

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

AMAZON.COM, INC. and AMAZON.COM SERVICES LLC,
Petitioner

v.

NOKIA TECHNOLOGIES OY
Patent Owner

Case No. IPR2024-01390
Patent. No. 9,390,137

PATENT OWNER'S PRELIMINARY RESPONSE

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2002	<i>Curriculum Vitae</i> of Dr. Dirk Grunwald

I. INTRODUCTION

Amazon.com, Inc. and Amazon.com Services LLC, (“Petitioner” or “Amazon”) petitioned for *inter partes* review of claims 1-20 (“Challenged Claims”) of U.S. Patent No. 9,390,137 (“’137 Patent”), which is owned by Nokia Technologies Oy (“Patent Owner” or “Nokia”). Petitioner asserts three grounds of unpatentability, but not a single ground contains a cited reference that discloses or even suggests the claimed multi-dimensional query that specifies what Petitioner alleges to satisfy the claimed one or more personas of the ’137 Patent.

The Board should deny institution under 35 U.S.C. § 314(a) because the Petitioner has failed to meet its burden of showing a reasonable likelihood of unpatentability for any challenged claims of the ’137 Patent. Specifically, in each of its grounds, the Petition fails because Aravamudan does not teach or suggest “determin[ing] a multi-dimensional query associated with at least one user device, wherein the multi-dimensional query specifies, at least in part, one or more personas, based, at least in part, on more than one person, associated with the at least one user device,” as required by the independent claims of the ’137 Patent. Instead, Aravamudan relies on a single dimension text based query to obtain search results. At best, those search results are then reordered based on a signature. In its analysis, Petitioner mischaracterizes the operation and teachings of Aravamudan and fails to

demonstrate that Aravamudan teaches or renders obvious all of the claim elements of the independent claims.

Worse still, Petitioner improperly relies on the same signature of Aravamudan for multiple distinct claim elements. In fact, Petitioner relies on the Aravamudan signature as allegedly teaching both the claimed “persona” and the claimed “ordering metric” of the independent claims, without explaining why a person of ordinary skill in the art would have understood a single prior art component to satisfy both claimed and disparate elements.

Because each of Petitioner’s grounds relies solely on Aravamudan for an alleged teaching of “a multi-dimensional query associated with at least one user device, wherein the multi-dimensional query specifies, at least in part, one or more personas, based, at least in part, on more than one person, associated with the at least one user device,” and Aravamudan fails to render the limitation obvious, all three of Petitioner’s grounds fail.

Accordingly, Patent Owner requests that the Board deny institution of *inter partes* review.¹

¹By submitting this Preliminary Response, no waiver of any argument is intended by Patent Owner. Patent Owner will have a right to file a complete response to the Petition, should the Board institute inter partes review. 37 C.F.R. § 42.120(a).

II. BACKGROUND

A. Overview of the '137 Patent

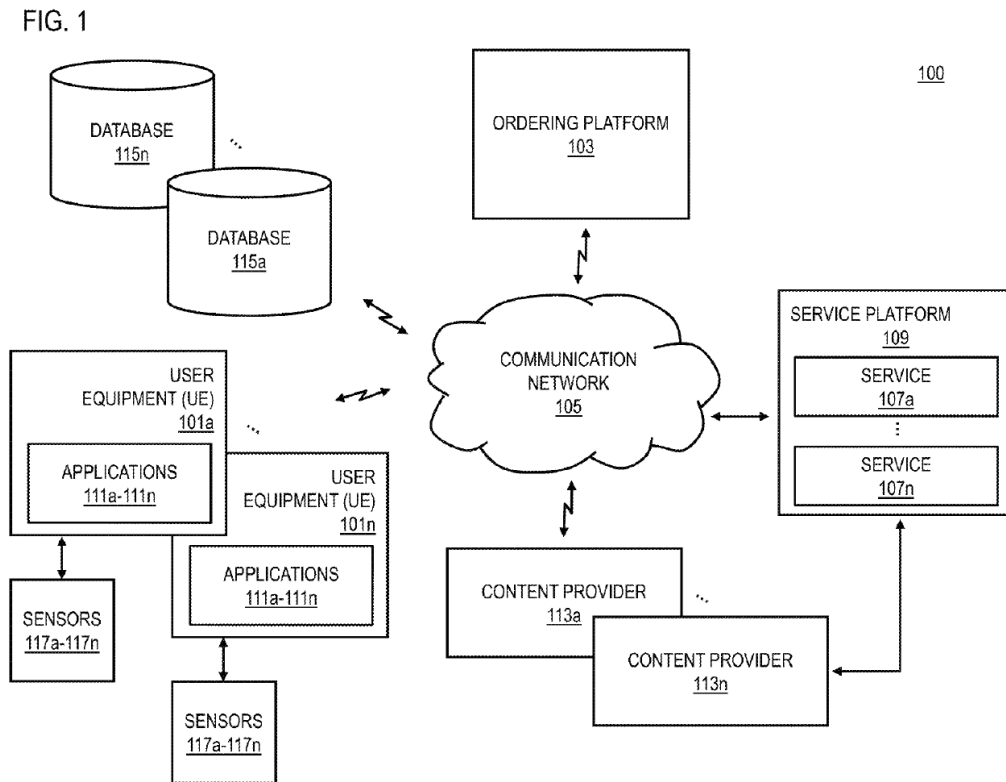
The '137 Patent relates to providing context-aware querying, retrieval and presentation of results on, for example, a mobile interface. Ex. 1001, Cover; 1:30-33; Ex. 2001, ¶44. The '137 Patent explains that device manufacturers and service providers face significant technical challenges to providing rich, situational-aware, context-sensitive datasets in a mobile environment because often, network and content services rely on the context of the users accessing the network services or the devices by which the users access the network services. Ex. 1001, 1:8-36; Ex. 2001, ¶¶45-46. Typically, determining the context becomes inadequate when multiple contexts and/or multiple users' actions need to be analyzed over a period of time, particularly when the context is determined in conjunction with a mobile device that has limited processing power and/or bandwidth. Ex. 1001, 1:14-23; Ex. 2001, ¶¶45-46.

The '137 Patent discloses that, to have rich, accurate datasets that span different context-aware situations to allow applications that utilize the datasets to be useful for multiple contexts and/or multiple users, an improved computer functionality involving a multi-dimensional contextual query along with an ordering metric provides efficient and accurate context-aware querying, retrieval and

presentation of results on, for example, a limited-screen mobile interface, which was not possible with conventional technology. Ex. 1001, 1:19-33; Ex. 2001, ¶¶46-47.

The '137 Patent allows a mobile user to provide additional information concerning relevant attributes for a data entity in a context-aware database. Ex. 1001, 4:1-11; Ex. 2001, ¶48.

Ex. 1001, FIG. 1



In FIG. 1 of the '137 Patent, the system includes user equipment (UE) 101 having connectivity to an ordering platform 103 via a communication network 104, where the UE 101 are in communication with one or more sensors 117 that acquire information regarding the context of the user and/or the UE 101. Ex. 1001, 3:53-55,

4:1-36; Ex. 2001, ¶¶48-49. Databases of the '137 Patent store objects and information concerning the objects, such as object contextual attributes which correspond to the context of the objects, such as, for example, the geographic location of the objects (e.g., address, city, country, etc.), the type of object (e.g., restaurants, schools, parks, and playgrounds). Ex. 1001, 4:37-44; Ex. 2001, ¶¶50-51.

The '137 Patent employs personas, which represent the possible different combinations of users that can be associated with a specific UE 101. Ex. 1001, 7:17-22; Ex. 2001, ¶¶52-53. Personas allow for the creation of situations associated with the UE 101 that correlate to user contextual attributes that form the multi-dimensional queries. Ex. 1001, 7:22-27; Ex. 2001, ¶54. A persona module of the '137 Patent can determine a complete persona associated with a UE 101, which includes representations of the type (e.g., gender, age group, disability, relationships, etc.) and quantity of the users that could possibly be associated with the UE 101. Ex. 1001, 7:28-34; Ex. 2001, ¶55. The complete persona enables the ordering platform to determine all possible personas and all possible user contextual attributes that could be associated with the UE 101 based on the possible users associated with the UE 101. Ex. 1001, 7:37-44; Ex. 2001, ¶55.

