

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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

v.

ZENTIAN LIMITED,  
Patent Owner.

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IPR2023-01197  
Patent 10,971,140 B2

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Before KEVIN F. TURNER, JEFFREY S. SMITH, and  
CHRISTOPHER L. OGDEN, *Administrative Patent Judges*.

SMITH, *Administrative Patent Judge*.

DECISION  
Granting Institution of *Inter Partes* Review  
35 U.S.C. § 314  
Granting Motion for Joinder  
35 U.S.C. § 315(c); 37 C.F.R. § 42.122

## I. INTRODUCTION

Petitioners Amazon Web Services, Inc. and Amazon.com Services LLC (“Amazon”) filed a Petition (Paper 1, “Pet.”) under 35 U.S.C. §§ 311–319 requesting *inter partes* review of claims 1–8 of U.S. Patent No. 10,971,140 B2 (Ex. 1001, “the ’140 patent”). Amazon also submits a Motion for Joinder (Paper 3, “Mot.”) to *Apple Inc. v. Zentian Ltd.*, IPR2023-00036 (“the Apple IPR”), to which the Board instituted *inter partes* review. IPR2023-00036, Paper 10 (PTAB June 12, 2023).

Patent Owner Zentian Limited (“Zentian”) filed a Preliminary Response and Contingent Joinder Opposition (Paper 7, “Prelim. Resp.”). To this, Amazon submitted a preliminary Reply (Paper 8, “Prelim. Reply”), and Zentian submitted a preliminary Sur-reply (Paper 9, “Prelim. Sur-reply”).

Each party alleges that it is the sole real party in interest, and this is not contested on the preliminary record. *See* Pet. 66; Paper 5, 1.

Under the authority delegated to us under 37 C.F.R. § 42.4(a) by the Director of the USPTO, we may institute an *inter partes* review when “the information presented in the petition . . . and any response . . . shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314(a); *see also* 37 C.F.R. § 42.108(c) (2023). Applying that standard, we institute an *inter partes* review of all the challenged claims of the ’140 patent for the reasons explained below. This is a preliminary decision, and we will base our final written decision on the full trial record. We also grant Amazon’s Motion for Joinder.

### A. Related Matters

The parties indicate that the following matters relate to the ’140 patent: *Zentian Ltd v. Apple Inc.*, 6:22-cv-00122, (W.D.Tex. Feb. 2, 2022);

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*Zentian Ltd v. Amazon.com, Inc.*, 6:22-cv-00123, (W.D.Tex. Feb. 2, 2022); *Apple Inc. v. Zentian Ltd.*, *Inter Partes* Review No. IPR2023-00033; *Apple Inc. v. Zentian Ltd.*, *Inter Partes* Review No. IPR2023-00034; *Apple Inc. v. Zentian Ltd.*, *Inter Partes* Review No. IPR2023-00035; and *Apple Inc. v. Zentian Ltd.*, *Inter Partes* Review No. IPR2023-00036. Paper 5, 1–2; Pet. 66.

### *B. The '140 Patent*

The '140 patent is related to a speech recognition circuit which uses parallel processors for processing the input speech data in parallel. Ex. 1001, 1:18–20.

The patent describes that in speech recognition, there are generally two processes: “front end processing to generate processed speech parameters such as feature vectors, followed by a search process which attempts to find the most likely set of words spoken from a given vocabulary (lexicon).” *Id.* at 1:21–26. According to the '140 patent, “for large vocabulary, speaker independent speech recognition, it is the search process that presents the biggest challenge.” *Id.* at 1:28–30.

The '140 describes that in order to speed up the search function, parallel processing techniques have been suggested. *Id.* at 1:45–47. The patent further describes that “one algorithm for performing the search is the Viterbi algorithm,” which “is a parallel or breadth first search through a transition network of states of Hidden Markov Models.” *Id.* at 1:36–39. This search algorithm is computationally intensive, but in one paper cited by the '140 patent, “a multi-threaded implementation of a fast beam search algorithm is disclosed.” *Id.* at 1:47–52. This “multi-threading implementation requires a significant amount of communication and synchronization among threads,” but in another paper, “the parallel

processing of input speech parameters is disclosed in which a lexical network is split statically among processors.” *Id.* at 1:52–58.

