UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

DIALECT, LLC, *Plaintiff*, v. BANK OF AMERICA, N.A., *Defendant*.	Civil Action No. 2:24cv207 **JURY TRIAL DEMANDED** [redacted]

SECOND AMENDED COMPLAINT FOR PATENT INFRINGEMENT AND DAMAGES AND DEMAND FOR JURY TRIAL

Plaintiff Dialect, LLC ("Dialect" or "Plaintiff") files this Complaint for Patent Infringement and Damages against Bank of American, N.A. ("Bank of America" or "Defendant") and alleges as follows:

INTRODUCTION

1. The novel inventions disclosed in U.S. Patent Nos. 7,640,160 (the "'160 Patent"); 8,195,468 (the "'468 Patent"); 8,447,607 (the "'607 Patent"); 9,263,039 (the "'039 Patent"); and 9,495,957 (the "'957 Patent") (collectively, the "Asserted Patents") in this case were invented by VoiceBox Technologies ("VoiceBox"). VoiceBox was a key pioneer in the fields of voice recognition technology and natural language understanding ("NLU") technology. These technologies power a wide variety of applications and platforms used in smart phones, tablets, TVs, Internet of Things ("IoT") devices, and vehicle multimedia and navigation systems. VoiceBox spent more than a decade developing and building key early NLU inventions, producing

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one of the most valuable patent portfolios in the industry, according to the Institute of Electrical and Electronics Engineers ("IEEE") in 2013. The Asserted Patents in this case are the result of this substantial investment and research.

2. Over the years, the inventions claimed in the Asserted Patents have been licensed to key companies in the industry.

3. The Asserted Patents, along with other former VoiceBox patents now owned by Dialect, are presently the subject of infringement lawsuits filed by Dialect against Amazon (pending in the Eastern District of Virginia, asserting the '468, '957 and '039 patents, among others) and Google (pending in the Eastern District of Delaware, asserting the '160 and '607 patents, among others). Dialect also previously asserted the '468, '957 and '607 patents in this District against Samsung; the lawsuit dismissed before Samsung filed a responsive pleading.[1]

4. Other VoiceBox patents sharing common inventors and subject matter with the Asserted Patents were previously asserted against Amazon in the District of Delaware, resulting in a jury verdict upholding patent validity, finding willful infringement, and awarding pre-enhancement damages of $46.7 million for past infringement plus a running royalty for continuing infringement.

THE PARTIES

5. Plaintiff is the current owner and assignee of the Asserted Patents.

6. Plaintiff is a Texas limited liability company with its principal place of business located at 133 E. Tyler St., Longview, Texas 75601-7216.

[1] *See* Redacted Public Order Dismissing All Claims, ECF No. 18-1, *Dialect, LLC v. Samsung Elec. Co., Ltd., et al.*, Case No. 2:23-cv-00061-JRG (E.D. Tex. Aug. 30, 2023), attached hereto as Exhibit A.

7. Defendant is a federally chartered national banking association with its principal place of business at Bank of America Corporate Center, 100 N. Tryon Street, Charlotte, North Carolina 28255. Defendant may be served through its registered agent at CT Corporation System, 1999 Bryan Street, Suite 900, Dallas, Texas 75201.

8. On information and belief, Defendant directly and/or indirectly develops, designs, manufactures, uses, distributes, markets, and offers infringing products and/or services, including Defendant's "*Erica*" virtual financial assistant feature of Defendant's Mobile App available on "select iOS and Android devices"[2] (the "Accused Products") in the United States and within the Eastern District of Texas, and otherwise directs infringing activities to this District in connection with its products and/or services as set forth in this Complaint.

JURISDICTION AND VENUE

9. This civil action arises under the patent laws of the United States, 35 U.S.C. § 1 *et seq.*, including without limitation 35 U.S.C. §§ 271, 281, 283, 284, and 285. Accordingly, this Court has subject matter jurisdiction under, *inter alia*, 28 U.S.C. §§ 1331 and 1338(a).

10. This District has general and specific personal jurisdiction over Defendant because Defendant has committed acts, directly or through intermediaries, in this District, giving rise to this action; is present in and transacts and conducts business in this District and the State of Texas; and transacts and conducts business with residents of this District and the State of Texas.

11. Plaintiff's causes of action arise, at least in part, from Defendant's contacts with and activities in this District and the State of Texas.

[2] "The mobile feature, *Erica*, […] requires that you download the latest version of the Mobile Banking app and is only available in the Mobile Banking app for select iOS and Android devices." https://promotions.bankofamerica.com/consumer/ericabyyourside, at fn. 1.

12. Defendant has infringed the Asserted Patents within this District and the State of Texas by making, using, distributing, marketing, offering, and/or importing in or into this District and elsewhere in the State of Texas, products and/or services that infringe the Asserted Patents, including the Accused Products. Defendant, directly and through intermediaries, makes, uses, offers, imports, distributes, advertises, promotes, and/or otherwise commercializes such infringing products in or into this District and the State of Texas. Defendant regularly conducts and solicits business in, engages in other persistent courses of conduct in, and/or derives substantial revenue from goods and services provided to residents of this District and the State of Texas.

13. This Court has personal jurisdiction over Defendants pursuant to TEX. CIV. PRAC. & REM. CODE § 17.041 *et seq*.

14. Personal jurisdiction exists over Defendant because Defendant has minimum contacts with this forum as a result of business regularly conducted within this District and the State of Texas, and, on information and belief, specifically as a result of, at least, committing the tort of patent infringement within this District and the State of Texas.

15. This Court also has personal jurisdiction over Defendant, in part, because Defendant does continuous and systematic business in this District, including by providing infringing products and services to the residents of this District that Defendant knew would be used within this District, and by soliciting business from the residents of this District.

16. Defendant is subject to personal jurisdiction in this Court, and venue is appropriate in this Court because, *inter alia*, Defendant and its authorized agents regularly solicit and transact business in this District and have established places of business in this District. For example, Defendant offers its products and services throughout Texas, including this District, by shipping,

distributing, offering for sale, selling, and advertising its products and services through its website, accessible within this District, and through its physical business locations within this District.

17. On information and belief, Defendant maintains physical places of business in this Judicial District, including but not limited to:

- 7105 Corporate Dr., Plano, Texas 75024
- 113 East FM 544, Murphy, TX 75094
- 3301 Golden Rd, Tyler, TX 75701
- 265 Dowlen Rd, Beaumont, TX 77706
- 6101 S. Broadway Ave, Tyler, TX 75703

18. In addition, the Bank of America Technology Center is located in 7105 Corporate Dr., Plano, Texas 75024, which Bank of America recently spent $86 million to renovate[3]. Upon information and belief, Bank of America has been actively recruiting research and development personnel for its *Erica* product in this District[4].

19. Accordingly, this Court's jurisdiction over the Defendant comports with the constitutional standards of fair play and substantial justice and arises directly from Defendant's purposeful minimum contacts with the State of Texas.

20. This Court also has personal jurisdiction over Defendant because Defendant has made its products and services available for, at least, downloading and use within this District.

21. Venue is proper in this Judicial District pursuant to 28 U.S.C. §§ 1391(b), 1391(c), and 1400(b) because, among other things, Defendant maintains a regular and established place of

[3] https://www.dallasnews.com/business/banking/2021/11/04/bank-of-america-is-pumping-86-million-into-renovating-its-plano-campus/

[4] https://plano-tx.geebo.com/jobs-online/view/id/1136570640-erica-ai-solutions-platform-/

business in his district, Defendant has transacted business in the Eastern District of Texas, and Defendant has committed acts of direct and indirect infringement in this Judicial District.

22. Defendant has not contested proper venue and exercise of personal jurisdiction in this District for patent infringement in actions in the past. *See, e.g.*, Answer, ¶¶ 4-5 *DynaPass IP Holdings, LLC v. Bank of Am. Corp. and Bank of Am., N.A.*, Civil Action No. 2:22-cv-00210 (E.D. Tex. Aug. 12, 2022); Answer, ¶¶ 4-5, *Wapp Tech Ltd. P'ship, et al. v. Bank of Am., N.A.*, Civil Action No. 4:21-cv-00670 (E.D. Tex. Nov. 4, 2021).

BACKGROUND

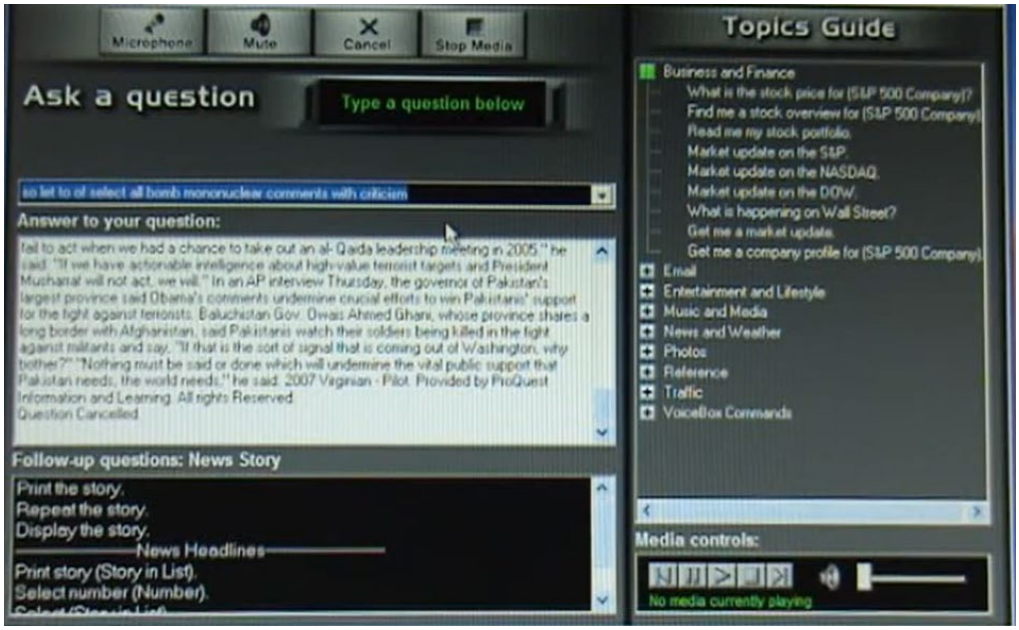
23. In 2001, three brothers, Mike, Rich, and Bob Kennewick, founded VoiceBox to bring NLU to a wide array of computer applications. They recognized that the typical computer speech-recognition systems forced human operators to adhere to a limited number of rigid speech prompts, typically through verbal menus of a so-called "Command and Control" system. These rigid prompts limited how systems were used and inhibited the widespread adoption of speech-recognition systems. The brothers believed that VoiceBox could become the first company to improve voice recognition systems to enable people to interact with computer speech systems naturally and effectively.

24. From its inception, VoiceBox engaged in intense research efforts to develop its NLU technology. As part of these efforts, VoiceBox Technologies achieved a significant milestone when it developed an early prototype called "Cybermind." As demonstrated on Seattle-area television news,[5] Cybermind was a voice-controlled speaker that could provide weather, recipes, sports scores, calendar updates, or play a song.

[5] https://www.youtube.com/watch?v=DDcRyPnvWhw

[redacted]

25. In addition, Cybermind enabled multi-modal user interactions. For example, Cybermind technology was used in desktop applications that could understand and respond to speech user input as well as non-speech user input.



