

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC.,
Petitioner,

v.

Zentian Limited
Patent Owner.

Case IPR2023-00037
Patent No. 10,971,140

PATENT OWNER'S PRELIMINARY RESPONSE

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EXHIBIT LIST

Exhibit No.	Description
2001	<i>Intentionally Left Blank</i>
2002	Declaration of Deliang Wang, Ph.D in support of Patent Owner's Preliminary Response
2003	Zentian Ltd. v. Apple. Inc., No. 6:22-cv-00122-ADA, Apple's Preliminary Invalidity Contentions
2004	Zentian Ltd. v. Apple. Inc., No. 6:22-cv-00122-ADA, Scheduling Order

I. Introduction

To meet the claims of the '140 patent, the Petition argues that it would have been obvious to substitute the clustered processor and memory architecture from one specific embodiment in Chen—which requires at least eight processors in four clusters with four memories—in place of Jiang's processor.

But the Petition omits to address that Jiang's "exemplary system" in its "Preferred Embodiment" is a "general purpose computing device in the form of a conventional personal computer 20," with a conventional CPU, Ex. 1004, 5:4-7, whereas Chen's highly complex eight-processor four-memory clustered design is for a *supercomputer*. Ex. 1005, 4:4-5, 4:57-5:6, 1:29-31.

As this Preliminary Response demonstrates, there was nothing "obvious" about replacing Jiang's conventional personal computing hardware with Chen's supercomputer processing and memory architecture, and an ordinary artisan would not have been motivated to make such a fanciful combination.

Nor would an ordinary artisan have been motivated to implement Jiang's speech recognition teachings using Chen's supercomputer processors and memories. An ordinary artisan would have understood that Jiang's CPU-based speech recognition system was not suited for combination with Chen's parallel processing system.

Moreover, beyond simply combining Jiang's teachings with Chen's hardware, the Petition relies on further modifications to the combination of Jiang and Chen in order to meet specific requirements of the challenged claims. Those modifications, however, are not supported by any motivation; instead, they are simply hindsight-driven reconstructions of the challenged claims.

The Petition thus fails to demonstrate a reasonable likelihood of success, and falls well short of the much more stringent "high likelihood" of success that the Board should apply here in view of *Fintiv* and recent precedents.

II. Background of the '140 Patent

U.S. Patent 10,971,140, titled "Speech recognition using parallel processors," is directed to an improved speech recognition circuit that "uses parallel processors for processing the input speech data in parallel." Ex. 1001, 1:18-20. The '140 patent teaches multiple processors "arranged in groups or clusters," with each group or cluster of processors connected to one of several "partial lexical memories" that "contains part of the lexical data." Ex. 1001, 3:13-18. "Each lexical tree processor is operative to process the speech parameters using a partial lexical memory and the controller controls each lexical tree processor to process a lexical tree corresponding to partial lexical data in a corresponding partial lexical memory." Ex. 1001, 3:19-24. The '140 patent further teaches that the invention "provides a circuit in which speech recognition processing is

performed in parallel by groups of processors operating in parallel in which each group accesses a common memory of lexical data.” Ex. 1001, 3:62-66.

III. Person of ordinary skill in the art

For purposes of this Preliminary Response, Patent Owner does not dispute the Petition’s proposed level of skill for a person of skill in the art (“POSA”), because the level of skill in the art is not necessary for addressing any disputes between the parties.

IV. Claim construction

The Petition does not propose any particular claim constructions and raises no claim construction issues.

Patent Owner’s arguments in this Preliminary Response are based on the plain and ordinary meaning of the words of the claims themselves in view of the associated teachings of the specification. However, to the extent the Board views Patent Owner’s arguments as resting on claim construction positions, the bases for such positions are set forth in the corresponding argument sections below.

