

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

KEA CLOUD, INC. & HI AUTO, INC.

Petitioners

v.

VALYANT AI, INC.

Patent Owner

Inter Partes Review No.: To Be Assigned

U.S. Patent No. 10,592,706

PETITION FOR *INTER PARTES* REVIEW
OF U.S. PATENT NO. 10,592,706 UNDER
35 U.S.C. § 311 AND 57 C.F.R. § 42.100

TABLE OF CONTENTS

I.	Introduction.....	1
II.	Overview of the '706 Patent.....	1
	A. The Specification and the Challenged Claims	1
	B. File History	4
	C. Person of Ordinary Skill in the Art (“POSA”).....	5
III.	Claim Construction.....	6
IV.	Statutory Grounds of Challenge	6
V.	Overview of the Technology	6
	A. Background of the Art.....	6
	B. Mahaffy – U.S. Pat. Appl. Pub. No. 2003/0018531.....	8
	C. Jasper – U.S. Pat. Appl. Pub. No. 2007/0007331.....	10
	D. Coleman – U.S. Pat. Appl. Pub. No. 2019/0108566	11
	E. Washington – U.S. Pat. Appl. Pub. No. 2017/0293905	13
VI.	Detailed Explanation of the Challenge.....	13
	A. Ground 1 – Obvious over Mahaffy + Jasper	13
	1. Motivation to Combine.....	13
	2. Claim 1.....	16
	3. Claim 2 – Real-Time Processing.....	26
	4. Claim 3 – Switch to Auditor Mode Before Deactivation.....	26
	5. Claim 4.....	28
	6. Claim 5 – Processor Associates Order Items and Queries Customer	32
	7. Claims 6, 8 – Convert Computer Queries to Audio	33
	8. Claim 7 – Auditor Order Comparison and Update.....	33
	9. Claim 9 – Alerting Auditor of Exceptions and Auditor Override	34
	10. Claim 10 – Deactivating Processor for Change in Customer Traffic, and Claim 11 - Deactivating Processor for Change in Site Staffing	35

B.	Ground 2A – Obvious over Coleman + Knowledge of a POSITA.....	36
1.	The '706 Patent Is Only Entitled to a 2019 Priority Date.....	36
2.	Claim 1.....	38
3.	Claim 2 – Real Time Processing.....	49
4.	Claim 3 – Switch to Auditor Mode Before Deactivation.....	50
C.	Ground 2B – Obvious over Coleman + Washington	51
1.	Motivation to Combine.....	51
2.	Claim 4.....	54
3.	Claim 5 – Processor Associates Order Items and Queries Customer	60
4.	Claims 6, 8 – Convert Computer Queries to Audio	61
5.	Claim 7 – Auditor Order Comparison and Update.....	62
6.	Claim 9 – Alerting Auditor of Exceptions and Auditor Override	62
7.	Claim 10 – Deactivating Processor for Change in Customer Traffic, and Claim 11 – Deactivating Processor for Change in Site Staffing	64
VII.	No Basis for Discretionary Denial.....	65
A.	Ground 1: Section 325(d)	65
B.	All Grounds: Section 314(a).....	67
VIII.	Mandatory Notices Under 37 C.F.R. § 42.8.....	69
A.	Real Parties-in-Interest	69
B.	Related Matters.....	69
C.	Identification of Counsel and Service Information	70
IX.	Grounds for Standing and Procedural Statement (37 C.F.R. § 42.104(a)) ..	71
X.	Payment of Fees.....	71
XI.	Conclusion	71
	Claim Appendix of Challenged Claims	i

TABLE OF AUTHORITIES

	Page(s)
Cases	
<i>Advanced Bionics, LLC v. Med-El</i> , IPR2019-01469, Paper 6 (Feb. 13, 2020)	65
<i>Akeva L.L.C. v. Nike, Inc.</i> , 817 F. App'x 1005 (Fed. Cir. 2020)	36, 38
<i>Apple Inc. v. Qualcomm Inc.</i> , IPR2018-01315, Paper 7 (PTAB Jan. 18, 2019).....	66
<i>Apple, Inc. v. Fintiv, Inc.</i> , IPR2020-00019, Paper 15	67
<i>Applications in Internet Time, LLC, v. RPX Corp.</i> , 897 F.3d 1336 (Fed. Cir. 2018).....	69
<i>Cook Group Incorporated, et al. v. Boston Scientific SciMed, Inc.</i> , IPR 2017-00135	67
<i>Digital Check Corp. d/b/a ST Imaging v. E-Imagedata Corp.</i> , IPR2017-00178, Paper 6 (PTAB April 25, 2017).....	67
<i>Intex Recreation Corp. v. Team Worldwide Corp.</i> , IPR2018-00871, Paper 14 (PTAB Sept. 14, 2018).....	65
<i>Nokia of Am. Corp. v. TQ Delta, LLC</i> , IPR2022-00471, Paper 11	67
<i>Oticon Medical AB, et al. v. Cochlear Limited</i> , IPR 2019-00975	67
<i>Phillips v. AWH Corp.</i> , 415 F.3d 1303 (Fed. Cir. 2005).....	6
Statutes	
35 U.S.C. § 100(i)	38
35 U.S.C. § 102(a)(1).....	8, 10
35 U.S.C. § 102(a)(2).....	11, 13, 36
35 U.S.C. § 103	6

35 U.S.C. § 311.....	1
----------------------	---

Other Authorities

37 C.F.R. § 42.8.....	69
37 C.F.R. § 42.10(b)	71
37 C.F.R. § 42.100	1
37 C.F.R. § 42.100(b)	6
37 C.F.R. § 42.104(a).....	71

LIST OF EXHIBITS

Exhibit No.	Description of Exhibit
1001	U.S. Patent No. 10,592,706
1002	Declaration of Boris Galitsky, Ph.D.
1003	USPTO Assignments on the Web for U.S. Patent No. 10,592,706
1004	Prosecution History for U.S. Patent No. 10,592,706
1005	Accelerated Examination Support Document filed October 5, 2017
1006	Non-Final Office Action mailed July 26, 2019
1007	Amendment filed October 25, 2019
1008	Final Office Action mailed January 8, 2020
1009	Notice of Allowability mailed January 27, 2020
1010	U.S. Patent Application No. 15/723,573 (U.S. Patent No. 10, 628,635)
1011	U.S. Provisional Patent Application No. 62/478,454
1012	U.S. Provisional Patent Application No. 62/633,240
1013	Redline comparison of the '706 Patent and the '573 Application
1014	Redline comparison of the '706 Patent and the '454 Application
1015	Redline comparison of the '706 Patent and the '240 Application
1016-1019	[reserved]
1020	U.S. Publication No. 2003/0018531 ("Mahaffy")
1021	U.S. Publication No. 2007/0007331 ("Jasper")
1022	U.S. Publication No. 2019/0108566 ("Coleman")
1023	U.S. Publication No. 2017/0293905 ("Washington")
1024-1029	[reserved]
1030	CV of Boris Galitsky, Ph.D.
1031	Docket Summary: C.A. No. 21-1698 (MN)
1032	Docket Summary: C.A. No. 21-1700 (MN)

1033-1039	[reserved]
1040	<i>The Future of Drive Thru: Overcoming Choke Points</i> , QSR, August 2017, available at https://www.qsrmagazine.com/outside-insights/future-drive-thru-overcoming-choke-points
1041	<i>Drive-Thrus</i> , Restaurant Development + Design, May 12, 2016, available at https://rddmag.com/design/781-drive-thrus
1042	<i>Fast-food restaurants begin outsourcing drive-through order-taking</i> , Pioneer Press, January 25, 2009, available at https://www.twincities.com/2009/01/25/fast-food-restaurants-begin-outsourcing-drive-through-order-taking/
1043	<i>McDonald's brings cognitive to the drive-through</i> , itnews, July 13, 2016, available at https://www.itnews.com.au/news/mcdonalds-brings-cognitive-to-the-drive-through-430482
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1050	<i>Automatic Speech Recognition (ASR)</i> , Techopedia, July 24, 2017, available at https://www.techopedia.com/definition/6044/automatic-speech-recognition-asr
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1052	Juang, B. H., & Rabiner, L. R. (2004), <i>Automatic Speech Recognition—A Brief History of the Technology Development</i> , Georgia Institute of Technology, Atlanta Rutgers University and the University of California, Santa Barbara, 1, 67, available at https://web.ece.ucsb.edu/Faculty/Rabiner/ece259/Reprints/354_LA_LI-ASRHistory-final-10-8.pdf
1053	<i>How Speech Recognition Works</i> , HowStuffWorks.com, November 10, 2006, available at https://electronics.howstuffworks.com/gadgets/high-tech-gadgets/speech-recognition.htm
1054	<i>Natural Language Processing (NLP)</i> , Techopedia, June 6, 2022, available at https://www.techopedia.com/definition/653/natural-language-processing-nlp
1055	<i>The Definitive Guide to Natural Language Processing (NLP)</i> , MonkeyLearn, October 29, 2015, available at

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1058	<i>Dragon NaturallySpeaking: User Guide</i> (2002-2011), V. 11.5
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1060	<i>Dragon NaturallySpeaking</i> , Wikipedia, available at https://en.wikipedia.org/wiki/Dragon_NaturallySpeaking
1061	<i>Voice Over Internet Protocol (VoIP)</i> , Federal Communications Commission, available at https://www.fcc.gov/general/voice-over-internet-protocol-voip

Pursuant to 35 U.S.C. § 311 and 37 C.F.R. § 42.100, Petitioners Kea Cloud, Inc. and Hi Auto, Inc. (collectively, “Petitioners”) request *inter partes* review of claims 1-11 (the “Challenged Claims”) of U.S. Patent No. 10,592,706 (“the ’706 Patent”), EX1001. The ’706 Patent is assigned to Valyant AI, Inc. (“Patent Owner”) per USPTO records. *See* EX1003.

I. Introduction

The ’706 Patent covers methods for automating the ordering function of a fast-food restaurant. The purportedly novel feature of the claims, per the Examiner, is that a human auditor monitors an autonomous workflow and switches to a human-assisted workflow when the automation is “not functioning properly.” But it is nothing new to monitor automation and turn it off when it fails. Rather, that is the most logical approach to ensure that automated processes, such as taking a customer’s order, actually complete their tasks.

II. Overview of the ’706 Patent

A. The Specification and the Challenged Claims

The ’706 Patent describes an automated order-processing system for drive-thru restaurants that generally takes over the order-processing function from an on-site employee. EX1001, 12:46-56. A human auditor can abort or intervene in the autonomous workflow to pass order-taking back to an on-site employee. *Id.*, 12:48-53; 13:23-43.

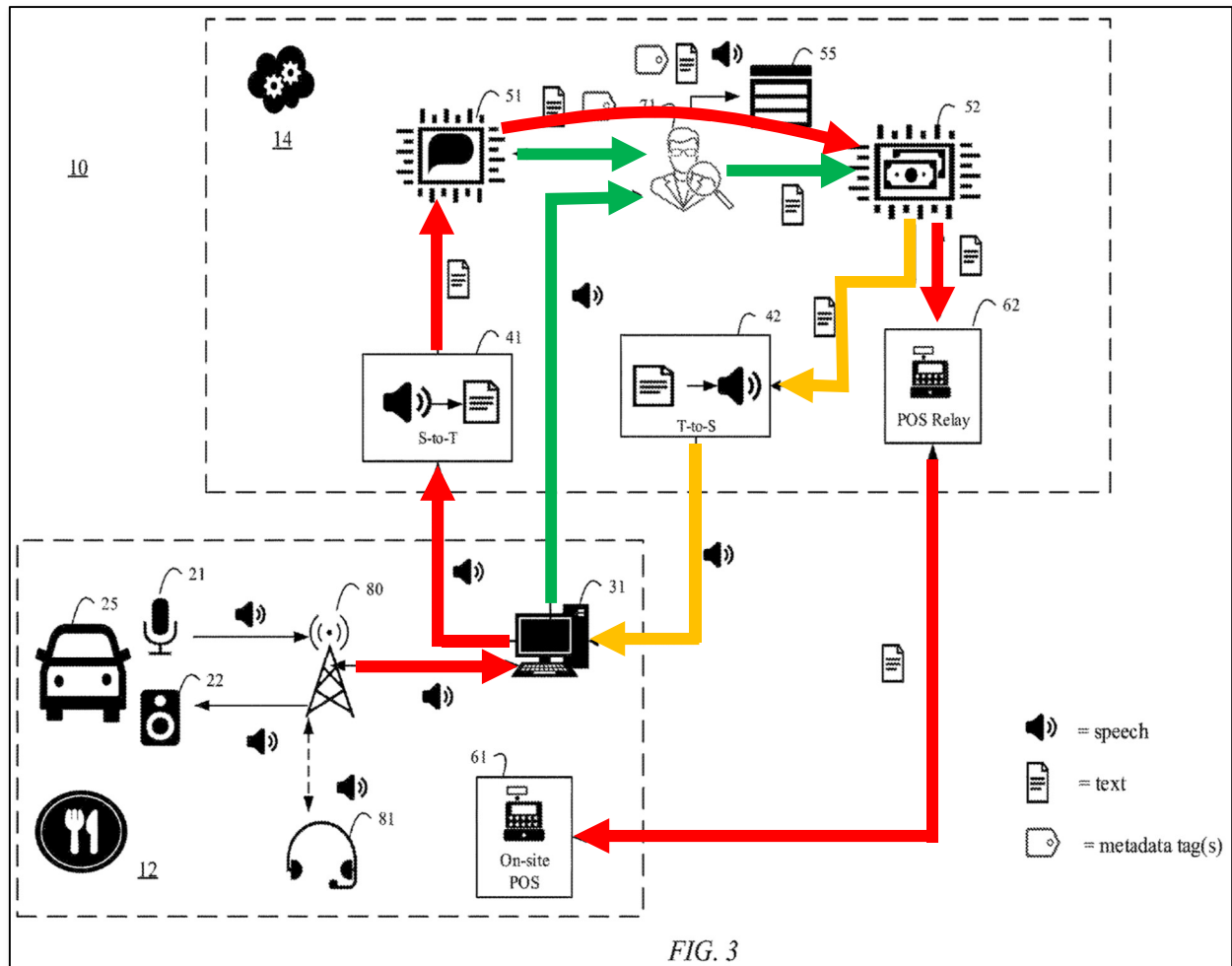


FIG. 3

Annotated FIG. 3 above depicts an autonomous workflow (red) and a human-assisted workflow (green) of the '706 Patent. *Id.*, FIGS 3-4. Both begin with a customer 25 speaking into a microphone 21 at the drive-thru order station 12 to place an order. *Id.*, 12:57-61. The audio is passed, via computer 31, to a speech-to-text module 41 that transcribes the audio into text. *Id.*, 7:29-44; 12:48-56; 13:7-16. The transcribed text is output to a natural language processor (“NLP”) 51 that identifies order items (e.g., “one cheeseburger”) from the transcribed text. *Id.*, 13:17-23.