The persona module determines the specific users that are associated with the UE 101, and, therefore, associated with the query, and creates the multi-dimensional query based, at least in part, on the user contextual attributes associated with the

persona. Ex. 1001, 7:45-53; Ex. 2001, ¶¶55-56. That is, a multi-dimensional query is created based on user contextual attributes associated with a persona associated with a UE. Ex. 2001, ¶56. This enables the ordering platform to have situational awareness regarding who is associated with the UE and who is querying the database. Ex. 1001, 7:53-65; Ex. 2001, ¶56.

A multi-dimensional query, that has been generated based on and thus specifies one or more personas, based on more than one person, is then executed; and a list of results can be generated, based on the multi-dimensional query, from one or more databases 114. Ex. 1001, 7:56-65, 9:17-18; Ex. 2001, ¶56. That is, the '137 Patent determines the one or more personas, based on more than one person, associated with the UE, creates a multi-dimensional query based on the one or more personas, executes the multi-dimensional query, and the resulting list of results is specific to the one or more personas. Ex. 2001, ¶56.

The '137 Patent also employs the context associated with the user of the UE 101 or of the UE 101 to create an ordering metric. Ex. 1001 7:66-8:2; Ex. 2001, ¶57. The context can be the current location of the user, and/or otherwise determined based on applications running on the UE, modules of the UE, sensors associated with the UE, or services associated with the UE. Ex. 1001, 8:2-16; Ex. 2001, ¶57.

The '137 Patent then employs the ordering metric to order the results of the multi-dimensional query. Ex. 1001, 9:18-26; Ex. 2001, ¶57. Upon generating a list

of results representing objects with corresponding object contextual attributes from the databases 115 based on the multi-dimensional query, an ordering metric module 207 generates an ordering metric to order the objects according to the object contextual attributes in comparison to the one or more of the personas, the one or more contexts, the one or more of the user contextual attributes, the one or more of the object contextual attributes, and the one or more dimensions of the multi-dimensional query. Ex. 1001, 9:26-34; Ex. 2001, ¶57. That is, the returned results of the multi-dimensional query, that are specific to the one or more personas, are then ordered using an ordering metric that is generated based on a determined context of the UE or the user of the UE. Ex. 2001, ¶57; *see also* Ex. 2001, ¶¶59-61.

B. Prosecution History

The '137 Patent issued from U.S. Patent Application No. 13/172,425 (the "'425 application") filed June 29, 2011, with original claims 1-48. Ex. 1002, 1-59; Ex. 2001, ¶63.

A Non-Final Office Action was mailed July 12, 2012, in which claims 1-20 were rejected under 35 U.S.C. §103(a) over U.S. Patent Publication No. 2010/0094904 ("Jandhyala") in view of U.S. Patent No. 7,747,618 ("Zeng"). Ex. 1002, 245-257; Ex. 2001, ¶65.

In response to the July 12, 2012, Non-Final Office Action, the Applicant amended independent claims 1 and 11 to recite that "the multi-dimensional query

specifies, at least in part, one or more personas, based, at least in part, on more than one person, associated with the at least one user device.” Ex. 1001, 261, 270; Ex. 2001, ¶66. Together with the amendments, the Applicant argued that “Jandhyala does not teach the claimed feature of ‘one or more personas, based, at least in part, on more than one person, associated with the at least one user device,’” and that “Jandhyala merely teaches modifying a search process to become more specific to each user (e.g. based on a single user’s browsing history).” Ex. 1002, 274. The Applicant also argued that “Jandhyala’s search process is only specific to a single user rather than more than one person.” Ex. 1002, 275. The Applicant also argued that Zeng did not cure Jandhyala’s deficiency. *Id.*; Ex. 2001, ¶66.

A Final Office Action was mailed January 11, 2013, in which the rejections of claims 1-20 under 35 U.S.C. §103(a) over Jandhyala and Zeng were maintained. Ex. 1002, 347-359; Ex. 2001, ¶67.

In response to the January 11, 2013, Final Office Action, on March 7, 2013, the Applicant traversed, arguing that “Jandhyala merely teaches determining a user’s browsing history, favorite web pages, or localization information to provide a more specific search process,” and that “Jandhyala’s search process is specific to only a single user rather than one or more personas based on more than one person.” Ex. 1002, 376 (referencing Jandhyala, ¶[0052]); Ex. 2001, ¶68. The Applicant also argued:

In response to the above argument, the Final Office Action asserted that Jandhyala's "PageRank algorithm" is based on the "Hemholtz wave equation representation of Internet interactions" and the Internet interactions are deemed associated with a plurality of users or personas by more than one device. Final Office Action, pages 3-4. Applicants respectfully disagree. Because the Internet interaction is associated with a plurality of users or personas with more than one user device, the Internet interaction cannot teach, for example, one or more persona, based on more than one person, associated with the at least one user device.

Ex. 1002, 376-377.

The Applicant also argued:

Further, the PageRank algorithm cannot teach a multi-dimensional query because the Page Rank algorithm is merely an algorithm for calculating relevance or importance scores for web pages that are returned for a search that is carried out in response to a query entered by a user. Jandhyala, paragraph [0027]. Thus, the PageRank algorithm is not a query but merely an algorithm that measures results of a query. Further, as the Final Office Action pointed out, the use of Internet or other network devices are merely for determining adaptive Page Rank or other types of scores for web pages. Final Office Action, page 6. Thus, the Internet interaction does not teach a query. The Final Office Action correctly acknowledged that Jandhyala does not disclose a multi-dimensional query but failed to further acknowledge that the PageRank algorithm does not even disclose a query.

Ex. 1002, 377; Ex. 2001, ¶69.

The Applicant also argued that “the Final Office Action asserted that Zeng cures the deficiencies of Jandhyala by disclosing a three-dimensional matrix with dimensions of users, queries, and documents, and the dimensions of users is deemed to comprise more than one person or persona,” “[h]owever, the dimension of user comprising more than one persona cannot teach, for example, one or more persona based on more than one person.” Ex. 1002, 377; Ex. 2001, ¶70.

The Applicant filed an Appeal Brief on June 3, 2013, in which the Applicant argued substantially similar arguments as presented in the March 7, 2013 Response. Ex. 1002, 393-401; Ex. 2001, ¶72. The Examiner filed an Answer to the Appeal Brief, substantially repeating the rejections in the January 11, 2013 Final Office Action. Ex. 1002, 410-418; Ex. 2001, ¶72.

The Applicant filed a Reply Brief on October 21, 2013, arguing, in response to the Examiner’s assertion that “appellant failed to specify the metes and bounds of the claimed ‘one or more persona,’” “Appellants define ‘one or more persona’ in paragraph [0040] of the Specification, which recites ‘[t]he personas represent the possible different combinations of users that can be associated with a specific UE 101. By way of example, a persona can represent the members of a family that are associated with the UE 101,’” also stating that “[a] person of ordinary skill in the art would know what ‘one or more personas’ means in light of the Specification.” Ex. 1002, 421 (citing Specification, ¶[0040]); Ex. 2001, ¶73.

On January 4, 2016, the Patent Trial and Appeal Board (“PTAB”) reversed the Examiner. Ex. 1002, 434-436. The PTAB “agree[d] with Appellants that the Examiner erred.” Ex. 1002, 435; Ex. 2001, ¶74. The PTAB explained that “the Examiner construed the claimed ‘multi-dimensional query’ as ‘a personal context (or keyword) query specified by at least one network user device including some abstract data or information,’” and then stated that “the Examiner’s construction of ‘multi-dimensional query’ ignores that the claimed query ‘specifies at least in part, one or more personas, based, at least in part, on more than one person.” Ex. 1002, 435. The PTAB further stated that “the cited portions of Jandhyala and Zeng respectively teach information that affects a PageRank algorithm based on a single user’s data and a three-dimensional matrix used to augment click through data,” “neither of which suggests the disputed limitation.” Ex. 1002, 435-436 (citing Jandhyala, ¶¶52, 61; Zeng, 2:46-58); Ex. 2001, ¶74.