V. The Board should deny institution under *Fintiv*

Whereas *inter partes* review was created “to establish a more efficient and streamlined patent system that will improve patent quality and limit unnecessary and counterproductive litigation costs,” “[p]arallel district court and AIA proceedings involving the same parties and invalidity challenges can increase,

rather than limit, litigation costs.” USPTO Memorandum, Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings with Parallel District Court Litigation (“Guidance Memo”) (June 21, 2022), at 1.

In considering whether to institute an *inter partes* review proceeding where there is a parallel district court litigation, the Board considers the following six factors set forth in *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (PTAB Mar. 20, 2020) (precedential):

1. Whether the court granted a stay or evidence exists that one may be granted if a proceeding is instituted;
2. Proximity of the court’s trial date to the Board’s projected statutory deadline for a final written decision;
3. Investment in the parallel proceeding by the court and the parties;
4. Overlap between issues raised in the petition and in the parallel proceeding;
5. Whether the petitioner and the defendant in the parallel proceeding are the same party; and
6. Other circumstances that impact the Board’s exercise of discretion, including the merits.

A. *Fintiv* factors 1-5 favor denial of institution

Factor 1: The patent at issue in this IPR is the subject of pending litigation in *Zentian Ltd. v. Apple, Inc.*, C.A. No. 6:22-cv-00122-ADA (W.D. Tex.). No stay has been granted, and neither party has sought a stay to the extent this proceeding is instituted.

Factors 3 and 5: The parties in the district court case are the same as the parties in this proceeding. That case has continued to proceed since the Petition in this proceeding was filed, and will continue to proceed. The parties have exchanged proposed claim constructions, have completed claim construction briefing, and are awaiting a *Markman* hearing. Preliminary infringement and invalidity contentions have also been exchanged. Fact discovery will commence on March 24, 2023, and the parties are completing discovery on Apple's pending motion to transfer to the Northern District of California.

Factor 4: Apple's preliminary invalidity contentions in the district court case rely on Jiang, Chen, Lucke, Robinson, and Wrench, which are all of the references at issue in this IPR. *Compare* Pet. 6 with Ex. 2003 at 26, 27-28.

Factor 2: A trial date has tentatively been set for April 22, 2024, and will more definitively be set after the *Markman* hearing. Ex. 2004 at 5. By contrast, the Board's Institution Decision in this proceeding is not due until June 15, 2023, placing the Board's projected final written decision date at June 15, 2024—several

months after the tentative trial date in the district court proceeding. Accordingly, there is a high likelihood that a final written decision in this *inter partes* review would come later than a decision in the district court litigation, and that the Board's decision would merely address the same prior art and issues raised in the district court.

Accordingly, *Fintiv* factors 1-5 favor discretionary denial.

