. §§ 311-319 AND 37 C.F.R. § 42.100 *et seq.*

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Comcast Cable Communications, LLC hereby petitions for *inter partes* review and cancellation under 35 U.S.C. §§ 311-319 and 37 C.F.R. § 42.100 *et seq*. of claims 1-30 of U.S. Patent No. 8,122,034 ("the '034 Patent"), attached as Ex.-1101.

I. MANDATORY NOTICES PURSUANT TO 37 C.F.R. § 42.8(A)(1)

A. 37 C.F.R. § 42.8(b)(1)&(2): Real Parties in Interest & Related Matters

The real parties-in-interest for this Petition are (i) Comcast Corporation, (ii) Comcast Business Communications, LLC, (iii) Comcast Cable Communications Management, LLC, (iv) Comcast Cable Communications, LLC, (v) Comcast Financial Agency Corporation, (vi) Comcast Holdings Corporation, (vii) Comcast of Houston, LLC, (viii) Comcast Shared Services, LLC, and (ix) Comcast STB Software I, LLC. These entities are referenced below as "Comcast entity __" or as "Comcast entities __," where "__" is one of or more of (i) through (ix).

No unnamed entity is funding, controlling, or directing the Petition for *Inter Partes* Review of U.S. Patent No. 8,122,034, or otherwise has an opportunity to control or direct this Petition or Petitioner's participation in any resulting IPR.

The '034 Patent has been asserted against Comcast entities (i) - (iv) and (vi) - (viii), as well as other defendants, in *Rovi Guides, Inc., et al. v. Comcast Corporation, et al.*, U.S. District Court for the Eastern District of Texas, Case No. 2:16-cv-00321 ("EDTX litigation"). The earliest date of service on any of the

Comcast entities named in the EDTX litigation was April 4, 2016. The EDTX litigation was subsequently transferred to the U.S. District Court for the Southern District of New York, Case No. 1:16-cv-09278.

The ’034 Patent is at issue in *Comcast Corporation, et al. v. Rovi Corporation, et al.*, U.S. District Court for the Southern District of New York, Case No. 1:16-cv-03852 (“SDNY litigation”). The SDNY litigation was brought by Comcast entities (i) - (iv) and (vi) - (ix). The SDNY litigation does not challenge the validity of a claim of the ’034 Patent.

Petitioner is filing concurrently one additional petition seeking *inter partes review* of claims 1-30 of the ’034 Patent under different grounds.

According to the United States Patent Office’s records from the PAIR system, the ’034 Patent claims priority based on application no. 60/695,463 (expired). According to the PAIR system, application nos. 13/398,904 (U.S. Patent 9,031,962), 14/685,372 (pending), and PCT/US06/25249 (published) claim priority to the application that became the ’034 Patent.

B. 37 C.F.R. § 42.8(b)(3)&(4): Lead & Back-Up Counsel and Service Information

Petitioner designates counsel listed below and consents to electronic service. A power of attorney for counsel is being filed herewith.

Lead Counsel Frederic M. Meeker (Reg. No. 35,282) fmeeker@bannerwitcoff.com Back-Up Counsel Bradley C. Wright (Reg. No. 38,061) bwright@bannerwitcoff.com Banner and Witcoff, Ltd. 1100 13th Street, NW, Suite 1200 Washington, DC 20005 Tel: (202) 824-3000 Fax: (202) 824-3001	Additional Back-Up Counsel Binal J. Patel (Reg. No. 42,065) bpatel@bannerwitcoff.com Banner and Witcoff, Ltd. 10 S. Wacker Dr., Suite 3000 Chicago, IL 60606 Tel: (312) 463-5000 Fax: (312) 463-5001 Scott M. Kelly (Reg. No. 65,121) skelly@bannerwitcoff.com Banner and Witcoff, Ltd. 1100 13th Street, NW, Suite 1200 Washington, DC 20005 Tel: (202) 824-3000 Fax: (202) 824-3001

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II. COMPLIANCE WITH THE REQUIREMENTS FOR A PETITION FOR *INTER PARTES* REVIEW

A. Payment of Fees Pursuant to 37 C.F.R. § 42.103

The undersigned authorizes the charge of any required fees to Deposit Account No. 19-0733.

B. Grounds for Standing Pursuant to 37 C.F.R. § 42.104(a)

Petitioner certifies that the '034 Patent is available for *inter partes* review and that Petitioner is not barred or estopped from requesting an *inter partes* review challenging claims 1-30 on the grounds identified in this Petition.[1]

III. OVERVIEW OF THE '034 PATENT

A. Brief Description of the Alleged Invention

The '034 Patent describes a system and method for "processing a search request received from a user operating a text input device" where the "search request is directed at identifying a desired item from a set of items." Ex.-1101, Abstract. Although described in the context of searching for television content items, the '034 Patent states that its "concepts can apply to processing search requests in a variety

[1] This Petition is being filed within one year of service on any entity named in the EDTX litigation.

of environments in which particular data items or content is sought in response to a user query." *Id.,* 4:16-22.[2]

A user starts the process by entering one or more characters to perform a search. The system of the '034 Patent provides a dynamic ordered listing of items where each item is ranked based on: (1) a popularity of the item; (2) a relevance value (or an adjusted relevance value) of a term associated with the item; and (3) a category relevance bias value of the item. *Id.*, Abstract, 6:6-25, *see also* claim 1.

Items being searched are assigned popularity values. *Id.,* 6:66-7:1, 7:50-52, Fig. 6B. The popularity values of the items serve "to indicate a relative measure of a likelihood that the item is desired by the user." *Id.*, claims 1 and 16.

In addition, the items may be described by one or more terms. For example, as depicted in Fig. 6A, the item "Seinfeld" (the TV serial) has a number of associated terms.

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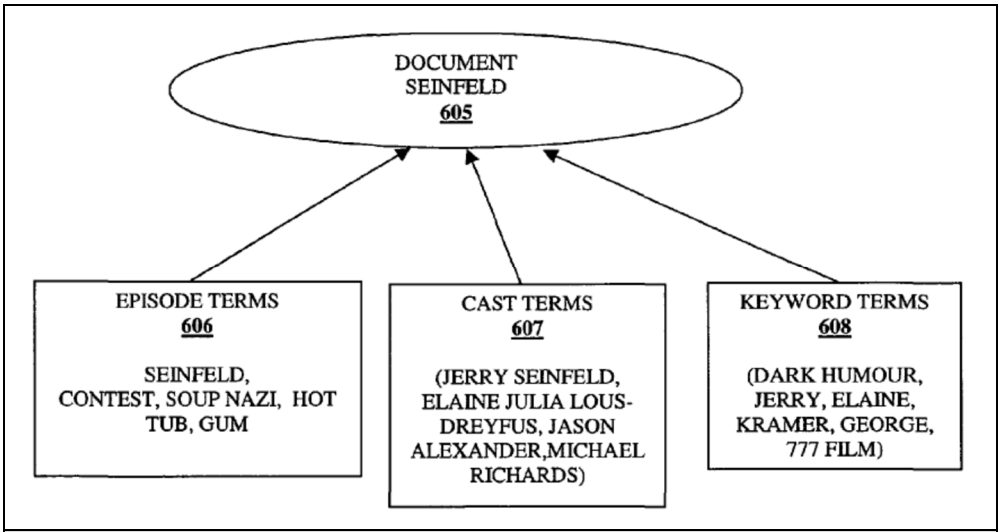
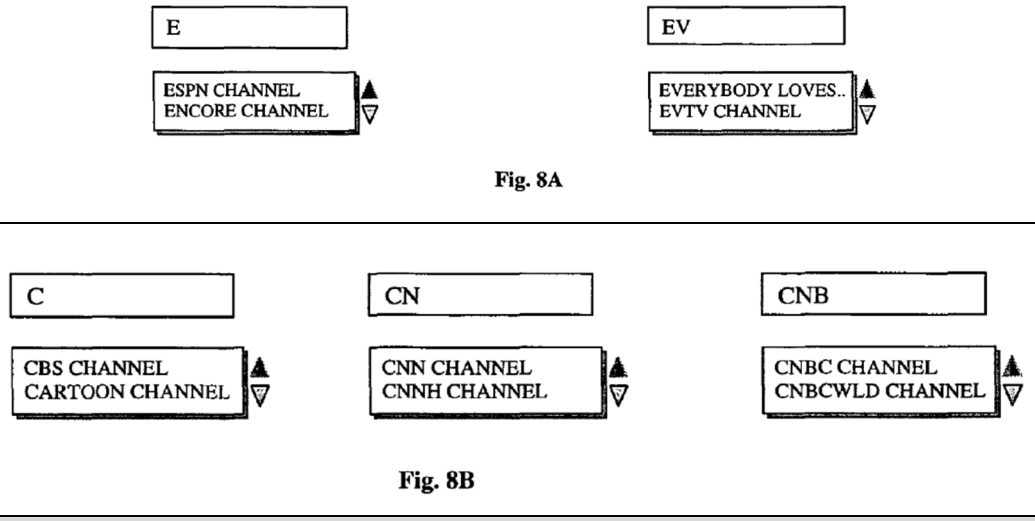
[2] The notation N:XX-YY refers to column (or page) number N, and lines XX to YY of a reference.