26. On information and belief, consumer focus groups being introduced to VoiceBox conversational voice technology described it as "cool," "unbelievable," "so fast," "it makes you feel like you're in the future already," and "I feel like I'm in the Jetsons."[6]

[6] https://www.youtube.com/watch?v=WCOGNnH-Bws

[redacted]

27. Throughout its research and development efforts, VoiceBox realized that its technology could be deployed in a wide range of applications from connected home to mobile personal assistants.

28. VoiceBox's groundbreaking work did not go unrecognized. By January 2012, VoiceBox had become a leader in NLU and conversational voice technology. Leading companies throughout the world, including Samsung, Toyota, Lexus, TomTom, Pioneer, Chrysler, Dodge, and Magellan used VoiceBox's award-winning and patented natural language understanding technology. VoiceBox had software applications that ran on smart speakers, in-car systems, smartphones, smart TVs, computers, tablets, e-readers, and personal navigation devices. As noted above, in November 2023, a Delaware jury determined that Amazon's "*Alexa*" platform, accessible through over 500 million devices throughout the world, including Amazon's *Echo* devices and the *Alexa* application for iOS and Android, also utilized VoiceBox's patented technology.

29. On information and belief, in 2013 the Institute of Electrical and Electronics Engineers ("IEEE") ranked VoiceBox number 13 in patent power for the computer software industry, ranking between SAP AG and Sony Computer Entertainment Inc.

[redacted]

IEEE Patent Power Rankings

Computer Software

Rank	Company / Organization	Country of Headquarters	2012 U.S. Patents	Pipeline Growth Index	Pipeline Impact	Self-Citations (%)	Adjusted Pipeline Impact	Pipeline Generality	Pipeline Originality	Pipeline Power
1	Microsoft Corp.	United States	2665	1.14	1.07	0.22	1.07	1.19	1.01	3909.67
2	VMware Inc.	United States	106	1.89	3.07	0.16	3.07	3.02	1.06	1966.63
3	Citrix Systems Inc.	United States	112	1.56	2.83	0.27	2.83	2.62	1.12	1441.86
4	Symantec Corp.	United States	379	1.34	1.54	0.16	1.54	1.63	1.01	1297.47
5	Digimarc Corp.	United States	94	0.9	5	0.88	2.08	4.8	1.12	944.96
6	Oracle Corp.	United States	913	0.92	1	0.12	1	1.13	0.98	930.36
7	CommVault Systems Inc.	United States	52	1.3	5	0.88	2.1	5	1.22	866.39
8	Cadence Design Systems Inc.	United States	158	1.15	2.45	0.15	2.45	1.76	0.89	699.87
9	Adobe Systems Inc.	United States	332	1.13	1.14	0.18	1.14	1.24	1	526.88
10	Rovi Corp.	United States	97	1.47	1.85	0.25	1.85	1.91	1.02	514.34
11	TeleCommunication Systems Inc.	United States	57	1.36	2.35	0.42	2.06	2.52	1.12	451.72
12	SAP AG	Germany	601	1.1	0.74	0.23	0.74	0.85	1.02	424.91
13	**Voicebox Technologies Inc.**	**United States**	**11**	**1.83**	**5**	**0.65**	**3.26**	**5**	**1.29**	**423.56**
14	Sony Computer Entertainment Inc.	Japan	220	1.33	1.1	0.36	1.03	1.26	1.08	409.7
15	Bally Technologies Inc.	United States	98	1.78	1.46	0.38	1.35	1.83	0.9	388.27
16	Smith Micro Software Inc.	United States	18	3	2.8	0.17	2.8	2.41	0.97	353.44
17	McAfee Inc.	United States	84	1.33	2.02	0.39	1.85	1.61	1.04	347.02
18	Nuance Communications Inc.	United States	160	1.15	1.19	0.3	1.19	1.56	1.02	345.99
19	Synopsys Inc.	United States	148	0.95	1.61	0.08	1.61	1.17	1.06	280.46
20	Infosys Ltd.	India	29	1.93	2.52	0.04	2.52	1.75	1.02	253.69

Source: IEEE Spectrum Patent Power 2013

30. After learning about VoiceBox's technology, Toyota hired VoiceBox to build a sophisticated NLU speech interface for its Lexus automobiles. VoiceBox built the voice and NLU capability for Toyota's award-winning Entune multimedia system[7].

31. Some of the most well-known technology companies and automotive companies in the world have paid, in the aggregate, hundreds of millions of dollars for access to VoiceBox's patented technology, through licensing of VoiceBox patents, including the Asserted Patents, and through adoption and deployment of VoiceBox's software platform and functionality in their products and services.

[7] https://www.prlog.org/11264790-atlantic-toyota-and-huntington-toyota-customers-entune-wins-two-awards-at-ces-in-las-vegas.html; https://www.businesswire.com/news/home/20120109006490/en/VoiceBox-and-Toyota-Form-Strategic-Relationship-to-Deliver-In-car-Voice-Technology-Innovations#:~:text=LAS%20VEGAS%2D%2D(BUSINESS%20WIRE,car%20voice%20products%20and%20capabilities.

THE ASSERTED PATENTS

32. The VoiceBox inventions claimed in the Asserted Patents relate to groundbreaking improvements to voice recognition and NLU and have particular application in digital voice assistants such as Bank of America's "*Erica*" virtual financial assistant.

U.S. PATENT NO. 7,640,160

33. On December 29, 2009, the U.S. Patent Office duly and legally issued the '160 Patent, entitled "Systems And Methods For Responding To Natural Language Speech Utterance". A true and correct copy of the '160 Patent is attached hereto as Exhibit B.

34. Dialect is the owner and assignee of all right, title, and interest in and to the '160 Patent, including the right to assert all causes of action arising under the '160 Patent and the right to sue and obtain any remedies for past, present, or future infringement.

35. The '160 Patent describes, among other things, novel and inventive methods for receiving natural language queries and/or commands and executing the queries and/or commands. '160 Patent, Abstract. The methods improve the reliability of determining the context of speech and non-speech communications and presenting the expected results for a particular question or command, for example by obtaining information and presenting results in a natural manner, even in cases where the question asked or the responses received are incomplete, ambiguous, or subjective. *Id.* at Abstract, 1:14-18, 1:51-57.

36. The novel inventions of the '160 Patent are recited in the claims. For example, claim 12 of the '160 Patent recites:

> 12. A method for interpreting natural language utterances using knowledge-enhanced speech recognition engine, wherein the knowledge-enhanced speech recognition engine is configured to determine an intent and correct false recognitions of the natural language utterances, comprising:
>
> receiving a transcription of a natural language utterance at a computer comprising the knowledge-enhanced speech recognition engine;

[redacted]

identifying one or more contexts that completely or partially match one or more text combinations contained in the transcription, wherein identifying the matching contexts includes comparing the text combinations against the grammar expression entries in the context description grammar and against one or more expected contexts stored in a context stack;

scoring each of the identified matching contexts;

selecting the matching context having a highest score to determine a most likely context for the utterance; and

communicating a request to a domain agent configured to process requests in the most likely context for the utterance, the request formulated using at least one grammar expression entry in the context description grammar.

'160 Patent, Cl. 12.

37. In explaining the reasons for allowability of the claims of the '160 Patent, the United States Patent and Trademark Office described how the closest existing prior art did not disclose or teach the claimed combination of inventive elements, noting that the closest prior art references "do not disclose or suggest comparing text combinations against both grammar expression entries in the context description grammar and against one or more expected contexts stored in a context stack." '160 File History, Notice of Allowability (April 6, 2009) at 2 (attached as Exhibit C).

U.S. PATENT NO. 8,195,468

38. On June 5, 2012, the U.S. Patent Office duly and legally issued the '468 Patent, entitled "Mobile Systems And Methods Of Supporting Natural Language Human-Machine Interactions". A true and correct copy of the '468 Patent is attached hereto as Exhibit D.

39. Dialect is the owner and assignee of all right, title, and interest in and to the '468 Patent, including the right to assert all causes of action arising under the '468 Patent and the right to sue and obtain any remedies for past, present, or future infringement.

40. As the '468 Patent explains, prior to the inventions disclosed therein, a machine's ability to communicate with humans in a natural manner was a difficult technical problem. The

[redacted]

inventors of the ’468 Patent conceived novel software techniques and structures to solve the technical problem.

41. For example, claim 19 recites a novel method of processing a combination of speech and non-speech inputs that receives multimodal natural language input from a user including a natural language utterance and a non-speech input, identifies the user, creates and merges transcripts of the inputs using a speech recognition engine and a semantic knowledge-based model that includes personalized and general models derived from prior interactions with the identified user and multiple users, and an environmental model derived from the identified user’s environment. The method identifies entries in a context stack matching information in the merged transcription, and determines the most likely context from the matched entries. It then identifies a domain agent associated with the most likely context, communicates a request to the domain agent and generates a response to the user from content provided by the domain agent:

> 19. A method for processing multi-modal natural language inputs, comprising:
>
> receiving a multi-modal natural language input at a conversational voice user interface, the multi-modal input including a natural language utterance and a non-speech input provided by a user, wherein a transcription module coupled to the conversational voice user interface transcribes the non-speech input to create a non-speech-based transcription;
>
> identifying the user that provided the multi-modal input;
>
> creating a speech-based transcription of the natural language utterance using a speech recognition engine and a semantic knowledge-based model, wherein the semantic knowledge-based model includes a personalized cognitive model derived from one or more prior interactions between the identified user and the conversational voice user interface, a general cognitive model derived from one or more prior interactions between a plurality of users and the conversational voice user interface, and an environmental model derived from an environment of the identified user and the conversational voice user interface;
>
> merging the speech-based transcription and the non-speech-based transcription to create a merged transcription;
>
> identifying one or more entries in a context stack matching information contained in the merged transcription;

[redacted]

> determining a most likely context for the multi-modal input based on the identified entries;
>
> identifying a domain agent associated with the most likely context for the multi-modal input;
>
> communicating a request to the identified domain agent; and
>
> generating a response to the user from content provided by the identified domain agent as a result of processing the request.

'468 Patent, Cl. 19.

42. Embodiments of these claimed elements are shown and described in the specification. For example, Figure 8 illustrates one exemplary embodiment:

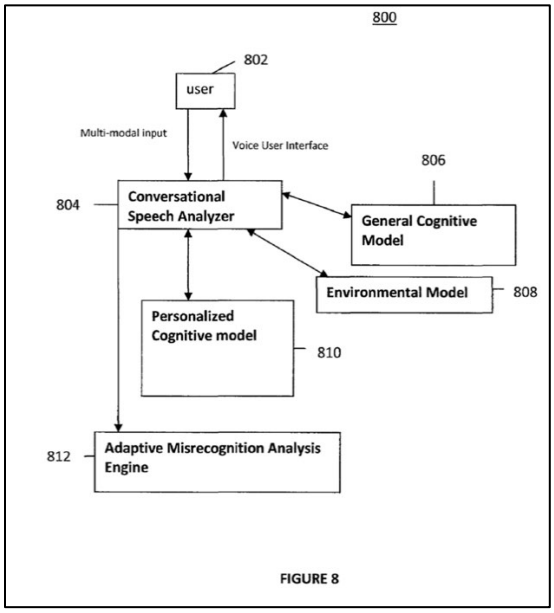


FIGURE 8

43. The specification of the '468 Patent describes how these claim elements help the overall system overcome the technical limitations of existing speech recognition systems. *See, e.g.*, '468 Patent, 23:58-24:40.