B. *Fintiv* factor 6 requires a “compelling” challenge, which the Petition does not present

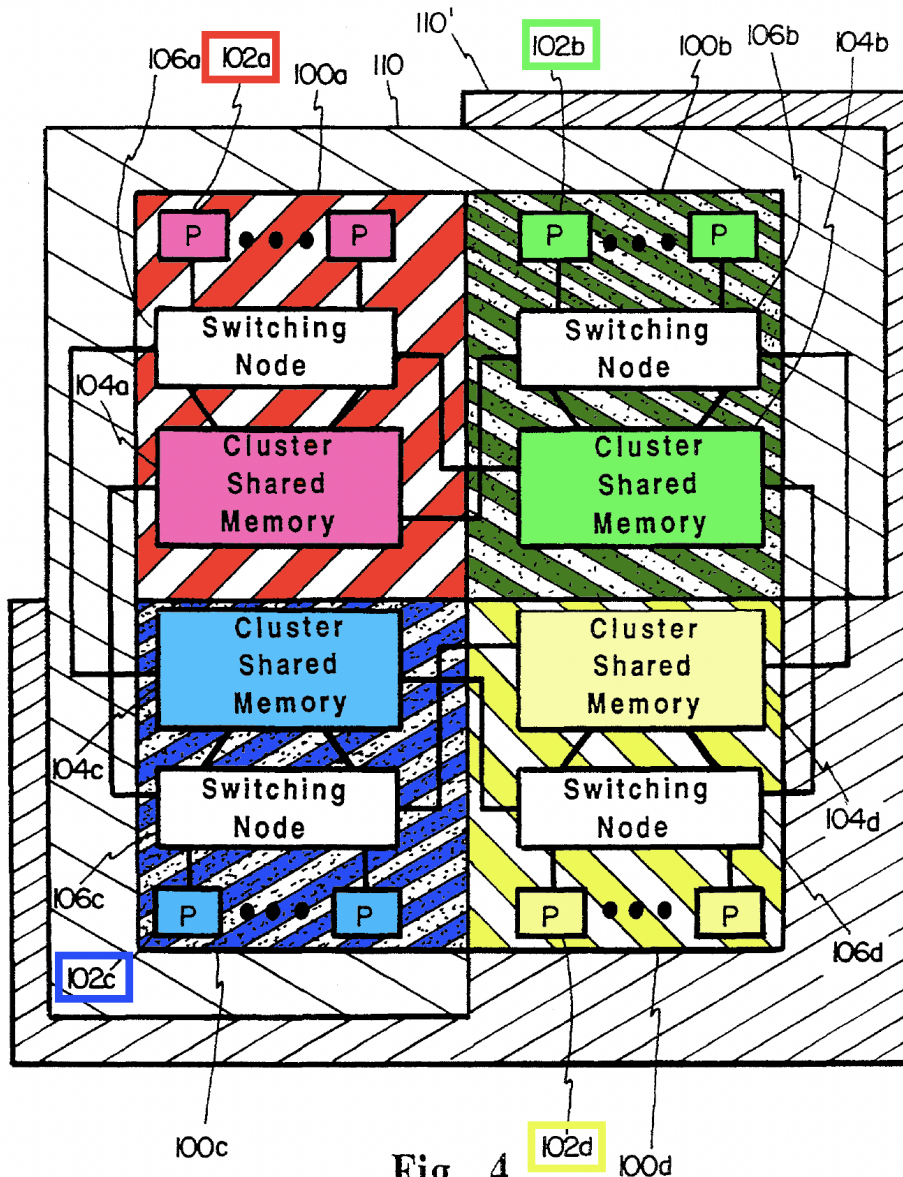
Because *Fintiv* factors 1-5 favor discretionary denial, the Board must consider whether the Petition presents “compelling merits.” *Commscope Techs. LLC v. Dali Wireless, Inc.*, IPR2022-01242, Paper 23 at 4 (Feb. 27, 2023) (precedential).

“The compelling merits standard is a higher standard than the standard for institution set by statute.” *Id.* at 3. To meet the “compelling merits” standard, the Petition must demonstrate that it is “**highly likely** that the petitioner would prevail with respect to at least one challenged claim.” *Id.* at 3-4 (emphasis added).

As this Preliminary Response demonstrates, the Petition fails to demonstrate even a reasonable likelihood of success, much less the “high likelihood” of success standard that the Board should apply in view of *Fintiv* and *Commscope*.

VI. An ordinary artisan would not have been motivated to substitute Chen's supercomputer processing architecture in place of Jiang's conventional processor for a personal computer

Claim 1 of the '140 patent is the sole challenged independent claim in this proceeding. Limitations 1(a) recites "one or more clusters of processors, each of the one or more clusters of processors comprising: a plurality of processors." Pet. 66. Jiang does not teach one or more clusters of processors, as the Petition admits. Pet. 14. To fill that gap, the Petition instead looks to Chen. Pet. 15. The Petition proposes to "substitute[]" Chen's processing architecture, shown below, in place of Jiang's disclosed processor. Pet. 19; Ex. 1004, Fig. 4 (annotated).



The Petition's combination, however, fails to address or even consider the highly disparate contexts of Chen and Jiang's systems, and the fundamental incompatibility of Chen's processing architecture as a substitute for Jiang's processor. Ex. 2002 ¶ 25.