In the human-assisted workflow, the identified order items are passed to a human auditor 71 along with the audio for comparison. *Id.*, 12:48-53; 13:23-27. If the auditor detects that the autonomous workflow is not functioning properly, or that the customer is frustrated or otherwise not being adequately served by the autonomous workflow, the auditor can abort or intervene in the order processing and pass control to an on-site employee 81. *Id.*, 13:33-43.

In the autonomous workflow, the auditor only audits orders when the system detects an exception. *Id.*, 14:22-39; FIGS. 3-4. The autonomous workflow in FIG. 3 above, for example, does not involve the auditor because, in that example, no exception has been detected.

Next, identified order items are passed to a point of sale (“POS”) relay 62, which transmits the order to the on-site POS system 61 where an on-site employee 81 fulfills the order by delivering the ordered food to the customer 25. *Id.*, 13:53-56; 13:3-6; 9:17-39.

In an upselling subroutine (orange), the identified order items may also be passed to a business processor 52 that outputs a text prompt (e.g., “would you like fries and a drink with that?”) to a text-to-speech module 42, which converts the text prompt into audio that is output to the customer via speakers 22 at the drive-thru order station. *Id.*, 13:44-56.

The challenged claims are recited in the Claims Appendix, including an identification of the subparts referenced throughout this Petition. Independent claims 1 and 4 cover methods for automating the ordering function of a drive-thru restaurant comprising components/steps generally summarized as follows:

- providing audio of a customer's order to an automated order processor;
- processing the audio with the automated order processor, using speech recognition and natural language processing, to generate an order from recognized menu items;
- switching to human-based order-taking when the automated order processing is not functioning properly; and
- transmitting the order to on-site employees who fulfill the order.

The dependent claims recite well-known features related to automated order processing, upselling, and error handling.

B. File History

The '706 Patent issued from U.S. Patent Application No. 16/274,170 ("the '170 Application"), which was filed on February 12, 2019.¹ EX1001.

In an accompanying Track One request, Patent Owner admitted that: (1) U.S. Patent Application Publication No. 2003/0018531 ("Mahaffy") was the "most closely related" prior art to the claimed subject matter (EX1005, pp.3-4), (2) most

¹ A discussion of the priority date of the '706 Patent is at Section VI.B. below.

of the limitations of the original independent claims were taught by Mahaffy (*Id.*, p.4), and (3) many of the dependent claims had “no features that would define over the references deemed most closely recited,” if the original independent claims were unpatentable (*Id.*, p.6).

Despite these admissions and the strength of Mahaffy as prior art, the Examiner never analyzed, discussed, or relied on Mahaffy in rejecting the claims. The Examiner instead relied on other U.S. patents and publications, none of which provided as strong an unpatentability ground as Mahaffy or Mahaffy in combination with other art. *See* EX1006; EX1008. Patent Owner thus easily distinguished over the Examiner-cited art as failing to teach “deactivating [an automated] customer order processing [by a remote operator] to pass customer control to an on-site employee.” EX1007, pp.13-15.

The Examiner subsequently allowed the claims. EX1009.

C. Person of Ordinary Skill in the Art (“POSA”)

A POSA would have had at least a bachelor’s degree in computer science or computer engineering and at least 2 years of experience with speech-recognition and natural-language-processing technology. EX1002, ¶94. A POSA would also have a general knowledge of fast-food ordering processes. *Id.*

III. Claim Construction

In an *inter partes* review, claim terms “shall be construed using the same claim construction standard that would be used to construe the claim in a civil action.” 37 C.F.R. § 42.100(b); *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005). For the purpose of this IPR only, Petitioners submit that the plain and ordinary meaning of the terms in the Challenged Claims should be used.

IV. Statutory Grounds of Challenge

Ground	Basis
1	Claims 1-11: obvious under 35 U.S.C. § 103 over Mahaffy (EX1020) in view of Jasper (EX1021)
2A	Claims 1-3: obvious under 35 U.S.C. § 103 over Coleman (EX1022) in view of the knowledge of a POSITA
2B	Claims 4-11: obvious under 35 U.S.C. § 103 over Coleman (EX1022) in view of Washington (EX1023)

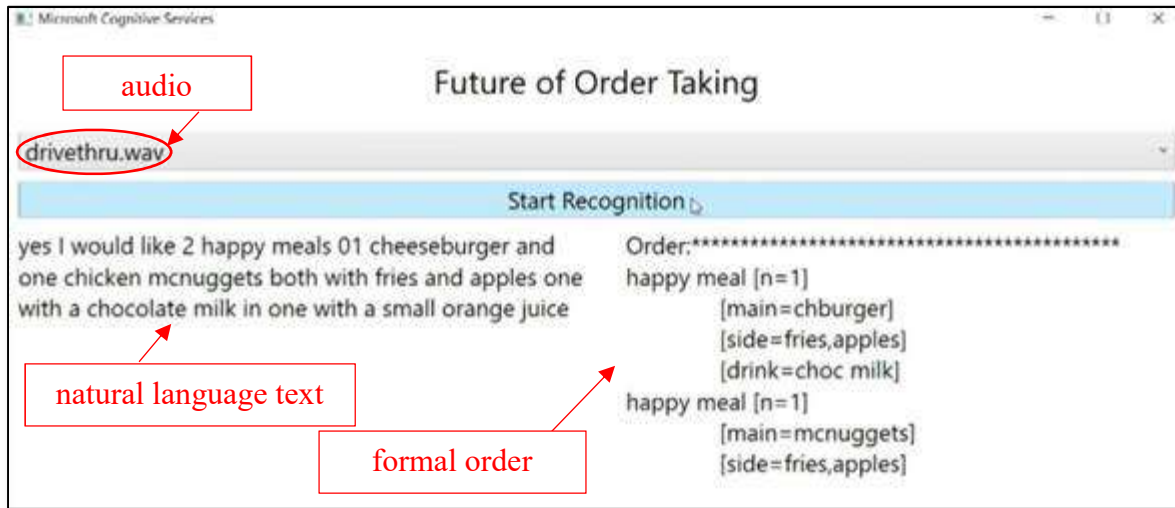
V. Overview of the Technology

A. Background of the Art

Introduced in the 1970’s, the drive-thru process is all-too-familiar. A customer arrives at the drive-thru and speaks their order into a microphone, an employee hears the order via a headset and enters the ordered menu items into the order processing system for preparation by kitchen staff, the customer pays for and receives their ordered menu items, and, finally, the customer drives away. EX1002, ¶33; EX1040; EX1022, ¶[0036]. *See also, e.g.*, EX1020, ¶[0005]; EX1041.

In the early 2000s, speed, accuracy and service concerns prompted the fast-food industry to consider outsourcing their order-taking functions to free up on-site employees for other tasks. By 2009, traditional drive-thru order-taking was commonly outsourced to off-site order takers at remote call centers. EX1042. And by early 2016, automated speech recognition (“ASR”) and natural language processing (“NLP”) technology had been applied to automate the order-taking process.² EX1043. Instead of a human employee, a computer took a customer’s verbal order using ASR and NLP and entered it into the restaurant’s order processing system to be fulfilled. EX1002, ¶¶34-35, 55-56; EX1020, ¶¶[0016]-[0017], [0019]; EX1022, ¶[0036]. More specifically, the verbal order was converted to natural-language text via ASR and that natural-language text was converted into a formal representation of the order via NLP. EX1002, ¶57. This two-step process is shown in the below image of an AI ordering system for McDonald’s AI Drive Thru in 2016:

² ASR (i.e., “speech recognition” or “speech-to-text”) is a computer process that converts human speech into natural-language text. EX1002, ¶36. NLP is a computer process that converts natural-language text into a formal representation, such as logical statements, that is computer readable. *Id.*, ¶48.



EX1043, p. 3 (with annotations); *see also*

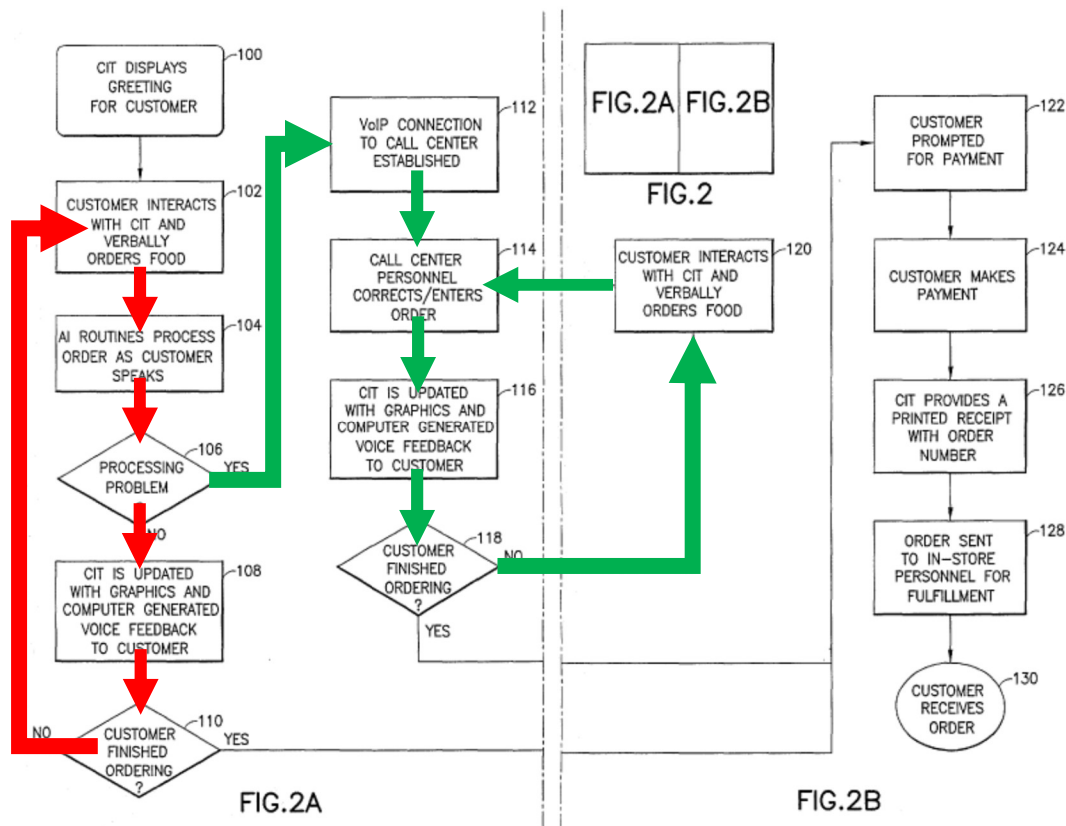
https://www.youtube.com/watch?v=Y_rSb4Vb5zA (video demonstration).

It was also well-known that ASR and NLP technology could, on occasion, break down or otherwise fail to accurately take customer orders. EX1002, ¶¶59-60. The natural response to this possibility was to monitor the automated workflow and to switch from the automated workflow to a human-assisted workflow when the automation was not functioning properly. *Id.* This concept of reverting to pre-automated processes when automated processes fail was not new in 2017 (or 2019). *Id.*

B. Mahaffy – U.S. Pat. Appl. Pub. No. 2003/0018531

Mahaffy, entitled “Point-of-Sale Commercial Transaction Processing System Using Artificial Intelligence Assisted by Human Intervention,” published on January 23, 2003. EX1020. Mahaffy is prior art under 35 U.S.C. § 102(a)(1).

Mahaffy discloses a system for automating the traditional fast-food voice ordering process but relies on human intervention where the automated system is unable to complete a transaction. EX1020, ¶¶[0015]-[0018]; EX1002, ¶¶98-103. Instead of a human cashier, Mahaffy uses a customer interaction terminal (CIT) 12, as shown in annotated FIGS. 2A-2B below, which is coupled to a computer system 14 running software that permits the CIT to interact with the customer and process, via AI routines, orders spoken into the CIT's microphone 22. EX1020, ¶¶[0016], [0021], [0030]-[0033], [0050]; EX1002, ¶100.



In Mahaffy's automated workflow (red), the AI routines utilize speech recognition and natural language processing to identify menu items from the customer's verbal

order and add those items to an order list. EX1020, ¶¶[0030]-[0033], [0044], [0050]; EX1002, ¶102.

Mahaffy also discloses a human-assisted workflow (green) for when Mahaffy's automated workflow cannot complete an order in a satisfactory manner. EX1020, ¶¶[0031], [0047]-[0048]; EX1002, ¶103. In that case, Mahaffy allows human operators 40 data-connected to the CIT to intervene to complete, correct, or verify the order via a human-assisted workflow through the CIT. *Id.*

C. Jasper – U.S. Pat. Appl. Pub. No. 2007/0007331

Jasper, entitled “Order Processing Apparatus and Method,” published on January 11, 2007. EX1021. Jasper is prior art under 35 U.S.C. § 102(a)(1).

Jasper discloses an order-taking system that uses voice-over-internet-protocol (“VoIP”) to connect customers at a drive-thru with a remote order-taking agent (e.g., a human at a call center or an AI) who takes their orders. EX1021, ¶¶[0045], [0047], [0054]-[0055], FIG. 1; EX1002, ¶105. In failure situations, an alternate remote agent may be selected (thus switching from AI to human, or vice versa) to step in and take the order, or the system may defer to the personnel at the restaurant to take the order via a restaurant point-of-sale system. EX1021, ¶¶[0059]-[0062]. Jasper also discloses using its remote order-taking selectively to handle overflow, such as during lunch or dinner rush or during staffing shortages. *Id.*, ¶[0063].

D. Coleman – U.S. Pat. Appl. Pub. No. 2019/0108566

Coleman, entitled “Contextual Restaurant Ordering System,” was effectively filed on October 5, 2017 and published on April 11, 2019. EX1022. Coleman is prior art under 35 U.S.C. § 102(a)(2) for the reasons discussed in Section VI.B. below.

Coleman discloses a system for automated drive-thru voice ordering, shown in annotated FIG. 1 below, where a drive-thru ordering area 1 has a microphone 8 into which a customer 6 speaks an order that is entered into a restaurant information system 3 for processing. EX1022, ¶¶[0029], [0034]-[0036], [0080]; EX1002, ¶¶107-108. Coleman re-routes this ordering process to human agents, however, if the automated workflow is not capably working. EX1022, ¶¶[0005], [0020], [0023]; EX1002, ¶109.