44. In explaining the reasons for allowing the claims, the United States Patent and Trademark Office described how the closest existing prior art did not disclose or teach the claimed combination of inventive elements:

> The prior art of record does not teach the combination of limitations in independent claims […], including multi-modal natural language speech and non-speech input

[redacted]

> being transcribed and merged, identifying a user with a conversational speech analysis engine which uses a semantic knowledge-based model including a personalized cognitive model derived from one or more prior interactions between the identified user and the mobile device, a general cognitive model derived from one or more prior interactions between a plurality of users and the mobile device, and an environmental model derived from an environment of the identified user and the mobile device, and a knowledge-enhanced speech recognition engine that identifies one or more entries in a context stack matching information contained in the merged transcription and determines a most likely context for the multi-modal natural language input based on the identified entries, and response generation by a domain agent associated with the most likely context identified by the system, where the domain agent receives a request.

'468 File History, Notice of Allowability (October 23, 2011) at 2 (attached as Exhibit E).

U.S. PATENT NO. 8,447,607

45. On May 21, 2013, the U.S. Patent Office duly and legally issued the '607 Patent, entitled "Mobile Systems And Methods Of Supporting Natural Language Human-Machine Interactions." A true and correct copy of the '607 Patent is attached hereto as Exhibit F.

46. Dialect is the owner and assignee of all right, title, and interest in and to the '607 Patent, including the right to assert all causes of action arising under the '607 Patent and the right to sue and obtain any remedies for past, present, or future infringement.

47. The '607 Patent describes, among other things, a novel mobile system that identifies and uses context, prior information, domain knowledge, and user specific profile data to achieve a natural environment for users to submit natural language requests. '607 Patent, Abstract. The claimed invention creates, stores, and uses extensive personal profile information for each user to improve the reliability of determining the context of a request and presenting the expected results. *Id*. The claimed invention also provides a system that uses "multi-modal communications that enable displaying of non-speech search results on a graphical interface" in conjunction with "speech commands" to execute requests. *Id.* at 21:49-60.

[redacted]

48. The novel inventions of the ’607 Patent are recited in the claims. For example, claim 12 of the ’607 Patent recites:

> 12. A method for processing natural language inputs, comprising:
>
> receiving, by one or more processors, a multi-modal natural language input from a user, the multi-modal natural language input including a natural language utterance and a non-speech input;
>
> generating, by the one or more processors, a non-speech transcription from the non-speech input;
>
> identifying, by the one or more processors, the user who provided the multi-modal natural language input;
>
> generating, by the one or more processors, a speech-based transcription based on a cognitive model associated with the user, wherein the cognitive model includes information on one or more prior interactions between the user and the device;
>
> generating, by the one or more processors, a merged transcription from the speech-based transcription and the non-speech transcription;
>
> identifying, by the one or more processors, an entry in a context stack, from among a plurality of entries that are in the context stack and that are each indicative of context, wherein the identified entry matches information in the merged transcription;
>
> identifying, by the one or more processors, a domain agent associated with the entry in the context stack;
>
> determining, by the one or more processors, a request based on the merged transcription; and
>
> communicating, by the one or more processors, the request to the domain agent, wherein the domain agent is configured to generate a response to the user.

’607 Patent, Cl. 12.

U.S. PATENT NO. 9,263,039

49. On February 16, 2016, the U.S. Patent Office duly and legally issued the ’039 Patent, entitled “Systems And Methods For Responding To Natural Language Speech Utterance.” A true and correct copy of the ’039 Patent is attached hereto as Exhibit G.

[redacted]

50. Dialect is the owner and assignee of all right, title, and interest in and to the ’039 Patent, including the right to assert all causes of action arising under the ’039 Patent and the right to sue and obtain any remedies for past, present, or future infringement.

51. The inventors of the ’039 Patent conceived novel software techniques and structures to overcome challenges in natural language processing. For example, claim 13 recites a novel method of transcribing the speech and non-speech communications to create speech-based and non-speech-based textual messages, merging the speech-based and non-speech based textual messages; searching the merged query for text combinations, comparing the text combinations to context description grammar, generating a relevance score based on that comparison, selecting a domain agent based on the relevance score, and organizing content based on the results from the relevance score to generate a response:

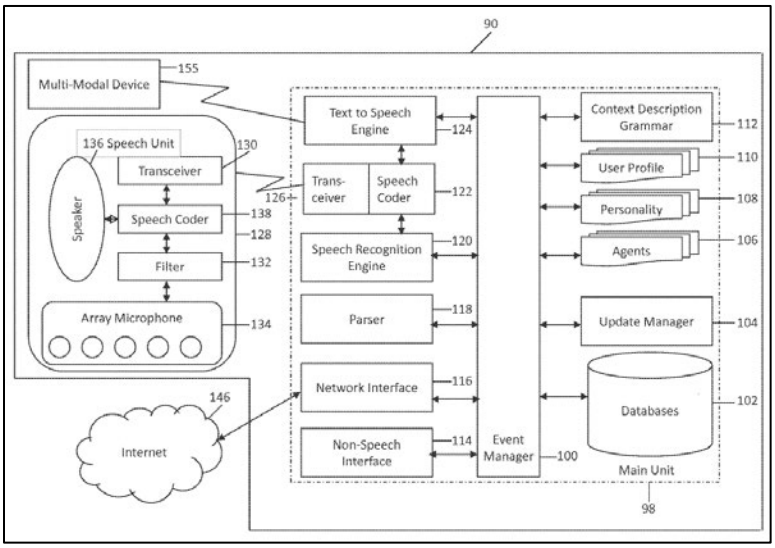
> 13. A method of processing speech and non-speech communications, comprising:
>
> receiving the speech and non-speech communications;
>
> transcribing the speech and non-speech communications to create a speech-based textual message and a non-speech-based textual message;
>
> merging the speech-based textual message and the non-speech-based textual message to generate a query;
>
> searching the query for text combinations;
>
> comparing the text combinations to entries in a context description grammar;
>
> accessing a plurality of domain agents that are associated with the context description grammar;
>
> generating a relevance score based on results from comparing the text combinations to entries in the context description grammar;
>
> selecting one or more domain agents based on results from the relevance score;
>
> obtaining content that is gathered by the selected domain agents; and

[redacted]

> generating a response from the content, wherein the content is arranged in a selected order based on results from the relevance score.

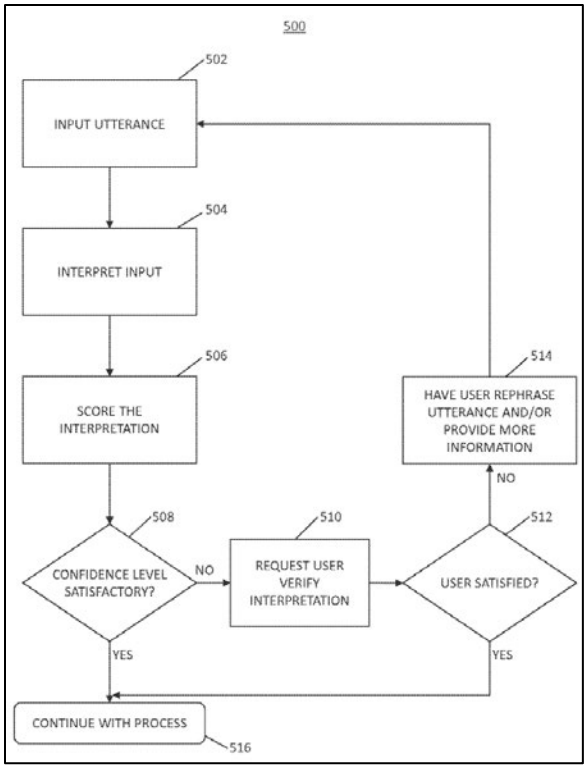
’039 Patent, Cl. 13.

52. Embodiments of these claimed elements are shown and described in the specification. For example, Figure 1 shows an overall diagrammatic view of the interactive natural language speech processing system according to one embodiment:



Additionally, Figure 5 shows a process for correctly interpreting a user’s utterance according to one embodiment:

[redacted]



53. The specification of the '039 Patent describes how these claim elements help the overall system overcome the technical limitations of existing speech recognition systems. *See, e.g.*, *id.* at 13:61-14:37 (describing comparison to context description grammar and relevance scoring); *id.* at 20:20-58 (describing improved word recognition accuracy using data from context description grammar); *id.* at 21:28-36 (describing a scoring system); *id.* at 23:19-29 (describing a scoring system); *id.* at 28:4-31 (describing the process of Figure 5); *id.* at 28:56-29:8 (describing selection of agents).

54. In explaining the reasons for allowing the claims, the United States Patent and Trademark Office described how the closest existing prior art did not disclose or teach the claimed combination of inventive elements:

> The prior art of record does not disclose or suggest the combination of a comparison module that compares text combinations to entries in a context description grammar, a scoring module that provides relevance scores based on the results from the comparison module, a domain agent selector that selects domain agents based on results from the scoring module, and a response generating module that

[redacted]

> generates a response from the content, wherein the content is arranged in a selected order based on results from the scoring module, as required by independent claim 1. Independent claims 13 and 19 recite similar limitations, and are allowed for similar reasons as claim 1.

'039 File History, Notice of Allowability (October 26, 2015) at 2 (attached as Exhibit H).

U.S. PATENT NO. 9,495,957

55. On November 15, 2016, the U.S. Patent Office duly and legally issued the '957 Patent, entitled "Mobile Systems And Methods Of Supporting Natural Language Human-Machine Interactions." A true and correct copy of the '957 Patent is attached hereto as Exhibit I.

56. Dialect is the owner and assignee of all right, title, and interest in and to the '957 Patent, including the right to assert all causes of action arising under the '957 Patent and the right to sue and obtain any remedies for past, present, or future infringement.