Ex.-1101, '034 Patent, Fig. 6A (excerpt)

The terms have relevance values that provide a relevancy of each term in identifying the item. *Id*., 2:64-3:4. Also, as shown in the example above, the terms associated with the "Seinfeld" item may be categorized into subspaces, e.g., episode terms 606, cast terms 607, and keyword terms 608. *Id.*, 7:44-49. Subspace categories may be biased to boost or suppress a category in generating an ordered listing of items resulting from the search, *id.*, 8:30-32, through the use of a "relevance bias value." *Id.*, claims 1, 16, *see also* 7:34-37.

As the user enters characters, an ordered list of items results from the search string. As shown in Figs. 8A-8B, reproduced below, the displayed items are ranked according to popularity and the listed items change as the user enters more characters (e.g., "E" then "EV").



Ex.-1101, '034 Patent, Figs. 8A-8B

The example in Fig. 8A "illustrates the case of a low popularity channel being superseded by a popular TV show 'Everybody [L]oves Raymond' on the entry of the second character." *Id.*, 9:28-30. The entry of a single character in the second example (Fig. 8B) "only brings up channels since the subspace biasing for the first character . . . boosts the majority of channel names over all other subspaces." *Id.*, 9:31-34. Both examples illustrate how the results list changes as a user enters more characters.

B. Prosecution History of the '034 Patent

The patent application that issued as the '034 Patent was filed on October 7, 2005 based on a provisional patent application filed on June 30, 2005. Ex.-1101. In the last Office action, the examiner rejected all of the claims under 35 U.S.C. § 103. Ex.-1108, pp. 5-20. The applicant overcame the examiner's rejection by agreeing to amendments suggested by the examiner, Ex.-1109, which were made in an

examiner's amendment. *See generally* Ex.-1110, pp. 6-16. The amendments made to independent claim 1 (and similarly to independent claim 16) are shown in underline below:

- for each item, associating a set of terms to describe the item and assigning a relevance value for each term based on a relevance of the term in identifying the term, the terms associated with the items being organized into searchable subspace categories, each subspace category having a relevance bias value; *id.*, p. 7 (emphasis in original).

- adjusting the relevance value assigned to at least one of the terms associated with one or more of the items retrieved in response to the one or more user-entered prefixes, wherein the adjusting of the relevance value is based on the count of the number of text characters received from the user; *id.,* p. 8 (emphasis in original).

- wherein at least one of the determining the first ranking order and determining the second ranking order is further based on the relevance bias value of the subspace categories. *Id.* (emphasis in original).

In other words, the examiner recognized—and the applicant acquiesced—that the other features of the claims were known in the art, including ranking items according to popularity, relevance and/or adjusted relevance.

IV. IDENTIFICATION OF CHALLENGE PURSUANT TO 37 C.F.R. § 42.104(B) AND STATEMENT OF THE RELIEF REQUESTED

A. 37 C.F.R. § 42.104(b)(1)&(2): Claims for Which Review is Requested and Ground(s) on Which the Challenge Is Based

Petitioner respectfully requests *inter partes* review and cancellation of claims 1-30 of the '034 Patent based on the following grounds of unpatentability:

Ground 1: Claims 1, 4, 6-8, 11-16, 19, 21-23 and 26-30 are unpatentable under 35 U.S.C. § 103 as obvious over U.S. Patent No. 7,039,635 ("Morgan") in view of U.S. Patent No. 6,718,324 ("Edlund").

Ground 2: Claims 2, 5, 9-10, 17, 20 and 24-25 are unpatentable under 35 U.S.C. § 103 as obvious over Morgan in view of Edlund and further in view of PCT Publication No. WO 2004/010323 ("Lowles").

Ground 3: Claims 3 and 18 are unpatentable under 35 U.S.C. § 103 as obvious over Morgan in view of Edlund and further in view of U.S. Patent Application Publication No. 2004/0267815 ("De Mes").

B. 37 C.F.R. § 42.104(b)(3): How the Challenged Claims Are to Be Construed and Level of Ordinary Skill in the Art

1. How the Challenged Claims Are to Be Construed

An unexpired claim subject to *inter partes* review "shall be given its broadest reasonable construction in light of the specification of the patent in which it

appears." 37 C.F.R. § 42.100(b). Consistent with this standard, the Board should construe these terms.[3]

i. "item"

The broadest reasonable construction of the term "item" in light of the specification is a particular thing (such as, but not limited to, a part of an enumeration, a document, a channel or a type of content). *See* Ex.-1113. The '034 Patent uses "item" as follows: "The present invention relates to data search techniques, and more particularly, to techniques for performing searches for television content and channels and other ***items***." Ex.-1101, 1:24-26 (emphasis added). The '034 Patent states that its disclosure is broadly applicable to "processing search requests in a variety of environments in which particular data ***items*** or content is sought in response to a user query." *Id.*, 4:20-22 (emphasis added), *see also,* 4:31-35 ("[t]elevision content items"), 6:66-67 ("content item (also referred to herein as a document, e.g., a particular movie")), Fig. 5 (box 502).

[3] Any claim term whose definition is not specifically discussed herein should be given its plain and ordinary meaning.

ii. "the text having one or more text characters of one or more prefixes for terms the user is using to identify a desired item"

The broadest reasonable construction of this limitation in light of the specification is one or more characters associated with a search string. The '034 Patent specification provides examples of a user entering a prefix having one, two, or more characters of the intended search query. *Id.*, 6:7-10 ("For example, to represent 'Brad Pitt,' the user may enter BP, BR P, BPI etc."), 9:45-51 ("For example, in the case of 'Everybody Loves Raymond' user could have entered 'E L' (E<space>L) instead of the query 'EV.' . . . in one case the input characters represented one prefix . . . while the other represented two prefixes."), 8:36-40.

iii. "the count of the number of text characters"

The broadest reasonable construction of the term "number of text characters" in light of the specification is the numerical magnitude of characters. As the user enters more characters, the magnitude of characters increases from a first magnitude (to determine the first ordered ranking of items) to a second magnitude (to determine the second ordered ranking of items). The change in magnitude causes the relevance value to adjust. *Id.*, 8:67–9:4.

During prosecution, the applicants asserted that "one of ordinary skill in the art would understand 'count of the number of text characters received from the user' to mean a numerical value . . . ." Ex.-1111, p. 11.[4]

iv. "subspace category"

The broadest reasonable construction of this limitation in light of the specification is a category, for part of a search space, associated with an item. The '034 patent explains: "The creation of subspaces may be based on a wide range of criteria including, but not limited to, (1) broad genre based subspace categorization, (2) individual term weighting-based categorization, or (3) personal search history (time sensitive and/or user specific) based categorization." Ex.-1101, 7:20-25. Examples of subspace categories include TV channel name, TV shows, TV casts, movie names, movie casts, and personalized search history. *Id.*, 7:37-49, Fig. 7.

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[4] The examiner correctly noted that the '034 Patent specification had little explanation of this limitation: "'Enumeration of characters in the user's search string' is not found in Applicant's Specification. Also, Applicant's Specification does not appear to definitely assign a specific interpretation to "number of text characters." Ex.-1112, p. 5. During prosecution, the examiner asserted the interpretation of this claim limitation meant the "number can be interpreted as a group of one kind." *Id.*, p. 7.

v. "relevance bias value"

The broadest reasonable construction of this limitation in light of the specification is a weighting or measure that gives preference over another. A "relevance bias value" can be a binary value, a real number value, or a constrained real number (e.g., a probability). For example, the relevance bias value of an item may be a weighting of a subspace category to boost or suppress a category over others. *Id.*, 8:30-32. The specification provides many examples of the relevance bias value. *See, e.g., id.*, 7:34-37, 7:46, 8:27, 8:34, 8:41-44, and Fig. 7.

2. The Level of Ordinary Skill in the Art

The relevant technology field for the '034 Patent is data/information search techniques. Ex.-1107, ¶40. A person of ordinary skill in this art ("POSA") would have had at least a bachelor's degree in computer science and at least two years of experience in the relevant field designing, constructing, and/or testing systems that utilize data and/or information search techniques. *Id*. The knowledge and skillset of such a person is reflected in the state of the art discussed in the Declaration of Edward A. Fox, PhD. *Id*., ¶¶48-60.

C. 37 C.F.R. § 42.104(b)(4): How the Claims Are Unpatentable

Sections VI and VII below explain how construed claims 1-30 of the '034 Patent are unpatentable under 35 U.S.C. §103, including an identification of where each element of the claims is taught by the prior art and the rationale for combining those teachings.

D. 37 C.F.R. § 42.104(b)(5): Evidence Supporting Petitioner's Challenge

The evidence supporting Petitioner's challenge is identified in the list of Exhibits above, including the Declaration of Dr. Edward A. Fox (Ex.-1107). Dr. Fox has considerable experience in the field of data searching. *Id.,* ¶¶5-29. His declaration provides factual support regarding the level of skill in the art, explains the prior art, and explains why the claimed invention would have been obvious to a POSA.

V. SUMMARY OF ARGUMENT

Claims 1-30 of the '034 Patent recite methods and systems for processing a search request. Ex.-1101, Abstract. The alleged innovation of the '034 Patent is to identify a desired item from a set of items in response to receiving a query input from a user involving a number of characters. *Id.*

As the user enters a query containing an initial character, items having one or more terms matching the input characters are identified. *Id.*, 3:20-26. This first group of items is ordered based in part on "relevance values" of the term in identifying the items and "popularity values" of the items, and then presented to the user. *Id.*, 3:27-32, 10:57-63 (claim 1).