A Notice of Allowance was mailed March 10, 2016. Ex. 1002, 438; Ex. 2001, ¶75.

C. Person of Ordinary Skill in the Art (POSITA)

Patent Owner contends that a person of ordinary skill in the art (“POSITA”) for the ’137 Patent would have had at least a bachelor’s degree in computer science or related field and at least two years of experience designing database query systems. Ex. 2001, ¶17. A person with a different degree but with additional relevant

experience could still qualify if the additional experience compensates for the different educational background. *Id.* A person with less than two years of experience working in a field involving design of database query systems could still qualify if the person has additional education that compensates for their lesser experience. *Id.*

While Petitioner provides a different definition of a POSITA for the '137 Patent, Patent Owner does not believe the ultimate definition of a POSITA impacts the issues presented herein for the purposes of Institution. *See* Petition, pp. 18-19. As such, while Patent Owner reserves all rights to challenge Petitioner's definition of the POSITA in this proceeding, for the purposes of Institution, Patent Owner does not dispute Petitioner's definition.

D. Claim Construction

“In an *inter partes* review proceeding, a claim of a patent . . . shall be construed 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). That standard “includ[es] construing the claim in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent.” *Id.*; *see also Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc).

The words of the claims themselves are first reviewed “to define the scope of the patented invention.” *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996) (citation omitted). The claim terms are “generally given their ordinary and customary meaning;” however, “a patentee may choose to be his own lexicographer and use terms in a manner other than their ordinary meaning, as long as the special definition of the term is clearly stated in the patent specification or file history.” *Id.* (citation omitted).

The '137 Patent defines the term “persona” when it recites that “personas represent the possible different combinations of users that can be associated with a specific UE 101.” Ex. 1001, 7:17-18. In fact, “personas can represent the members of a family that are associated with the UE 101.” Ex. 1001, 7:19-20. The '137 Patent further states: “The personas allow for the creation of situations associated with the UE 101 that correlate to user contextual attributes that form the multi-dimensional queries, in addition to, for example, context information, to generate a list of results from one or more databases 115 that can later be ordered according to an ordering metric.” Ex. 1001, 7:22-27. As an example, the '137 Patent states: “By associating a persona of a device with an infant and a mother, the ordering platform can associate the device situations involving an infant and the mother of the infant, such as whether a restaurant allows public breast feeding, whether a restaurant has private seating for mothers with infants, etc.” Ex. 1001, 11:25-34; Ex. 2001, ¶80.

The Applicants' clear intent to define the term "persona" was confirmed during prosecution. Specifically, in a Reply Brief filed on October 21, 2013 and in response to the Examiner's assertion that "appellant failed to specify the metes and bounds of the claimed 'one or more persona,'" the Applicant explained that "Appellants *define* 'one or more persona' in paragraph [0040] of the Specification, which recites '[t]he personas represent the possible different combinations of users that can be associated with a specific UE 101. By way of example, a persona can represent the members of a family that are associated with the UE 101,'" also stating that "[a] person of ordinary skill in the art would know what 'one or more personas' means in light of the Specification." Ex. 1002, 421 (citing Specification, ¶[0040]) (emphasis added); Ex. 2001, ¶81. *Vitronics Corp.*, 90 F.3d at 1582.

As such, "persona" should be construed as "represent[ing] the possible different combinations of users that can be associated with a specific UE,"² as defined in the prosecution history and specification. Ex. 2001, ¶82.

² The '137 Patent defines a UE as "any type of mobile terminal, fixed terminal, or portable terminal including a mobile handset, station, unit, device, multimedia computer, multimedia tablet, Internet node, communicator, desktop computer, laptop computer, notebook computer, netbook computer, tablet computer, personal communication system (PCS) device, personal navigation device, personal digital

For the purpose of institution alone, Patent Owner asserts that the remainder of the claim terms should be construed according to the ordinary and customary meaning as understood by a POSITA; Patent Owner also reserves the right to address construction of any terms if this proceeding is instituted and/or in any other action involving the '137 Patent.

III. THE BOARD SHOULD NOT INSTITUTE *INTER PARTES* REVIEW

Petitioner has failed to meet its obligations with respect to the challenged claims in the Petition. Pursuant to 37 C.F.R. § 42.108(c), Petitioner must demonstrate a reasonable likelihood “at least one of the claims challenged in the petition is unpatentable” to warrant institution of an *inter partes* review for that claim. Petitioner has not done so. All three of Petitioner’s ground fatally rely on Petitioner’s flawed analysis and mischaracterization of the cited references – the cited references do not render obvious “determin[ing] a multi-dimensional query associated with at least one user device, wherein the multi-dimensional query specifies, at least in part, one or more personas, based, at least in part, on more than

assistants (PDAs), audio/video player, digital camera/camcorder, positioning device, television receiver, radio broadcast receiver, electronic book device, game device, or any combination thereof, including the accessories and peripherals of these devices, or any combination thereof.” Ex. 1001, 6:8-21.

one person, associated with the at least one user device.” Accordingly, Grounds 1-3 fail.

A. Ground 1 – Aravamudan and Adomavicius do not render obvious Claims 1-2, 6, 9-12, 16, and 19-20 of the ’137 Patent.

Ground 1 alleges that Aravamudan and Adomavicius render obvious Claims 1-2, 6, 9-12, 16, and 19-20 of the ’137 Patent. Ex. 1003, ¶54; Petition, p. 11. Ground 1 fails. Petitioner’s allegations in Ground 1 fail to teach or suggest “determin[ing] a multi-dimensional query associated with at least one user device, wherein the multi-dimensional query specifies, at least in part, one or more personas, based, at least in part, on more than one person, associated with the at least one user device.” Moreover, a POSITA would not have been motivated to combine Aravamudan and Adomavicius in the manner suggested by Petitioner. Ex. 2001, ¶¶85-137.

- 1. The proposed combination fails to teach or suggest “determin[ing] a multi-dimensional query associated with at least one user device, wherein the multi-dimensional query specifies, at least in part, one or more personas, based, at least in part, on more than one person, associated with the at least one user device.”**

Both independent Claims 1 and 11 require “determin[ing] a multi-dimensional query,” where the multi-dimensional query is “associated with at least one user device,” “specifies, at least in part, one or more personas,” where the “one or more personas” are “based, at last in part, on more than one person, associated with the at least one user device.” ’137 Patent, Claims 1, 11. Aravamudan fails to render such

elements obvious in either of its disclosed embodiments, and therefore Petitioner cannot show there is a reasonable likelihood that any of the challenged claims are rendered obvious by the alleged prior art. Ex. 2001, ¶¶86-137.

In making its case, Petitioner relies on Aravamudan alone for elements [11b] and [1a]. Petition, pp. 25, 45. Specifically, Petitioner relies on the Aravamudan signature as being the claimed “persona,” which is simply incorrect.

In addition, Petitioner relies on an irreconcilable mixture of citations from distinct embodiments in Aravamudan. Indeed, for some portions of elements [11b] and [1a], Petitioner relies on a first embodiment related to a one-dimensional text query and, for others, relies on a second embodiment related to providing personalization information. With regard to both embodiments, Petitioner seems to be relying on a Aravamudan signature (i.e., “a normalized vector of probabilities” that “capture the historical patterns of the user’s behavior with respect to a particular set of activities” (Ex. 1004, ¶[0059])) to personalize a query. As is demonstrated below, Petitioner is simply wrong. Aravamudan’s signature, at best, is used to reorder results of a query and, thus fails to teach or suggest elements [11b] and [1a]. Ex. 1004, ¶[0130] (“In particular, the results obtained through a query are identified and *reordered* by promoting relevance values of individual search results *based on the set of signatures.*”); *see also* Ex. 1002, 398 (distinguishing an algorithm that reorders results from a query based on relevance scores).