57. The inventors of the '957 Patent conceived novel software techniques and structures to solve problems with existing natural language processing systems. For example, claim 7 recites a novel method for processing a natural language utterance that generates a context stack of context information that corresponds to prior utterances, performs speech recognition to determine words in the utterance, identifies context entries in the context stack that correspond to the words by comparing entries from the context stack to the words and generates rank scores for the context entries based on the comparison. Based on the words and the context information, the method determines a command or request associated with the utterance:

> 7. A computer-implemented method of processing a natural language utterance, the method comprising:
>
> generating a context stack comprising context information that corresponds to a plurality of prior utterances, wherein the context stack includes a plurality of context entries;
>
> receiving, by one or more computer processors, the natural language utterance, wherein the natural language utterance is associated with a command or is associated with a request;

[redacted]

determining one or more words of the natural language utterance by performing speech recognition on the natural language utterance;

identifying, from among the plurality of context entries, one or more context entries that correspond to the one or more words, wherein the context information includes the one or more context entries, wherein identifying the one or more context entries comprises:

comparing the plurality of context entries to the one or more words;

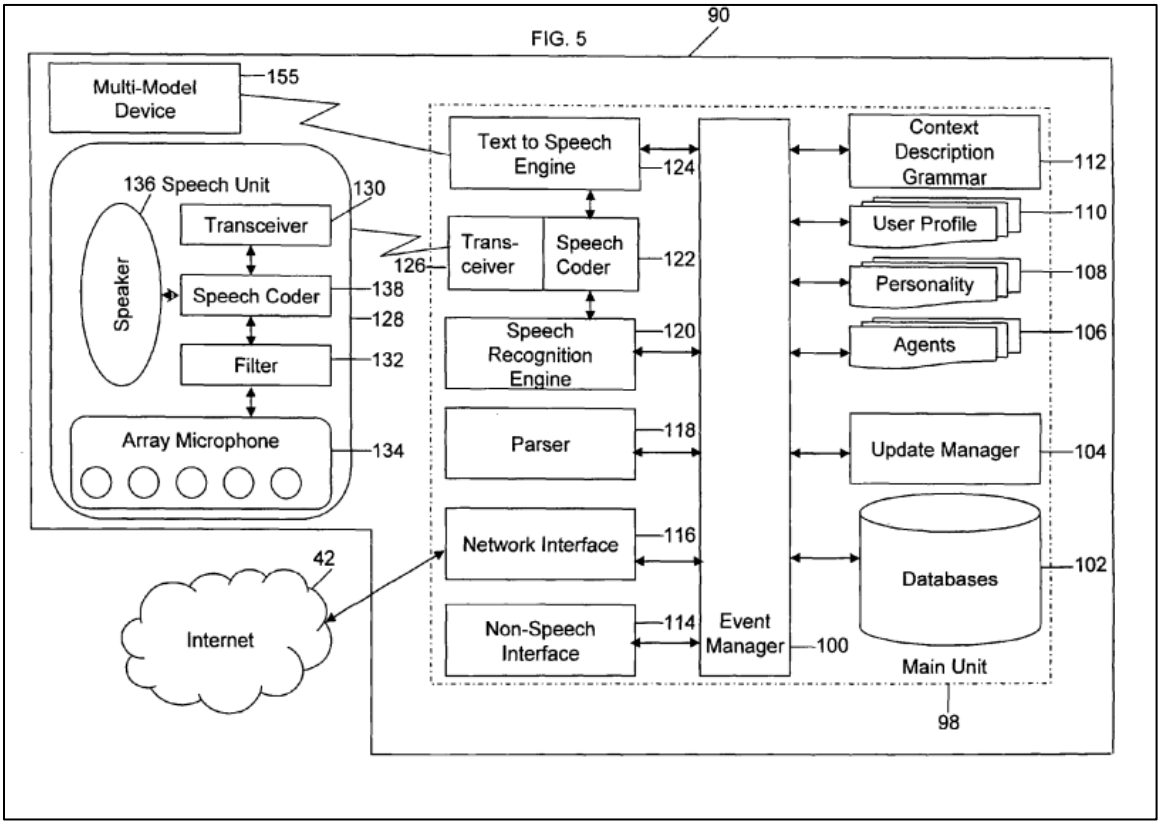
generating, based on the comparison, one or more rank scores for individual context entries of the plurality of context entries; and

identifying, based on the one or more rank scores, the one or more context entries from among the plurality of context entries; and

determining based on the determined one or more words and the context information, the command or the request associated with the natural language utterance.

'957 Patent, Cl. 7.

58. Embodiments of these claimed elements are shown and described in the specification. For example, Figure 5 describes an embodiment of the invention:



[redacted]

BANK OF AMERICA'S AWARENESS OF VOICEBOX'S TECHNOLOGY AND THE ASSERTED PATENTS

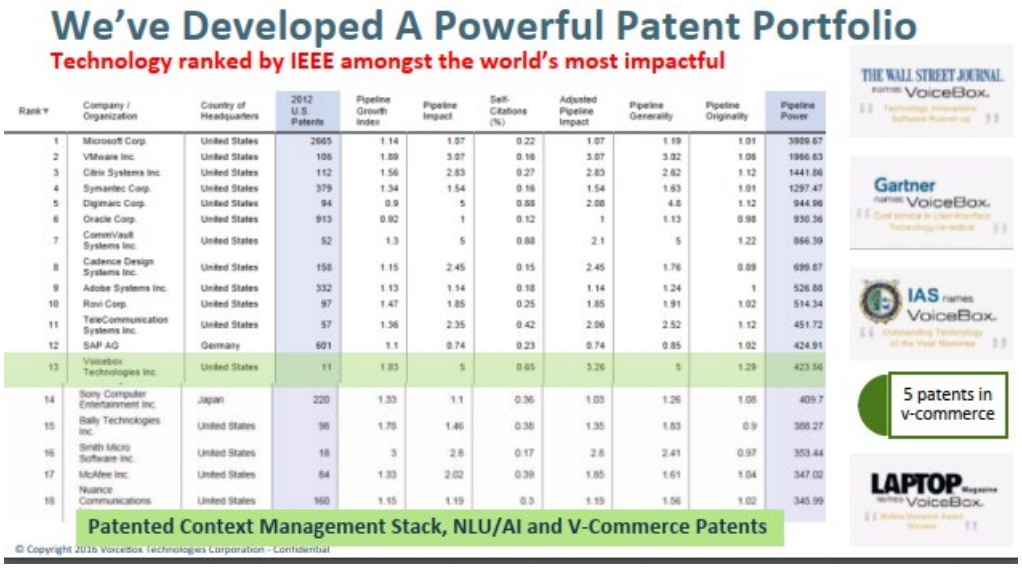
59. [redacted]

[redacted]

60. On information and belief, between [redacted] and 2016, VoiceBox and Bank of America engaged in discussions concerning the functionality and applicability of VoiceBox's

[redacted]

patented conversational voice interaction platform technology for the financial services industry. VoiceBox proposed a collaboration or other relationship through which Bank of America could leverage VoiceBox's technology and expertise to build and deploy a virtual financial assistant based on the voice recognition and conversational, natural language understanding (NLU) and natural language processing (NLP) technologies that are the subject of the Asserted Patents invented by VoiceBox. VoiceBox specifically referred to its patents relating to NLU technology in its presentations to Bank of America, as shown in one slide from one such presentation reproduced below. Further, Bank of America's patent application No. 13/804,345, which was filed in March 2013, cites U.S. Pat. Pub. No. 2007/0050191, which led to three Asserted Patents: the '607, '468, and '957 Patents. That also demonstrates Bank of America's knowledge of the Asserted Patents.



61. Bank of America's internal documents show that [redacted]

62. Bank of America's internal documents also show that

[redacted]

63. Therefore, Bank of America has become knowledgeable of VoiceBox and Nuance's voice recognition and natural language understanding technology since [redacted]. In 2015, Nuance purchased the Asserted Patents from VoiceBox. Bank of America likely became aware of the patent purchase (and the Asserted Patents) because [redacted]. On information and belief, Bank of America also became aware of the Asserted Patents through [redacted], if not earlier. In 2018, Nuance purchased VoiceBox, which was widely reported by the press. *See, e.g.*, https://www.geekwire.com/2018/nuance-communications-buys-voicebox-technologies-scooping-another-seattle-area-company/; https://www.speechtechmag.com/Articles/News/Speech-Technology-News/Nuance-Buys-VoiceBox-Technology-with-Little-Fanfare-125216.aspx. Bank of America likely became aware of Nuance's purchase of VoiceBox from public sources and [redacted].

64. Given Bank of America's extensive knowledge of and history with both VoiceBox and Nuance, Bank of America had reason to know that the Asserted Patents, which were invented by VoiceBox and later acquired from VoiceBox by Nuance, relate to the voice recognition technology and natural language understanding technology used by Erica and were infringed by Erica. At a minimum, on information and belief, Bank of America subjectively believed that there

was a high probability that the Asserted Patents existed and that it infringed those patents, and took deliberate action to avoid learning of these facts.

65. At a minimum, Bank of America became aware of the Asserted Patents and their infringement as of the date of the Original Complaint.

BANK OF AMERICA'S INFRINGING TECHNOLOGY

66. Bank of America is one of the largest banking institutions in the world. On information and belief, as of February 2024, Bank of America was the second largest bank in the United States and the second largest bank in the world, with a market capitalization of over $250 billion and total assets in excess of $3.0 *trillion*.

67. In around 2013, Bank of America began developing a conversational voice-based "virtual financial assistant" accessible from consumer mobile devices (e.g., devices running Apple's iOS operating system or Google's Android operating system) within Bank of America's mobile banking application. The virtual financial assistant is named *Erica*. By the summer of 2017, Bank of America had reportedly "pooled together a team of more than 100 people dedicated to building [*E]rica*, a voice- and chat-driven product designed to help customers manage their financial lives using predictive analytics and cognitive messaging." *Inside the development of Erica, Bank of America's AI-powered bot,*" Tanaya Macheel, *TearSheet*, July 28, 2017, Exhibit J.

68. Since the initial deployment of *Erica* in June 2018, Bank of America has regularly touted the growth and success of *Erica*, including that, as of mid-2023:

- *Erica* surpassed 1.5 billion total client interactions, was used by 37 million clients, over 10 million hours of conversations, and that "client engagement with *Erica* is accelerating, and it will easily exceed 2 billion within a few months. Our clients appreciate how simple and intuitive *Erica* is[.]"

[redacted]

- Client engagement with *Erica* was up 35% year-over-year, and hours of interaction were up 31% year-over-year.
- Clients were engaging with *Erica* 56 million times per month, with clients most often using *Erica* to:
  i. Monitor and manage their subscriptions, such as food services and gym memberships – 3.6 million times per month
  ii. Understand spending habits – 2.1 million times per month
  iii. Stay informed of merchant refunds – 863,000 times per month
  iv. Stay on top of upcoming bills – 332,000 times per month
  v. Check their FICO score – 267,000 times per month

See Bank of America Press Release, "BofA's *Erica* Surpasses 1.5 Billion Client Interactions, Totaling More Than 10 Million Hours of Conversations," July 13, 2023, (https://newsroom.bankofamerica.com/content/newsroom/press-releases/2023/07/bofa-s-erica-surpasses-1-5-billion-client-interactions--totaling.html).

69. On information and belief, one of the primary drivers of *Erica's* success is the "conversational" nature of users' interactions with the virtual assistant, as touted in Bank of America's own employee training reference materials. The financial industry has taken note of the success and the economic value of the *Erica* platform to Defendant's bottom line. For example, in October 2023, Fortune Magazine published an article entitled "*How 'Erica' helped power a 19% spike in earnings at Bank of America.*"[8] A February 2019 Note from Juniper Research, entitled, "*Bank Cost Savings via Chatbots to Reach $7.3 Billion by 2023, as Automated Customer*

[8] https://fortune.com/2023/07/19/bank-of-america-erica-financial-assistant-leads-to-earnings-increase/

Experience Evolves, Representing a Growth in Operational Savings of 3,400% from 2019" specifically noted the success of the *Erica* platform in relation to its forecasts of bank cost savings from use of the conversational NLP technology, including the significance of the domain agent architecture enabled by the Accused Patents:

- "As NLP (Natural Language Processing) evolves and domain expertise is added to AI systems, chatbots are demonstrating a proven record of seamless service delivery..."