Jiang teaches that, in its “Preferred Embodiment,” “an exemplary system for implementing the invention includes a general purpose computing device in the form of a conventional personal computer 20, including processing unit 21. . . .” Ex. 1004, 5:4-7; Ex. 2002 ¶ 26. Jiang likewise repeatedly refers to “personal computer 20” throughout its disclosure as the “exemplary system” in which its speech recognition teachings are to be implemented and usable. Ex. 1004, 5:13-16, 5:27-30, 5:44-46, 5:55-58, 6:6-10, 6:12-15, 6:28-31, 6:39-42; Ex. 2002 ¶ 26. Indeed, Jiang specifically teaches: “tree search engine 74 is preferably implemented in CPU 21,” which is the CPU shown for personal computer 20, “or may be performed by a dedicated speech recognition processor employed by personal computer 20.” Ex. 1004, 6:39-42; Ex. 2002 ¶ 26. An ordinary artisan would have known at the time that Jiang’s CPU 21 for a conventional personal computer would have been of the nature of the Intel and AMD personal computer processors that dominated the market through the late 1990s and early 2000s. Ex. 2002 ¶ 26. An ordinary artisan would have likewise understood that Jiang’s reference to “a dedicated speech recognition processor” referred to another processor of the same nature as the Intel or AMD processor that would have served as CPU 21, or else a digital signal processor of the type sold by Texas Instruments at the time. Ex. 2002 ¶ 26. And While Jiang teaches that CPU 21 in personal

computer 20 “may include one or more processors,” Ex. 1004, 6:39-41, an ordinary artisan would have understood that teaching to refer to the possibility of using multiple hardware processors included in *a conventional personal computer* at the time to form CPU 21. Ex. 2002 ¶ 26.

Chen, by contrast, is a patent disclosed by Cray Research, which was known at the time as a leading designer of cutting edge, extremely expensive and complex supercomputing systems. Ex. 1005 at 1 (“Assignee”); Ex. 2002 ¶ 27. Indeed, Chen expressly refers to the “original supercomputer developed by the assignee of the present invention.” Ex. 1005, 4:4-5; Ex. 2002 ¶ 17. Moreover, the Chen reference is expressly directed towards improving upon the prior supercomputers developed by Cray and others. Ex. 1004, 4:57-5:6; Ex. 2002 ¶ 27. Indeed, Chen expressly states “[t]he present invention relates generally to parallel processing computer systems for performing multiple-instruction-multiple-data (MIMD) parallel processing.” Ex. 1004, 1:29-31. A person of ordinary skill would have understood that “parallel processing computer systems for performing . . . MIMD parallel processing” at the time were supercomputers, not conventional personal computers. Ex. 2002 ¶ 27. Moreover, while Chen teaches that its disclosed parallel processing computer system could be built using “commercially [*sic*] single chip microprocessors, as well as commercially available memory chips,” Ex. 1005,

10:18-21, Chen's system would have nonetheless required *four* clusters of processors, each cluster containing at least two processors, and each cluster connected to a dedicated cluster shared memory, with multiple clusters also adjacently interconnected to another cluster's memory. Ex. 1005, 9:10-19; Ex. 2002 ¶ 27. In other words, Chen's system required at least eight processors and four cluster shared memories, as well as complex intra-connections and interconnections between the processors themselves, the processors to various memories, and the memories to one another. Ex. 2002 ¶ 27. An ordinary artisan would have understood that, even using commercially available processors and memory chips, Chen's architecture would have entailed far greater cost, complexity, and hardware space requirements than what would have been suitable for a conventional personal computer at the time. Ex. 2002 ¶ 27.

Indeed, in the late 1990s and early 2000s, the costs of processors and memories were generally known to be the most significant cost categories for personal computers. Ex. 2002 ¶ 28. Thus, for instance, an ordinary artisan would have understood that adding seven more processors and three more memories and creating the necessary interconnections to form Chen's supercomputer architecture in the context of a personal computing device would have rendered the resulting

computing system cost prohibitive for the general public, and thus for the vast majority of automatic speech recognition customers. Ex. 2002 ¶ 28.