Finally, and in contrast to the claims themselves and the prosecution history, Petitioner relies on the Aravamudan signature to satisfy multiple distinct elements including both (a) the persona specified by the query as well as (b) the ordering metric³ for the results of the query. Petitioner's overreliance on the Aravamudan signature for disparate claim elements is improper not only because the claimed persona and ordering metric are presumed to be distinct components, but also because the Aravamudan system precludes the signature from being both part of the query and part of the reordering operation. Indeed, if the signature were part of the query, the resultant relevance values would already have taken into account the signature and, thus, would not need to be and could not be adjusted or reordered based on the application of the same signature. As such, collapsing the signature of Aravamudan into Aravamudan's query would render Aravamudan's ordering operation, as proposed by Petitioner, superfluous and wasteful, and would only be the result of impermissible hindsight. *See Sci. Plastic Prods. Inc. v. Biotage AB*, 766 F.3d 1355, 1359 (Fed. Cir. 2014) (obviousness must be viewed with "the foresight

³ For the purposes of this argument, Patent Owner does not admit or concede that claim element 11d, in whole or in part, is taught or rendered obvious by the signature or any other disclosure of Aravamudan and/or Adomavicius.

of a person of ordinary skill, not with the hindsight of the inventor's successful achievement").

a) Aravamudan does not disclose “one or more personas.”

The Petition and Dr. Crovella fail to address the proper interpretation of the claimed “one or more personas,” as set forth above. *See* §II.D *supra*. That is, the Applicant clearly set forth a definition for “one or more personas” in the Specification and file history, explaining that they “*define* ‘one or more persona’ in paragraph [0040] of the Specification, which recites ‘[t]he personas represent the possible different combinations of users that can be associated with a specific UE 101’.” *See* Ex. 1002, 421 (emphasis added); Specification as filed, ¶[0040]. Aravamudan provides no such teaching or suggestion.

Petitioner alleges that “Aravamudan ‘uses [preference] *signatures* to personalize’ [user] queries to search over multiple dimensions.” Petition, p. 25 (referencing Ex. 1004, ¶¶[0129-0130]); Ex. 2001, ¶88. Petitioner also alleges that “user queries are processed and personalized with the *signatures*,” and that “[t]he information in the *signatures* (e.g., context and genre) is used as additional search dimensions.” *Id.* Here, Petitioner appears to be alleging that Aravamudan's signature is the specified “persona.” However, as is demonstrated below, Aravamudan's signature cannot satisfy the proper definition of “persona” because Aravamudan's signature merely captures the viewing habits of a household and does not “represent

the possible *different combinations of users* that can be associated with a specific UE.” Ex. 2001, ¶88.

Aravamudan describes its signature as a “stochastic signature” that is “a normalized vector of probabilities” that “capture the historical patterns of the user’s behavior with respect to a particular set of activities.” Ex. 1004, ¶[0059]. Aravamudan further explains that the “the stochastic signature is a probabilistic model, and it is an identity that can be used for validation, prediction, etc.” Ex. 1004, ¶[0050]. Aravamudan also clarifies that, “[w]hile this type of signature can be used to identify a user according to his or her preference, it is distinguished from a unique signature that a user may employ to authenticate an item or guarantee the source of the item, for example.” *Id.*; Ex. 2001, ¶89.

Petitioner alleges that “signatures generated for ‘the users of the family [who] are members of a household using a single interface device’” satisfies the claimed persona. Petition, p. 31. However, Aravamudan describes that a signature collectively describes the viewing habits of the household. Ex. 1004, ¶[0108]. Indeed, having a single signature for *all* users of a device, such as a family, still fails to meet the recitations of the claims as it does not “represent the possible *different combinations of users* that can be associated with a specific UE.” Ex. 2001, ¶90. The definition of “persona” requires the ability to represent *different combinations of users*, which Aravamudan’s signature cannot do. Ex. 2001, ¶90.

Unlike a signature in Aravamudan, the claimed persona enables the system to separate out the “different combinations of users,” which in a family might be the husband and wife or husband and child. *See* Ex. 1001, 11:25-34 (“By associating a persona of a device with an infant and a mother, the ordering platform can associate the device situations involving an infant and the mother of the infant, such as whether a restaurant allows public breast feeding, whether a restaurant has private seating for mothers with infants, etc.”); Ex. 2001, ¶91. But the Aravamudan signatures do not and cannot do that. Instead, Aravamudan’s signature is limited to the statistical viewing habits of a single set of users (i.e., one signature that represents the entirety of users using the device) and does not address difference combinations of users. Thus, the user of the Aravamudan device might be the whole family, but there is no way to separate out different combinations of users as is required by the definition of persona (e.g., two specific family members like a mother and baby). Indeed, Aravamudan confirms in that it states that the signatures are not “a unique signature that a user may employ to authenticate an item.” *Id.* Aravamudan would not be able “include[] representations of the type (e.g., gender, age group, disability, relationships, etc.) and quantity of the users that could possibly be associated with the UE.” Ex. 1001, 7:30-34; Ex. 2001, ¶91.

Petitioner never addresses “represent[ing] the possible *different combinations of users* that can be associated with a specific UE.” Instead, at best,

Petitioner argues for a different part of the claim recitation that “the household signature is based, at least in part, on more than one person” because Aravamudan “disclos[es] an algorithm for decomposing the household signatures into its constituent information.” Petition, p. 31. But the fact that Aravamudan’s signature is composed of constituent information is of no moment because Aravamudan’s never discloses that its signature “represent[s] the possible *different combinations of users* that can be associated with a specific UE.” Ex. 2001, ¶92.

To be clear, Petitioner never asserts that decomposing the signatures satisfies or is even relevant to the “personas” limitation. Nevertheless, such an argument would fail because Aravamudan does not allow for “different combinations” of users but instead merely breaks down the signature into its smallest constituent parts and does not disclose any use of the parts. Moreover, Aravamudan never teaches or suggests using the decomposed data from the household signatures as a part of any multi-dimensional query, and Petitioner and Dr. Crovella neither allege nor explain how or why a POSITA would have thought the decomposed data would have been used as part of any multi-dimensional query. Ex. 2001, ¶92.

Specifically, Aravamudan describes decomposing a signature to approximate the number of family members in a signature, the gender of each family member, and the ages of the family members. Ex. 1004, ¶[0106]. However, in such an embodiment, the signature has been decomposed and is no longer available to be

used i to reorder results from a query. Ex. 2001, ¶92. Such a decomposed signature does not and cannot represent multiple possible combinations of users of a UE, and Petitioner provides no explanation as to how a decomposed, and therefore eliminated, signature, would satisfy the proper definition of a persona. Ex. 2001, ¶92.

Aravamudan's signature does not and cannot "represent the possible different combinations of users that can be associated with a specific UE," nor can it "represent the members of a family that are associated with the UE." *See* Ex. 1002, 421. Accordingly, Aravamudan's signature cannot teach "one or more personas." Ex. 2001, ¶93.

b) Aravamudan's first embodiment discloses a one dimensional text query.

Aravamudan discloses a simple, one-dimensional text query that is related to finding a television program or station, and Petitioner alleges that "Aravamudan 'uses [preference] *signatures* to personalize' [user] queries to search over multiple dimensions." Petition, p. 25 (referencing Ex. 1004, ¶¶[0129-0130]); Ex. 2001, ¶94. Petitioner also alleges that "user queries are processed and personalized with the *signatures*," and that "[t]he information in the *signatures* (e.g., context and genre) is used as additional search dimensions." *Id.* Again, Petitioner appears to be alleging that Aravamudan's signature is, or somehow includes, the specified "persona," and that the signature is therefore somehow incorporated into or otherwise a part of

Aravamudan's query. Ex. 2001, ¶94. That is, Petitioner appears to be alleging that the signature is used to determine the multi-dimensional query itself as is required by the claims. But that is not what Aravamudan discloses. Aravamudan merely discloses simple text queries that do not rely on nor incorporate signatures. Ex. 2001, ¶94. As such, Petitioner's reliance on the first embodiment fails for at least these two distinct reasons.

i. Aravamudan's text query is a single dimension text query.

Aravamudan discloses a single dimension text query based on received input characters, such as including the letter "C" or "S" in a query after receiving the letter "C" or "S" as input. Ex. 2001, ¶95. Nothing else is included as part of the text query. Indeed, Aravamudan explains that its system begins searching for content item results as the user enters letters of a text query (i.e., "C"). Ex. 1004, ¶[0129]; Ex. 2001, ¶95. The system identifies content items as candidates for presentation based on comparing the letters of the text query with descriptive terms associated with the content items. Ex. 1004, ¶[0129]; Ex. 2001, ¶95. According to Aravamudan, "[t]hus, if the user enters a text query starting with the letter 'S', all results beginning with the letter 'S' would be presented to the user." Ex. 1004, ¶[0089]; Ex. 2001, ¶95.