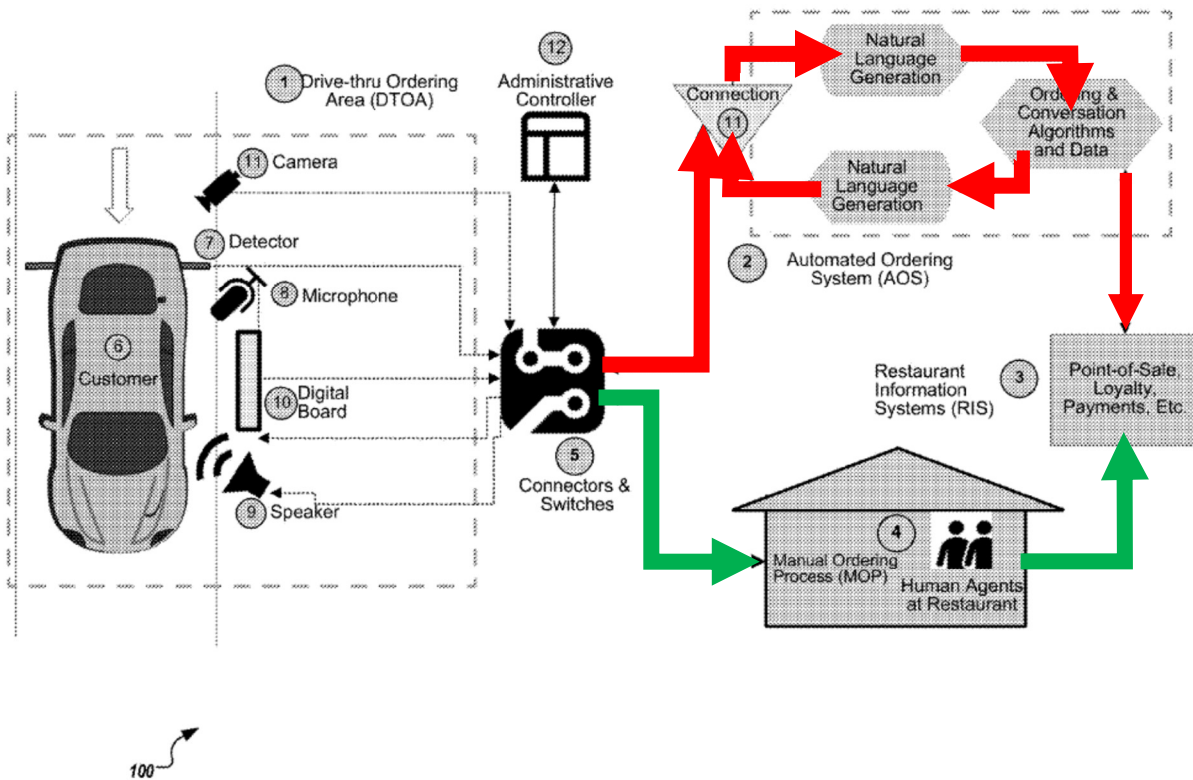


FIG. 1

In an automated workflow (red), an automated order system (“AOS”) 2 uses a natural language understanding (“NLU”) component to process the customer’s order by converting it into transcribed text and intent. EX1022, ¶¶[0034]-[0035], [0070]-[0071]; EX1002, ¶109. In a human-assisted workflow (green), human agents take the customer’s order via a manual order process system (“MOP”) 4 by interfacing with the customer. EX1022, ¶¶[0035]-[0036], [0068]; EX1002, ¶109. A switch 5 controls whether the order is to be taken via the AOS or via the MOP. EX1022, ¶¶[0038], [0041], [0045], [0063], [0068]-[0069].

E. Washington – U.S. Pat. Appl. Pub. No. 2017/0293905

Washington, entitled “Voice Recognized Data Analysis and Corrective Action Systems and Methods,” was effectively filed on April 8, 2016 and published on October 12, 2017. EX1023. Washington is prior art under 35 U.S.C. § 102(a)(2).

Washington discloses an order processing system 100 that facilitates the order-taking process at a drive-thru restaurant via a speech-to-order (“STO”) system 106. EX1023, ¶¶[0021]-[0022]; EX1002, ¶111. The STO system converts customer speech into an order that is displayed to an operator. EX1023, ¶¶[0030]-[0037], [0039]-[0045], [0068]-[0073]. An operator also listens to the customer speech and can confirm or make corrections to the order. *Id.*, ¶¶[0038], [0068]-[0070], [0020].

VI. Detailed Explanation of the Challenge

A. Ground 1 – Obvious over Mahaffy + Jasper

1. Motivation to Combine

Mahaffy and Jasper both relate to improvements in conventional ordering processes where customers can order at the counter or drive-thru. At the counter, customers speak face-to-face with on-site employees. *E.g.*, EX1020, ¶[0005]; EX1021, ¶[0003]. In the drive-thru, customers speak into an order box having a microphone and speaker to allow two-way communication with on-site employees. *E.g.*, EX1021, ¶[0005]. Either way, an on-site employee enters the customer’s order into a point-of-sale (“POS”) terminal, which transmits the customer’s order to

kitchen staff to fulfill the order while the cashier accepts payment from the customer.

E.g., EX1020, ¶[0005]; EX1021, ¶[0003]. *See also* EX1002, ¶113.

Both Mahaffy and Jasper recognize that “delays and inefficiencies in order intake and fulfillment” can “become[] the critical bottleneck in the overall workflow,” which “lead[s] to reduced production, long customer queues and ultimately customer dissatisfaction.” EX1021, ¶[0010]; *see also* EX1020, ¶[0006] (“The primary bottleneck to serving greater numbers of customers is in the processing of the orders,” and “profits for a fast food restaurant can be increased by decreasing the transaction time for the orders, such that more orders can be entered in a given time frame.”) Both also recognize that merely having more on-site employees taking orders is not a viable solution to the bottleneck problem—whether for lack of on-site space (EX1020, ¶[0006]) or lack of local labor (EX1021, ¶[0006]). *See also* EX1002, ¶114.

Mahaffy’s solution is automating the ordering process with a customer-interaction-terminal (“CIT”) equipped with speech-recognition AI routines to take customer orders autonomously. *E.g.*, EX1020, ¶¶[0015]-[0018]. This solution effectively provides more order takers (AI-based CITs) than the on-site space or labor pool otherwise allows by reducing on-site staff requirements. *Id.*, ¶¶[0021], [0011]. Still, Mahaffy acknowledges shortcomings in its solution where the AI may

fail. *E.g.*, EX1020, ¶[0018].³ As a fallback, Mahaffy reverts to a call-center-based approach with human operators intervening to take over order processing from the AI routines. *E.g.*, *Id.*, ¶¶[0018], [0047]. *See also* EX1002, ¶¶115-117.

Like Mahaffy, Jasper also uses a call-center-based approach, connecting customers at the drive-thru with call-center agents who take customer orders. *E.g.*, EX1021, ¶[0022], FIG. 1. Yet Jasper recognizes that the customer-agent connection can fail, which can waste time and lead to customer frustration. *Id.*, ¶[0059]. Jasper solves this problem by, on a connection failure, transferring order-taking responsibility to on-site personnel who can take the customer's order conventionally. *Id.* *See also* EX1002, ¶¶118-119.

A POSA would have found it obvious to modify Mahaffy to include the same failsafe of Jasper for its own call-center-based connections. EX1002, ¶120. Mahaffy discloses no reason why its call center would be less prone to connection failures than Jasper's call center, leading to a similar waste of time and customer frustration. *Id.*, ¶121. Thus, because Jasper identifies an existing problem in an aspect of Mahaffy, as well as that problem's solution, and because the ultimate goals of any fast-food ordering system are to decrease ordering time and increase customer

³ This was a known problem in the art. *See* EX1022, ¶[0021] (explaining reasons an automated system may not smoothly complete the ordering process).

satisfaction, a POSA would be motivated by Jasper to similarly address connection failures in Mahaffy, and to thereby similarly avoid the resulting wasted time and customer frustration. *Id.*

A POSA would have a reasonable expectation of success in adding Jasper’s revert-to-the-on-site-employee failsafe measure to Mahaffy because it merely requires applying known techniques from Jasper to improve the similar system of Mahaffy in the same way with predictable results (i.e., reverting to an existing and conventional on-site workflow). *Id.*, ¶¶121-122.

2. Claim 1

[1-Pre], and [1a] – Audio Stream of Customer Order⁴

The preamble is not limiting, but Mahaffy discloses a method for automating the fast-food voice ordering process, with humans intervening when the automation underperforms.

Mahaffy discloses “providing an audio stream of an order of a customer,” by “a customer order [that] is verbally provided into the microphone 22 of the CIT at 102,” which is then reproduced for the operator. EX1020, ¶¶[0031], [0033].

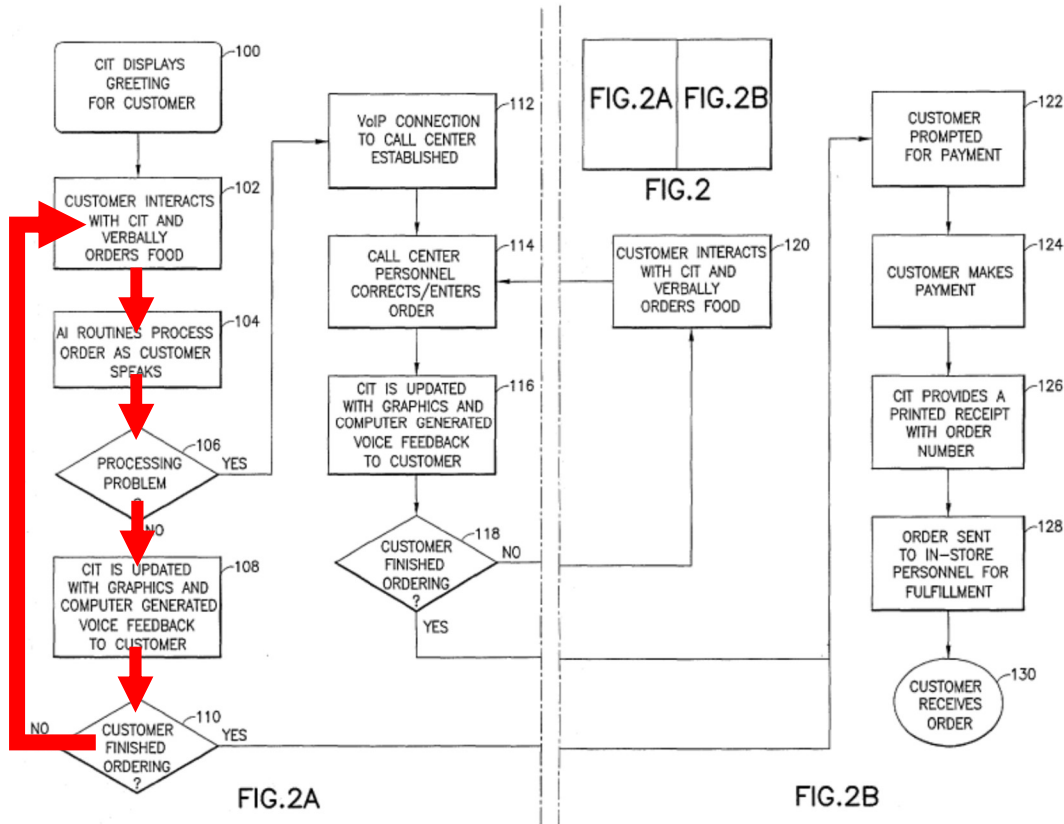
⁴ See Appendix of the Challenged Claims for full identification of the limitations referred to by shorthand herein.

Mahaffy's customer is "positioned on a site" because the CIT can be placed at the drive-thru of a restaurant. *Id.*, ¶[0029]. *See also* EX1002, ¶¶123-130.

Patent Owner also admitted that Mahaffy discloses these features. EX1005, p. 4.

[1b] – AI-Trained Order Processor

Mahaffy discloses an "order processor having a speech recognition module" by its computer system with AI routines that parse customers' utterances to determine what the customer wants. EX1020, ¶[0033]. Mahaffy's CIT is coupled to that computer system, which permits the CIT to interact with customers and process, via the AI routines, orders spoken into its microphone. *Id.*, ¶¶[0030], [0033]. In Mahaffy's automated workflow (red), the AI routines use ASR and NLP to identify and add spoken menu items to an order list:



Id., FIGS. 2A-2B, ¶¶[0034], [0037]-[0038], [0040], [0044]. For example, the AI routines recognize the words “three” and “SuperBurgers” from the customer’s utterance, which the AI routines interpret as an order for three SuperBurgers. *Id.*, ¶[0040]. A POSA would understand that this describes using speech-recognition for automated order-taking, and is no different from the structure identified in the ’706 Patent. *See* EX1002, ¶¶131-134; EX1001, 1:25-32 (“Speech recognition systems are systems that utilize a machine to identify words or phrases in spoken language and convert them into machine readable text or instructions.”).

A POSA would also understand that the AI routines of Mahaffy would be “trained using artificial intelligence programs.” EX1002, ¶¶135-146.

First, Mahaffy's AI routines are optimized based on conditioning data collected at the POS that is used to train the AI routines on a "continual basis," suggesting a "supervised learning" approach that involves training using artificial intelligence. EX1020, ¶[0034]; EX1002, ¶¶136-139. Mahaffy indeed suggests using speech-to-text software (*e.g.*, Dragon NaturallySpeaking software) that was known to be trained using AI according to a supervised learning approach. EX1020, ¶[0038]; EX1002, ¶136. The Dragon software corresponds to the speech-to-text software identified in the '706 Patent. EX1001, 7:37-41. EX1002, ¶138.

Second, a POSA would understand that all speech-recognition routines, including Mahaffy's, would be developed by training a neural network's ability to pattern match against incoming audio by providing a corpus of sample audio that has been assigned text words or phrases. EX1002, ¶¶141-142; *see also id.*, ¶143 (finding no difference between the '706 Patent's description of training its speech-to-text module and the general understandings of a POSA regarding training speech recognition routines as in Mahaffy).

[1c] – Converting Audio to Text

As discussed in *[1b]*, Mahaffy discloses a "speech recognition model."

Mahaffy also discloses that its speech recognition model "converts a word or words in the audio stream to text" by its AI routines that "recognize and parse the speech of the customer ... such that individual menu items ordered are properly

added to the customer's order list ... after each menu item is ordered.” EX1020, ¶¶[0044], [0040].

A POSA would understand that recognizing menu items from speech involves converting the audio to text. EX1002, ¶¶148-150. Mahaffy indeed suggests using a known speech-to-text software (*e.g.*, Dragon's NaturallySpeaking) that was known to convert words in the audio stream to text. EX1020, ¶[0038]; EX1002, ¶¶148-150.