Moreover, successfully modifying a standard personal computer to implement Chen's supercomputer processor and memory architecture would have required a level of expertise in parallel computer design that would have exceeded the qualifications that the Petition has identified for the person of ordinary skill in the art. Ex. 2002 ¶ 29. As Dr. Wang explains, ordinary artisans in the field of speech recognition, many of whom he has taught and trained, do not have the expertise to design parallel computing systems of the type taught in Chen. Ex. 2002 ¶ 29. Besides processors and memories, such a design would have to address core hardware issues such as registers, busses, controllers, communication protocols, and even cooling fan systems. Ex. 2002 ¶ 29. Such knowledge is not necessary or even particularly relevant to an ordinary artisan in the field of automatic speech recognition. Ex. 2002 ¶ 29. Indeed, even an eminent scholar in the field of automatic speech recognition such as Dr. Wang would not have the expertise to implement Chen's teachings if asked to modify a personal computer to realize Chen's parallel processing architecture. Ex. 2002 ¶ 29. Notably, parallel processing is a computer systems area that is distinct from the signal processing and machine learning area where speech recognition belongs. Ex. 2002 ¶ 29.

Given that Jiang was expressly directed to “a general purpose computing device in the form of a conventional personal computer 20,” Ex. 1004, 5:4-7, an ordinary artisan would not have been motivated to substitute Jiang’s generic “processing unit 21”/“CPU 21” with the Cray supercomputer “parallel processing computer systems for performing . . . MIMD parallel processing” disclosed in Chen. Ex. 1005, 1:29-31; Ex. 2002 ¶ 30. By way of analogy, such a modification would have been akin to replacing a conventional engine in a conventional automobile with the engine from a Formula One car. Ex. 2002 ¶ 30. Although such a modification would appear on the surface to promise to make the conventional car faster, there is nothing obvious about it, and the potential motivation of “more speed” is not ultimately a motivation to make such a substitution because a Formula One engine is fundamentally unsuitable for use with a conventional commercially available automobile. Ex. 2002 ¶ 30.

In the same vein, while replacing a conventional computer processor with a highly complex supercomputer processing architecture may superficially seem poised to make the conventional computer “faster,” an ordinary artisan would have known that such a substitution is anything but “obvious” and would make no sense. Ex. 2002 ¶ 30. Simply put, an ordinary artisan would not have been motivated to implement Jiang’s speech recognition teachings, which were intended

for the computing environment of a generic personal computer, using Chen's eight-processor, four-memory, multiple-instruction-multiple-data parallel processor. Ex. 2002 ¶ 30. Such a combination would have been the work of a highly *unusual* artisan using highly *unordinary* creativity, not the work of an ordinary artisan using ordinary creativity, as obviousness requires. Ex. 2002 ¶ 29.

Moreover, an ordinary artisan would have understood that Chen's parallel processing system is the opposite of Jiang's CPU-based processing system. Ex. 2002 ¶ 27. In particular, an ordinary artisan would have known that Jiang's speech recognition technique is directed by a CPU, which operates in serial, and that Jiang's teachings are thus not suited for implementation in Chen's parallel processing environment. *Id.* Thus, the ordinary artisan would not have been motivated to implement Jiang's CPU-based speech recognition teachings in Chen's parallel processing system. *Id.*

Further, as explained above, such modifications would have fundamentally altered the resulting device so that it would no longer be suitable as a "personal computer" due to the resulting cost and even size of the system. Ex. 2002 ¶ 31. The resulting system would have greatly limited the usability of speech recognition systems, including Jiang's speech recognition techniques. Ex. 2002 ¶ 31. Thus, an ordinary artisan would not have been motivated to modify Jiang in order to use the

hardware design of Chen. Ex. 2002 ¶ 31. In addition, for the reasons above, an ordinary artisan also would not have had a reasonable expectation of success in undertaking such a modification. Ex. 2002 ¶ 32.