As the user enters more characters, the system identifies a second group of items matching the characters received thus far. *Id.*, Abstract, 10:64-11:4 (claim 1). This second group of items is ordered at least in part based on "***adjusted*** relevance

values" of a term associated with identifying the items and "popularity values" of the items. *Id.*, 11:7-17 (claim 1).

Finally, the terms are organized into searchable "subspace categories" and each category has an associated "relevance bias value." This "relevance bias value" is also an input to "determining the first ranking order" and/or "determining the second ranking order" of items. *Id.*, 11:22-25 (claim 1).

For the reasons set forth below, claims 1-30 of the '034 Patent would have been obvious to a POSA.

Ground 1 discussed below relies on at least the teachings of Morgan in view of Edlund. Morgan teaches that it was known to rank items based on a combination of popularity value of the item, relevance value of the term to the item, adjusted relevance value of the term to the item (where the relevance value is adjusted based on character count), and a category bias value of the term to the item. *Infra* Section VII.A. To the extent Morgan arguably doesn't teach it, Edlund teaches that it was known to assign popularity and relevance values to terms as they pertain to items. *Infra* Section VII.A.

Ground 2 discussed below relies on at least the aforementioned teachings of Morgan in view of Edlund and further in view of Lowles. Lowles teaches known techniques for text input processing, which is directed to an aspect of the Morgan system. *Infra* Section VII.B. Lowles also teaches that it was known that text input

processing can be a function of the number of characters entered by the user. *Infra* Section VII.B. Lowles further teaches that it was known to display information on display constrained devices such as mobile devices. *Infra* Section VII.B.

Ground 3 discussed below relies on at least the aforementioned teachings of Morgan in view of Edlund and further in view of De Mes. De Mes teaches that it was known to leverage information relating to personal browsing history to determine ordering of items. *Infra* Section VII.C.

In short, the limitations of claims 1-30 were known in the prior art. Combining the known teachings of Morgan-Edlund, Morgan-Edlund-Lowles, and/or Morgan-Edlund-De Mes would have been obvious to a POSA. As explained in Sections VI and VII below, such a person would have known to dynamically generate an ordered listing of items as the user enters text characters where the ordered listing is ranked using known criteria such as relevance of the search term to the items, an adjusted relevance of the terms to the items based on a character count of the user's text entry, item popularity, and biasing of subspace categories associated with the search terms.

Accordingly, a POSA would have found the '034 Patent to claim a "combination of familiar elements according to known methods" that "does no more than yield predictable results." *KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. 398, 416 (2007).

VI. THE CLAIMS ARE UNPATENTABLE

A petition for *inter partes* review must demonstrate "a reasonable likelihood that the petitioner would prevail with respect to at least one of the claims challenged in the petition." 35 U.S.C. § 314(a). This Petition meets this threshold. The grounds discussed below and in the Declaration of Dr. Fox (Ex.-1107) demonstrate that the challenged claims are unpatentable for obviousness. Each ground is discussed in turn below, and relies on the teachings of the references as would have been understood by a POSA. Each ground provides a description of the scope and content of the prior art, considers the differences between the claimed invention and the prior art, and resolves the level of ordinary skill in the art. *See Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966). Considering the knowledge, experience, and creativity of a person of ordinary skill in the art, such a person would have found the challenged claims to be a "predictable use of prior art elements according to their established functions," and therefore obvious in view of this prior art. *See KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. 398, 417 (2007).

This Petition presents references and arguments not presented or considered during prosecution. None of the references in the combination of Morgan, Edlund, Lowles, and De Mes were applied during prosecution and none were cited on the '034 Patent. Additionally, the grounds discussed below are not redundant of the ground in the other petition concurrently filed herewith, as they rely on different

prior art combinations and different rationales for applying their teachings to each other.

VII. SPECIFIC GROUNDS FOR UNPATENTABILITY

Pursuant to Rule 42.104(b)(4)-(5), the specific grounds discussed below and in the Declaration of Dr. Fox (Ex.-1107) demonstrate that the challenged claims are unpatentable for obviousness.

A. GROUND 1: Claims 1, 4, 6-8, 11-16, 19, 21-23, 26-30 Are Unpatentable Over Morgan in View of Edlund

Morgan (Ex.-1102) is a U.S. patent that issued on May 2, 2006 based on a patent application filed August 22, 2002 and provisional application filed June 11, 2002, and thus is prior art under pre-AIA 35 U.S.C. § 102(e).

Edlund (Ex.-1103) is a U.S. patent that issued on April 6, 2004, and thus is prior art under pre-AIA 35 U.S.C. § 102(b).

1. Independent Claim 1

The preamble to claim 1 recites "A method of processing a search request received from a user operating a hand-held text input device, the search request directed at identifying a desired item from a set of items, each of the items having one or more associated terms, the method comprising." Ex.-1101, claim 1. Morgan discloses "[i]n response to characters entered within a Find dialog box, a minifind window is dynamically updated to provide corresponding search strategies and quick matches from content search data that are being searched." Ex.-1102, Abstract.

Morgan also discloses that its system may be implemented within "handheld devices, pocket personal computing devices, digital cell phones adapted to connect to a network . . . ." *Id.*, 5:11-21. Thus, to the extent the preamble is limiting, Morgan discloses the preamble limitations. Ex.-1107, ¶¶104-05.

i. "providing the set of items, the items having assigned popularity values to indicate a relative measure of a likelihood that the item is desired by the user"

Morgan discloses a minifind window that displays search strategies and quick matches (i.e., "items") based on data that is being searched. Ex.-1107, ¶107. At least the search strategies are grouped and ordered based on an assigned popularity value. *Id.*, ¶¶106-08. Morgan discloses a process step "which orders the strategies in the list by rank, with the higher priority strategies (i.e., the most likely intended strategies) moved near the top of the list and the lower priority strategies moved nearer the bottom of the list." Ex.-1102, 12:32-36, Fig. 4 (step 212), *see also*, 3:32-40, 3:64–4:1; Ex.-1107, ¶¶107-08. Morgan therefore discloses a process where rankings are made based on popularity of the items.

Moreover, it would have been obvious to modify Morgan to also assign popularity values to the quick matches. *Id*., ¶108. A POSA would have appreciated the value of applying popularity values to quick matches for the same reason Morgan discloses assigning popularity values to search strategies (i.e., providing the higher

priority strategies near the top and the lower priority strategies nearer the bottom). *Id.*

If Morgan arguably does not expressly teach assigning popularity values to items, Edlund teaches it. *Id.*, ¶109. Edlund assigns a popularity value (i.e., a measure of a likelihood of being desired) to Web documents based on the number of times a document has been accessed. Ex.-1103, 3:46-50 ("Three measures are combined when calculating the overall document relevance: . . . (b) version-adjusted popularity value (e.g., number of accesses to each version of the document . . . ."), 10:2-7 ("The Ranking Database (0208) contains all the data the present invention needs to calculate the version adjusted popularity and the document recency . . . . The value for each record is the number of hits used to count the popularity").

It would have been obvious to combine the teachings of Edlund with Morgan to assign popularity values to the search strategies and the quick matches and utilize popularity in the Morgan search engine. Ex.-1107, ¶113. Under Supreme Court precedent, "if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill." *KSR*, 550 U.S. at 417.

Both Edlund and Morgan relate to searching for content based on user input search strings. Ex.-1107, ¶111. At a minimum, as discussed above, Morgan

discloses using popularity (i.e., the most likely intended strategies) to perform ranking. A POSA would know from Edlund that assigning popularity values to both the search strategies and the quick matches may be utilized as a tool to rank the search strategies and the quick matches according to popularity. *Id.*, ¶¶111-13.

Moreover, it would have been within the capabilities of a POSA to implement the popularity values of Edlund to efficiently rank the search strategies and the quick matches (i.e., items). *Id.*, ¶112. Likewise, a POSA would have recognized the advantages of assigning popularity values to the search strategies and the quick matches and would have been motivated to do so in order to best rank the search strategies and the quick matches as disclosed in Morgan. *Id.* Assigning popularity values would have been easily predictable to a POSA and would yield predictable results. *Id.* Thus, it would have been obvious to modify Morgan with the teachings of Edlund to assign popularity values to the search strategies and the quick matches (i.e., items) of Morgan in order to enable the user to efficiently search and access desired information in a body of data. *Id.*, ¶113; Ex.-1102, 1:17-19.

ii. "for each item, associating a set of terms to describe the item and assigning a relevance value for each term based on a relevance of the term in identifying the item,"

Morgan discloses a minifind window listing search strategies and quick matches (i.e., "items") based on data that is being searched. Ex.-1102, Abstract, Figs. 7B, 8. At least the search strategies and quick matches are identified based on

a relevance value of the term. For example, Morgan identifies potential search strategies that match (i.e., that have a threshold relevance value to) the user-typed term. *Id.*, 12:21-30, Fig. 4 (steps 206 and 210).

Similarly, as to quick matches, Morgan identifies all the potential quick matches that match the user-typed term (i.e., the quick matches that have a threshold relevance value to the term). *Id.*, 12:47-52, Fig. 5 (step 254). Morgan also explains that this step "substantially reduces the number of items included in the quick matches list" and "includes items with words that start with the characters input by the user, even though the words are not the first words in the item as displayed. For example, if the user enters 'rup,' the quick matches listing will include 'Prince Rupert.'" *Id.*, 13:2-10, Fig. 5 (step 254).