Moreover, a POSA would understand that all speech-recognition modules, including that of Mahaffy, work by converting audio into a text-based phoneme (*e.g.*, *th*, *p*, *d*, etc.) sequence for pattern matching against known words or word sequences. EX1002, ¶¶151-153. For example, the audio “three SuperBurgers” may be converted to the phoneme sequence “th-r-ee--s-oo-p-u-r--b-u-r-g-u-r”, which may be pattern-matched against known words to generate the text “three super burgers.” *Id.*; EX1020, ¶[0040]. There is no difference between this and what a POSA would understand from Mahaffy's teachings. *Id.*

Patent Owner also admitted that Mahaffy discloses these features. EX1005, p. 4.

[1d] – Identifying Words per Training

As discussed in *[1b]* and *[1c]*, Mahaffy discloses a “speech recognition module” and “text of the converted audio stream.”

Mahaffy discloses the remainder of this limitation by its AI routines that “recognize and parse the speech of the customer ... such that individual menu items ordered are properly added to the customer’s order list ... after each menu item is ordered.” EX1020, ¶¶[0044], [0040]. EX1002, ¶155.

Mahaffy discloses using spoken-word training because its sentence parsing uses grammar learned automatically from a corpus of utterances parsed manually. EX1020, ¶¶[0042], [0034]. A POSA would understand that this constitutes processing text communication according to a previous spoken word training. EX1002, ¶¶156-157.

A POSA would also understand that Mahaffy’s AI routines would be trained “according to spoken-word training” to perform pattern matching. That is, as discussed in *[Ib]*, all speech-recognition routines, including Mahaffy’s, would be developed by training a neural network’s ability to pattern match against incoming audio by providing a corpus of sample audio that has been assigned text words or phrases. *Id.*, ¶158. *See also id.*, ¶159 (finding no difference between the ’706 Patent’s description of training its speech-to-text module and the general understandings of a POSA regarding training speech recognition routines as in Mahaffy).

Patent Owner also admitted that Mahaffy discloses these features. EX1005, p. 4.

[1e] – NLP Receives and Creates Order

[1f] – Generating Order

Mahaffy discloses a “natural language processor having order assembly capabilities” by its computer system with AI routines that parse orders from customer speech. EX1020, ¶¶[0033], [0050]. Mahaffy discloses “order assembly capabilities,” “creates or modifies an order,” and “generating an order” because “the AI routines are able to recognize and parse the speech of the customer ... such that individual menu items ordered are properly added to the customer’s order list” EX1020, ¶¶[0044], [0050]. *See also* EX1002, ¶¶161-162.

A POSA would understand that this AI order-generating routine of Mahaffy involves “receiv[ing] recognized text” corresponding to the menu item. EX1002, ¶163.

First, Mahaffy discloses that “[as] the AI routines processes the words of the customer’s order, the task is to recognize the customer’s request at a level sufficient to process his order,” e.g., by recognizing menu items such as “three SuperBurgers,” which “analysis is a direct result of the speech recognition.” EX1020, ¶[0040]; EX1002, ¶164.

Second, as discussed in *[1c]*, a POSA would understand that all speech-recognition routines, including Mahaffy’s, work by converting an incoming audio stream into a text-based phoneme sequence for pattern matching against known

words or word sequences corresponding to known intents or meanings. EX1002, ¶¶165-166. *See also, e.g.*, EX1020, ¶[0040]. There is no difference between this and what a POSA would understand from Mahaffy’s teachings. EX1002, ¶166.

Mahaffy discloses “exception detection capabilities” by “the ability of the AI routines of the computer system 14 to recognize when the result of the speech recognition is correct and, when it is incorrect.” EX1020, ¶[0039]. Mahaffy explains that “all current speech recognition systems use an underlying probabilistic model [that] estimates how likely [the] particular word sequence is to have generated the acoustic signal heard.” *Id.*; *see also id.*, ¶[0047]. *See also* EX1002, ¶167.

Patent Owner also admitted that Mahaffy discloses these features. EX1005, p. 4.

[1g] – Alerting Auditor of Exceptions

Mahaffy discloses an “auditor located off-site” by “human operators 40 [that] work at the call center,” which is “located on different premises than the CIT.” EX1020, ¶[0031]. Mahaffy discloses that the human operators are “connected to the order processor via a data connection” or “a network connection,” which may be a VoIP connection, between the CIT (and the computer system) and the call center. *Id.*, ¶¶[0047], [0050], FIGS. 2A-2B. *See also* EX1002, ¶¶169-170.

Further to the discussion in *[1e]*, Mahaffy discloses “alerting an auditor of detected exceptions in the order” by the VoIP connection created in response to “a

problem with the order processing at 106,” and by the operator being “able to correct, verify or complete” the customer’s order. EX1020, ¶¶[0047], [0050]. First, per VoIP protocol, the operator would receive and need to answer an incoming VoIP call from the CIT/computer system in order to establish the VoIP connection, thus alerting the operator. *See* EX1002, ¶¶172-174. Second, since the VoIP connection is established in response to the detected exceptions (EX1020, ¶¶[0047], [0050]), the incoming VoIP call would alert the operator that exceptions were detected. EX1002, ¶174.

Patent Owner also admitted that Mahaffy discloses these features. EX1005, p. 4.

[1h] – Deactivating Order Processor

Mahaffy switches to the human-assisted workflow if at any time during the customer’s order an exception is detected in the AI routine order processing, i.e., when the AI is unable to satisfactorily complete an order. EX1020, ¶¶[0039], [0047]. As discussed in *[1g]*, Mahaffy initiates the human-assisted workflow by establishing a VoIP connection with the human operator, where the operator may complete the order without reversion to the AI routines. *Id.*, ¶¶[0031], [0047], [0050], FIGS. 2A-2B. A POSA would understand that completing the order by the human-assisted workflow to the exclusion of the automated workflow corresponds to “deactivating the order processor” because the AI routines are no longer used in

that transaction. *See* EX1002, ¶¶176-178. A POSA would also understand that such deactivation occurs naturally “with the auditor,” in the course of establishing the VoIP connection and then completing the order with the operator without reversion to the AI routines. *Id.*, ¶¶179-180.

[1i] – On-Site Employee Completes Order

As discussed in *[1g]* to *[1h]*, Mahaffy discloses a human-assisted workflow where human operators intervene “to correct, verify or complete” the order by communicating with the customer through the VoIP connected CIT. EX1020, ¶¶[0047], [0050].

Jasper describes an analogous order-taking system where drive-thru POS customers are connected, via a VoIP connection, with a remote order-taking agent (e.g., at a call center). EX1021, ¶¶[0047], [0054]-[0055], FIG. 1.

Jasper discloses this limitation by a failsafe via which the system defers to the in-store personnel to take the order. *Id.*, ¶¶[0059], [0061]-[0062] (describing failure situations occurring mid-order). In failure situations, “the order taking responsibility reverts back to the store and employees” who “pick[] up where the remote order taking agent 12a left off based on the order data transmitted thus far.” *Id.*, ¶¶[0061]-[0062]. The “prompting” is naturally met by the incomplete order data being sent to the on-site employee. *See* EX1002, ¶¶184-188.

As discussed in Section VI.A.1., a POSA would have found it obvious to modify Mahaffy to include the failsafe of Jasper so that, in the event the VoIP connection between the call center operator 40 and the CIT 12 fail, the order-taking reverts to an on-site employee to complete the order, as taught by Jasper. *Id.*, ¶¶189-191. A POSA would recognize that this is a simple combination of known elements with predictable results. *Id.*

3. Claim 2 – Real-Time Processing

Mahaffy discloses “the order is processed in real time” because the customer “interacts at 206 with the CIT 12 in real-time, verbally ordering food,” EX1020, ¶[0050], then is directed to the order pick-up area to be provided with the order, *Id.*, ¶[0048]. And drive-thru orders are typically processed in real time. *See* EX1002, ¶¶194-195.

4. Claim 3 – Switch to Auditor Mode Before Deactivation

Mahaffy discloses an “autonomous mode” by the automated workflow discussed in [1b]. Mahaffy discloses the “auditor-assist mode” by the human-assisted workflow, also discussed in [1b]. EX1020, ¶[0047]. Mahaffy also discloses “the alert to the auditor” by the incoming VoIP call to the operator when an exception is detected, as discussed in [1g]. *Id.*, ¶¶[0039], [0047].

The VoIP call “prompts the auditor to switch the order processor from an autonomous mode to an auditor-assist mode,” because the VoIP call prompts the

operator to answer the call and establish the VoIP connection via which he can correct, verify or complete the order. *See* EX1002, ¶¶198-201; EX1020, ¶[0047] (VoIP connection permits the operator to “correct, verify or complete the customer menu orders”).

As discussed in *[1h]*, Mahaffy discloses “deactivating the order processor.”

Mahaffy also discloses that the automated workflow may continue to process additional items for the order after the operator corrects the order. Ex. 1020, ¶[0050], FIGS. 3A-3B. A POSA would understand that these two approaches to completing the order stem from a common event: the operator intervened to correct the AI routine. *See* EX1002, ¶202.

It would have therefore been obvious to a POSA to give the operator control over the approach to follow once the initial correction to the AI generated order is made, namely, to either (a) revert to the automated workflow to complete the order or (b) to complete the order without reverting to the automated workflow. *Id.*, ¶203. The AI routines would thus not be deactivated until it is decided that the order processing is to be completed without reverting back to the automated workflow. *Id.*

A POSA would recognize that modifying Mahaffy so that the operator controls whether to continue to process the order or to revert back to the AI routines merely combines known elements of Mahaffy to achieve a predictable result. *Id.*,

¶204. Moreover, doing so would be nothing more than an obvious design choice, since there are a limited number of possible options (i.e., whether to complete the order with the AI or the operator can be either decided before the operator intervention, during the operator intervention, or after the operator intervention). *Id.*, ¶205.

5. Claim 4

The majority of claim 4 tracks *[1-Pre]* and *[1a] to [1f]*, and its limitations are satisfied by Mahaffy for the same reasons as explained above. The differences in claim 4 are discussed below.

[4g] – Providing Audio to Auditor

Mahaffy discloses “providing an audio stream of the customer order to an auditor” by the VoIP connection “permitting the transmission of the customer’s voice order quickly and inexpensively to an operator 40 at the off-site call center 16.” EX1020, ¶[0047]. The remainder of this limitation tracks *[1g]* and is satisfied by Mahaffy for the same reasons. *See also* EX1002, ¶¶208-209.

[4h] – Providing Generated Order to Auditor

Mahaffy discloses this limitation because “each operator is provided with ... a display 46,” and “the display 46 permits the operator to see the customer’s order,” EX1020, ¶[0031], that was generated by the AI routines. *Id.*, ¶¶[0033], [0044], [0050], ¶[0047]. *See also* EX1002, ¶¶211-212.

[4i] – Comparing Audio with Generated Order

As discussed in [4g] and [4h], Mahaffy discloses providing “the audio stream of a customer order,” and providing “the generated order” to the auditor.

Mahaffy further discloses “performing a comparison ... by the auditor” because “[t]he operator 40 is able to correct, verify or complete” the order using “the customer’s recorded verbal order.” EX1020, ¶¶[0047], [0050], FIGS. 2A-2B. A POSA would understand that, for the operator to correct or verify the order, the operator would naturally compare the order generated on the display to the order audio, to identify any errors to be corrected or to verify correctness. *See* EX1002 ¶¶215-218.

Patent Owner also admitted that Mahaffy discloses these features. EX1005, p. 4.

[4j] – Switch to Auditor-Assist Mode

As discussed in [4i], Mahaffy discloses “the comparison of the audio stream with the generated order.”

As discussed regarding claim 3, Mahaffy discloses “switching to an auditor-assist mode” by (after switching to the human-operated workflow, *see* [1b]) completing the order processing with the operator “without reversion to the AI routines.” EX1020, ¶[0047], FIGS. 2A-2B. Mahaffy also discloses that the

automated workflow may continue to process the additional items for the order after the operator corrects the order. *Id.*, ¶[0050], FIGS. 3A-3B.

For the same reasons discussed regarding claim 3, it would have been obvious to a POSA to give the operator control over which approach to follow once the initial correction to the AI generated order is made, namely, to either (a) revert to the automated workflow to complete the order or (b) to complete the order without reverting to the automated workflow. *See* EX1002 ¶¶221-225. Accordingly, “switching to an auditor-assist mode” would occur on deciding that the order processing will be completed without reverting back to the automated workflow. *Id.*

[4k] – Update Errors in Order

Mahaffy discloses “updating the order processor based upon errors,” because, “when there is a problem with the order processing” that necessitates intervention, “the operator 40 is able to correct, verify or complete” the order. EX1020, ¶¶[0047], [0050], FIGS. 2A-2B. As discussed in *[4i]*, Mahaffy discloses “based upon errors detected in the order by the auditor” because the auditor’s corrections are based on a comparison of the order audio with the displayed order. *See also* EX1002, ¶¶227-229.

[4l] – Deactivate Order Processor

The limitations of *[4l]* track to *[1h]* and are satisfied by Mahaffy for the same reasons.

*[4m] – On-Site Employee Completes Order,
Collects Payment*

Mahaffy discloses “transmitting the generated order to an on-site employee ... to provide notifications to release the ordered product or service to the customer” because “the order is sent at 128 to order fulfillment employees (kitchen staff and order assembly personnel) who prepare the order,” and “the costumer is provided at 130 with the customer’s corresponding order.” EX1020, ¶[0048].

Jasper describes an analogous order-taking system in which customers at a drive-thru are connected, via a VoIP connection, with a remote order-taking agent (e.g., at a call center). EX1021, ¶¶[0047], [0054]-[0055], FIG. 1.

Jasper discloses “transmitting the generated order to an on-site employee to communicate with the customer” and “to collect payment from the customer” because the RPOS system “may receive an order from the remote agent terminal 42 ... [and the] RPOS system 30 can transmit the order to at least one POS terminal, which an on-site employee then uses for fulfillment of the order and for collecting payment.” *Id.*, ¶[0057]. The employee communicates with the customer by “request[ing] the payment from the customer.” *Id.*, ¶[0058]. *See also* EX1002, ¶236.

A POSA would have found it obvious to modify Mahaffy to include the on-site employee functions of Jasper so that the operators of Mahaffy “need only specialize in taking orders and do not need to also function as a cashier,” as

suggested by Jasper. *See* EX1002 ¶¶237-239; EX1021, ¶[0067]. A POSA would recognize that this is a simple combination of known elements with predictable results. Ex. 1002, ¶238.

**6. Claim 5 – Processor Associates Order Items and Queries
Customer**

As discussed in [1e], Mahaffy discloses an NLP.