A specific example of Aravamudan's first embodiment includes a text query in which the character "C" is received and serves as the query. Ex. 1004, ¶¶[0129-0132]; Ex. 2001, ¶95. Aravamudan depicts in Table 1 the query results that are

retrieved based on executing the query “C.” Ex. 2001, ¶95. Accordingly, Aravamudan’s text query is a single dimension text query. Ex. 2001, ¶95.

Ex. 1004, ¶[0132], TABLE 1

TABLE 1	
Channel	Relevance Number
CBS	500
CNBC	300
COMEDY CHANNEL	100
CARTOON NETWORK	70
	...

ii. Reordering the results of Aravamudan’s text query does not make the query itself multi-dimensional.

First, continuing its example of returning results for the text character “C,” Aravamudan confirms that signatures are used to *reorder* results and are not part of the query itself. Specifically, Aravamudan discloses that the “generic relevance numbers of channels, based on popular opinion, are 500, 300, 100, and 70, for ‘CBS,’ ‘CNBC,’ ‘COMEDY CHANNEL’, and ‘CARTOON NETWORK’, respectively, with a maximum bound of 1000.” Ex. 1004, ¶[0132]. The results shown in Table 1 are ordered based on the generic relevance numbers of channels. Ex. 2001, ¶98.

Ex. 1004, ¶[0132], TABLE 1

TABLE 1	
Channel	Relevance Number
CBS	500
CNBC	300
COMEDY CHANNEL	100
CARTOON NETWORK	70
	...

Aravamudan then *reorders* the results, as shown in Table 2, based on a signature. Specifically, because the user watched the channels “CARTOON NETWORK” and “COMEDY CHANNEL” in the past, the signature probabilities for these channels are set at 0.7 and 0.3, respectively. Ex. 1004, ¶¶[1032-0133]; Ex. 2001, ¶99.

Ex. 1004, ¶[0133], TABLE 2

TABLE 2	
Channel	Relevance Number
CARTOON NETWORK	2015
COMEDY CHANNEL	1351
CBS	500
CNBC	300
	...

Second, the Applicant distinguished a system in which query results are reordered based on relevance, such as is disclosed by Aravamudan. Ex. 2001, ¶96. Specifically, the Applicant stated:

Further, the PageRank algorithm cannot *teach a multi-dimensional query because* the Page Rank algorithm is *merely*

an algorithm for calculating relevance or importance scores for web pages that are returned for a search that is carried out in response to a query entered by a user. See, e.g., Jandhyala, ¶ [0027]. Thus, the PageRank algorithm is not a query but merely an algorithm that measures results of a query. Also, as the Examiner (per page 6 of the Final Office Action) pointed out, the use of the Internet or other network devices is merely for determining adaptive Page Rank or other types of scores for web pages. Thus, the Internet interactions do not teach the claimed query.

Ex. 1002, 398; Ex. 2001, ¶96. Similar to what was overcome on appeal, Aravamudan discloses a stochastic signature or signature, that is configured to *reorder* retrieved query results based on learned user preferences. Ex. 1004, ¶[0019], ¶[0130] (“In particular, the results obtained through a query are identified and *reordered* by promoting relevance values of individual search results *based on the set of signatures.*”); Ex. 2001, ¶97.

Just as what was distinguished during prosecution (i.e., that single-dimension search with relevance-based reordering does not qualify as prior art), Aravamudan merely relies on a signature to reorder single-dimension results, based on relevance values. Aravamudan does not specify a signature as part of any query. Ex. 2001, ¶100. Accordingly, Aravamudan cannot teach a multi-dimensional query. Ex. 2001, ¶100.

iii. Aravamudan's text query does not specify a persona.

Even if the query of Aravamudan was (improperly) considered to be multi-dimensional, Ground 1 still fails because the claim requires that the multi-dimensional query specifies, at least in part, one or more personas, based, at least in part, on more than one person, associated with the at least one user device. But the single dimension text query of Aravamudan's first embodiment does not specify a persona at all. Ex. 2001, ¶101. To be clear, Petitioner and Dr. Crovella allege that Aravamudan's signature satisfies the claimed persona (*see* Petition, p. 25) but, as noted throughout, this is incorrect because the signature, at best, is merely used to reorder results. As such, Aravamudan's single dimension text query fails to specify the signature according to the claims. Ex. 2001, ¶101.

Aravamudan, at best, provides a stochastic signature that is configured to reorder retrieved query results based on learned user preferences. Ex. 1004, ¶[0019]; Ex. 2001, ¶101. Aravamudan defines its "stochastic signature" as "a normalized vector of probabilities" that "capture the historical patterns of the user's behavior with respect to a particular set of activities." Ex. 1004, ¶[0059]; Ex. 2001, ¶101. An "example of a signature for use with a television system is {(ABC 0.3), (CBS 0.2), (NBC 0.5)}," which "captures that over a given period time period, when the user was watching television, the user watched ABC 30% of the time, CBS 20% of the time, and NBC 50% of the time." *Id.*

Aravamudan shows, in FIG. 2, “a sample signature hierarchy for the multiple dataspace learning model,” with n locations 200, m dataspaces 210, and k time slots 200.” Ex. 1004, ¶[0062], FIG. 2; Ex. 2001, ¶102.

Ex. 1004, FIG. 2

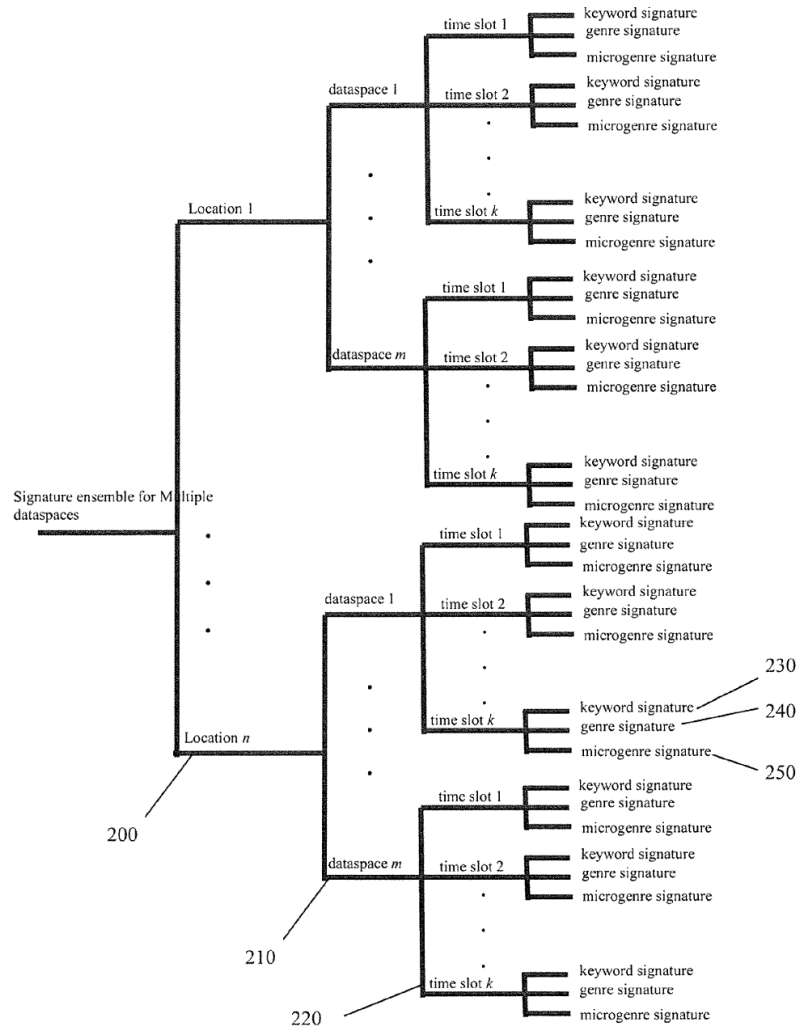


Figure 2

Referring to FIG. 2, Aravamudan explains that, “[a]t the first level, the figure illustrates activities in each location 200,” “[w]ithin each location 200, the system

captures dataspace-specific activities in individual signatures,” [i]nside each dataspace 210, for each time slot 220, the system obtains a unique signature,” and that “the signature hierarchy captures the nature of the activity within the time slot by appropriate keyword 230, genre 240, and microgenre signatures 250.” Ex. 1004, ¶[0062]; Ex. 2001, ¶103. Aravamudan describes a first embodiment in which “various individual, aggregate, and program signatures reside on a server system that contains a set of content items,” and the “server system uses the signatures to personalize search results provided to users of the system.” Ex. 1004, ¶[0129]. Aravamudan explains that query results are obtained and then “*reordered* by promoting relevance values of individual search results based on the set of *signatures*.” *Id*; Ex. 2001, ¶104.