Thus, Morgan discloses that its terms have assigned relevance values based on the relevance of the term in identifying the item. Ex.-1107, ¶¶114-17.

If Morgan arguably does not expressly teach assigning relevance values, Edlund teaches it. *Id.*, ¶118. Edlund discloses assigned relevance values to terms that shows the relevance of the term in identifying the item. Ex.-1103, 2:20-25, 3:26-32.

Under Supreme Court precedent, "if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its

actual application is beyond his or her skill." *KSR*, 550 U.S. at 417. Both Edlund and Morgan relate to searching for content based on user input search strings. Ex.-1107, ¶119. At a minimum, Morgan discloses using relevance to perform ranking. *Id*. A POSA would know from Edlund that relevance values may be utilized to rank the search strategies and quick matches according to relevance. *Id*.

Moreover, it would have been within the capabilities of a POSA to implement the relevance values of Edlund to efficiently rank the search strategies and quick matches (i.e., items). *Id.,* ¶120. Likewise, a POSA would have recognized the advantages of assigning relevance values to the search strategies and quick matches and would have been motivated to do so in order to best rank the search strategies and quick matches as disclosed in Morgan. *Id.* For these reasons, assigning relevance values to the search strategies and quick matches would have been easily predictable to a POSA and would yield predictable results. *Id.* Thus, it would have been obvious to modify Morgan based on Edlund to assign relevance values to enable the user to efficiently search and access desired information in a body of data. *Id.*, ¶121; Ex.-1102, 1:17-19. In other words, a POSA would understand that it is common for search engines to compute and store in an index "a relevance value for each term based on a relevance of the term in identifying the item," as required in this limitation of claim 1. Ex.-1107, ¶118.

iii. "the terms associated with the items being organized into searchable subspace categories, each subspace category having a relevance bias value"

Morgan teaches providing a listing of subspace categories that can be selected to narrow the search results. Morgan states that "the user can select an advanced search button 376, which displays advanced search options 380 as shown in FIG. 10. These advance search options enable the user to filter the search results shown in search results pane 358, according to content type, or according to a selected category/subcategory." Ex.-1102, 11:3-8, Fig. 10. In other words, each subspace category initially has the same subspace category relevance bias value (i.e., each subspace category is considered in the search). By the user selecting a category/subcategory, the relevance bias values of the subspace categories are adjusted so that only the selected category/subcategory is searched and the remaining categories/subcategories are not searched. Ex.-1107, ¶124.

Thus, Morgan discloses that the terms associated with the items are organized into searchable subspace categories and that the subspace categories initially have a common subspace category relevance bias value. *Id.*, ¶¶122-24.

iv. "receiving text on the hand-held text input device entered by the user, the text having one or more text characters of one or more prefixes for terms the user is using to identify a desired item"

Morgan's system may be implemented within a hand-held text input device. Ex.-1102, 5:11-21 ("handheld devices, pocket personal computing devices, digital

cell phones adapted to connect to a network . . . .”). Morgan also discloses that the hand-held device may be used to receive text entered by the user. *Id.*, Abstract (“[i]n response to characters entered within a Find dialog box, a minifind window is dynamically updated to provide corresponding search strategies and quick matches from content search data that are being searched.”). Morgan further discloses that the text may have one or more text characters of prefixes for the term the user is using to identify a desired item. *See, e.g.*, *id.*, 2:53-61 (“[f]or many words, it may be that typing only a portion of the word is sufficient to indicate the word in its entirety, or at least to narrow the field of choices regarding related matching items . . .” and “Microsoft Corporation's INTERNET EXPLORER™ and other programs provide auto completion of text entries, using entries that were previously input in the program . . . .”). Finally, Morgan’s system parses the string input to find potential matches. *Id.*, 12:4-6 (“[s]tep 200 provides for parsing the string input by the user, which may comprise a portion of a word or even a single character, or one or more words.”), 12:7-9 (“finds any matches between search content data types, aliases, and tokens relative to the parts of speech and tokens identified in step 200.”), Fig. 4.

Thus, Morgan discloses receiving text on the hand-held text input device that was entered by the user, where the received text has text characters of prefixes for terms the user is using to identify a desired item. Ex.-1107, ¶¶126-29.

v. "in response to receiving a text character, performing a first incremental find to compare the one or more user-entered prefixes with the terms associated with the items and to retrieve the relevance values for the one or more user-entered prefixes matching terms associated with the items"

Morgan discloses "performing a first incremental find to compare the one or more user-entered prefixes with the terms associated with the items." Morgan "waits for a user to type a character within the Find dialog box . . . determines if at least 400 milliseconds has elapsed since the last character was input by the user," and, if so, "populates the search strategies list . . . [and] the quick matches list based upon the one or more characters input by the user." Ex.-1102, 11:19-34, Fig. 3 (steps 152, 154, 156, and 158).

For search strategies, Morgan "provides for parsing the string input by the user, which may comprise a portion of a word or even a single character, or one or more words," and "finds any matches between search content data types, aliases, and tokens relative to the parts of speech and tokens identified in step 200." *Id.*, 12:1-9, Fig. 4 (step 200, 202, 204).

Similarly, for quick matches, Morgan "includes items with words that start with the characters input by the user, even though the words are not the first words in the item as displayed. For example, if the user enters 'rup,' the quick matches listing will include 'Prince Rupert.'" *Id.*, 13:2-10, Fig. 5 (step 254). In another example, if the user enters "Turk," the quick matches listing will include items that

start with or contain the text "Turk." (e.g., "Turkana," "Turkana Boy" and "Turkana, Lake"). *Id.*, Fig. 7B.

To identify relevant items (i.e., search strategies and quick matches), Morgan must perform an incremental find to compare the user-entered prefixes with the terms associated with the items and to identify those items that have a minimum relevance value to the user-entered prefixes. Ex.-1107, ¶134. While Morgan may not expressly disclose a process for actually retrieving "relevance values for the one or more user-entered prefixes matching terms associated with the items," it does disclose identification of search strategies and quick matches that meet or exceed a threshold relevance such that they should be listed. *Id.*, ¶135.

If Morgan arguably does not expressly teach retrieving relevance values, Edlund teaches it. Edlund assigns documents a "content relevance" which is a matching of the query search term to words in a document. Ex.-1103, 3:46-48 ("Three measures are combined when calculating overall document relevance: (a) content relevance (e.g., matching of query search terms to words in a document . . . .").

Edlund also discloses a data flow utilized to search for items based on a combination of each item's relevance value and popularity value. *Id.*, Fig. 1. The user (0154) inputs keywords for a query (0155) and the search engine (0156) "calculates the content relevance . . . and return [sic] a list of search results ranked

based on this content relevance." *Id.,* 6:10-12, *see also, id.*, 3:29-32, 2:52, 3:7, 5:45-47, 6:2, 6:28, 8:29-31, Fig. 1, Fig. 3.

Under Supreme Court precedent, "if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill." *KSR*, 550 U.S. at 417. Both Edlund and Morgan relate to searching for content based on user input search strings. Ex.-1107, ¶119. At a minimum, Morgan discloses using relevance to perform ranking. *Id*. A POSA would know from Edlund that relevance values may be utilized to rank search strategies and quick matches according to relevance. *Id*. Thus, it would have been obvious to modify Morgan with the teachings of Edlund to assign relevance values to enable the user to more efficiently search and access desired information in a body of data. *Id.*, ¶121. In other words, a POSA would understand that it is known for search engines to "retrieve the relevance values for the one or more user-entered prefixes matching terms associated with the items." Id., ¶¶136-38.

vi. "determining a first ranking order of items found in the first incremental find based at least in part on the retrieved relevance values and the assigned popularity values of the items found in the first incremental find"

Morgan discloses "determining a first ranking order of items [i.e., search strategies] found in the first incremental find based at least in part on the retrieved relevance values and the assigned popularity values of the items found in the first

incremental find." *Id.*, ¶139. Following Morgan in Fig. 4, the process at step 206 "creates a matching search strategy and adds it to the list of search strategies," and at "step 210 checks to determine if there is yet another match identified in step 202 and if so, the logic returns to step 206 to add another search strategy to the list." Ex.-1102, 12:21-23, Fig. 4 (steps 202, 206). In other word, this process in Morgan identifies the items that have a threshold relevance value. Morgan continues and provides that "[a]fter no additional matches are identified in decision step 210, the logic proceeds to a step 212, which orders the strategies in the list by rank, with the higher priority strategies (i.e., the most likely intended strategies) moved near the top of the list and the lower priority strategies moved nearer the bottom of the list." *Id.*, 12:31-36, Fig. 4 (steps 210, 212). In other words, Morgan then ranks the identified relevant items according to popularity.

vii. "ordering and presenting one or more items to the user found in the first incremental find based on the first ranking order"