VII. The Petition fails to demonstrate obviousness as to a shared acoustic model memory containing acoustic model data for a cluster of processors

In addition to limitation 1(a)'s requirement of "one or more clusters of processors, each of the one or more clusters of processors comprising: a plurality of processors;" limitation (b) further requires "an acoustic model memory storing acoustic model data," and limitation (c) recites "wherein each of the plurality of processors is configured to compute a probability using the acoustic model data in the acoustic model memory."

Together, limitation 1(a)-(c) thus require that each of the plurality of processors in a cluster share an acoustic model storing acoustic model data. Ex. 2002 ¶ 33.

The specification of the '319 patent describes that same architecture, explaining:

"[T]he present invention provides a circuit in which speech recognition processing is performed in parallel by groups of processors operating in parallel *in which each group accesses a common memory of lexical data*. . . . Each processor within a group can access the same lexical data as any other processor in the group. The controller can thus control the parallel processing of input speech parameters in a more flexible manner. For example, it

allows more than one processor to process input speech parameters using the same lexical data in a lexical memory. This is because the lexical data is segmented into domains which are accessible by multiple processors.” Ex. 1001, 3:44-58 (emphasis added).

Figure 2 of the patent, annotated below, further illustrates that architecture by showing two groups of lexical tree processors, with each group containing multiple processors 1-*k*, and each group of processors connected to a dedicated “acoustic model memory.” Ex. 2002 ¶ 34, Ex. 1001, Fig. 2 (annotated).

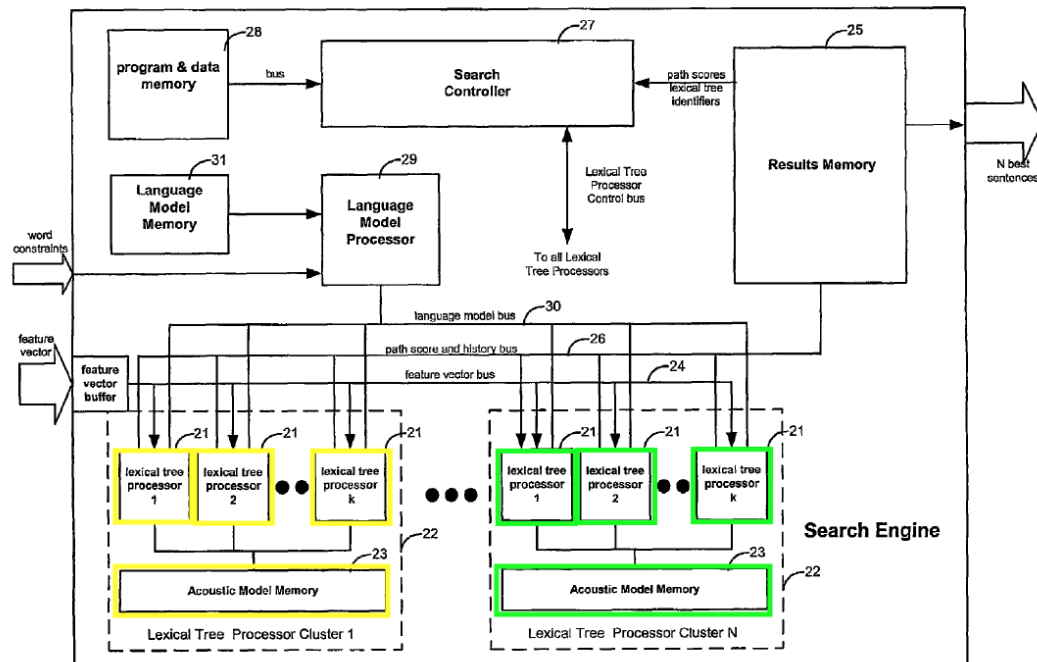


Fig 2

The Petition’s sole theory as to limitations 1(a)-(c) relies on the combination of Jiang and Chen. Pet. 14-31, 54. The Petition admits that Jiang does not teach the several processors to one acoustic model memory architecture of the challenged

claims. Pet. 14. The Petition therefore again looks to Chen for the teaching of groups of processors placed into “separable clusters, each cluster having a common cluster shared memory that is symmetrically accessible by all of the processors in that cluster.” Pet. 23.