- "Chatbot integration in mobile banking apps will be the dominant channel for chatbot-driven customer communications, accounting for 79% of successful interactions in 2023. This dominance is due to several reasons, primarily an increase in user preference for app-based banking, as well as the strong performance of early banking chatbots, such as Bank of America's *Erica*."

https://www.juniperresearch.com/press/bank-cost-savings-via-chatbots-reach-7-3bn-2023/

70. Bank of America has extensively patented features in the Natural Language Understanding (NLU) field, which are indicative of infringing activity and the significant investment by Bank of America in developing NLU functionality, including the accused functionalities. *See, e.g.*, U.S. Patent No. 11,881,216.

71. As described in detail below, the consumer-facing functionalities of the *Erica* platform, as well as Bank of America's own patent filings, reflect and reveal Bank of America's development and implementation of methods and systems for determining and acting upon the intents of users' speech and non-speech inputs by using domain agent architectures, context awareness, user identification, multi-modal input methods, and other elements, steps and methods as described in the Asserted Patents invented by VoiceBox.

72. In March 2024, Dialect's counsel sent a letter to Bank of America seeking a discussion regarding Dialect's patents. As of the filing date of the Original Complaint, Dialect has not received a response from Bank of America.

[redacted]

FIRST COUNT
(Infringement of U.S. Patent No. 7,640,160)

73. Dialect incorporates by reference the allegations set forth in Paragraphs 1-72 of the Complaint as though fully set forth herein.

74. The claims of the ’160 Patent are valid and enforceable.

75. The claims of the ’160 Patent are directed to patentable subject matter. The ’160 Patent is directed to innovations that implement and improve a voice recognition system and natural language processing. The inventive claimed steps of the ’160 Patent improve on the processing of a natural language utterance by a user. The claimed inventions provide specific concrete solutions to the problem of speech recognition in existing systems.

76. On information and belief, in violation of 35 U.S.C. § 271(a), Defendant has directly infringed and continues to directly infringe one or more claims of the ’160 Patent, including at least claim 12 of the ’160 Patent, in the state of Texas, in this District, and elsewhere in the United States by, among other things, making, using, selling, offering for sale, and/or importing into the United States products and services that embody one or more of the inventions claimed in the ’160 Patent, including the Accused Products.

77. Each of the Accused Products incorporates and/or implements elements that are identical or equivalent to each claimed element of the patented invention pointed out by at least Claim 12 of the ’160 Patent.

78. Claim 12 of the ’160 Patent recites:

> 12. A method for interpreting natural language utterances using knowledge-enhanced speech recognition engine, wherein the knowledge-enhanced speech recognition engine is configured to determine an intent and correct false recognitions of the natural language utterances, comprising:
>
> receiving a transcription of a natural language utterance at a computer comprising the knowledge-enhanced speech recognition engine;

[redacted]

identifying one or more contexts that completely or partially match one or more text combinations contained in the transcription, wherein identifying the matching contexts includes comparing the text combinations against the grammar expression entries in the context description grammar and against one or more expected contexts stored in a context stack;

scoring each of the identified matching contexts;

selecting the matching context having a highest score to determine a most likely context for the utterance; and

communicating a request to a domain agent configured to process requests in the most likely context for the utterance, the request formulated using at least one grammar expression entry in the context description grammar.

'160 Patent, Cl. 12.

79. Each of the Accused Products implements a method for interpreting natural language utterances using knowledge-enhanced speech recognition engine, wherein the knowledge-enhanced speech recognition engine is configured to determine an intent and to correct false recognitions of the natural language utterances.

80. *Erica* implements a method of interpreting natural language utterances. For example, Bank of America touts the ability of *Erica* to answer questions "through spoken conversation and/or visual text" and informs customers that they "can speak or type to *Erica*" and can interact with *Erica* by "Speaking to *Erica*" or by "Typing [their] requests."

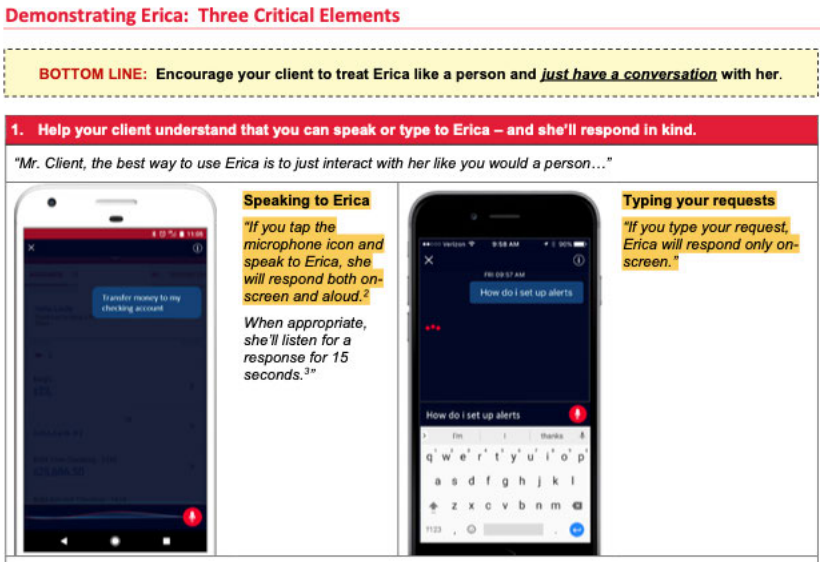
How Does Erica Help Clients Manage Their Finances?

Erica helps ensure clients know and understand all that our Mobile Banking app can do for them. Erica is new to the world and she is still learning, but she's pretty smart and eager to help. She can make it easier for clients to stay on top of their finances in three different ways:

	Erica Can:	Examples of What Clients Can Type/Say:	Outcome:
1	**Answer questions through spoken conversation and/or visual text.**	*"What is my checking account balance?"* *"When is my mortgage due?"* *"What is my credit card limit?"*	*Erica provides relevant account information on screen (and aloud, if spoken to).*

Erica Financial Center Job Aid, Updated 03.26.18, at p. 1.
https://message.bankofamerica.com/onlinebanking_demo/mobileApp_Simulator/erica_qrg/Erica_Financial_Center_Job_Aid_PDF.pdf

[redacted]



Id. at p. 4.

81. On information and belief, *Erica* interprets natural language utterance using a knowledge-enhanced speech recognition engine, because it considers prior interactions between *Erica* and a plurality of users. For example, Bank of America's own press releases and websites tout *Erica's* combination of artificial intelligence, predictive analytics, and natural language, including that "*Erica* is designed to learn from clients' behaviors over time," and that information is stored and aggregated from "clients" (e.g., "*Erica* learns from the conversations with you and other Bank of America customers"):

> Erica combines the latest technology in artificial intelligence, predictive analytics and natural language to be a virtual financial assistant to clients. Currently, clients can ask Erica to:
>
> Erica is designed to learn from clients' behaviors over time, helping them accomplish simple to complex tasks within the mobile banking app with easy-to-follow prompts. Clients can interact with Erica any way they choose, including texting, talking or tapping options on their screen.

https://www.businesswire.com/news/home/20180518005038/en/Bank-of-Ame...elivers-First-Widely-Available-AI–Driven-Virtual-Financial-Assistant

[redacted]

How does Erica learn and improve (future functionality)?

Erica learns from the conversations with you and other Bank of America customers and has a dedicated team that's continually working to expand the capabilities offered.

Are my conversations with Erica recorded?

Yes, we keep a record of your conversations with Erica for quality assurance, to maintain an accurate account of your requests, identify opportunities to make Erica's responses more helpful and ensure Erica's performance is optimal. When you speak with Erica by voice, the discussions are recorded and saved for 90 days so they can be analyzed to help refine listening skills.

https://promotions.bankofamerica.com/digitalbanking/mobilebanking/erica

See also:

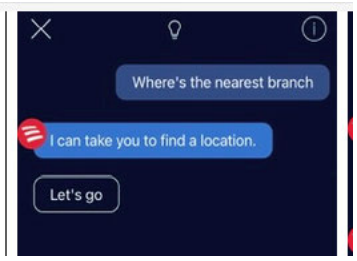
When it comes to data collection, conversations with Erica are recorded for reference and quality assurance purposes to help enhance the usefulness of Erica's responses. According to BoA, voice interactions with Erica are saved for 90 days to help refine the AI's listening skills.

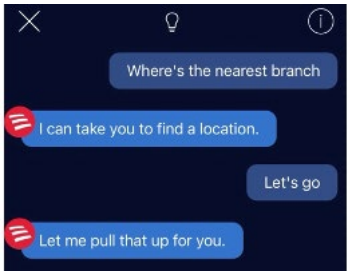
https://cointelegraph.com/learn/bank-of-america-erica-ai-powered-chatbot

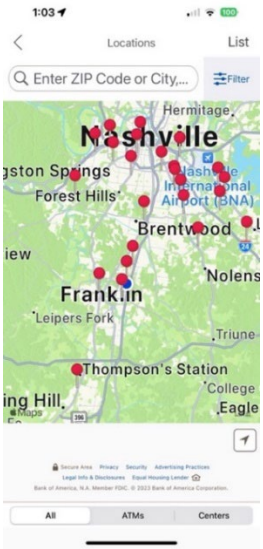
82. On information and belief, the speech recognition engine implemented by *Erica* also is knowledge-enhanced in that it takes into account information and knowledge derived from an environment of the identified user and the conversational voice user interface. For example, on information and belief, when a user asks *Erica* "Where's the nearest branch," *Erica's* knowledge-based model can access information concerning the environment of the user, for example the user's current location, respond "Let me pull that up for you," and sends the request to a branch finder

[redacted]

"agent" and presents information to the user that relies upon the understanding of "nearby" to leverage said information about the user's current location in processing the request:







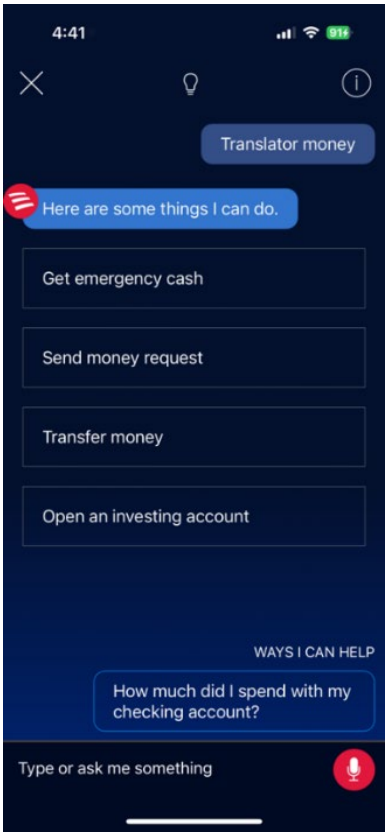
83. For further example, and on information and belief, *Erica* is also knowledge-enhanced in that it identifies the user and uses knowledge and information relating to the user in interpreting natural language utterances. For example, to use *Erica* a user must be logged into the user's banking accounts, through which *Erica* can and does access profile and account information specific to that user.

84. On information and belief, Erica's knowledge-enhanced speech recognition engine is configured to determine an intent and correct false recognitions of the natural language utterances.