Morgan discloses "ordering and presenting one or more items [i.e., search strategies and quick matches] to the user found in the first incremental find based on the first ranking order." Ex.-1107, ¶¶140-42. Morgan discloses a display. Ex.-1102, 4:17-21. Morgan also discloses, as an example in Fig. 7B, a "Find dialog box after four characters ['Turk'] have been input, showing how the list of search strategies has changed in response thereto, and showing a list of corresponding quick matches." *Id.*, 4:56-59. Search strategies list 356' and quick matches 364 now

include items that correspond to the characters input by the user with a first entry. *Id.*, 10:33-43, Figs. 7A, 7B, 8.

viii. "in response to receiving at least one subsequent text character, performing a second incremental find to compare the one or more user-entered prefixes, including the at least one subsequent text character and any preceding text characters, with the terms associated with the items and to retrieve the relevance values for said one or more user-entered prefixes matching terms associated with the items"

Morgan discloses updating the search strategies and quick matches in response to the user entering more text characters. Ex.-1107, ¶143. Morgan discloses "in response to receiving at least one subsequent text character, performing a second incremental find to compare the one or more user-entered prefixes, including the at least one subsequent text character and any preceding text characters, with the terms associated with the items and to retrieve the relevance values for said one or more user-entered prefixes matching terms associated with the items." *Id.*

Morgan discloses that "search strategies and quick matches that are listed are dynamically updated as the user inputs additional characters in the Find dialog box." Ex.-1102, Abstract. "As other characters are input by the user, search strategies list 352 and quick matches list 364 are repopulated with corresponding related entries." Ex.-1102, 10:44-46, Figs. 7A, 7B, 8. For example, "decision step 160 determines if the user has pressed Enter or activated the Go control, or selected one of the search

strategies or quick match items in either of those lists. If not, the logic returns to step 152 to wait for the user to input another character (or to initiate a search by carrying out one of the user options indicated in decision step 160)." Ex.-1102, 1:35-40, Fig. 3.

ix. "determining a count of the number of characters of text received from the user"

Morgan discloses determining a count of the number of characters of text received from the user. Ex.-1107, ¶144. Morgan teaches that quick match entries will vary depending on the number of characters of text entered by the user and received by the system. *Id*. Morgan discloses that it "counts the number of characters entered" as part of its process for generating the quick match listing. Ex.-1102, 12:44-46, Fig. 5.

x. "adjusting the relevance value assigned to at least one of the terms associated with one or more of the items retrieved in response to the one or more user-entered prefixes, wherein the adjusting of the relevance value is based on the count of the number of text characters received from the user"

Morgan discloses "adjusting the relevance value assigned to at least one of the terms associated with one or more of the items retrieved in response to the one or more user-entered prefixes, wherein the adjusting of the relevance value is based on the count of the number of text characters received from the user." Ex.-1107, ¶¶145-49. Morgan discloses that determining the quick match listing depends on the count of the number of text characters received from the user. *Id.*, ¶145.

Morgan discloses that "[i]n the event that the count determined in step 250 is less than the predefined minimum in decision step 252, a step 258 populates the quick matches list with the ***entire list*** of articles, media, titles, etc. Next, the logic in a step 260 scrolls through the list to the first prefix match (or closest available match)." Ex.-1102, 12:64–13:2 (emphasis added), Fig. 5. Thus, Morgan assigns the same relevance value to the listings in the quick match field if the count of the number of text characters received from the user is below a certain threshold. Ex.-1107, ¶148.

Alternatively, "[i]f the count obtained in step 250 is not less than (i.e., is greater than or equal to) a predefined minimum in a decision step 252, a step 254 populates the quick matches list of the minifind window with a ***subset listing*** of articles, media, titles, etc. having words that start with the characters currently input by the user." Ex.-1102, 12:47-52 (emphasis added), Fig. 5. Thus, in providing a subset listing (where the count of the number of text characters received from the user exceeds a certain threshold), Morgan necessarily adjusts the relevance value assigned to at least one of the terms associated with the retrieved quick match items. Ex.-1107, ¶148.

Similarly, with respect to search strategies, when the user enters "Turk," and then later enters "ey," the relevance of search strategies identified in the first ordered ranking will be different than the relevance of the search strategies in the second

ordered ranking. *Id.*, ¶149. Thus, as the user enters more characters, the relevance of any term as it relates to the search strategy is necessarily different than before, and is therefore adjusted. *Id*.

xi. "determining a second ranking order of the items found in the second incremental find based at least in part on the adjusted relevance values and the assigned popularity values of the items found in the second incremental find; and"

Morgan discloses determining a second ranking order of the items found in the second incremental find based at least in part on the adjusted relevance values and the assigned popularity values of the items found in the second incremental find. *Id.*, ¶¶150-52.

Morgan discloses updating search strategies and quick matches as the user enters more text characters. Ex.-1102, Abstract ("The search strategies and quick matches that are listed are dynamically updated as the user inputs additional characters in the Find dialog box."), 10:44-46 ("As other characters are input by the user, search strategies list 352 and quick matches list 364 are repopulated with corresponding related entries."), 11:35-40 ("decision step 160 determines if the user has pressed Enter or activated the Go control, or selected one of the search strategies or quick match items in either of those lists. If not, the logic returns to step 152 to wait for the user to input another character (or to initiate a search by carrying out one of the user options indicated in decision step 160)."), Figs. 3, 7A, 7B, 8.

Thus, after the first incremental find, when the user enters more characters, the relevance value of quick matches and search strategies is adjusted. Ex.-1107, ¶152. These entries are therefore based on adjusted relevance values. *Id*.

xii. "ordering and presenting one or more items to the user based on the second ranking order so that the relative order of the items found in both the first and second incremental finds is adjusted as characters are entered"

Morgan discloses ordering and presenting search strategies and quick matches based on the second ranking order so that the relative order of these items found in both the first and second incremental finds is adjusted as characters are entered. *Id.*, ¶154. Morgan discloses displaying the ordered listing of search strategies and quick matches. *Id.*, ¶153. For example, Fig. 7B depicts the Find dialog box after four characters ("Turk") have been input and Fig. 8 depicts the Find dialog box after a full word ("Turkey") has been input, showing changes in the list of search strategies and quick matches. Ex.-1102, 4:60-63, Figs. 7B, 8.

xiii. "wherein at least one of determining the first ranking order and determining the second ranking order is further based on the relevance bias values of the subspace categories."

Morgan discloses that the first ranking order or the second ranking order can be further based on the relevance bias values of the subspace categories. Ex.-1107, ¶¶155-57. Fig. 10 of Morgan depicts a listing of various subspace categories that can be selected by the user to narrow the search results. Ex.-1102, 11:3-8 ("the user can select an advanced search button 376, which displays advanced search options

380 as shown in FIG. 10. These advance search options enable the user to filter the search results shown in search results pane 358, according to content type, or according to a selected category/subcategory."), Fig. 10.

Morgan discloses that search results can be narrowed after the search strategies and quick matches are generated. Ex.-1107, ¶156. However, because there are a limited number of options (i.e., before or after), it would have been readily apparent to a POSA to modify Morgan to allow for selecting subspace categories prior to generating the search strategies and quick matches. *Id*. Thus, it would have been obvious to run the advanced search option in Morgan to generate a ranking order of items that fall within the selected category/subcategory. *Id.*, ¶157.

In other words, it would have been apparent to a POSA that the processes of determining the first and second ranking order can be based on the relevance bias values of the subspace categories (i.e., by the user selecting the desired subspace categories). *Id.*, ¶157.

2. Dependent Claim 4

Claim 4 depends from claim 1 and recites "the ordering and presenting of one or more items is limited to items having associated terms of one or more selected subspace categories." As explained above with respect to claim 1, Fig. 10 of Morgan discloses a listing of various subspace categories that can be selected to narrow the search results. Ex.-1102, 11:3-8, Fig. 10. This advanced search option allows

Morgan to generate a ranking order of items that fall within the selected category/subcategory. Ex.-1107, ¶159. Thus, in Morgan, the processes of determining the first and second ranking order can be limited to items having associated terms of one or more selected subspace categories. *Id.*

3. Dependent Claim 6

Claim 6 depends from claim 1 and recites "the ordered and presented one or more items are presented on a display device, the display device having display space allocated according to the subspace categories." Morgan discloses this limitation. Fig. 10 of Morgan discloses a listing of various subspace categories that can be selected to narrow the search results. Ex.-1102, 11:3-8, Fig. 10. Morgan also discloses that items may be displayed according to subspace categories. *Id.*, 2:26-33 ("[r]eference works will sometimes enable a user to select a specific category prior to entry of a search query. For example, a user might selectively make a search for a geographic location by initially limiting the search to data maintained in an atlas database. Alternatively, after the user enters a query, ***the search engine may provide a list of alternatives in different categories*** from which the user may choose to more accurately access information of interest.") (emphasis added). *See also*, Ex.-1107, ¶161. As another example, Morgan shows certain quick matches being displayed in groups, as shown in the expandable subspace categories of "Turk Broda," "Turk Edwards" and "Turkana Bay" in Fig. 7B. Ex.-1102, Fig. 7B, *see,*

also, Fig. 8 (search strategies, and quick matches), Fig. 9 ("Turkey," "Items containing the word(s) 'turkey'").