Aravamudan’s signature is thus not part of the query at all; instead, after a query returns a set of results or content items, “[e]ach of these content items is associated with a base relevance value that measures the popularity of the item in the overall population,” and the “system uses these base relevance values to rank which contents are likely sought by the user.” Ex. 1004, ¶[0129]; Ex. 2001, ¶105. The system then “modifies the base relevance values based on the set of signatures,” and the “final relevance weights of each item determine if the item is included in the result set and help determine its position in a list of results.” Ex. 1004, ¶[0130]. The signatures simply change the relevance weights in order to change the order of the

query results, thus the signature is never used to personalize the queries or alter the queries in any way; Ex. 2001, ¶105. As such, Petitioner's assertion fails. *Id.*; *see also* Ex. 2001, ¶¶106-111.

c) Aravamudan's second embodiment discloses a request associated with a sole user and the request does not specify a persona.

Aravamudan also discloses and Petitioner appears to rely on providing personalization information to a third-party service provider as a form of a query. Specifically, Petitioner alleges that a "POSITA would have understood that the system has determined a multi-dimensional query in between steps 3 and 4 [of FIG. 12] at least by refining the query to search over the multiple dimensions in the user preference signature corresponding to the user device and context." Petition, p. 27; Ex. 1003, ¶69. As with Petitioner's arguments with respect to the text query of Aravamudan, Petitioner's mischaracterizes Aravamudan. Ex. 2001, ¶¶112-113. Similar to Aravamudan's first embodiment, Aravamudan's Figure 12 embodiment (i.e., Aravamudan's second embodiment) fails to render the claims obvious at least because it uses the signatures, or personal preference information, to *reorder* the results of a query *after the query has been executed and prior to returning the*

results to a user – not as an additional search dimension as alleged by Petitioner.

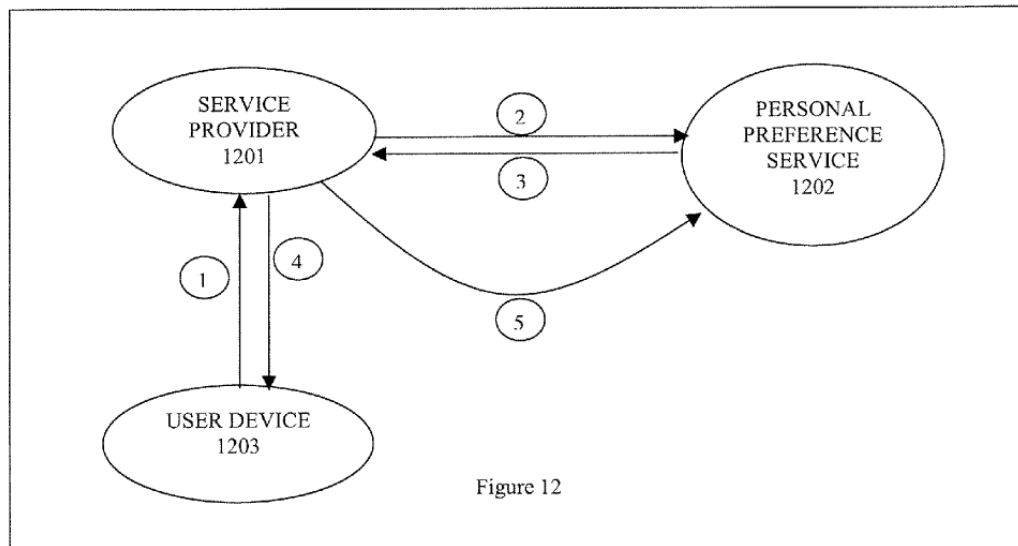
Ex. 2001, ¶¶112-113.⁴

Aravamudan’s Figure 12 is directed to providing personalization information to third-party service providers so that a user’s experience with the third-party service may be improved. Ex. 1004, ¶[0166]; Ex. 2001, ¶113. Aravamudan explains that a service provider may request user signature information from the learning system to order (or reorder) the results of a query for a user. Ex. 1004, ¶[0173]; Ex. 2001, ¶113. Specifically, Aravamudan explains that a service provider, such as a video content search engine, may “wish[] to use the user’s signature to order the results of a query,” and thus “may request specific information on which channels or program the user watched.” *Id.* Further, Aravamudan’s Figure 12 relates to sharing information about a user so that the information about the user (i.e., signature

⁴ The Applicant distinguished over the system of Aravamudan’s second embodiment during prosecution because Aravamudan’s second embodiment merely reorders results returned for a query that is carried out in response to a request entered by a user and the results are reordered based on relevant preference information. *See* Ex. 1002, 377, 398; Ex. 2001, ¶¶116-120; Ex. 1004, FIG. 12, ¶[0175]. Thus, Aravamudan cannot teach a multi-dimensional query. *Id.*

information) can be used to order results retrieved for the user in a new location (e.g., when a user enters a new store). Ex. 2001, ¶113; *see also* Ex. 2001, ¶¶114-115.

Ex. 1004, FIG. 12



Petitioner alleges that in step 2 of FIG. 12, “[s]ervice provider 1201 communicates the substance of the request and the additional context information to personal preference service 1202.” Ex. 1004, ¶[0175]; Ex. 2001, ¶118. The additional context information can include the location of the user device, the time of the request, and general description of the action the user is performing (e.g., the fact the user is currently using a telephone versus playing media). Ex. 1004, ¶[0175]; Ex. 2001, ¶118. The actions are described using descriptive tags that are assigned to the various actions by the system. *Id.* The context information passed from the service provider to the personal preference service assists the personal preference in retrieving relevant preference information to send back to the service provider so

that the service provider can order results based on the relevant preference information that is stored as a signature. Ex. 2001, ¶118. But, the request and the context information passed from the service provider to the personal preference service is not used to determine, create, or otherwise modify any sort of request or query – it is used by the personal preference service to retrieve signature information to send back to the service provider for the purpose of the service provider ordering (or reordering) its own retrieved results. Ex. 2001, ¶118.

Regardless, Aravamudan’s request, even if it is (incorrectly) considered a multi-dimensional query, does not specify any alleged persona. Ex. 2001, ¶121. The request of step 1 in Aravamudan’s Figure 12 contains a unique identifier that identifies a single user or the user device is not disclosed as being based on more than one person associated with the device. Ex. 1004, ¶[0174]; Ex. 2001, ¶121. Moreover, the request of step 1 in Aravamudan’s Figure 12 not specifying any alleged persona (i.e., a signature) is consistent with Aravamudan’s description of a desire for “the personal preference service 1202” to “only have a set of unique device identifies that share signatures for each user,” and “there would be no identity information beyond the identifiers” so that “the user’s identity is maintained anonymous, yet responses matching user’s preferences can be delivered.” Ex. 1004, ¶[0174]; Ex. 2001, ¶121. In step 2 of FIG. 12, the service provider, not the user device, communicates with a personal preference service. Ex. 2001, ¶122. For

example, “[s]ervice provider 1201 communicates the substance of the request and the additional context information to personal preference service 1202.” Ex. 1004, ¶[0175]; Ex. 2001, ¶122. The additional context information provided by the service provider includes “the location of the user device, if available, the time of the request, and general description of the action the user is performing (e.g., the fact the user is currently using a telephone versus playing media).” Ex. 1004, ¶[0175]; Ex. 2001, ¶122. The actions are described using descriptive tags that are assigned to the various actions by the system. *Id.* The context information passed from the service provider to the personal preference service assists the personal preference service in retrieving relevant preference information to send back to the service provider so that the service provider can order results based on the relevant preference information. Ex. 2001, ¶122.