According to the Petition’s theory, it would allegedly have been obvious to modify Jiang in view of Chen to create a system with multiple clusters of processors each with a shared memory. Pet. 24. In particular, the Petition proposes to “implement the speech recognition techniques taught by Jiang using the clustered processor computing platform of Chen to expedite the search process by leveraging shared memory among clustered processors.” Pet. 24. The Petition additionally asserts that “a POSITA would have stored at least a portion of the acoustic model data (HMM acoustic model from Jiang’s model memory 72) in the shared cluster memories 104a-d of *each* of the clusters 100a-d taught by Chen for access by processors 102a-d during speech recognition[.]” Pet. 24. The Petition later states, “in the proposed modified system, each of Chen’s processors 102a-d in respective clusters 100a-d would have computed probability scores as taught by Jiang using the acoustic model data stored in shared cluster memories 104a-d of each of the clusters 100a-d[.]” Pet. 30.

The Petition, however, provides no reason *why* the ordinary artisan would have been motivated to specifically utilize *each* of Chen's shared cluster memories 104a-d as an "acoustic model memory" storing "acoustic model data," as recited in limitations 1(a)-(c) of the challenged claims. Ex. 2002 ¶ 37.

The Petition's failure to provide any *motivation* for that crucial aspect of its combination theory is fatal. *PersonalWeb Techs., LLC v. Apple, Inc.*, 848 F.3d 987, 991 (Fed. Cir. 2017); *In re NuVasive, Inc.*, 842 F.3d 1376, 1381-82 (Fed. Cir. 2016); *In re Warsaw Orthopedic, Inc.*, 832 F.3d 1327, 1333-34 (Fed. Cir. 2016); *Ariosa Diagnostics v. Verinata Health, Inc.*, 805 F.3d 1359, 1364-67 (Fed. Cir. 2015); *ActiveVideo Networks v. Verizon*, 694 F.3d 1312, 1328 (Fed. Cir. 2012). When correctly applied, the requirement of a motivation to combine the prior art elements in the specific manner alleged "serves to prevent hindsight bias." *Medichem, S.A. v. Rolabo, S.L.*, 437 F.3d 1157, 1164 (Fed. Cir. 2006) (internal citations and quotations omitted).

Notably, Chen does not contain any teachings regarding speech recognition systems, and Chen thus could not motivate using each of its cluster shared memories as acoustic model memories storing acoustic model data. Ex. 2002 ¶ 36, 37. Jiang, on the other hand, does not teach clusters of processors with each cluster having its own dedicated acoustic model memory storing acoustic model data.

Jiang thus likewise could not motivate the Petition's specific design choice. Ex. 2002 ¶ 37.

Rather, the Petition's convenient theory is plainly driven by hindsight, and simply reflects a reconstruction of the challenged claims arrived upon by starting with the claims themselves and working backwards. But "[i]n making obviousness determinations, the test is 'whether the subject matter of the claimed inventions would have been obvious to one skilled in the art at the time the inventions were made, *not* what would be obvious to a judge after reading the patents in suit and hearing testimony.'" *Medichem*, 437 F.3d at 1164 (emphasis original) (quoting *Panduit Corp. v. Dennison Mfg. Co.*, 774 F.2d 1082, 1092 (Fed. Cir. 1985)).

Because the Petition's theory as to limitations 1(a)-(c) does not demonstrate why the artisan of ordinary skill "would have combined elements from specific references *in the way the claimed invention does*," *ActiveVideo*, 694 F.3d at 1328 (emphasis original), the Petition fails to demonstrate a reasonable likelihood of success, much less a **high** likelihood of success.