4. Dependent Claims 7 and 8

Claim 7 depends from claim 1 and recites "the hand-held text input device includes a set of overloaded keys generating an ambiguous text input." Claim 8 depends from claim 7 and adds that "the hand-held text input device is a phone, a mobile computing device, or a remote control device for a television." Morgan discloses that its system may be practiced with a digital cell phone. *Id.*, 5:11-21 ("invention may be practiced with . . . digital cell phones . . . ."). A POSA would understand that cell phones available in June 30, 2005 had a set of overloaded keys generating an ambiguous text input. Ex.-1107, ¶163. The 12-key layout of digital cell phones of that time were overloaded keys (e.g., the "2" key being mapped to letters "a," "b," and "c"). *Id.* Morgan therefore discloses the use of a hand-held text input devices that include a set of overloaded keys generating an ambiguous text input. *Id.*

5. Dependent Claim 11

Claim 11 depends from claim 1 and recites "the assigned popularity values of one or more items of the set of items is based on a relative measure of popular opinion of the item." Morgan discloses ordering search strategies with the higher priority strategies (i.e., the most likely intended strategies) moved near the top of the

list and that they may be reordered based upon a "best match" determined algorithmically. Ex.-1107, ¶164; Ex.-1102, 9:19-27, 12:31-36, Fig. 4 (step 212), *see also*, 3:32-40, 3:64–4:1.

If Morgan does not expressly show that the assigned popularity values of one or more of the items (e.g., search strategies) are based on a relative measure of popular opinion of the item, Edlund teaches it. Ex.-1107, ¶165. Edlund assigns documents a popularity value based on the number of times a document has been accessed, which is a relative measure of popular opinion of the item. Ex.-1103, 3:46-50 ("Three measures are combined when calculating the overall document relevance: . . . (b) version-adjusted popularity value (e.g., number of accesses to each version of the document . . ."), 10:2-7 ("The Ranking Database (0208) contains all the data the present invention needs to calculate the version adjusted popularity and the document recency . . . . The value for each record is the number of hits used to count the popularity"), 7:27-31.

It would have been obvious to combine the teachings of Edlund with Morgan to assign popularity values to the search strategies and utilize popularity in the Morgan search engine. Ex.-1107, ¶167. Under Supreme Court precedent, "if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill." *KSR*,

550 U.S. at 417. Both Edlund and Morgan relate to searching for content based on user input search strings. Ex.-1107, ¶111. At a minimum, "Morgan discloses using popularity (i.e., the most likely intended strategies) as part of a ranking methodology." *Id.* A POSA would know from Edlund that assigning popularity values to the search strategies may be utilized to rank the search strategies according to popularity. *Id*. Thus, it would have been obvious to modify Morgan with the teachings of Edlund to assign popularity values to the search strategies of Morgan to enable the user to more efficiently search and access desired information in a body of data. Ex.-1107, ¶167.

6. Dependent Claim 12

Claim 12 depends from claim 1 and recites "the assigned popularity values of one or more items of the set of items is based on a temporal relevance of the items or a location relevance of the items." Morgan discloses this limitation. Ex.-1107, ¶168. Morgan discloses that the user may be enabled to selectively make a search for a geographic location by initially limiting the search to data maintained in an atlas database. Ex.-1102, 2:26-30. Similarly, Fig. 10 of Morgan shows advanced search buttons that include a Historical Maps category. *Id.*, 11:3-8, FIG. 10.

7. Dependent Claim 13

Claim 13 depends from claim 1 and recites "at least one of determining the first ranking order and determining the second ranking order is further based on the

number of prefixes of the received text." Morgan discloses this limitation. Ex.-1107, ¶¶171-73. Morgan discloses the search strategies varying based on the number of prefixes (or words) entered by the user. *Id.,* ¶171. For example, the Search Strategy will vary depending on whether the user types just "Canada" or "map of Canada." Ex.-1102, 9:19-27. In other words, the search strategies will vary depending on whether the user types one prefix or three prefixes. Ex.-1107, ¶¶171-73.

8. Dependent Claims 14 and 15

Claim 14 depends from claim 1 and recites "a portion of the set of items resides on a computer remote from the user." Claim 15 depends from claim 1 and recites "a computer remote from the user performs at least one of the steps of receiving text entered by the user, performing the first incremental find, determining the first ranking order, performing the second incremental find, determining the count of the number of characters of text received, adjusting the relevance values of the terms associated with the items, and determining the second ranking order."

Morgan discloses a distributed computing environment involving remote computers and where tasks may be performed by remote processing devices and where program modules may be located in remote memory storage devices. Ex.-1102, 5:21-26, 6:40-51. Morgan describes a variety of network environments and devices (*id.*, 6:40-7:3) and, in particular, discloses finding information regardless of

whether it is "accessed locally, or over a network." *Id.*, Abstract, 8:26-28, 8:33-35, 11:47-50. Thus, Morgan discloses that a portion of the set of items resides on a computer remote from the user (e.g., remote processing and remote memory storage devices). Ex.-1107, ¶¶175-76. Morgan also discloses that the various process steps of claim 1 may be performed in a remote processing device. *Id.*

9. Independent Claim 16

Independent claim 16 is an apparatus claim reciting limitations similar to independent claim 1. Any differences between claims 1 and 16 do not affect unpatentability in view of Morgan and Edlund. *Id.*, ¶177.

The preamble to claim 16 differs from claim 1 in that it recites a "system" whereas claim 1 recites a "method." The preamble to claim 16 recites "A system for processing a search request received from a user operating a hand-held text input device, the search request directed at identifying a desired item from a set of items, each of the items having one or more associated terms, the system comprising."

Morgan discloses these limitations found in the preamble. *Id.*, ¶179; Ex.-1102, Abstract ("[i]n response to characters entered within a Find dialog box, a minifind window is dynamically updated to provide corresponding search strategies and quick matches from content search data that are being searched."), 5:11-21 ("handheld devices, pocket personal computing devices, digital cell phones adapted to connect to a network . . . .").

i. "a first memory for storing at least a first portion of the set of items, the items having assigned popularity values to indicate a relative measure of a likelihood that the item is desired by the user, and"

Like claim 1, claim 16 recites assigning popularity values to items. Claim 16 differs in that it requires a "first memory for storing at least a first portion of the set of items." Adding a memory does not materially alter the obviousness analysis or differences between the claimed invention and the prior art.

The only difference of significance is that this limitation includes "first memory for storing at least a first portion" of the items. Morgan discloses this. Ex.-1107, ¶¶180-81. Morgan discloses a first memory for storing at least a first portion of the items. Ex.-1102, 5:27-38 ("an exemplary system . . . includes . . . a system memory 22 . . . . The system bus . . . may be any of several types of bus structures, including a memory bus or memory controller . . . . The system memory includes read only memory (ROM) 24 and random access memory (RAM) 25."), 8:11-13 ("is to enable a user to more efficiently find desired information within content search data 102"), 8:52-53 ("[i]n order to generate the quick matches list, the present invention accesses content search data 102."), Fig. 2.

As to the remaining portions of this limitation, Morgan discloses them as discussed regarding claim 1. Ex.-1107, ¶106. Also, as discussed regarding claim 1, if Morgan arguably does not expressly teach assigning popularity values to items, Edlund teaches it. *Id.*, ¶109.

ii. "each item being associated with a set of terms to describe the item, each term being assigned a relevance value based on a relevance of an informational content of the term in identifying the item,"

Like claim 1, this limitation assigns a relevance value to each term, but differs from claim 1 in that that relevance values are "based on a relevance of an informational content of the term in identifying the item." There is no substantial difference between the claims for purposes of invalidity.

Morgan discloses identifying and listing search strategies and quick matches (i.e., "items") from content search data that are being searched. Ex.-1102, 2:64-3:2, 7:65-8:8, Fig. 3. Morgan also discloses that the search strategies and quick matches are identified based on a relevance value of the term. *Id.*, 2:3-8. A POSA would understand that the relevance value is "based on a relevance of an informational content of the term in identifying the item." Ex.-1107, ¶183.

To the extent Morgan does not expressly disclose that the "relevance value [is] based on a relevance of an informational content of the term in identifying the item," it would have been obvious to do so. Edlund discloses assigning documents a "content relevance" based on matching the keyword search term to words in a particular document (Ex.-1103, 3:46-48), which results in assigning a relevance value based on the informational content of the term in identifying the document. Ex.-1107, ¶184. It would have been obvious to combine and/or modify Morgan in view of Edlund. *Id*., ¶185. Both Edlund and Morgan relate to searching for content

based on user input search strings. Morgan's search identifies items based on relevance and it was known to assign relevance values based on informational content to terms, as taught in Edlund, to improve the searching performed in Morgan. *Id.*

iii. "the terms associated with the items being organized into searchable subspace categories, each subspace category having a relevance bias value;"

This limitation is identical to a corresponding limitation in claim 1 and is taught by Morgan for the reasons discussed in Section VII.A.1.iii. *Id.*, ¶186.

iv. "a device input for receiving text entered by the user on a hand-held text input device, the text having two or more text characters of one or more prefixes for terms the user is using to identify a desired item,"

Similar to claim 1, this limitation recites receiving text entered by a user on a hand-held text input device, but differs in two respects: (i) it recites "a **device input**"[5] for receiving entered text, and (ii) requires "**two or more text characters** of one or more prefixes."

Morgan's system may be implemented with "handheld devices, pocket personal computing devices, digital cell phones adapted to connect to a network . . .

[5] The term "device input" is found only in claim 16 of the '034 Patent. Under the broadest reasonable interpretation, this phrase refers to device having an input.