Mahaffy further discloses the “business processor” by “routines in the computer system which operate the virtual cashier [and] are adapted to follow additional techniques which are shown to increase restaurant sales.” EX1020, ¶[0046]. Accordingly, the CIT “may prompt the customer via computer-generated voice or displayed text to add other items to the menu list, and a complete order may require multiple interactions between the customer and virtual cashier 38.” *Id.*, ¶[0046]. For example, “the virtual cashier preferably asks whether the customer would like french fries with an order which does not already include french fries, or whether for a nominal additional sum the customer would prefer to upsize the french fries and drink order, e.g., from medium to large.” *Id.* Mahaffy further discloses that any “[a]dditional menu items orders are processed at 104 and the CIT is updated at 108 until the customer indicates at 110 that the order is complete.” *Id.* Mahaffy thus also discloses the limitations of [5b] and [5c]. *See also* EX1002, ¶¶243-246.

Mahaffy also discloses that the sales routines “receive[] order information from the [NLP]” because the sales routines must be aware of the current order to ask if the customer would like fries with an order that does not already include fries or if the customer would prefer to upsize a drink from medium to large. EX1002, ¶247.

7. Claims 6, 8 – Convert Computer Queries to Audio

Mahaffy discloses the “text-to-speech processor” by its “automated speech synthesis” on which “[v]oice generation to interact with the customer may be based.” EX1020, ¶[0044]. A POSA would understand that automated speech synthesis refers to text-to-speech processing, which converts text into audible speech. EX1002, ¶¶250, 258.

As discussed regarding claim 5, Mahaffy discloses the “business processor” by its sales routines. EX1020, ¶[0046]. Mahaffy further discloses “convert queries from the business processor into audio to be communicated to the customer” and “create an audio communication of the query generated by the business processor” because the CIT “may prompt the customer via computer-generated voice or displayed text to add other items to the menu list” as discussed for claim 5. *Id. See also* EX1002, ¶¶251, 258.

8. Claim 7 – Auditor Order Comparison and Update

As discussed in *[le]*, Mahaffy discloses “the order generated by the natural language processor” by the customer’s order list. EX1020, ¶¶[0033], [0044], [0050].

The remaining limitations track those in [4i] and [4k], and are satisfied by Mahaffy for the same reasons. Patent Owner also admitted that Mahaffy discloses these features. EX1005, p. 4. *See also* EX1002, ¶¶254-255.

9. Claim 9 – Alerting Auditor of Exceptions and Auditor Override

As discussed in [1e], Mahaffy discloses the NLP having exception-detection capabilities.

As discussed in [1g], Mahaffy discloses “alerting the auditor ... of any exceptions detected by the artificially intelligent order processing system” by the VoIP connection that is created in response to “a problem with the order processing at 106,” and by which the operator is “able to correct, verify or complete” the customer’s order. EX1020, ¶¶[0047], [0050]. A POSA would understand that the alert is by the AI routines (i.e., the NLP), because the VoIP connection is initiated when the AI routines recognize inaccurate speech recognition via a probabilistic model. *Id.*, ¶¶[0039], [0047]. *See also* EX1002, ¶¶260-262.

Mahaffy further discloses that “the auditor can override the artificially intelligent order processing system based upon the detected exception” by the operator being “able to correct, verify or complete” the customer’s order. EX1020, ¶¶[0047], [0050]. *See also* EX1002, ¶263.

Patent Owner also admitted that Mahaffy discloses these features. EX1005, p. 4.

10. Claim 10 – Deactivating Processor for Change in Customer Traffic, and Claim 11 - Deactivating Processor for Change in Site Staffing

As discussed in [1b], [1g], and [4g], Mahaffy discloses “the auditor” and “the order processor.”

Jasper discloses using its system at specific times “to handle overflow orders, such as those order[s] which exceed the restaurant’s or chain’s own order taking capacity, e.g., lunch or dinner rush or during staffing shortages.” EX1021, ¶[0063]. A POSA would understand that, when the restaurant’s order-taking capacity is not so exceeded, the system is deactivated in favor of the on-site employees who enter orders into the RPOS system. *Id.*, ¶¶[0056], [0058]. Jasper thus discloses deactivating its system (which is a substitute for on-site order-taking) in favor of on-site order-taking in response to the end of a lunch/dinner rush. *See* EX1002, ¶¶267-269. Jasper also discloses deactivating its system in favor of on-site order-taking in response to the end of a staffing shortage. *See Id.*, ¶¶274-275.

It would have been obvious to a POSA to modify Mahaffy so its operators can deactivate the AI routines in favor of on-site employee order-taking in response to the end of a lunch/dinner rush, or at the end of a staffing shortage, as suggested by Jasper. A POSA would be motivated to do so in order to reduce the costs of paying

the operators to be on-call at times when on-site employees can handle the order-taking demand. *See Id.*, ¶¶269-270, 276-277.

B. Ground 2A – Obvious over Coleman + Knowledge of a POSITA

1. The '706 Patent Is Only Entitled to a 2019 Priority Date

While Coleman was filed on October 1, 2018 and published on April 11, 2019, Coleman is prior art under 35 U.S.C. § 102(a)(2) because the '706 Patent is not entitled to a priority date earlier than its February 12, 2019 actual filing date.

The '706 Patent issued from U.S. Patent Application No. 16/274,170 (“the '170 Application”), which was filed on February 12, 2019. EX1001. The '170 Application claims priority to U.S. Patent Application No. 15/723,573 (“the '573 Application”), filed on October 3, 2017, which in turn claims priority to U.S. Provisional Patent Application No. 62/478,454 (“the '454 Application”), filed on March 29, 2017. EX1010; EX1011. The '170 Application also claims priority to U.S. Provisional Patent Application No. 62/633,240 (“the '240 Application”), filed on February 21, 2018. EX1012.

Despite its priority claim, the effective filing date of the '706 Patent is its actual filing date of February 12, 2019, because each of the challenged claims lacks “continuity of disclosure” with the parent applications. *See, e.g., Akeva L.L.C. v. Nike, Inc.*, 817 F. App'x 1005, 1012 (Fed. Cir. 2020). As shown in EX1013 (comparing the '706 Patent disclosure to that of the '573 Application), EX1014

(comparing the '706 Patent and the '454 Application), and EX1015 (comparing the '706 Patent and the '240 Application), the '706 Patent's disclosure is far field of its parent applications. EX1002, ¶¶87-89.

The '706 Patent claims automated order-taking involving a *human auditor* intervening in an ongoing order-taking transaction. Claim 1 recites “alerting an auditor of detected exceptions in the order,” and “deactivating the order processor with the auditor in response to the detected exceptions in the order.” EX 1001, Claim 1. Claim 4 recites “providing an audio stream of an order ... to an auditor, the auditor located off-site,” “providing the generated order to the auditor,” “performing a comparison of the audio stream ... with the generated order by the auditor,” “errors detected in the order by the auditor,” and “deactivating the order processor with the auditor.” EX 1001, Claim 4. *See also* EX1002, ¶84.

The *auditor* is a human connected “to the artificially intelligent order processing system to ensure the fidelity of the order process and recognition of speech by the artificially intelligent order processing system.” EX1001, 12:46-56. “If the auditor 71 detects that the artificially intelligent order processing system 10 is not functioning properly, or that the customer 25 is frustrated or otherwise not being adequately served by the artificially intelligent order processing system 10, then the auditor 71 can abort, or intervene in, the transaction....” *Id.*, 13:33-40. *See also* EX1002, ¶85.

The '706 Patent's parent applications do not disclose this *human auditor* intervening in an automated order-taking process. The '573 Application and '454 Application each describe a computer-generated conversational holographic assistant that takes customer orders. *See generally* EX1010, EX1011. The '240 Application describes improving speech-to-text generation accuracy using video-speech matching. *See generally* EX1012. *See also* EX1002, ¶¶85-91.

Because the parent applications do not describe the *human auditor* claimed in the '706 Patent, the '706 Patent is not entitled to the priority benefit of any of its parent applications. *Akeva*, 817 F. App'x at 1012. Accordingly, the effective filing date of the '706 Patent is no earlier than its actual filing date of February 12, 2019. 35 U.S.C. § 100(i).

2. Claim 1

*[1-Pre], and [1a] – Audio Stream of
Customer Order*

The preamble is not limiting, but Coleman discloses a system for automated drive-thru ordering, which reroutes the ordering process to human agents if the automated workflow is not working correctly.

Coleman discloses “an audio stream of an order of a customer” by its “at least one microphone 8 is used to receive and transduce audible expressions from customers associated with the order interactions.” EX1022, ¶[0029]. The customer is “positioned on a site” at a drive-thru ordering area (“DTOA”) of a restaurant. *Id.*,

¶¶[0027]-[0029]. The order's audio stream is "provid[ed]" to a manual order process ("MOP") system, which allows human agents at the restaurant site to interact with the customer through communication equipment (*e.g.*, microphone, speaker, headsets, etc.). *Id.*, ¶[0036]. The audio stream is also "provid[ed]" to an automated ordering system ("AOS") that can receive the audio stream. *Id.*, ¶¶[0069]-[0070]. *See also* EX1002, ¶¶283-286.

[1b] – AI-Trained Order Processor

Coleman discloses an "order processor" by its AOS 2 and its restaurant information system ("RIS") 3. EX1022, ¶[0034]. In Coleman's automated workflow (red), the AOS "manages the [customer] interactions after they have begun and processes the interactions ... while interpreting and responding to customer input." *Id.*, ¶[0070].

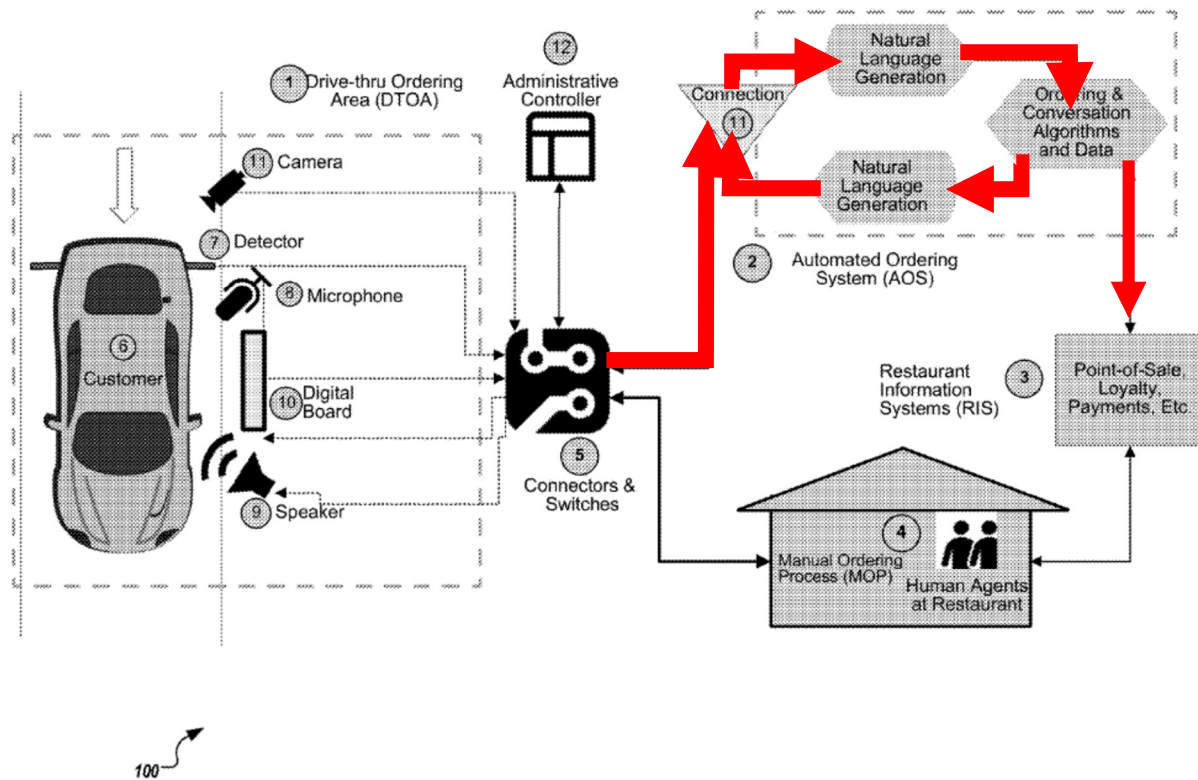


FIG. 1

Id., FIG. 1 (annotated). Coleman’s AOS includes a natural language understanding (“NLU”) component that “converts human speech to transcribed text and intents,” and a set of ordering and conversion algorithms that automatically “process the customer’s order.” *E.g.*, *Id.*, ¶¶[0034], [0047]. Coleman’s NLU corresponds to the “speech recognition module.” *See* EX1002, ¶¶288-290. This is no different from the structure identified in the ’706 Patent. *E.g.*, EX1001, 1:25-32 (“Speech recognition systems are systems that utilize a machine to identify words or phrases in spoken language and convert them into machine readable text or instructions.”).

A POSA would understand that Coleman’s NLU would be “trained using artificial intelligence.” First, Coleman discloses that its system uses “machine learning models.” EX1022, ¶[0047]. Second, a POSA would understand that, as of the critical date, speech recognition routines that use machine learning models (like Coleman’s NLU) would be developed by training a neural network’s ability to pattern match against incoming audio by providing corpus of sample audio with assigned text words or phrases. EX1002, ¶¶291-296 (finding no difference between the ’706 Patent’s description of training its speech-to-text module and the general understandings of a POSA regarding training with machine learning models as in Coleman).

Moreover, to the extent it is not inherent that Coleman’s NLU is “trained using artificial intelligence,” a POSA would nevertheless have found it obvious to train Coleman’s NLU using artificial intelligence, since most, if not all, ASR systems around 2017 (and 2019) were trained that way. *See Id.*, ¶¶291-294. Accordingly, it would have been obvious to a POSA to similarly train Coleman’s NLU to recognize words and phrases in users’ speech, as merely applying a known technique to improve a similar speech recognition system in the same way. *Id.*, ¶297.

[1c] – Converting Audio to Text

As discussed in *[1b]*, Coleman discloses the “speech recognition module.”

Coleman further discloses that its NLU “converts human speech to transcribed text.” EX1022, ¶[0034]. The human speech that is converted is the audio stream, discussed in [1a], that is received by the AOS 2 for processing. *Id.*, ¶¶[0069]-[0070]. *See also* EX1002, ¶¶300-302.

*[1d] – Identifying Words per Spoken Word
Training*

As discussed in [1b] and [1c], Coleman discloses a “speech recognition module” and the “text of the converted audio stream.”