To implement parallel processing of the search function, the ’140 describes a special circuit, in which a “plurality of lexical tree processors are connected in parallel to the input port and perform parallel lexical tree processing for word recognition by accessing the lexical data in the lexical memory arrangement.” *Id.* at 2:4–8. In addition, a “controller controls the lexical tree processors to process lexical trees identified in the results memory arrangement by performing parallel processing of a plurality of lexical tree data structures.” *Id.* at 2:12–15.

Figure 2 is a diagram of the circuit of the ’140 patent, and is reproduced below.

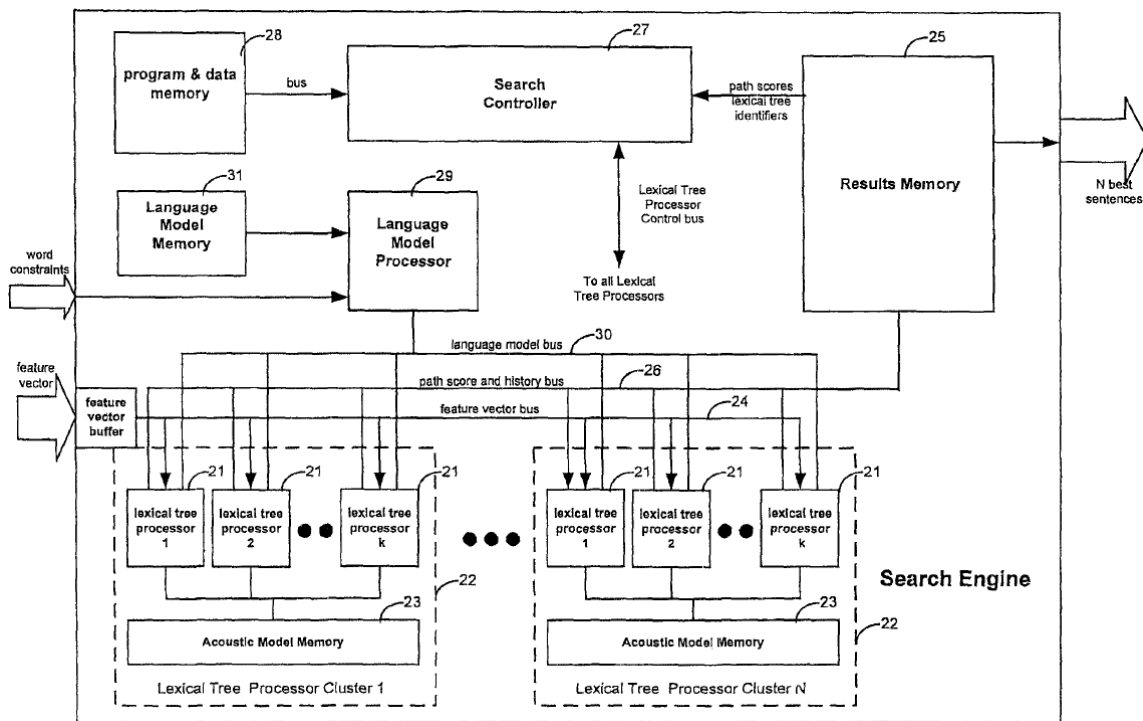


Figure 2, showing a plurality k of lexical tree processors 21, arranged in a lexical tree processor cluster 22, with acoustic model memory 23.

*C. Illustrative Claim*

Challenged claim 1 of the '140 patent recites:

1. [Pre] A speech recognition circuit comprising:
  - [a] one or more clusters of processors, each of the one or more clusters of processors comprising:
    - a plurality of processors; [b] and
    - an acoustic model memory storing acoustic model data, [c] wherein each of the plurality of processors is configured to compute a probability using the acoustic model data in the acoustic model memory, [d] wherein:
      - the speech recognition circuit is configured to generate an initial score for an audio sample; [e] and
      - the initial score is used to determine whether to continue processing to determine a final score via processing a larger amount of model data than that was processed to generate the initial score.

Ex. 1001, 6:13–26; Pet. 66 (showing Amazon’s bracketed claim annotations).

*D. Evidence*

Amazon relies on the following prior art:

US Patent No. 6,374,219 B1, issued April 16, 2002 (Ex. 1004, “Jiang”);

US Patent No. 5,428,803, issued June 27, 1995 (Ex. 1005, “Chen”);

US Patent Appl. Publ. No. 2001/0053974 A1, published December 20, 2001 (Ex. 1008, “Lucke”);

US Patent No. 5,983,180, issued November 9, 1999 (Ex. 1009, “Robinson”);

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