." Ex.-1102, 5:14-17. These are examples of a "device input for receiving text entered by the user on a hand-held text input device" as claimed. Ex.-1107, ¶188. Similarly, Morgan provides examples of a user input "text having two or more text characters of one or more prefixes for terms the user is using to identify a desired item." Ex.-1102, Figures 7B (text entered is "Turk"), 8, and 9; Ex.-1107, ¶189.

v. "the two or more text characters including a first text portion and a second text portion, the second text portion being received subsequent to the first text portion;"

Morgan discloses this limitation. Ex.-1107, ¶190. Morgan discloses a user input text having "two or more text characters" where the second text portion is received after the first text portion. Ex.-1102, Figs. 7B (text entered is "Turk"), 8, and 9.

vi. "a processor for performing a first incremental find in response to receiving the first text portion and for ordering one or more items found in the first incremental find based on a first ranking order, the first incremental find comparing the one or more user-entered prefixes with the terms associated with the items and retrieving the relevance values for the one or more user-entered prefixes matching terms associated with the items,"

This limitation is similar to limitations in claim 1 reciting a "first incremental find" and "first ranking order," but it differs in two respects: (i) it recites "a **processor** for performing" the "first incremental find" and "ordering . . . a first ranking order", and (ii) the performing is "in response to receiving the **first text portion**" of input text characters.

Morgan discloses a processor for performing the claimed process steps. Ex.-1102, 4:17-22 ("system includes . . . a processor . . . [that] executes the machine instructions to implement functions generally consistent with the above described method."). Morgan discloses that the processing steps are performed in response to receiving the "first text portion." *Id.*, Figs. 7B (text entered is "Turk"), 8, and 9; Ex.-1107, ¶192.

vii. "the first ranking order of the one or more items found in the first incremental find being based on the assigned popularity values of the items and being based on the retrieved relevance values for the one or more user-entered prefixes matching terms associated with the items, so that relatively more popular and more relevant items appear earlier in the order for user selection or activation,"

This limitation is similar to the "first ranking order" limitation in claim 1, but differs in two respects: (i) the "first ranking order" requires "being based on" the relevance and popularity values,[6] and (ii) the "first ranking order" results in the "relatively more popular and more relevant items appear[ing] earlier in the order for user selection or activation."

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[6] This difference in language does not change the scope of the limitation, because there is no significant difference in ordering "based on" (claim 16) or "based at least in part on" (claim 1) relevance and popularity values.

Morgan discloses these limitations. Ex.-1107, ¶194. As discussed with respect to claim 1, Morgan discloses retrieving popularity and relevance values for content items and ordering them such that more popular and more relevant items appear earlier in the order presented to a user for selection. *Id.*, ¶139. For example, Morgan discloses "that the search strategies list will be reordered based upon a 'best match' determined algorithmically" and that reordering might lead to a popular search strategy likely to find what the user desires. Ex.-1102, 9:19-21. Morgan also discloses ordering "with the higher priority strategies (i.e., the most likely intended strategies) moved near the top of the list and the lower priority strategies moved nearer the bottom of the list." *Id.*, 12:32-36, Fig. 4 (step 212), *see also*, 3:32-40, 3:64–4:1.

viii. "the processor also for performing a second incremental find in response to receiving the second text portion and for ordering one or more items found in the second incremental find based on a second ranking order, the second incremental find comparing the one or more user-entered prefixes with the terms associated with the items and retrieving the relevance values for the one or more user-entered prefixes matching terms associated with the items,"

This limitation is similar to a corresponding limitation in claim 1, but includes "the **processor** also for performing a second incremental find in response to receiving the **second text portion** . . . ." The same processor that performs "the first incremental find" also performs the second incremental find, and does so in response

to receiving a "second text portion" of characters entered by the user. Ex.-1107, ¶¶191-92, 195.

ix. "the second ranking order of the one or more items found in the second incremental find being based on the assigned popularity values of the items and being based on adjusted relevance values for the one or more user-entered prefixes matching terms associated with the items,"

This limitation is similar to the "second ranking order" limitation in claim 1, but differs in that the "second ranking order" is "being based on" the relevance and popularity values, whereas in claim 1 the "second ranking order" is "based at least in part" on the two values. This difference in language does not change the claim scope, and this limitation is taught for the reasons discussed in Section VII.A.1.xi. Ex.-1107, ¶¶196-98.

x. "the relevance values of the terms associated with the items being adjusted in response to the count of the number of text characters received from the user,"

Claim 1 recites "adjusting the relevance value . . ." which is similar to this limitation. Claim 16 uses different words, but the scope of the claim is the same. The prior art teaches this limitation as discussed in Section VII.A.1.x. *Id.,* ¶¶145-49, 199.

xi. "the order of at least a portion of the one or more items being changed based on the adjusted relevance values of the terms, and"

This limitation is not found in claim 1. But Morgan teaches this limitation. As previously discussed, Morgan adjusts relevance values of terms, *see* Section

VII.A.1.x; Ex.-1107, ¶¶145-49, 200-01, and the order of items changes based on adjusted relevance values. *Id.*, ¶198; *see, e.g.,* Ex.-1102, Fig. 5. Thus, the order of items in the second ranking order changes following adjustment of relevance values.

xii. "at least one of the first ranking order and the second ranking order being further based on the relevance bias values of the subspace categories; and"

This limitation is nearly identical to the "wherein" limitation in claim 1, but this limitation omits the word "wherein" and reference to "determining" the first and second ranking orders. This limitation is found in the prior art for the same reasons as discussed regarding claim 1. *See* Section VII.A.1.xiii; Ex.-1107, ¶¶155-57, 202.

xiii. "a device output for presenting at least one of the first and the second ordered one or more items to the user."

This limitation is similar to a corresponding limitation in claim 6. Morgan teaches this limitation. *Id.,* ¶203; Ex.-1102, 7:61-8:8, 4:61-63, 10:33-58, Fig. 7B, Fig. 8.

10. Dependent Claim 19

Dependent claim 19 recites "[t]he system of claim 16, wherein the incremental find is limited to items having associated descriptive terms of one or more selected subspace categories." It is not clear from claim 19 whether "the incremental find" refers to the "first incremental find" or the "second incremental find." The broadest reasonable interpretation of this phrase is that it refers to either the "first incremental find" or the "second incremental find."

As discussed above in Section VII.A.1.xiii with respect to claim 1, FIG. 10 of Morgan discloses a listing of various subspace categories that can be selected to narrow the search results. Ex.-1102, 11:3-8, Fig. 10. This advanced search option allows Morgan to generate a ranking order (of the search strategies, quick matches, or the search results themselves) limited to the selected category(ies)/subcategory(ies). Ex.-1107, ¶205. Thus, Morgan discloses that the processes of determining the first and second ranking order can be limited to items having associated descriptive terms of one or more selected subspace categories. *Id.*, ¶204.

11. Dependent Claim 21

Dependent claim 21 recites substantially identical features to those recited in claim 6 for purposes of invalidity, and they should stand or fall together. *Id.,* ¶206; *see supra* Section VII.A.3.

12. Dependent Claims 22 and 23

Dependent claims 22 and 23 recite substantially identical features to those recited in claims 7 and 8, respectively, for purposes of invalidity, and they should stand or fall together. Ex.-1107, ¶207; *see supra* Section VII.A.4.

13. Dependent Claim 26

Dependent claim 26 recites substantially identical features to those recited in claim 11 for purposes of invalidity, and they should stand or fall together. Ex.-1107, ¶208; *see supra* Section VII.A.5.

14. Dependent Claim 27

Dependent claim 27 recites substantially identical features to those recited in claim 12 for purposes of invalidity, and they should stand or fall together. Ex.-1107, ¶209; *see supra* Section VII.A.6.

15. Dependent Claim 28

Dependent claim 28 recites substantially identical features to those recited in claim 13 for purposes of invalidity, and they should stand or fall together. Ex.-1107, ¶210; *see supra* Section VII.A.7.

16. Dependent Claims 29 and 30

Dependent claims 29 and 30 recites substantially identical features to those recited in claims 14[7] and 15[8], respectively. Although the wording in claims 29 and 30 differs from that in claims 14 and 15, those differences do not impact the

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[7] Claim 14 recites "a portion of the set of items resides on a computer remote from a user." Claim 29 recites a "second memory on a computer remote from the user . . . stor[es] at least a second portion of the set of items."

[8] Claim 15 recites a number of process steps performed by a computer remote from a user. Claim 30 requires that a "processor is disposed in a computer remote from the user." Because the process steps in claim 15 are performed by a computer remote from the user, the remote computer necessarily includes a processor.

unpatentability analysis. Thus, the limitations of claims 29 and 30 are taught in Morgan for the same reasons discussed regarding claims 14 and 15. For purposes of invalidity, claims 29 and 30 should stand or fall together with claims 14 and 15, respectively. Ex.-1107, ¶¶211-12; *see supra* Section VII.A.8.

B. GROUND 2: Claims 2, 5, 9-10, 17, 20, and 24-25 Are Unpatentable Over Morgan in View of Edlund and Lowles

The teachings of Morgan and Edlund are explained above in Section VII.A with respect to Ground 1.

Lowles (Ex.-1104) is an international application published under the PCT that published on January 29, 2004, and thus is prior art under pre-AIA 35 U.S.C. § 102(b).