In step 3 of FIG. 12, the personal preference service 1202 sends the relevant preference information (based on the tags sent by user device 1203) to service provider 1201. Ex. 1004, ¶[0175]; Ex. 2001, ¶123. Continuing with Aravamudan’s example, Aravamudan explains that a service provider may request user signature information from the learning system to ***order*** (or reorder) the results of a query for a user, thus, in step 3, the relevant preference information (e.g., signature) is sent to the service provider. *See* Ex. 1004, ¶[0173]; Ex. 2001, ¶123.

In step 4 of FIG. 12, the service provider uses the received relevant personal preference information that has been ordered according to the signature to send a response to the user device. Ex. 1004, ¶[1076]; Ex. 2001, ¶124. Again, continuing with Aravamudan's example of its second embodiment, the service provider uses the user's signature to **order** (or reorder) the results of the query.⁵ Ex. 1004, ¶[0173]; Ex. 2001, ¶124.

While Petitioner and Dr. Crovella allege that a "POSITA would have understood that the system has determined a multi-dimensional query in between steps 3 and 4," neither Petitioner nor Dr. Crovella explains why the POSITA would have had such an understanding, especially in view of the explicit disclosure in Aravamudan that the relevant preference information is actually used to order results after the results have been retrieved. Ex. 2001, ¶125. Indeed, there is no suggestion in Aravamudan that any query is refined between steps 3 and 4 of FIG. 12. Ex. 2001, ¶125.

In Aravamudan's Figure 12, any signature that is applied by Aravamudan in Figure 12 is applied to **reorder** the results but is never applied to or is specified by

⁵ As discussed above, the Applicant distinguished a system in which query results are reordered based on relevance, such as is disclosed by Aravamudan. Ex. 2001, ¶¶86, 95-100.

the query itself. Ex. 2001, ¶126. Accordingly, Aravamudan fails to teach or suggest “a determination of a multi-dimensional query associated with at least one user device, wherein the multi-dimensional query specifies, at least in part, one or more personas, based, at least in part, on more than one person, associated with the at least one user device.” Ex. 2001, ¶¶126-127.

2) Petitioner conflates “persona” with “ordering metric” to cobble together its grounds.

As is clear from the preceding sections, Petitioner relies on the Aravamudan signature for many distinct elements in the claims—“persona,” “ordering metric,” or “user contextual attributes.” Petitioner does so without any explanation as to how a POSITA would have reconciled the resulting amalgamation of different claim terms. That is, Petitioner impermissibly relies on the signature to render obvious multiple distinct claim elements, which is directly contrary to the well understood rule that “[w]here a claim lists elements separately, as done here, there is ‘a presumption that those components are distinct.’” *Barrday, Inc. v. Lincoln Fabrics Inc.*, No. 2022-1903, 2023 WL 7871688, at *4 (Fed. Cir. Nov. 16, 2023) (quoting *Kyocera Senco Indus. Tools Inc. v. Int’l Trade Comm’n*, 22 F.4th 1369, 1382 (Fed. Cir. 2022)); *see Becton, Dickinson & Co. v. Tyco Healthcare Grp., LP*, 616 F.3d 1249, 1254 (Fed. Cir. 2010) (“Where a claim lists elements separately, ‘the clear implication of the claim language’ is that those elements are ‘distinct component[s]’

of the patented invention.”) (quoting *Gaus v. Conair Corp.*, 363 F.3d 1284, 1288 (Fed. Cir. 2004)).

First, the Petition states that “Aravamudan records users’ context-based preferences in personalized signatures.” Petition, p. 25. Aravamudan describes its signature as a “stochastic signature” that is “a normalized vector of probabilities” that “capture the historical patterns of the user’s behavior with respect to a particular set of activities.” Ex. 1004, ¶[0059]. Thus, it appears the Petition identifies Aravamudan’s signature, including the historical patterns of user behavior, as a user’s context-based preferences.

Next, the Petition states that the multi-dimensional query specifies one or more personas because it is determined based on a signatures. Petition, pp. 30-31. Specifically, the Petition states that “Aravamudan explains that the household persona signature is helpful for devices with limited input-capabilities by simplifying query input.” *Id.* Thus, it appears the Petition identifies the signature itself as satisfying the claimed persona.

Finally, the Petition recites that Aravamudan’s signature satisfies the claimed ordering metric. Petition, p. 40. Specifically, the Petition states that Aravamudan “order[s] search results using the ordering metric of user preference signatures that are based on the user device’s contextual attributes.” *Id.*

But Petitioner and Dr. Crovella fail to reconcile the use of Aravamudan's signature for an alleged teaching of each of the "contextual attributes," "persona," and "ordering metric," which all represent different concepts that serve different purposes and are utilized at different points in the claim. *See e.g., Gamber-Johnson LLC v. Nat'l Prods. Inc.*, IPR2021-01159, Paper No. 7 at 18-19 (P.T.A.B. Jan. 3, 2022) ("Petitioner offers no explanation or reasoning sufficient for its reliance on the same structure for different elements set forth in the claim"). Conflating the terms as alleged in the Petition and by Dr. Crovella is improper. For example, neither Petitioner nor Dr. Crovella explains how a signature can be part of the query and also be part of the ordering metric after the query at the same time. It is nonsensical for the results of a query that are ordered based on the signature to be reordered based on the same criteria as the query itself.

By way of example and underscore why a signature cannot be part of the query and also be the reordering metric, Aravamudan depicts returning results for the text character "C." Specifically, Aravamudan discloses that the "generic relevance numbers of channels, based on popular opinion, are 500, 300, 100, and 70, for 'CBS,' 'CNBC,' 'COMEDY CHANNEL', and 'CARTOON NETWORK', respectively, with a maximum bound of 1000." Ex. 1004, ¶[0132]. The results shown in Table 1 are ordered based on the generic relevance numbers of channels. Ex. 2001, ¶129.

Ex. 1004, ¶[0132], TABLE 1

Channel	Relevance Number
CBS	500
CNBC	300
COMEDY	100
CHANNEL	
CARTOON	70
NETWORK	
	...

Aravamudan then *reorders* the results, as shown in Table 2, based on a signature. Specifically, because the user watched the channels “CARTOON NETWORK” and “COMEDY CHANNEL” in the past, the signature probabilities for these channels are set at 0.7 and 0.3, respectively. Ex. 1004, ¶¶[1032-0133]; Ex. 2001, ¶130.

Ex. 1004, ¶[0133], TABLE 2

Channel	Relevance Number
CARTOON NETWORK	2015
COMEDY CHANNEL	1351
CBS	500
CNBC	300
	...

If Aravamudan’s signature were part of Aravamudan’s original query then the Relevance Numbers of Table 1 would not be the generic numbers “500, 300, 100, and 70”, but instead would already include the signature probabilities in Table 2. Ex. 2001, ¶131. If the signature probabilities were already applied as part of the query

results and the results ordered accordingly, there would no longer be any need for the reordering step. That is, the additional application of the signature probabilities would not reorder the results at all. Ex. 2001, ¶131. For this additional reason, Petitioner cannot rely on the signature to be both the query and the reordering step.

Regardless, Aravamudan's signature also fails to teach or suggest "one or more user contextual attributes of the at least one user device." Instead, Aravamudan describes its signature as a "stochastic signature" that is "a normalized vector of probabilities" that "capture the historical patterns of the user's behavior with respect to a particular set of activities." Ex. 1004, ¶[0059]. Because the signature does not rely on one or more user contextual attributes *of the at least one user device*, Ground 1 fails for this additional reason.

As is demonstrated herein, Aravamudan is clear that a signature is at best used for reordering search results and, thus, is a not part of determining a multi-dimensional query "wherein the multi-dimensional query specifies, at least in part, one or more personas."