VIII. The Petition fails to demonstrate obviousness as to "each of the plurality of processors [being] configured to compute a probability," as recited in 1(c)

The Petition's obviousness theory also fails at a second level. Whereas the Petition alleges it would have been obvious to combine Jiang and Chen such that **each** of Chen's processors in a cluster of processors would have been configured to

compute a probability, as recited in limitation 1(c), the Petition provides no actual reason why an ordinary artisan would have configured the combination of Jiang and Chen in that manner.

Under the heading “Motivation to Combine Chen with Jiang for Claim 1(c),” the Petition provides no reason whatsoever. Pet. 31. Instead, the Petition simply makes conclusory assertions as to what purportedly would have happened, without giving any motivation for *why* those assertions would have occurred. The entirety of the Petition’s “motivation” section for limitation 1(c) is below.

c) Motivation to Combine *Chen* with *Jiang* for Claim 1(c)

A POSITA would have been motivated to modify *Jiang* to include *Chen*’s clustered processors, as discussed above for Claims 1(a) and 1(b). As discussed, *Jiang* teaches a multiprocessor speech recognition system in which a lexical tree search is used to recognize spoken words. *See* Section VI.C.1. *Jiang* modified by *Chen* teaches or renders obvious an HMM acoustic model, accessible to its plurality of processors, used to perform a tree search to determine a most likely phoneme represented by features extracted from a user’s utterance. *Jiang*, 7:30-47.

Moreover, the Petition’s earlier statement that “[a] POSITA would have recognized it would have been advantageously efficient to use each of the clustered processors of Jiang-Chen to perform speech recognition,” Pet. 30, likewise says nothing at all. As the Federal Circuit has held, the “generic” assertion of “efficiency” is not evidence of a motivation to combine, as it “bears no relation to

any specific combination of prior art elements” and “fails to explain why a person of ordinary skill would have combined elements from specific references *in the way the claimed invention does.*” *ActiveVideo*, 694 F.3d at 1328 (emphasis original). Furthermore, an ordinary artisan would know that even using each of Chen’s clustered processors for performing the speech recognition taught in Jiang would **not** necessarily lead to each of the processors being “configured to compute a probability,” as limitation 1(c) requires. Ex. 2002 ¶ 39. Rather, Jiang’s speech recognition technique requires various processing activities, and there is no particular reason why **each** of Chen’s multiple processors would have been dedicated to the specific task of computing a probability. Ex. 2002 ¶ 39.

Likewise inadequate is the Petition’s assertion that “Chen teaches that for each cluster of processors, the plurality of processors in each cluster may perform processing in parallel, such that each processor of each of the clusters performs the intended operation.” Pet. 30 (emphasis removed). The fact that Chen’s processors can work in parallel on a given task is not a reason why they would have been specifically configured to each perform the particular task of computing a probability, as recited in limitation 1(c). Ex. 2002 ¶¶ 38-39.

Accordingly, the Petition fails to demonstrate a reasonable likelihood of success as to limitation 1(c), much less a **high** likelihood of success.

IX. Conclusion

For the reasons above, the Board should decline to institute the Petition.

Respectfully submitted,

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Date: March 15, 2023

CERTIFICATION OF WORD COUNT

The undersigned hereby certifies that the portions of the above-captioned **PATENT OWNER'S PRELIMINARY RESPONSE** specified in 37 C.F.R. § 42.24 have 4,175 words, in compliance with the 14,000 word limit set forth in 37 C.F.R. § 42.24(b)(1). This word count was prepared using Microsoft Word 365.

/Peter Knops/

Peter Knops

Counsel for Patent Owner

Date: March 15, 2023

CERTIFICATION OF SERVICE

The undersigned hereby certifies that the foregoing **PATENT OWNER'S PRELIMINARY RESPONSE** was served electronically via e-mail on March 15, 2023, on the following counsel of record for Petitioner:

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