1. Dependent Claims 2 and 5

Claim 2 depends from claim 1 and recites "the relevance bias values are based on the count of the number of text characters received from the user." Similarly, claim 5 depends from claim 4 and recites "the one or more selected subspace categories are selected based on the count of the number of text characters received from the user."

Morgan does not expressly disclose that the relevance bias values or selected subspace categories are based on a count of the number of text characters received. However, Lowles discloses relevance bias values of subspace categories that are based on the count of the number of text characters received from the user. Ex.-

1104, 16:26-29, 17:10-12, 17-26; Ex.-1107, ¶¶218-19. Lowles also discloses that the bias value for a subspace category for acronyms is increased when two or more uppercase characters are entered in a sequence. *See id.*, ¶218. Lowles further discloses selecting a subspace category based on the count of the number of text characters received from the user. Ex.-1107, ¶219.

For example, Lowles discloses that a subspace category for acronyms is selected when two or more uppercase characters are entered in a sequence. Ex.-1104, 16:26-29 ("[c]ategories may be used to establish access or searching priority, so that words in certain categories are accessed in some predetermined order, or filtering rules, where only particular categories are accessed or searched."), 17:10-12 ("Categories might also be inferred from a current context, such that words in an acronym category are accessed when a user inputs two uppercase letters in sequence."), 17:17-26 ("A variation of category-based custom word list access is 'on-the-fly' weighting adjustment. If a current text operation is normally associated with a particular category, then weightings of words in that category are increased, by applying a predetermined adjustment factor to the weightings, for example. Words in the associated category thereby have a more significant weighting during an associated text operation. The adjustment factor is selected to achieve a desired effect. A higher adjustment factor ensures that words in the category have higher adjusted weightings than words in other categories, whereas a lower adjustment

factor may prevent infrequently used words in the category from displacing more frequently used words in other categories.").

It would have been obvious to a POSA to combine Morgan's categories to find results relevant to search terms with Lowles's adjusted weightings of categories or Lowles's selecting of a category based on the number of characters received by the user. Ex.-1107, ¶220. Under Supreme Court precedent, "if a technique has been used to improve one device, and a [POSA] would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill." *KSR*, 550 U.S. at 417. Both Lowles and Morgan relate to searching for content based on user input search strings. Ex.-1107, ¶221. At a minimum, Morgan discloses using subspace categories to perform ranking. *Id.* Morgan also discloses using the count of the number of text characters to adjust relevance values. *Id*. Lowles simply extends the concept of counting the number of text characters to also adjust weightings of categories (i.e., relevance bias values). *Id.* A POSA would know from Lowles to adjust weightings of categories "to enable the user to more efficiently search and access desired information in a body of data." Ex.-1102, 1:13-19; Ex.-1107, ¶222.

Moreover, at least in part because it was already known in Morgan, it would have been within the capabilities of a POSA to implement the adjusted weightings of categories of Lowles to efficiently rank the search strategies or quick matches.

Ex.-1107, ¶222. Likewise, a POSA would have recognized the advantages of adjusted weightings of categories and would have been motivated to leverage it to rank search strategies or quick matches. *Id*. Further, it was predictable, with predictable results, to a POSA to adjust weightings of categories based on character count. *Id.* Thus, it would have been obvious to modify Morgan with the teachings of Lowles to use character counting to adjust not only relevance values (as taught in Morgan) but also to adjust weightings of categories (as taught in Lowles) "to enable the user to more efficiently search and access desired information in a body of data." Ex.-1102, 1:13-19; Ex.-1107, ¶223.

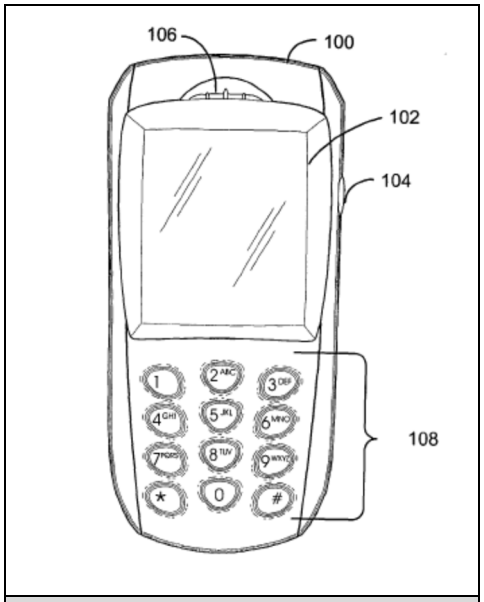
2. Dependent Claims 9 and 10

Claim 9 depends from claim 1 and recites "the ordered and presented one or more items are presented on a display constrained device." Claim 10 depends from claim 9 and recites "the display device is a phone, a mobile computing device, or a non-intrusive interface display area of a television."

Morgan discloses that it may be practiced with a digital cell phone and that a variety of input devices may be utilized. Ex.-1102, 5:11-22, 6:4-8, 8:40-45. Morgan therefore discloses the use of digital cell phones (i.e., display constrained devices) that display the ordered items. Ex.-1107, ¶225.

To the extent that Morgan does not expressly show that the cell phone is a display constrained device, it would have been obvious to use such a device, which

were known in the art. *Id.*, ¶226. For example, Lowles discloses "[u]ser input is received at step 78, when the user begins typing on a keyboard . . . [w]here the keyboard is a reduced keyboard, then an input keystroke sequence may be ambiguous, such that more than one word in the custom word list is mapped to the input keystroke sequence." Ex.-1104, 16:4-9. As another example, Fig. 6 in Lowles discloses a display-constrained device, namely a cell phone.



Ex.-1004, Lowles, Fig. 6

3. Dependent Claims 17 and 20

Dependent claims 17 and 20 recite substantially identical limitations to those recited in claims 2 and 5, respectively, for purposes of invalidity, and they should stand or fall together. Ex.-1107, ¶227; *see supra* Section VII.B.1.

4. Dependent Claims 24 and 25

Dependent claims 24 and 25 recite substantially identical limitations to those recited in claims 9 and 10, respectively, for purposes of invalidity, and they should stand or fall together. Ex.-1107, ¶228; *see supra* Section VII.B.2.

C. GROUND 3: Claims 3 and 18 Are Unpatentable Over Morgan in View of Edlund and De Mes

The teachings of Morgan and Edlund are explained above in Section VII.A with respect to Ground 1.

De Mes (Ex.-1105) is a U.S. patent application publication that was filed on March 25, 2004, and thus is prior art under pre-AIA 35 U.S.C. § 102(e).

1. Dependent Claim 3

Claim 3 depends from claim 1 and recites "the subspace categories include a personalized history category containing terms associated with items identified from previous incremental finds conducted by the user."

Morgan does not expressly disclose a personalized history category. However, De Mes discloses a method for creating a searchable personal browsing history. Ex.-1105, Abstract, ¶37. De Mes also describes that the stored metadata and textual data may be displayed in categories to allow for searching of the displayed categories of metadata and textual data. *Id.*, ¶9.

It would have been obvious to a POSA to combine the teachings of Morgan with the teachings of De Mes to incorporate providing a personal browsing history.

Both Morgan and De Mes relate to searching for content based on user input search strings. Ex.-1107, ¶233. Morgan describes the purpose of Morgan's system "is to enable a user to more efficiently find desired information within content search data." Ex.-1102, 8:10-13.

At a minimum, Morgan discloses subspace categories and the concept of ranking quick matches based on popularity. Ex.-1102, 12:31-36 (ranking "with the higher priority strategies (i.e., the most likely intended strategies) moved near the top."); Ex.-1107, ¶234. Morgan thus disclosed the concept of giving higher rank priority to search strategies that were the most likely intended strategies. *Id*. This determination could, for example, have been made by considering the user's search history. *Id.* De Mes simply adds the known concept of using personal browsing history as a subspace category. *Id.*, ¶232. For example, De Mes describes "that a user is able to view his or her browsing activity in categorised views which provides efficient access to the required information." Ex.-1105, ¶12. Thus, it would have been obvious to a POSA to incorporate a personal browsing history into the categories described by Morgan. Ex.-1107, ¶235.

2. Dependent Claim 18

Dependent claim 18 recites substantially identical features to those recited in claim 3 for purposes of invalidity, and they should stand or fall together. *Id.*, ¶236; *see supra* Section VII.C.1.

VIII. CONCLUSION

Petitioner respectfully submits that *inter partes* review of claims 1-30 of U.S. Patent No. 8,122,034 should be instituted on the grounds set forth herein.

BANNER AND WITCOFF, LTD

Dated: February 22, 2017

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CERTIFICATION UNDER 37 CFR § 42.24(d)

Pursuant to 37 C.F.R. § 42.24(a)(1)(i), I certify that this paper includes 12,906 words. In accordance with 37 C.F.R. § 42.24(a)(1), this word count does not include a count of the words in a table of contents, a table of authorities, mandatory notices under § 42.8, a certificate of service or word count, or appendix of exhibits or claim listing. Furthermore, in accordance with 37 C.F.R. § 42.24(d), this word count is the word count of the word-processing system used to prepare the paper.

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CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. § 42.105, I hereby certify that I caused a true and correct copy of the Petition for *Inter Partes* Review in connection with U.S. Patent No. 8,122,034 and supporting evidence to be served via FedEx Priority Overnight on February 22, 2017, on the following:

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