85. For example, when a user's utterance is misinterpreted, *Erica* is configured to determine an intent and correct false recognitions of a natural language utterance. In the screenshot below, the user's natural language utterance was "transfer money." *Erica* falsely recognized the utterance as "translator money," and on information and belief, the knowledge-enhanced speech

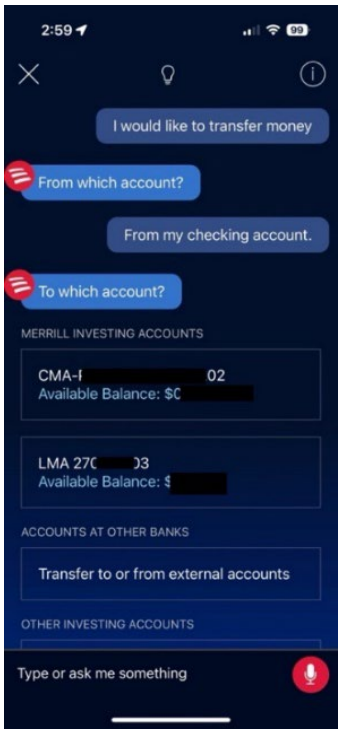
[redacted]

recognition engine corrected the false recognition by presenting options including "transfer money":



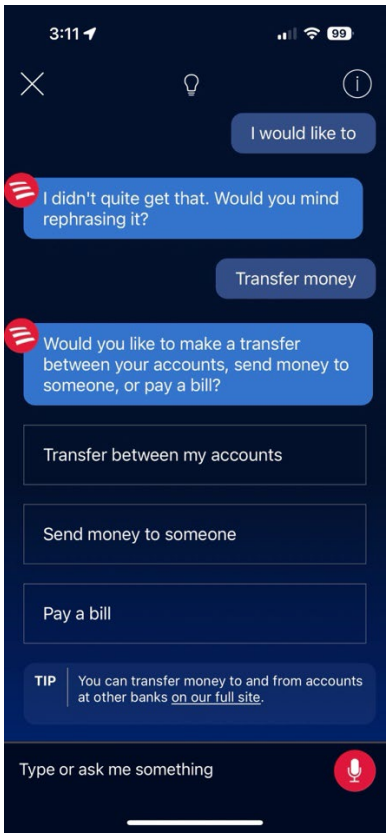
86. *Erica* transcribes natural language utterances and on information and belief, the transcriptions (whether or not displayed to the user) are received at a computer comprising the knowledge-based speech recognition engine (as set forth above). For example, the screenshot below shows that *Erica* transcribed the user's speech utterances and responded to the transcribed utterances:

[redacted]



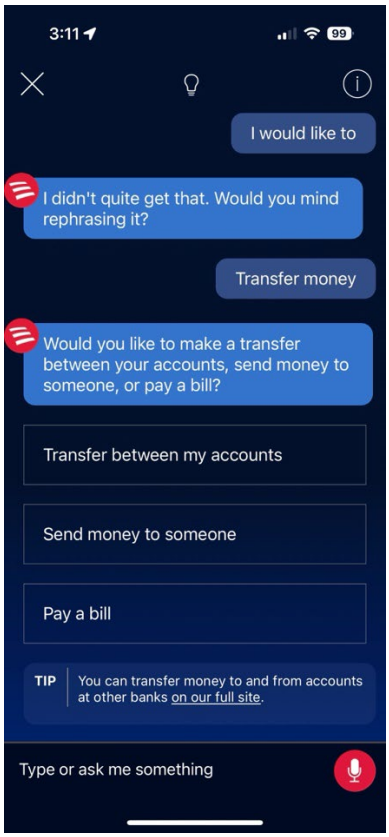
87. On information and belief, *Erica* identifies one or more contexts that completely or partially match one or more text combinations contained in the transcription, wherein identifying the matching contexts includes comparing the text combinations against the grammar expression entries in the context description grammar and against one or more expected contexts stored in a context stack. For example, on information and belief, for the interaction below, Erica has a context stack that stores one or more expected contexts associated with "Transfer between my accounts," "Send money to someone," and "Pay a bill." On information and belief, Erica has context description grammar that includes grammar expression entries (e.g., in the form of regular expression patterns) associated with contexts. In this example, on information and belief, the context relating to "Transfer between my accounts" is associated with the keyword "Transfer", and Erica identifies one or more contexts relating to "Transfer between my accounts" that completely or partially match the text combination of "Transfer money" in the transcription.

[redacted]



88. On information and belief, *Erica* scores each of the identified matching contexts. *Erica* implements processes to generate relevance scores based on the comparisons of the user-request-associated keywords (text combinations) to the entries in a context description grammar, including keyword sets associated with one or more of contexts, associated with domain agents. For example, on information and belief, in response to user input of "I would like to" and "Transfer money", Erica presents an option of "Transfer between my accounts", which is arranged above "Send money to someone" and "Pay a bill", indicating that the three options are ranked based on their scores.

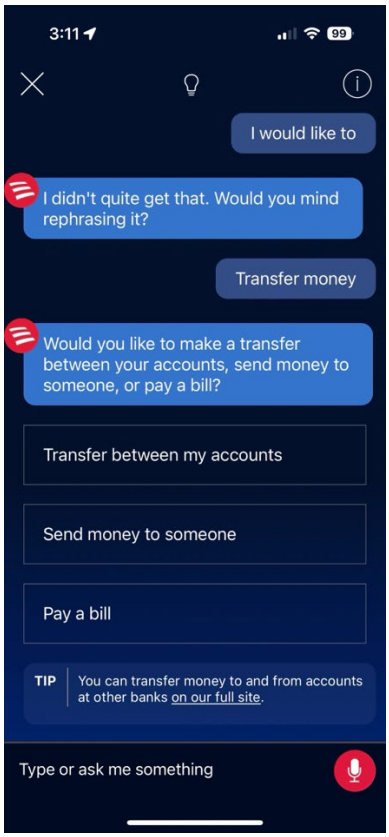
[redacted]



89. Upon information and belief, *Erica* selects the matching context having a highest score to determine a most likely context for the utterance. For example, on information and belief, Erica presents three options above, which are ranked based on their scores; "Transfer between my accounts" is ranked first because it is selected as having the highest score.

90. On information and belief, *Erica* communicates a request to a domain agent configured to process requests in the most likely context for the utterance, the request formulated using at least one grammar expression entry in the context description grammar. For example, when user selects "Transfer between my accounts," Erica communicates the user request to a domain agent that transfers money. On information and belief, the requests to the domain agents are formulated using at least one grammar expression entry in the context description grammar. On information and belief, the grammar expression entry relating to transfer money would include at least values of the account to transfer from, the account to transfer to, and the amount of transfer.

[redacted]



91. Fact and expert discovery are expected to confirm that the Accused Products infringe the ’160 Patent, for which further evidence may lie in whole or in part in source code and technical documents to which Dialect does not presently have access.

92. Further, on information and belief, Defendant has actively induced and/or contributed to infringement of at least Claim 12 of the ’160 Patent in violation of at least 35 U.S.C. § 271(b), (c), and (f).

93. Users of the Accused Products directly infringe at least Claim 12 of the ‘160 Patent when they use the Accused Products in the ordinary, customary, and intended way.

94. On information and belief, Defendant’s inducements in violation of 35 U.S.C. § 271(b) include, without limitation and with specific intent to encourage infringement, knowingly inducing consumers to use the Products within the United States in the ordinary, customary, and intended way by, directly or through intermediaries, supplying the Accused Products to consumers

within the United States and instructing and encouraging such customers to use the Accused Products in the ordinary, customary, and intended way, which Defendant knew infringes at least Claim 12 of the '160 Patent, or, alternatively, was willfully blind to the infringement.

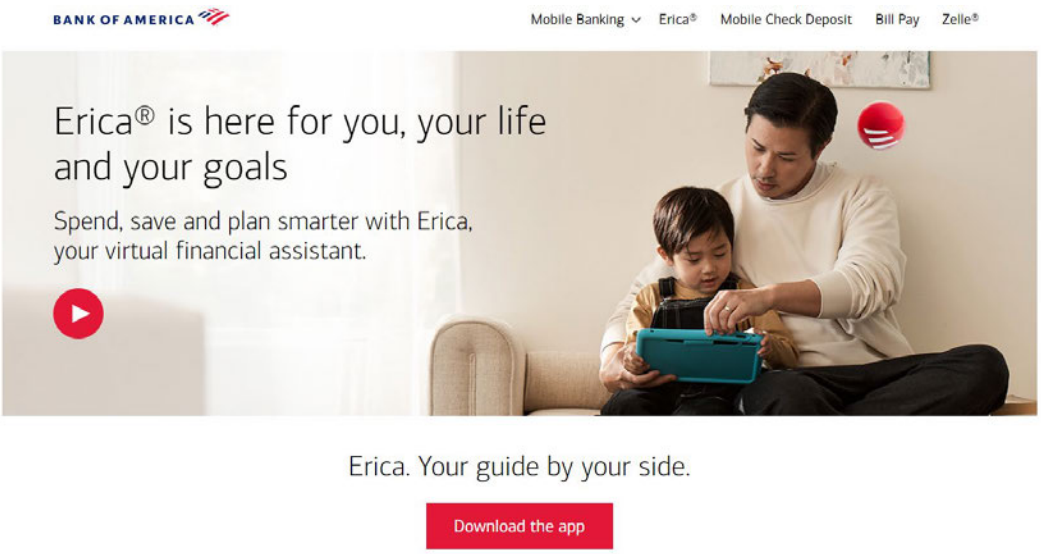
95. On information and belief, Defendant's inducements in violation of 35 U.S.C. § 271(b) further include, without limitation and with specific intent to encourage the infringement, knowingly inducing customers to commit acts of infringement with respect to the Accused Products within the United States, by, directly or through intermediaries, instructing and encouraging such customers to import, make, use, sell, offer to sell, or otherwise commit acts of infringement with respect to the Accused Products in the United States, which Defendant knew infringes at least Claim 12 of the '160 Patent, or, alternatively, was willfully blind to the infringement.

96. On information and belief, Defendant actively advertised Erica with instructions to users to encourage infringement. For example, Defendant describes specific examples of Erica usage on its website (https://promotions.bankofamerica.com/digitalbanking/mobilebanking/erica). The Erica features shown on Defendant's website closely match the claim elements the '160 Patent, which supports a reasonable inference that Defendant encourages its users to infringe the '160 Patent.

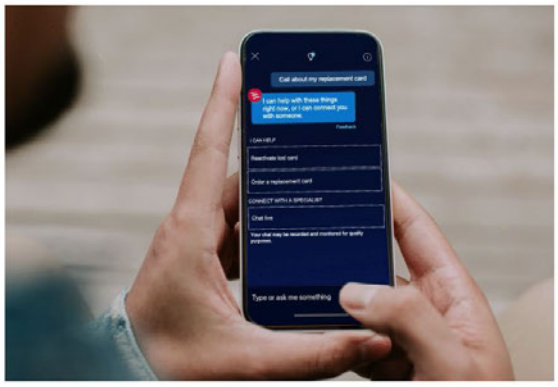
97. Specifically, Defendant's website shows that a user may interact with Erica by "type or ask me something." Erica can receive a transcription of user's natural language utterance such as "Show my duplicate charges" or "View my rewards." Erica's speech-recognition engine is "knowledge-enhanced" because "Erica is able to consider a range of data within Bank of America, like your cash flow, balances, transaction history and upcoming bills…" and "Erica learns from the conversations with you and other Bank of America customers..." The website

[redacted]

shows that Erica identifies a context relating to "rewards" by matching text combination of "View my rewards." One may reasonably infer that Erica matches the text combination including "rewards" against expected contexts and grammar expression entries (relating to rewards, past transactions, account information, recurring charges, etc.) and that Erica scores matching contexts and selects the matching context with the highest score to determine a most likely context, which relates to awards. One may reasonably infer from the examples on the website that there are multiple domain agents, with each relating to different tasks, including finding rewards, finding account information, finding past transactions, etc. One may also reasonably infer that Erica communicates the request relating to awards to a domain agent that is configured to process this type of requests, and that the request is formulated in a specific format that is associated with the domain agent.