Coleman also discloses “identify a word or words” by its NLU converting the human speech into “transcribed text and intents.” EX1022, ¶[0034]. In the context of a drive-thru ordering system, a POSA would understand the “intents” of the customer’s verbal order include the intent to add spoken menu items (*i.e.*, words identified as corresponding to menu items) to the customer’s order. EX1002, ¶¶304-306. *See also, e.g.*, EX1022, ¶¶[0020] (customers place orders “in the same manner as they would ... if speaking to a human restaurant worker”). And Coleman discloses that its “ordering and conversation algorithms ... process the inputs from the NLU,” and “transmit[] the order information to the RIS 3 so that the order can be fulfilled.” *Id.*, ¶¶[0034], [0047], [0055], [0080].

A POSA would further understand that Coleman’s NLU would be trained “according to a previous spoken word training.” As discussed in [1b], speech

recognition systems that use machine learning models (like Coleman’s NLU) would be developed by training a neural network’s ability to pattern match against incoming audio by providing corpus of sample audio having assigned text words or phrases. EX1002, ¶306. A POSA would also understand that such training is iterative and utilizes a feedback loop, correcting mistakes in associations and reinforcing correct associations. *Id.*; *see also id.*, ¶307 (finding no difference between the ’706 Patent’s description of training its speech-to-text module and the general understandings of a POSA regarding training with machine learning models as in Coleman).

To the extent it is not inherent that Coleman’s NLU identifies words “according to previous spoken word training,” a POSA would have found it obvious to train Coleman’s NLU using spoken word training, since most, if not all, ASR systems around 2017 (and 2019) were trained according to the general approach discussed above. *See Id.*, ¶308. Thus, it would have been obvious to a POSA to similarly train Coleman’s NLU in order to recognize words and phrases in users’ speech according to previous spoken word training, as merely applying a known technique to improve a similar speech recognition system in the same way. *Id.*

[1e] – NLP Receives and Creates Order, and
[1f] – Generating Order

Coleman discloses a “natural language processor” by its “ordering and conversation algorithms that process the inputs from the NLU ... to determine or select the next action to be taken by the AOS 2,” EX1022, ¶[0034], “to accurately process the customer’s order,” *id.*, ¶[0047]. The selected action includes transmitting order information to the RIS so that the order can be fulfilled. *Id.*, ¶¶[0080], [0047], [0055]. Coleman also discloses the AOS can perform “modifications to the order or confirm[] certain aspects of the order.” *Id.*, ¶[0059]. Coleman thus discloses “order assembly capabilities,” “creates or modifies an order,” and “generating an order,” by the ordering and conversion algorithms. EX1002, ¶¶310-311.

As discussed in *[1c]* and *[1d]*, a POSA would understand that the ordering and conversion algorithms add recognized menu items from the customer’s speech to the customer’s order—and would therefore involve “receiv[ing] recognized text” corresponding to the menu items from the NLU. *Id.*, ¶¶312-315. Further, a POSA would understand that all speech-recognition routines, including those of Coleman, work by converting audio into a text-based phoneme sequence (the sequence of sound units, e.g., *th*, *p*, *d*, etc.) for pattern matching against known words or word sequences. For example, the audio “three SuperBurgers” may be converted to the

phoneme sequence “th-r-ee--s-oo-p-u-r--b-u-r-g-u-r”, which may be pattern-matched against known words to generate the text “three super burgers.” *Id.*

Coleman also discloses “exception detecting capabilities” in the context of an automatic transfer from the automated (AOS) process to a manual (MOP) process by its determination of “suitable reasons” to make the transfer, including “whether the customer 6 is speaking or providing inputs in an unclear manner,” “whether the monitored customer behavior is particularly unusual or negative,” whether connection has been lost or there is an “internal error,” or whether a human at the restaurant interrupted the connection. EX1022, ¶¶[0071]-[0075]. *See also* EX1002, ¶316.

[1g] – Alerting Auditor of Exceptions

As discussed in [1e], Coleman discloses “detected exceptions.”

Coleman discloses “alerting an auditor of detected exceptions in the order” because, “if an active ordering process with the AOS 2 is re-routed to the MOP 4, then the human agents are alerted to the re-routed interaction and communicate with the customer 6 through the DTOA 1 equipment and can complete the order in the usual manual manner.” EX1022, ¶[0077]. The human agents can be on-site or remotely connected to the RIS via a data connection. *Id.*, ¶[0036]. *See also* EX1002, ¶319.

A POSA would understand that alerting human agents to the re-routed interaction alerts them “of detected exceptions in the order,” because the ordering process would not have been re-routed to the human agents but for the detected exception. EX1002, ¶320.

Coleman also describes “alerting an auditor of detected exceptions” by overhearing the “suitable reasons” discussed in [1e]. More particularly, the human agents are able to “listen in” on the automated interactions and intervene—to reroute the interaction from the AOS to the MOP—upon hearing the suitable reasons, such as when “the automated process is not completing successfully, such as due to poor interactions or understanding of the customer.” EX1022, ¶¶ [0045], [0089]. *See also* EX1002, ¶¶321-325.

[1h] – Deactivating Order Processor

As discussed in [1e], Coleman discloses “detected exceptions.”

Coleman discloses the remainder of the limitation by its automatic transfer of the ordering process by the AOS to the MOP, namely, from the automatic workflow (red) to a human-assisted workflow (green):

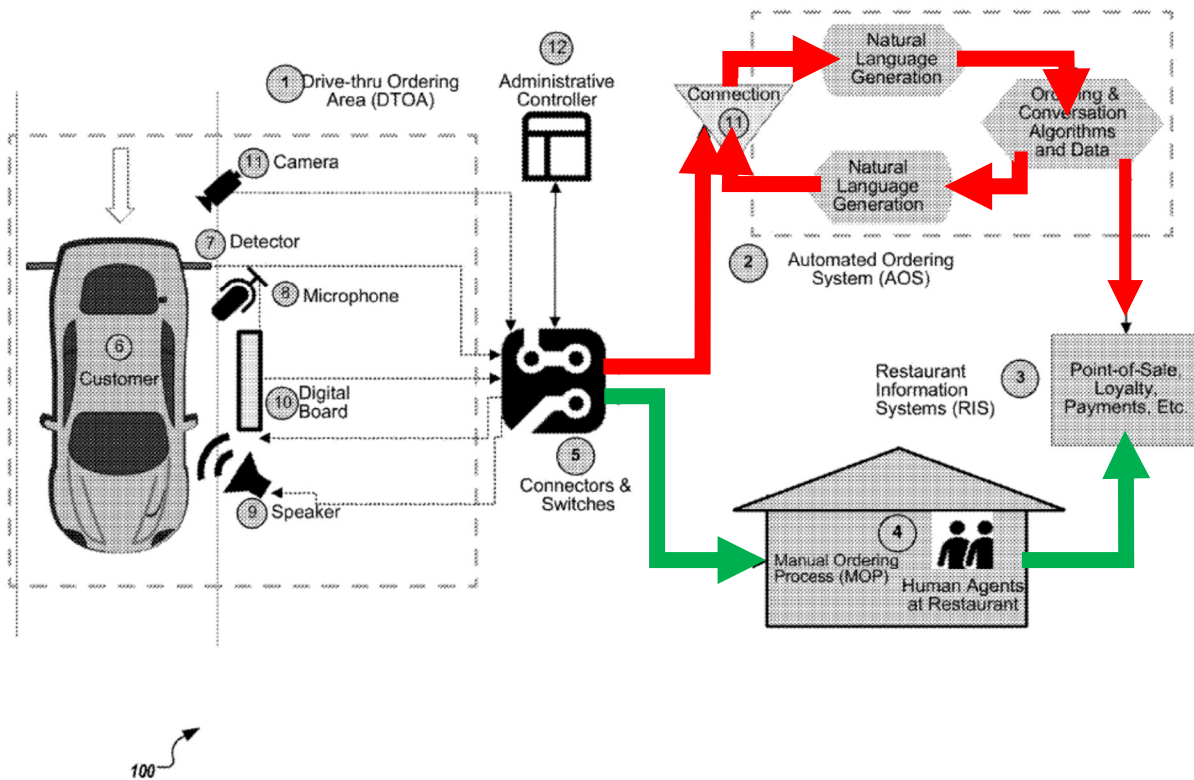


FIG. 1

More particularly, the switches control the transfer (or re-routing) of the ordering process between the automatic workflow (red) of the AOS and the human-assisted workflow (green) of the MOP. EX1022, ¶¶[0038]-[0046]. The switches also control whether the ordering process is initiated with the AOS or the MOP. *Id.*, ¶¶[0023], [0063], [0067]. The switches can be controlled by the human agents, via the administrative controller 12, to determine if orders “shall be taken (a) manually by human agents as part of the MOP 4 or (b) by the AOS 2.” *Id.*, ¶[0045]. Coleman therefore discloses “deactivating the order processor with the auditor.” *See also* EX1002, ¶¶328-329.

Coleman also describes that the human agents are “able to listen to the automated interactions with a customer” and “interrupt[] the connection to the AOS 2 using the administrative controller 12 or by manually manipulating or interacting with the connectors or switches 5.” EX1022, ¶[0076]. More particularly, the human agents can determine a “new context” which justifies interrupting the AOS 2 “[i]f the automated process is not completing successfully, such as due to poor interactions or understanding of the customer.” *Id.*, ¶[0089]. These circumstances correspond to the “detected exceptions” that are suitable reasons for transferring the ordering process from the AOS to the MOP, which are discussed in [1e]. Coleman therefore further discloses that the human agent deactivates the AOS “in response to the detected exceptions.” *See also* EX1002, ¶¶330-331.

[1i] – On-Site Employee Completes Order

Coleman discloses this limitation by the AOS transmitting the order information to the RIS so that the order can be fulfilled by the RIS and the restaurant’s human agents “in a manner that is consistent with the typical manual drive-thru ordering process throughout the restaurant industry.” EX1022, ¶¶ [0036], [0080]. A POSA would understand that the typical drive-thru ordering process involves prompting an on-site employee to put the ordered food in a bag and deliver it to the customer. EX1002, ¶333. *See also, e.g.*, EX1016 (“A dedicated drive-thru runner picks up the menu items, assembles them in a bag and brings the bag to a

team member at the drive-thru window. ... [T]he person staffing the drive-thru window ... takes payment and passes the bag or other packaging to the customer.”) A POSA would understand such typical activity to be inherent in Coleman’s reference to the order being fulfilled by the restaurant’s human agents. EX1002, ¶334; *see also id.*, ¶¶335-336 (finding no difference between the ’706 Patent’s description of the on-site employee’s responsibilities and actions and the general understandings of a POSA regarding the typical drive-thru ordering process).

To the extent it is not inherent in Coleman, a POSA would have found it obvious to prompt an on-site employee to engage the customer and complete the order, in light of the general knowledge in the art discussed above. A POSA would understand that doing so merely applies a known technique to improve a similar system in the same way, namely, providing a process for completing the order at the drive-thru location. *Id.*, ¶337.

3. Claim 2 – Real Time Processing

Coleman discloses this limitation by a “drive-thru system implementation,” in which the “order is placed at the DTOA 1 and the customer drives to a window or other area to receive the order.” EX1022, ¶¶[0025]-[0027], FIG. 1. A POSA would understand that processing drive-thru orders is done in real-time because the “NLP can be used in machine or conversational interfaces to replace the need for another human to be interacting in real-time with a customer or user” (*id.*, ¶[0003]); and

“[t]he system allows customers to order in the same manner as they would place an order if speaking to a human restaurant worker” (*id.*, ¶[0020]). EX1002, ¶¶340-341.

4. Claim 3 – Switch to Auditor Mode Before Deactivation

As discussed in [1h] and [1g], Coleman discloses “deactivating the order processor” and “the alert to the auditor.”

Coleman further discloses an “autonomous mode” by the AOS “interact[ing] with the customer 6 by processing the voice input ... and generating responses to the customer ... to complete an order.” EX1022, ¶¶[0070], [0034]. The “auditor-assist mode” is disclosed by Coleman by the MOP for human agents to “communicate with the customer 6 and manipulate the RIS 3 to transact the customer’s order.” *Id.*, ¶¶[0068], [0070], [0036]. *See also* EX1002, ¶¶345-346.

Coleman discloses the remainder of the limitation because determining to initiate the ordering interaction with the MOP (and thus deactivate the AOS) can be based on “whether a prior attempt at an automated solution in a previous interaction was successful,” or “required a failover to [the] manual system.” EX1022, ¶¶[0032], [0067]. A POSA would understand that the human agent, who is listening in on a prior AOS interaction with the customer, may be alerted to the detected exceptions by hearing them, which may prompt the human agent to re-route the interaction from the AOS to the MOP. The human agent may then, based on that prior failover to the MOP, determine that the next interaction is initiated with the MOP. *See also*

EX1002, ¶¶347-349. Coleman therefore discloses that the auditor is prompted to re-route the previous ordering interaction “prior to” deactivating the AOS in initiating the current ordering interaction. *Id.*

C. Ground 2B – Obvious over Coleman + Washington

1. Motivation to Combine

Coleman and Washington both relate to automating drive-thru interactions using an automated speech-to-order system. *E.g.*, EX1022, ¶[0020]; EX1023, ¶¶[0020]-[0022]. Both also recognize that failing to accurately take the customer’s order is undesirable. *E.g.*, EX1022, ¶[0021] (noting that the ability to handle errors and alleviate other issues in order-taking is “highly desirable”); EX1023, ¶[0020] (noting that “errors may be introduced into the order ... [which] errors cause customer dissatisfaction [and] decrease efficiency of the drive-thru system.”). These problems were generally known in the field of automated order-taking, and there were many efforts to resolve them. *E.g.*, EX1022, ¶[0021] (“while existing NLP services continue to improve, on occasion, the customer’s behavior and/or the ordering environment may preclude the automated system from smoothly completing the ordering process.”); *see also* EX1020, ¶[0039] (“important issue is the ability of the AI routines ... to recognize when the result of the speech recognition is correct and, when it is incorrect, to cause the system to ask the

customer for a clarification or cause intervention by a human operator”); EX1002, ¶¶352-353.

Coleman minimizes potential order inaccuracies by, among other things, having a human agent “listen in or otherwise follow an ongoing automatic interaction,” so that the human agent can “at any time, interrupt the automatic interaction to move the interaction to a manual process” if the automated process is not completing successfully, “such as due to poor interactions or understanding of the customer,” or for other “suitable reasons.” EX1022, ¶¶[0089], [0036], [0071]-[0076]. Coleman also discloses that the human agent can be provided with “a listing of interactions performed so far” or other “contextual information” about the interactions between the automated system and the customer and has the ability to “follow an ongoing automatic interaction.” *Id.*, ¶¶[0036], [0077], [0089]. The human agent can also be provided with “a summary of instructions received” from the automated system (*i.e.*, a summary of the order taken by the automated system to that point), but Coleman is not explicit about whether this happens before or after Coleman’s switchover to the manual order process (the “MOP 4”). *Id.*, ¶[0090]; EX1002, ¶¶354-356.