**3) A POSITA would not have been motivated to combine
Aravamudan and Adomavicius as suggested by Petitioner.**

The Petition and Dr. Crovella argue that the "combination of Aravamudan's teachings of personalized multi-dimensional queries" "with Adomavicius' teachings of a context-sensitive database" teaches "limitation [11c]," alleging that a "POSITA would have been motivated to implement Aravamudan's method and system using

a database such as that taught by Adomavicius.” Petition, p. 33, Crovella, ¶¶79, 86-92.

The Petition states that Aravamudan teaches executing a query “which has been personalized to search the dimensions based on ‘context sensitive user preference,’” and generating search results, and that Adomavicius teaches a “context sensitive database” on which to execute multi-dimensional queries. Petition, pp. 34-35. The Petition then argues that “a POSITA would have been motivated to implement Aravamudan’s teachings using Adomavicius’ database.” Petition, p. 7; Crovella, ¶87. However, both Petitioner and Dr. Crovella fail to explain how a person of ordinary skill in the art would have combined the references, let alone doing so without eliminating the need for Aravamudan’s signatures entirely. Ex. 2001, ¶¶132-133.

First, contrary to the assertions made by Petitioner and Dr. Crovella, Aravamudan does not teach or suggest querying over multiple dimensions based on context-sensitive user preferences, as discussed above. Ex. 2001, ¶117. That is, Aravamudan discloses receiving a text query, retrieving results based on the same, and reordering the results based on a signature or set of signatures. Ex. 2001, ¶134. As such, the combination would not yield the alleged predictable results of “storing, querying, and retrieving Aravamudan’s context-sensitive query results on a context-sensitive database as taught by Adomavicius” (*see* Petition, p. 37) because

Aravamudan has no need for a context-sensitive database. Ex. 2001, ¶134. That is, Aravamudan's queries are not context-sensitive – they are merely executed based on received input text and then the results are reordered based on signatures. A context-sensitive database would thus be of no use in the query of Aravamudan. *Id.*

Moreover, it is unclear how the combination of Aravamudan and Adomavicius would be implemented without eliminating Aravamudan's signature, which the Petition relies on for numerous claim elements. Ex. 2001, ¶135. For example, according to the Petition and Dr. Crovella, Aravamudan uses its signatures as part of an alleged multi-dimensional query, and the signatures are made up of contextual attributes (or dimensions, according to Petitioner and Dr. Crovella). Ex. 2001, ¶135. Adomavicius' multidimensional model or cube stores values for multiple dimensions in a given space – for example, a recommendation space having dimensions user, item, and time. Ex. 2001, ¶135. Combining Aravamudan's signatures with Adomavicius' multidimensional model or cube would result in the multidimensional model or cube storing the underlying values that make up the signature, rather than the signature itself, thereby eliminating the signature entirely. Ex. 2001, ¶135.

Neither Petitioner nor Dr. Crovella explains how Aravamudan's signatures would be used in conjunction with Adomavicius' multidimensional model. Ex. 2001, ¶136. It is unclear how a query of Aravamudan, executed using a

multidimensional model or cube of Adomavicius, would then have the signature of Aravamudan applied thereto to reorder the results. Ex. 2001, ¶136. Adomavicius considers several dimensions and associated values as part of a multidimensional recommendation space - given all of the dimensions a model of Adomavicius considers as part of a recommendation space, it is unclear how or why the signature of Aravamudan, which also contains alleged dimensions according to Petitioner, would then need to be applied to any results received from the multidimensional recommendation space of Aravamudan. Ex. 2001, ¶136. Eliminating Aravamudan's signature renders Aravamudan inoperable for its intended purpose – which is reordering results based on signatures prior to presenting the reordered results – thus a POSITA would not have had a reasonable expectation of success in the combination. *See Medtronic, Inc. v. Teleflex Innovations S.A. R.L.*, 69 F.4th 1341, 1349–50 (Fed. Cir. 2023) (explaining that it would have been an “error for the Board to ignore evidence that a proposed modification would interfere with a reference’s stated purpose” and affirming Board finding that challenged patent was non-obvious in part because “the destruction of [a prior art reference’s] ‘entire premise’ ‘counsel[ed] strongly against’ obviousness.”)

Indeed, the Board repeatedly denies institution of Petitions where Petitioners propose combinations that are inconsistent with a primary references’ stated objectives. *See ASUSTeK Comput., Inc. et al. v. LiTL LLC*, IPR2024-00532, Paper

No. 20 at 21, 23 (P.T.A.B. May 23, 2024) (denying institution by finding that “Petitioner’s modified computer incapable of fulfilling Lane’s objectives” and that “the proposed modification would render Lane’s computer unsuitable for its intended purpose.”); *see also Shimano, Inc. v. Globeride, Inc.*, IPR2015-00273 Paper No. 40 at 12 (Final Written Decision) (P.T.A.B. June 16, 2016) (citing *In re Gordon*, 733 F.2d 900, 902 (Fed. Cir. 1984) as standing for the proposition that a case of obviousness is undermined if modifying the prior art would render that prior art inoperable for its intended purpose); *see also In re Gordon*, 733 F.2d 900, 902 (Fed. Cir. 1984) (reversing the Board’s determination of obviousness where the modification to the primary reference that turned it upside down as needed to meet the claim would have rendered the primary reference “inoperable for its intended purpose”).

Accordingly, because the proposed combination would render Aravamudan inoperable for its intended purpose, a POSITA would not have been motivated to combine Aravamudan and Adomavicius as suggested by Petitioner. Ex. 2001, ¶137.

B. Ground 2 – Aravamudan, Adomavicius, and McNee do not render obvious Claims 1-6, 9-16, and 19-20 of the ’137 Patent.

In Ground 2, the Petition relies on Aravamudan and Adomavicius for the limitations recited in independent Claims 1 and 11 as argued in Ground 1, and introduces McNee for purported teachings related to various dependent claims that depend from independent Claims 1 and 11. Petition, pp. 63-75; Ex. 1003, ¶147. As

explained above, Aravamudan and Adomavicius do not render obvious independent Claims 1 and 11 of the '137 Patent. *See* § III.A *supra*. Accordingly, for at least the same reasons, Aravamudan, Adomavicius, and McNee do not render obvious Claims 1-6, 9-16, and 19-20 of the '137 Patent. Ex. 2001, ¶¶138-139.

C. Ground 3 – Aravamudan, Adomavicius, and Ramer do not render obvious Claims 1-2, 6-12, and 16-20 of the '137 Patent.

In Ground 3, the Petition relies on Aravamudan and Adomavicius for the limitations recited in independent Claims 1 and 11 as argued in Ground 1, and introduces Ramer for purported teachings related to dependent Claims 7-8 and 17-18. Petition, pp. 77-82; Ex. 1003, ¶176. As explained above, Aravamudan and Adomavicius do not render obvious independent Claims 1 and 11 of the '137 Patent. *See* § III.A *supra*. Accordingly, for at least the same reasons, Aravamudan, Adomavicius, and Ramer do not render obvious Claims 1-2, 6-12, and 16-20 of the '137 Patent. Ex. 2001, ¶¶140-141.

IV. THE BOARD SHOULD EXERCISE ITS DISCRETION TO DENY INSTITUTION

The Petition fails to demonstrate a likelihood of success with respect to a single claim. Indeed, Patent Owner has demonstrated that the grounds, are facially deficient. As a result, Petitioner fails to demonstrate that any of the challenged claims are likely found to be unpatentable. For at least these reasons, the Board should exercise its discretion and deny institution.

V. CONCLUSION

For the above-stated reasons, Patent Owner requests that the Board deny institution of the Petition.

Dated: January 31, 2025

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CERTIFICATE OF WORD COUNT

Under the provisions of 37 C.F.R. § 42.24, the undersigned hereby certifies that the word count for the foregoing Patent Owner's Preliminary Response totals 10,009 words, which is less than the 14,000 allowed words under 37 C.F.R. § 42.24(a)(1)(i),(b)(1).

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CERTIFICATE OF SERVICE

The undersigned hereby certifies that the foregoing **PATENT OWNER'S PRELIMINARY RESPONSE** and accompanying exhibits were served electronically via e-mail on January 31, 2025, in their entirety on the following counsel of record for Petitioner:

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