[redacted]

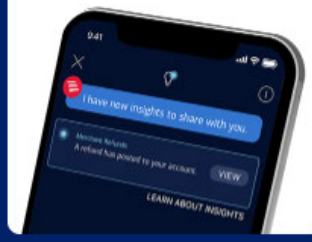


Get the answers you need

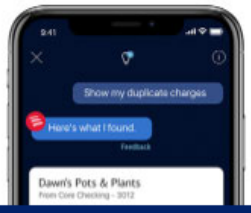
Erica includes more ways to quickly answer your questions, including a live chat with a Bank of America specialist.[2]

Stay on top of your finances with Erica, your virtual financial assistant

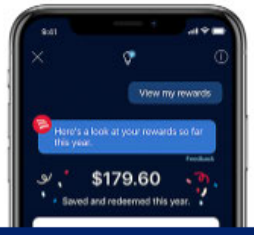
Be alerted when merchant refunds post to your account



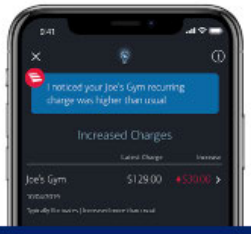
Get notified when duplicate charges occur



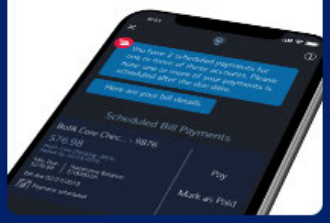
View and redeem rewards in one place



Monitor recurring charges and increases

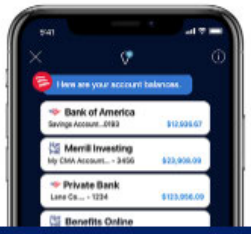


Receive bill reminders when payments are scheduled to be made

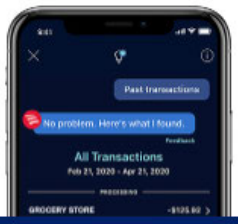


Review weekly updates on monthly spending

View balances across all your accounts



Locate past transactions across accounts



FICO® Score Insights[3] notifies you of important credit score changes

[redacted]

Get started with Erica today

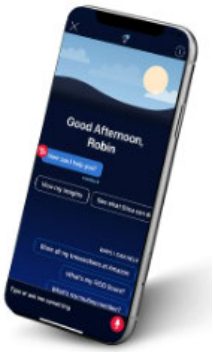
Enter your U.S. mobile number and we'll text you a link to download the Bank of America® Mobile Banking app so you can get started.

Select your device

Get the app

Message and data rates may apply.
Terms and Conditions

Scan a photo to download now



How does Erica work?

Erica leverages the latest technologies, in advanced analytics and cognitive messaging to serve as your trusted financial assistant. Erica is able to consider a range of data within Bank of America, like your cash flow, balances, transaction history and upcoming bills, to help you stay on top of your finances.

Do I need the Mobile Banking app to use Erica?

Yes. Right now, Erica is exclusively available in the Mobile Banking app. Just download the app today to get started!

Will I see the transactions that Erica completed for me?

You'll receive the same confirmations as you do today for transactions conducted in the mobile app. You can also check all transactions in the mobile app and in Online Banking.

How does Erica learn and improve (future functionality)?

Erica learns from the conversations with you and other Bank of America customers and has a dedicated team that's continually working to expand the capabilities offered.

98. On information and belief, in violation of 35 U.S.C. § 271, Defendant's contributory infringement further includes offering to sell or selling within the United States, or importing into the United States, components of the patented invention of and/or a material or apparatus for use in practicing at least Claim 12 of the '160 Patent, constituting a material part of the invention. On information and belief, Defendant knows and has known the same to be especially made or especially adapted for use in an infringement of the '160 Patent, and such components are not a staple article or commodity of commerce suitable for substantial non-

[redacted]

infringing use. For example, on information and belief, the Erica system is not a staple article and is not a commodity of commerce suitable for substantial non-infringing use, at least because the Erica system is "exclusively available in Bank of America's Mobile Banking app," and the Mobile Banking app infringes at least Claim 12 of the '160 Patent. The Erica system is especially made or especially adapted for use in an infringement of the '160 Patent, because it is designed to receive and interpret natural language utterances in a manner claimed by the '160 Patent, and it is not capable of substantial non-infringing use.

Do I need the Mobile Banking app to use Erica?

Yes. Right now, Erica is exclusively available in the Mobile Banking app. Just download the app today to get started!

99. Defendant is not licensed or otherwise authorized to practice the claims of the '160 Patent.

100. Thus, by its acts, Defendant has injured Dialect and is liable to Dialect for directly and/or indirectly infringing one or more claims of the '160 Patent, whether literally or under the doctrine of equivalents, including without limitation claim 12.

101. On information and belief, Bank of America deployed Erica in as early as June 2018, and became aware of the infringement of the Asserted Patents in as early as June 2018. At a minimum, Defendant has knowledge of the '160 Patent and its infringement at least as of the filing of the Original Complaint. Defendant has had, and continues to have, the specific intent to infringe, through its deliberate and intentional infringement or, alternatively, through its willfully blind disregard of the '160 Patent by knowing there was a high probability of infringement but taking deliberate actions to avoid confirming that infringement. The filing of this action has also made Defendant aware of the unjustifiably high risk that its actions constituted and continue to constitute infringement of the '160 Patent. On information and belief, discovery will reveal

additional facts and circumstances from which Defendant's knowledge and intent to infringe (or willful indifference), both before and after the filing of this action, may be inferred.

102. Accordingly, Defendant's infringement of the '160 Patent has been and continues to be deliberate, intentional, and willful, and this is therefore an exceptional case warranting an award of enhanced damages and attorneys' fees and costs pursuant to 35 U.S.C. §§ 284 and 285.

103. As a result of Defendant's infringement of the '160 Patent, Dialect has suffered monetary damages, and seeks recovery, in an amount to be proven at trial, adequate to compensate for Defendant's infringement, but in no event less than a reasonable royalty with interest and costs.

104. On information and belief, Defendant will continue to infringe the '160 Patent unless enjoined by this Court. Defendant's infringement of Dialect's rights under the '160 Patent will continue to damage Dialect, causing irreparable harm for which there is no adequate remedy at law, unless enjoined by this Court.

SECOND COUNT
(Infringement of U.S Patent No. 8,195,468)

105. Dialect incorporates by reference the allegations set forth in Paragraphs 1-104 of the Complaint as though fully set forth herein.

106. The claims of the '468 Patent are valid and enforceable.

107. The claims of the '468 Patent are directed to patentable subject matter. The '468 Patent is directed to innovations that implement and improve a voice recognition system and natural language processing. The inventive claimed steps of the '468 Patent improve on the processing of a natural language utterance by a user. The claimed inventions provide specific concrete solutions to the problem of speech recognition in existing systems.

108. On information and belief, in violation of 35 U.S.C. § 271(a), Defendant has directly infringed and continues to directly infringe one or more claims of the '468 Patent,

including at least Claim 19 of the ’468 Patent, in the state of Texas, in this judicial district, and elsewhere in the United States by, among other things, making, using, selling, offering for sale, and/or importing into the United States products and services that embody one or more of the inventions claimed in the ’468 Patent, including the Accused Products.

109. Each of the Accused Products contains elements that are identical or equivalent to each claimed element of the patented invention pointed out by at least Claim 19 of the ’468 Patent:

> 19. A method for processing multi-modal natural language inputs, comprising:
>
> receiving a multi-modal natural language input at a conversational voice user interface, the multi-modal input including a natural language utterance and a non-speech input provided by a user, wherein a transcription module coupled to the conversational voice user interface transcribes the non-speech input to create a non-speech-based transcription;
>
> identifying the user that provided the multi-modal input;
>
> creating a speech-based transcription of the natural language utterance using a speech recognition engine and a semantic knowledge-based model, wherein the semantic knowledge-based model includes a personalized cognitive model derived from one or more prior interactions between the identified user and the conversational voice user interface, a general cognitive model derived from one or more prior interactions between a plurality of users and the conversational voice user interface, and an environmental model derived from an environment of the identified user and the conversational voice user interface;
>
> merging the speech-based transcription and the non-speech-based transcription to create a merged transcription;
>
> identifying one or more entries in a context stack matching information contained in the merged transcription;
>
> determining a most likely context for the multi-modal input based on the identified entries;
>
> identifying a domain agent associated with the most likely context for the multi-modal input;
>
> communicating a request to the identified domain agent; and
>
> generating a response to the user from content provided by the identified domain agent as a result of processing the request.

’468 Patent, Cl. 19.

[redacted]

110. *Erica* implements a method of processing multi-modal natural language inputs. For example, Bank of America touts the ability of *Erica* to answer questions "through spoken conversation and/or visual text" and informs customers that they "can speak or type to *Erica*" and can interact with *Erica* by "Speaking to *Erica*" or by "Typing [their] requests."

How Does Erica Help Clients Manage Their Finances?

Erica helps ensure clients know and understand all that our Mobile Banking app can do for them. Erica is new to the world and she is still learning, but she's pretty smart and eager to help. She can make it easier for clients to stay on top of their finances in three different ways:

Erica Can:		Examples of What Clients Can Type/Say:	Outcome:
1	**Answer questions through spoken conversation and/or visual text.**	*"What is my checking account balance?"* *"When is my mortgage due?"* *"What is my credit card limit?"*	*Erica provides relevant account information on screen (and aloud, if spoken to).*

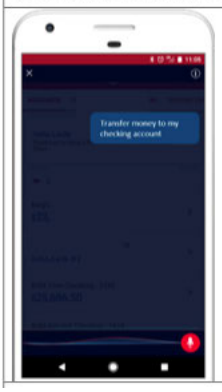
Erica Financial Center Job Aid, Updated 03.26.18, at p. 1. https://message.bankofamerica.com/onlinebanking_demo/mobileApp_Simulator/erica_qrg/Erica_Financial_Center_Job_Aid_PDF.pdf

Demonstrating Erica: Three Critical Elements

BOTTOM LINE: Encourage your client to treat Erica like a person and *just have a conversation* with her.