Washington guards against order inaccuracies using a similar human-assist approach that gives the human agent more flexibility to correct the automated system. Like Coleman, Washington’s human agent (“operator 116”) can override

the automated system. EX1023, ¶[0070]. But Washington further discloses, whereas Coleman only suggests, that the operator can take the additional step of comparing the customer's actual audio order with the autonomously generated order. *Id.*, ¶[0038] (The "operator 116 may review the menu items entered into the order input device 132 and then press a 'Submit' button when satisfied that the menu items are correct (e.g., correspond to the actual menu items that the customer ordered)"); ¶[0022]. *See also* EX1002, ¶¶357-359; 379-383. Washington also discloses, whereas Coleman only suggests, that if the operator determines there to be failures with the autonomously generated order, the operator can correct those failures. EX1023, ¶¶[0023], [0038]-[0039], [0069]-[0070]. *See also* EX1002, ¶¶357-359.

A POSA would have found it obvious to modify Coleman, in line with what Coleman already suggests, to better guard against order inaccuracies by giving Coleman's human agent the explicit ability to compare the automatically generated order with the customer's spoken order prior to the switchover to Coleman's auditor-assist mode. EX1002, ¶360. Coleman already recognizes that a "suitable reason" for interrupting the autonomous order-taking process can be that the speech-recognition is inaccurately interpreting the customer's order. EX1022, ¶¶[0071], [0080]. Washington teaches that a human operator auditing an automated order processing can identify such inaccurate interpretations and minimize inaccuracies in the order-taking by overriding the automated order processing and manually

correcting the order when a comparison of the entered menu items with the customer's order reveal that they do not correspond. EX1023, ¶[0038]. A POSA would therefore have modified Coleman to allow further human verification of the accuracy of a speech-recognition generated order by having Coleman's human agent review the AOS generated order for inaccuracies—as a “suitable reason” for interrupting the AOS order processing—while already listening in on the interaction. EX1002, ¶¶361-363.

This combination would allow for more immediate intervention by Coleman's human agent when the AOS is not accurately interpreting the customer's order than if the human agent were to only listen for audio-only indications that the AOS is inaccurately interpreting the customer's order (*e.g.*, the customer verbally indicates the AOS order is incorrect). *Id.* Consequently, customer dissatisfaction and inefficiencies would be reduced. *Id.*

2. Claim 4

The majority of claim 4 tracks [1-Pre] and [1a] to [1f], and its limitations are satisfied by Coleman for the same reasons. The differences in claim 4 are discussed below.

[4g] – Providing Audio to Auditor

Coleman discloses “providing an audio stream of the customer order to an auditor” because “even where the AOS 2 is triggered to start an interaction, human

agents may be listening in ... through headphones worn by one or more agents.”
EX1022, ¶[0036]. The remainder of this limitation tracks *[lg]* and is satisfied by
Coleman for the same reasons.

[4h] – Providing Generated Order to Auditor

Coleman discloses this limitation as its human agents “listening in ... through
a listing of interactions performed so far.” *Id.* A POSA would understand that, in
the context of a drive-thru ordering system, the interactions include those for the
customer adding menu items to the order. Ex. 1002, ¶¶367-368; EX1022, ¶[0070]
 (“the AOS 2 will continue to interact with the customer 6 by processing the voice
input ... and generating responses ... to complete an order”). And, as discussed in
[ld], such processing of the voice input includes the AOS converting the voice input
into “transcribed text and intents,” *Id.*, ¶[0034], where the intents, in the context of
a drive-thru ordering system, include adding menu items to the order. *See also*
EX1002, ¶¶369-370.

*[4i] – Comparing Audio with Generated
Order, and [4j] – Switch to Auditor-Assist
Mode*

As discussed in *[4g]* and *[4h]*, Coleman discloses the “audio stream” and the
“customer order.” Coleman also discloses that its human agents are “able to listen
to the automated interactions with a customer.” EX1022, ¶[0076].

Washington discloses the “comparison of the audio stream ... with the generated order by the auditor” of [4i] and the similar limitation of [4j]. First, Washington discloses that order input device displays the order as entered so far by the speech-to-order system. EX1023, ¶[0036]. And that the operator has a headset via which to hear the order as given by the customer into the microphone. *Id.*, ¶[0020]. Second, the operator “may review the menu items entered into the order input device” and may submit the order “after the operator verifies ... that the menu items entered into the order input device match the menu items in ... the order as given by the customer.” *Id.*, ¶¶[0022], [0038]. *See also* EX1002, ¶¶379-383.

Coleman discloses “switching to an auditor-assist mode” by its re-routing of the ordering process from the AOS to the MOP, as illustrated below:

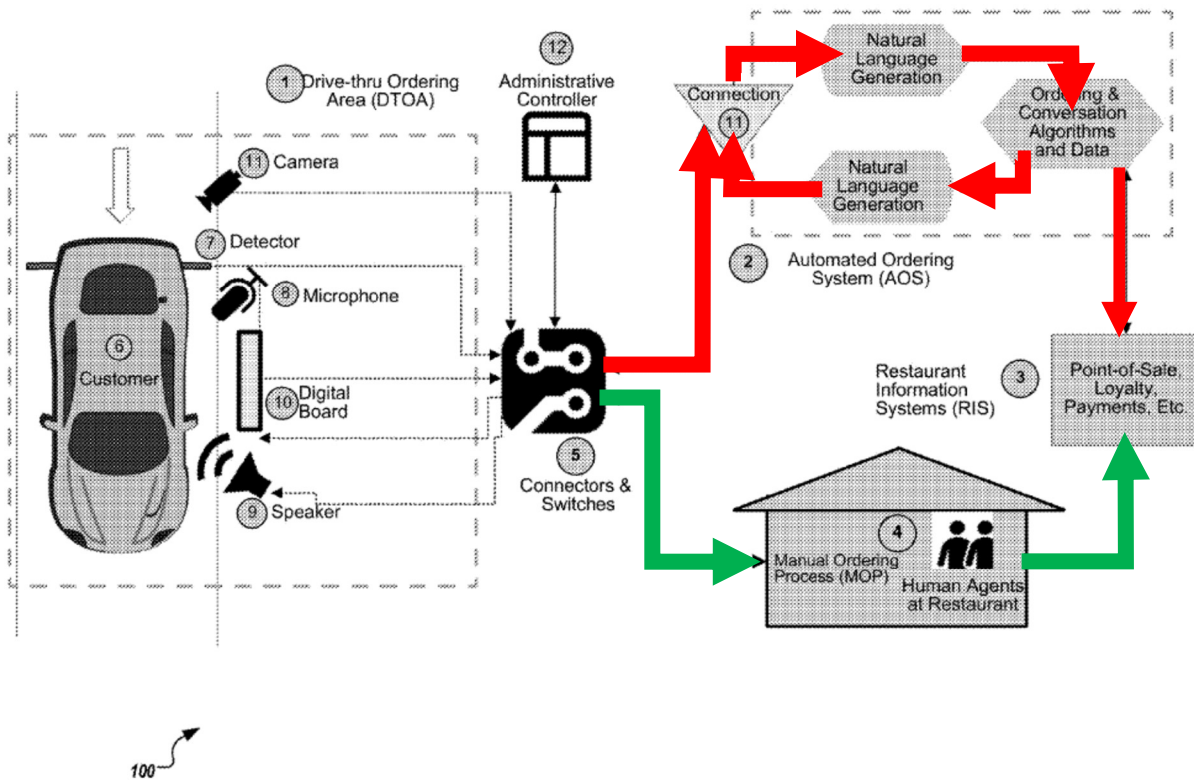


FIG. 1

In addition to Coleman’s human agents being “able to listen in to the automated interactions with a customer,” they can “interrupt[] the connection to the AOS 2 using the administrative controller 12 or by manually manipulating or interacting with the connectors or switches 5.” EX1022, ¶[0076]. *See also* EX1002, ¶¶373-377.

As discussed in Section VI.C.1., a POSA would have found it obvious to modify Coleman to apply Washington’s way of verifying the accuracy of a speech-recognition generated order, by having Coleman’s human agent review the AOS generated order for inaccuracies—as a “suitable reason” for interrupting the AOS order processing to enter Coleman’s “auditor-assist mode” and thus being “in response to the comparison of the audio stream with the generated order”—while

already listening in on the interaction. EX1002, ¶¶384-388. A POSA would therefore understand that the combination of Coleman and Washington discloses these limitations. *Id.*

[4k] – Update Errors in Order

Washington discloses this limitation by its point-of-sale terminal receiving an “input to override the menu items.” EX1023, ¶¶[0069]-[0070]. As discussed in *[4i]*, the point-of-sale terminal displays the speech-to-order system generated order for the operator’s review. EX1023, ¶¶[0038], [0022]. The “operator 116 may review the menu items ... and then press a ‘Submit’ button when satisfied that the menu items are correct (e.g., correspond to the actual menu items that the customer ordered).” *Id.*, ¶[0038]. If the operator provides an input to override the speech-to-order system generated order, the point-of-sale terminal updates the menu items, quantities, and customizations and submits the order to the item ordering system. *Id.*, ¶[0070]. *See also* EX1002, ¶391.

As discussed in Section VI.C.1., a POSA would have found it obvious to modify Coleman to apply Washington’s way of verifying the accuracy of a speech-recognition generated order, by having Coleman’s human agent review the AOS generated order for inaccuracies—as a “suitable reason” for interrupting the AOS order processing—while already listening in on the interaction. EX1002, ¶¶392-396. A POSA would also understand that, in the course of interrupting the AOS

order processing due to an order inaccuracy, the human agent would correct the order, as suggested by Washington. *Id.*

[4l] – Deactivate Order Processor

The limitations of *[4l]* track to the same limitations of *[1h]* and are satisfied by Coleman for the same reasons.

*[4m] – On-Site Employee Completes Order,
Collects Payment*

Coleman discloses this limitation because its customers are given “instructions on proceeding to pick up and/or pay for the ordered food and beverages,” while “the AOS 2 transmits the order information to the RIS 3 so that the order can be fulfilled by the RIS 3 and the restaurant’s human agents.” EX1022, ¶[0080]. The human agents may be “at the restaurant site.” *Id.*, ¶¶ [0021], [0023], [0034], [0036]. The RIS is used to manage and execute transactions with customers, can include a point-of-sale system that executes and records transactions, and includes a kitchen process management system. *Id.*, ¶[0035]. A POSA would therefore understand that the order is transmitted to the agent at the point-of-sale system “to communicate with the customer, to collect payment from the customer, and to provide notifications to release the ordered product ... to the customer.” EX1002, ¶¶398-399.

**3. Claim 5 – Processor Associates Order Items and Queries
Customer**

As discussed in [1e], Coleman discloses a “natural language processor.”

Coleman further discloses the “business processor” by its “ordering and conversation algorithms” programmed to “determine the optimal action [of the AOS] given the order status and inputs from the AOS 2.” EX1022, ¶¶[0034], [0047], [0070]. *See also* EX1002, ¶402. Coleman’s ordering and conversation algorithms “may alter actions and the conversational response provided to a customer ... to determine one or more recommendations associated with an order.” EX1022, ¶[0058]. More specifically, “the items included in a current order may be used to identify one or more items to recommend” to the customer. *Id.* Examples of such responses include: “suggesting one or more menu items for the current customer 6,” and “suggesting other modifications to the order.” *Id.*, ¶¶[0059], [0079]. Coleman therefore further discloses “receives order information,” “associating the order items with one or more additional menu items or options associated with the order items,” and “querying the customer” about the additional menu items. EX1002, ¶¶403-404.

In the context of a drive-thru ordering system, a POSA would understand that the suggested items, if accepted by the customer, are added to the order. First, Coleman describes that its system “interacts with customers using voice input from the customers ... that allow the customers to place and review orders

conversationally ... in the same manner as they would place an order if speaking to a human restaurant worker.” EX1022, ¶[0020]. To accomplish this, the AOS’s “ordering and conversation algorithms ... process the inputs from the NLU,” and “transmit[] the order information to the RIS 3 so that the order can be fulfilled.” *Id.*, ¶¶[0034], [0047], [0055], [0080]. The AOS may “process many rounds of interactions with the customer 6 to complete an order.” *Id.*, ¶[0070]. Second, Coleman discloses that its DOTA includes a digital board where “updated items included in the order” may be presented to provide visual feedback to the customer. *Id.*, ¶[0031]. A POSA would therefore understand that “the NLP updates the order based upon the customer response to the query” when a customer of Coleman accepts the suggested order items. EX1002, ¶¶405-406.

4. Claims 6, 8 – Convert Computer Queries to Audio

As discussed in claim 5, Coleman discloses the “queries from the business processor” and the “query generated by the business processor.” EX1022, ¶¶[0058]-[0059], [0079]. Coleman further discloses the “text-to-speech processor” by its “Natural Language Generation (NLG) component that converts text to audible voice speech.” *Id.*, ¶[0034]. *See also* EX1002, ¶409.

Coleman discloses the remaining limitations because the potential actions of the AOS include “generat[ing] a voice response through the NLG.” EX1022, ¶¶[0048]-[0050], [0070]. A POSA would understand that the NLG generated voice

response includes recommending or suggesting menu items. First, Coleman describes that its system “interacts with customers using voice input from the customers ... that allow the customers to place and review orders conversationally ... in the same manner as they would place an order if speaking to a human restaurant worker.” EX1022, ¶[0020]. Second, Coleman identifies an example “conversational response” of the AOS as recommending or suggesting one or more menu items to the customer. *Id.*, ¶¶[0058]-[0059], [0079]. A POSA would therefore understand that the menu item recommendations are converted into audio responses to the customer. EX1002, ¶¶410-412.

5. Claim 7 – Auditor Order Comparison and Update

As discussed in [1f], Coleman discloses “the order generated by the natural language processor.”

The remaining limitations track those in [4i] and [4k] and are satisfied by the combination of Coleman and Washington for the same reasons. *See Id.*, ¶¶416, 419.

6. Claim 9 – Alerting Auditor of Exceptions and Auditor Override

As discussed in [1e], Coleman discloses “exceptions detected” by detecting “suitable reasons” to re-route processing from the AOS to the MOP, including “whether the customer 6 is speaking or providing inputs in an unclear manner,” “whether the monitored customer behavior is particularly unusual or negative,” whether connection has been lost or there is an “internal error,” or whether a human

at the restaurant interrupted the connection. EX1022, ¶¶[0071]-[0075]. *See also* EX1002, ¶421.

As discussed in [Ig], Coleman discloses “alerting the auditor ... of any exceptions detected” because, “if an active ordering process with the AOS 2 is re-routed to the MOP 4, then the human agents are alerted to the re-routed interaction and communicate with the customer 6 through the DTOA 1 equipment and can complete the order in the usual manual manner.” EX1022, ¶[0077]. *See also* EX1002, ¶422.

As discussed in [Ih], Coleman also describes that its switches, which control the transfer (or re-routing) of the ordering process between the automatic workflow of the AOS and the human-assisted workflow of the MOP, can be controlled by the human agents to determine if orders “shall be taken (a) manually by human agents as part of the MOP 4 or (b) by the AOS 2.” EX1022, ¶[0045]. The human agents are also “able to listen in to the automated interactions with a customer” and “interrupt[] the connection to the AOS 2 using the administrative controller 12 or by manually manipulating or interacting with the connectors or switches 5.” *Id.*, ¶[0076]. The human agents can determine “a new context” which justifies interrupting the AOS 2 “[i]f the automated process is not completing successfully, such as due to poor interactions or understanding of the customer.” *Id.*, ¶[0089]. These circumstances correspond to the “suitable reasons” for transferring the

ordering process from the AOS to the MOP, which are discussed in [1e]. A POSA would therefore understand that the “auditor can override the artificially intelligent order processing system based upon the detected exception” in Coleman because the human agent controlling Coleman’s switches to re-route the ordering process from the AOS to the MOP upon listening in on the automated process and hearing suitable reasons to interrupt it. EX1002, ¶¶423-424.

7. Claim 10 – Deactivating Processor for Change in Customer Traffic, and Claim 11 – Deactivating Processor for Change in Site Staffing

As discussed in [1h], Coleman discloses that “the auditor deactivates the order processor” by the human agent controlling whether the ordering process is initiated with the AOS or the MOP. EX1022, ¶¶[0023], [0045], [0063], [0067].

Coleman discloses the remaining limitations because whether to use the AOS or not can be determined based on the “volume of transactions with customers in the DTOA 1 and/or inside the restaurant within a recent time period,” “the relative volume of transactions ... as compared to the typical transaction volume,” the “current number of customers (or expected customers),” “the number of human agents currently available at the restaurant and a current number of transactions being performed inside of the restaurant,” and “an estimate or determination of the availability or responsiveness of the human agents operating the MOP 4.” *Id.*, ¶[0067]. Coleman thus discloses deactivating the AOS in favor of the MOP in

response to the reduced transaction volume. *See* EX1002, ¶428. Coleman also discloses deactivating the AOS in favor of the MOP in response to the number of human agents meeting or exceeding the transaction volume. *Id.*, ¶432.

VII. No Basis for Discretionary Denial

A. Ground 1: Section 325(d)

Under *Advanced Bionics, LLC v. Med-El*, IPR2019-01469, Paper 6 (Feb. 13, 2020) (precedential) (“*Advanced Bionics*”), the Board considers (1) whether the Petition presents the same or substantially the same art/argument previously presented and, if so, (2) whether the Office materially erred in its prior evaluation.

Step (1) is not satisfied here. Although Mahaffy was cited by Patent Owner during prosecution, Mahaffy was not cited by the Examiner or used in a rejection. *See* EX1006; EX1008. Jasper also was not cited. EX1001. Moreover, Mahaffy and Jasper teach the limitations that the Examiner indicated as missing from the prior art and leading to the claims being allowable. EX1008, pp.8-9; *Cf.*, Sec. VI.B.3 at [1g], [1h], and [1i], and Sec. VI.B.6. at [4j] and [4l]. The combination of Mahaffy and Jasper was thus not previously presented to the PTO, nor is it reasonably cumulative with the “[p]rior art of record [that]... fails to teach” these same limitations. *Id.* *See Intex Recreation Corp. v. Team Worldwide Corp.*, IPR2018-00871, Paper 14, at 13 (PTAB Sept. 14, 2018) (cited references not discussed or used in rejection “weighs against exercising discretion to deny under § 325(d)” (citation omitted)); *see also*

Apple Inc. v. Qualcomm Inc., IPR2018-01315, Paper 7, at 22-26 (PTAB Jan. 18, 2019).

Step (2) is also not satisfied here because the PTO materially erred by not considering Mahaffy. The Examiner concluded that “[p]rior art of record ... fails to teach” limitations *[lg]*, *[lh]* and *[4j]*. EX1008, pp. 8-9. But the Examiner’s conclusion was wrong. Mahaffy discloses or renders obvious these limitations—in addition to every other limitation that the prior art of record taught. *See generally* Section VI.A.

Tellingly, for *[lg]*, Patent Owner admitted that Mahaffy teaches “[a]lerting an auditor of detected exceptions in the order.” EX1005, p. 4. This admission is contrary to the Examiner’s conclusion that *[lg]* was unmet by prior art of record. And while there is no direct admission that Mahaffy teaches its auditor is “located off-site and connected to the order processor via a data connection,” a cursory review of Mahaffy—prompted by Patent Owner’s admission—would have quickly revealed that this limitation is also met, in addition to the limitations of *[lh]* and *[4j]*. *See* Sec. VI.A.3. at *[lg]*, *[lh]* and Sec. VI.A.6. at *[4j]*. The sole remaining “allowable” limitation *[li]* recites conventional on-site drive-thru activity. *See* Section VI.A.3. at *[li]*. Thus, because it is *more* on-point than the other prior art of record, there is little doubt that the PTO erred by not relying on Mahaffy as a basis for rejecting at least the ’706 Patent’s independent claims.

The Board has instituted trial in similar circumstances, and should likewise do so here. *See, e.g., Oticon Medical AB, et al. v. Cochlear Limited*, IPR 2019-00975, Paper 15 at pp. 10, 19-20 (PTAB Oct. 16, 2019) (precedential) (primary reference was relied on during examination; secondary reference was uncited and non-cumulative); *Digital Check Corp. d/b/a ST Imaging v. E-Imagedata Corp.*, IPR2017-00178, Paper 6 at 12-13 (PTAB April 25, 2017) (prior art was not used in a rejection nor discussed substantively); *Cook Group Incorporated, et al. v. Boston Scientific SciMed, Inc.*, IPR 2017-00135, Paper 7 at 9-15 (PTAB May 16, 2017) (claim “has distinct limitations that were not addressed by the Examiner for the rejection based on [the previously applied prior art]”).

B. All Grounds: Section 314(a)

Under the Director’s Interim Procedure for Discretionary Denials (June 21, 2022) (“Interim Procedure”), “the PTAB will not deny institution based on *Fintiv* if there is compelling evidence of unpatentability,” which this Petition provides. That should conclude the *Fintiv* analysis here. *Nokia of Am. Corp. v. TQ Delta, LLC*, IPR2022-00471, Paper 11 at 19-21. Regardless, the *Fintiv* factors also weigh against discretionary denial.

The “potential for stay” factor is neutral as no stay has been requested. *Apple, Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 15 at 12 (May 13, 2020) (informative).

The “timing of trial” factor weighs against discretionary denial because Petitioners filed this Petition before the district court has ruled on Petitioners’ motions to dismiss and before any procedural schedule (including a trial) has been set. EX1031; EX1032.

The “litigation investment” factor weighs against discretionary denial because, other than initial motion practice, the parties have invested little in the district court litigations.

The “overlap of issues” factor weighs against discretionary denial because Petitioners challenge all 11 claims of the ’706 Patent, whereas Patent Owner’s complaint only asserts claim 1 in the district court.

Although Petitioners are litigation defendants, the Board will reach a final decision before any district court trial thereby simplifying the litigations.

Finally, the Petition’s “strong showing on the merits” weighs against denial. Interim Procedure, 3-5.

VIII. Mandatory Notices Under 37 C.F.R. § 42.8

A. Real Parties-in-Interest

In addition to the Petitioners (Kea Cloud, Inc. and Hi Auto, Inc.), Petitioners identify E La Carte, Inc. d/b/a/ Presto as a real party-in-interest.⁵

B. Related Matters

The '706 Patent is involved in the following civil suits filed by Patent Owner:

Defendant(s)	Case No.
Kea Cloud, Inc.	C.A. No. 1:21-cv-01698-MN
Hi Auto, Inc., and E La Carte, Inc. d/b/a Presto	C.A. No. 1:21-cv-01700-MN

⁵ Petitioners note that Presto is a customer of Hi Auto and its co-defendant in one of the two pending district court litigations. Moreover, up until recently (although not at the moment), Presto was represented in the district court by Hi Auto's counsel. However, Presto has not instructed the undersigned counsel to file this IPR petition and has not contributed financially to the IPR preparation. Nevertheless, Presto is being listed as a real party-in-interest out of an abundance of caution, although it has expressly objected to such inclusion. *See Applications in Internet Time, LLC, v. RPX Corp.*, 897 F.3d 1336, 1345 (Fed. Cir. 2018) (considering equitable and practical considerations other than merely control over the IPR).

These lawsuits are both in their early stages, no scheduling order has been issued, and no trial date has been set. The Defendants each filed a motion to dismiss on grounds of invalidity under 35 U.S.C. § 101, and those motions remain pending.

C. Identification of Counsel and Service Information

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Please direct all correspondence to lead and backup counsel at the addresses identified above. Petitioners consent to electronic service by e-mail. Concurrently filed herewith are Powers of Attorney pursuant to 37 C.F.R. § 42.10(b).

IX. Grounds for Standing and Procedural Statement (37 C.F.R. § 42.104(a))

Petitioners certify that the '706 Patent is available for *inter partes* review and that Petitioners are not barred or estopped from requesting an *inter partes* review of the patent on the grounds identified herein.

X. Payment of Fees

The inter partes review fee accompanies this Petition. Petitioners authorize the PTO to charge any additional fees to Deposit Acct. No. 05-1323 (Reference No. 118475.0000005).

XI. Conclusion

The Challenged Claims are unpatentable for the reasons set forth above.

Dated: January 6, 2023

Respectfully submitted,

/Vincent J. Galluzzo/

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Claim Appendix of Challenged Claims

Independent Claim 1

- [1-Pre] 1. A method comprising the steps of:
 - [1a] providing an audio stream of an order of a customer positioned on a site;
 - [1b] providing an order processor having a speech recognition module trained using artificial intelligence programs;
 - [1c] converting a word or words in the audio stream to text using the speech recognition module;
 - [1d] processing the text communication with the speech recognition module to identify a word or words in the text of the converted audio stream according to a previous spoken word training;
 - [1e] providing a natural language processor having order assembly capabilities and exception detection capabilities, wherein the natural language processor receives recognized text from the order processor and creates or modifies an order based upon the recognized text;
 - [1f] generating an order with the natural language processor

- [1g] alerting an auditor of detected exceptions in the order, the auditor located off-site and connected to the order processor via a data connection;
- [1h] deactivating the order processor with the auditor in response to the detected exceptions in the order; and
- [1i] prompting an on-site employee to engage the customer and complete the order.

Dependent Claims 2 and 3

- [2] 2. The method according to claim 1 wherein the order is processed in real time.
- [3] 3. The method according to claim 1 wherein the alert to the auditor prompts the auditor to switch the order processor from an autonomous mode to an auditor-assist mode prior to deactivating the order processor.

Independent Claim 4

- [4-Pre] 4. A method comprising the steps of:
- [4a] providing an audio stream of an order of a customer to a speech-to-text processor, the customer positioned on a site;
- [4b] providing an order processor incorporating a speech recognition module trained using artificial intelligence programs;
- [4c] converting a word or words in the audio stream to text using the speech recognition module;
- [4d] processing text communication with the speed recognition module to identify a word or words in the text of the converted audio stream according to a previous spoken word training;
- [4e] providing a natural language processor having order assembly capabilities and exception detection capabilities, wherein the natural language processor receives recognized text from the order processor and creates or modifies the order based upon the recognized text;
- [4f] generating an order with the natural language processor;
- [4g] providing an audio stream of a customer order to an auditor, the auditor located off-site and connected to the order processor via a data connection;

- [4h] providing the generated order to the auditor;
- [4i] performing a comparison of the audio stream of a customer order with the generated order by the auditor;
- [4j] switching to an auditor-assist mode in response to the comparison of the audio stream with the generated order;
- [4k] updating the order processor based upon errors detected in the order by the auditor;
- [4l] deactivating the order processor with the auditor; and
- [4m] transmitting the generated order to an on-site employee to communicate with the customer, to collect payment from the customer, and to provide notifications to release the ordered product or service to the customer

Dependent Claims 5-11

- [5-Pre] 5. The method according to claim 4 wherein
- [5a] a business processor receives order information from the natural language processor (NLP) and performs the steps of:
- [5b] associating the order items with one or more additional menu items or options associated with the order items; and

- [5c] querying the customer about the one or more additional menu items or options associated with the order items, wherein the NLP updates the order based upon the customer response to the query.
- [6-Pre] 6. The method according to claim 5 further comprising the steps of:
- [6a] providing a text-to-speech processor to convert queries from the business processor into audio to be communicated to a customer; and
- [6b] processing the text with the text-to-speech processor to create an audio communication of the query generated by the business processor
- [7-Pre] 7. The method according to claim 4 further comprising the steps of
- [7a] reviewing an order by the auditor by comparing the order generated by the natural language processor to the communication in the audio stream and
- [7b] updating the order based upon auditor review
- [8-Pre] 8. The method according to claim 4 further comprising the steps of:

- [8a] providing a text-to-speech processor to convert queries from the business processor into audio to be communicated to a customer; and
- [8b] processing the text with the text-to-speech processor to create an audio communication of the query generated by the business processor.
- [9-Pre] 9. The method according to claim 4 further comprising the step of
- [9a] alerting the auditor by the natural language processor (NLP) of any exceptions detected by the artificially intelligent order processing system, wherein the auditor can override the artificially intelligent order processing system based upon the detected exception.
- [10] 10. The method according to claim 4 wherein the auditor deactivates the order processor in response to a detected change in customer traffic.
- [11] 11. The method according to claim 4 wherein the auditor deactivates the order processor in response to a detected change in staffing at the site

Certification of Word Count

Pursuant to 37 C.F.R. § 42.24(d), I certify that the foregoing Petition contains 13,138 words, not including the table of contents, exhibit list, mandatory disclosures, claim appendix, certificate of service and certification of word count.

Respectfully submitted,

Dated: January 6, 2023

/Vincent J. Galluzzo/
Vincent J. Galluzzo

Certificate of Service

Pursuant to 37 C.F.R. § 42.6(e)(4), I certify that the foregoing Petition, along with the accompanying exhibits, was served on the following correspondence address of record for the subject patent via Federal Express on January 7, 2023:

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Courtesy copies have also been served via e-mail on Patent Owner's litigation counsel of record at the following addresses:

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Respectfully submitted,

Dated: January 6, 2023

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