1. Help your client understand that you can speak or type to Erica – and she'll respond in kind.

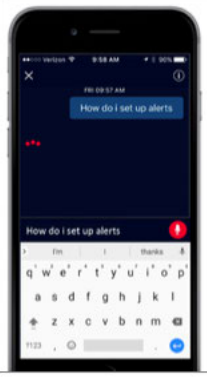
"Mr. Client, the best way to use Erica is to just interact with her like you would a person…"



Speaking to Erica

"If you tap the microphone icon and speak to Erica, she will respond both on-screen and aloud.[2]

When appropriate, she'll listen for a response for 15 seconds.[3]"



Typing your requests

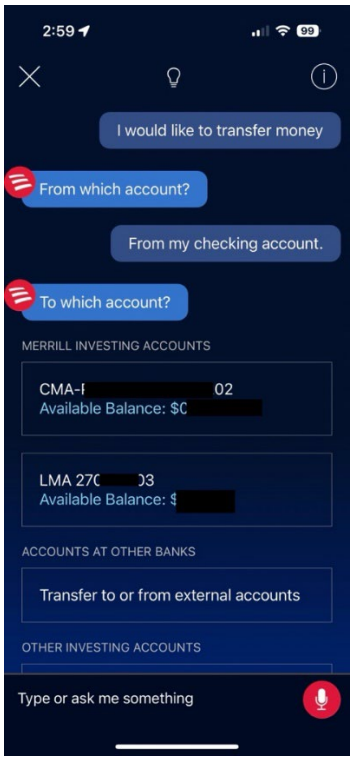
"If you type your request, Erica will respond only on-screen."

Id. at p. 4.

111. *Erica* also allows users to communicate by selecting (e.g., by tapping on the touchscreen) icons (including those containing natural language statements) displayed on the screen. Each of these input methods (speech, typed text, and text/icon selection) can be used either alone or in combination during a single dialogue with *Erica*. For example, *Erica* can receive a voice speech natural language input ("I would like to transfer money"), then a non-speech,

[redacted]

keyboard-entered natural language input ("From my checking account"), and then a non-speech, icon-selection natural language input (by tapping one of the provided selection boxes containing the natural language input text).



112. *Erica* receives the multi-modal input including a natural language utterance and a non-speech input provider by a user, as described above. *Erica* is described by Bank of America as "conversational" in press releases and employee training documents:

> • Expanded Erica's conversational knowledge, including the ability to engage clients with salutations and well wishes, such as "happy birthday".

https://www.businesswire.com/news/home/20180518005038/en/Bank-of-Ame...elivers-First-Widely-Available-AI–Driven-Virtual-Financial-Assistant

See also:

[redacted]

May 28, 2019 at 1:00 PM Eastern

Bank of America today announced that its virtual assistant, Erica, is already helping more than 7 million clients stay on top of their finances through the company's award-winning mobile app. Since its nationwide rollout in June 2018, Erica has:

- Completed over 50 million client requests – from everyday banking activities to more complex tasks – through the latest in artificial intelligence (AI (A.I.)), predictive analytics and natural language processing.
- Been engaged by an average of more than 500,000 new users per month.
- Doubled the various ways in which clients can ask financial questions – from 200,000 at launch to more than 400,000 today – through the ongoing expansion of conversational knowledge.
- Assisted clients across generations, including 15 percent from Gen Z, 49 percent millennials, 20 percent Gen X and 16 percent baby boomers/seniors.

https://newsroom.bankofamerica.com/press-releases/consumer-banking/bank-americas-ericar-completes-more-50-million-client-requests

113. *Erica* provides a voice user interface at which receives multi-modal natural language input:

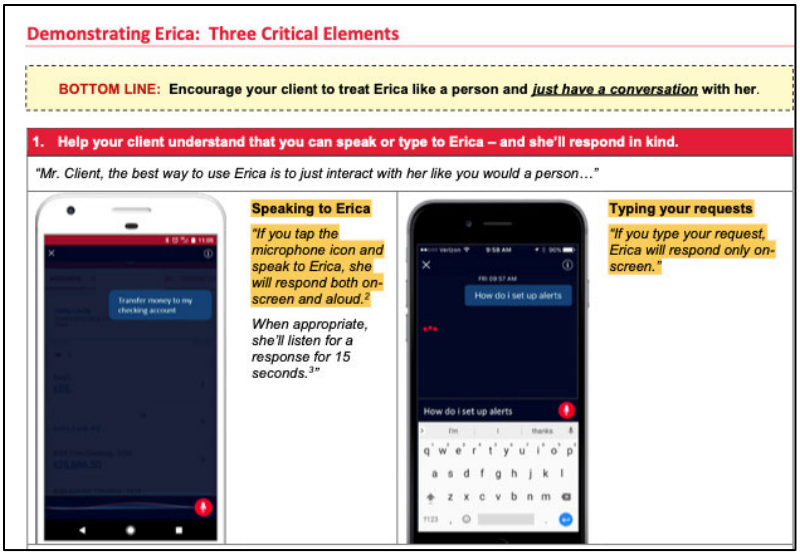
How Does Erica Help Clients Manage Their Finances?

Erica helps ensure clients know and understand all that our Mobile Banking app can do for them. Erica is new to the world and she is still learning, but she's pretty smart and eager to help. She can make it easier for clients to stay on top of their finances in three different ways:

Erica Can:		Examples of What Clients Can Type/Say:	Outcome:
1	**Answer questions through spoken conversation and/or visual text.**	*"What is my checking account balance?"* *"When is my mortgage due?"* *"What is my credit card limit?"*	*Erica provides relevant account information on screen (and aloud, if spoken to).*

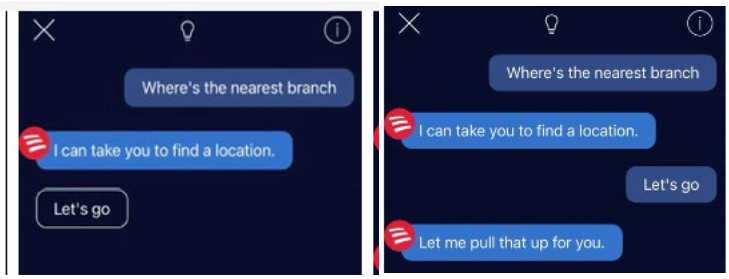
Erica Financial Center Job Aid, Updated 03.26.18, at p. 1. https://message.bankofamerica.com/onlinebanking_demo/mobileApp_Simulator/erica_qrg/Erica_Financial_Center_Job_Aid_PDF.pdf

[redacted]



Id. at p. 4.

114. On information and belief, *Erica* uses a transcription module coupled to the conversational voice user interface that transcribes the non-speech input to create a non-speech-based transcription. For example, in the dialogue below, *Erica* transcribed a non-speech input (tapping on box provided by *Erica* with the words "Let's go") into a non-speech-based transcription (displayed/represented to the user in the form of "Let's go" in the user's dialogue stream):



115. On information and belief, *Erica* and Bank of America's website and app identify the user that provided the multi-modal input, including by identifying the user using the user's account information, account username, and account password.

[redacted]

116. On information and belief, *Erica* creates a speech-based transcription of the natural language utterance using a speech recognition engine and a semantic knowledge-based model.

117. On information and belief, the semantic knowledge-based model implemented by *Erica* includes a personal cognitive model derived from prior interactions between *Erica* and the user and a general cognitive model derived from prior interactions between *Erica* and a plurality of users. For example, Bank of America's press releases and websites tout *Erica's* combination of artificial intelligence, predictive analytics, and natural language, including that "*Erica* is designed to learn from clients' behaviors over time", and that information is stored and aggregated from "clients" (e.g., "*Erica* learns from the conversations with you and other Bank of America customers"):

> Erica combines the latest technology in artificial intelligence, predictive analytics and natural language to be a virtual financial assistant to clients. Currently, clients can ask Erica to:

> Erica is designed to learn from clients' behaviors over time, helping them accomplish simple to complex tasks within the mobile banking app with easy-to-follow prompts. Clients can interact with Erica any way they choose, including texting, talking or tapping options on their screen.

https://www.businesswire.com/news/home/20180518005038/en/Bank-of-Ame...elivers-First-Widely-Available-AI–Driven-Virtual-Financial-Assistant

> How does Erica learn and improve (future functionality)?
>
> Erica learns from the conversations with you and other Bank of America customers and has a dedicated team that's continually working to expand the capabilities offered.

[redacted]

> Are my conversations with Erica recorded?
>
> Yes, we keep a record of your conversations with Erica for quality assurance, to maintain an accurate account of your requests, identify opportunities to make Erica's responses more helpful and ensure Erica's performance is optimal. When you speak with Erica by voice, the discussions are recorded and saved for 90 days so they can be analyzed to help refine listening skills.

https://promotions.bankofamerica.com/digitalbanking/mobilebanking/erica

See also:

> When it comes to data collection, conversations with Erica are recorded for reference and quality assurance purposes to help enhance the usefulness of Erica's responses. According to BoA, voice interactions with Erica are saved for 90 days to help refine the AI's listening skills.

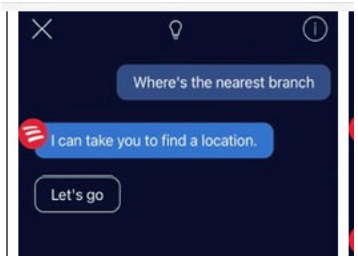
https://cointelegraph.com/learn/bank-of-america-erica-ai-powered-chatbot

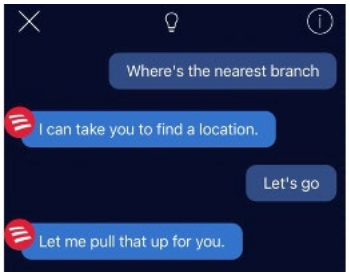
118. On information and belief, the semantic knowledge-based model implemented by *Erica* includes a general cognitive model derived from one or more prior interactions between a plurality of users and the conversational voice user interface. As described above, *Erica* uses prior interactions between Erica and a plurality of users to process user input. Further, on information and belief, Erica uses machine learning to create transcriptions of user input, and the machine learning algorithm is trained on data relating to interactions between users and Erica-enabled devices.

119. On information and belief, the semantic knowledge-based model implemented by *Erica* includes an environmental model derived from an environment of the identified user and the conversational voice user interface. For example, on information and belief, when a user asks *Erica* "Where's the nearest branch", the semantic knowledge-based model can access information

[redacted]

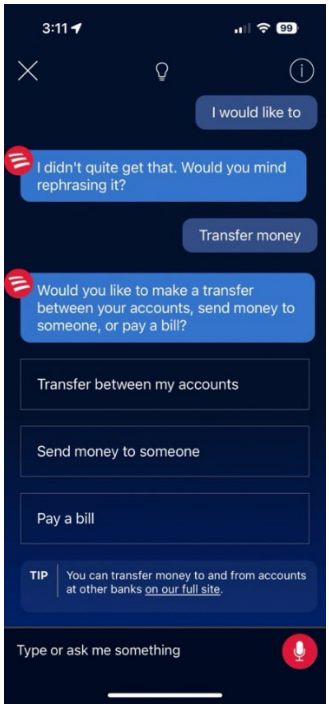
concerning the environment of the user, for example the user's current location, and use such information to process the request:



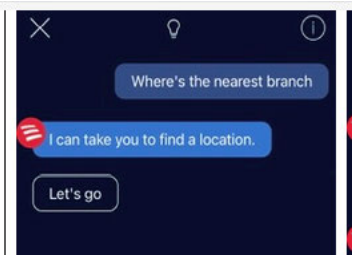


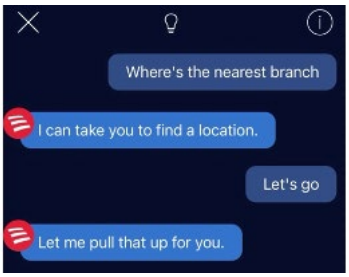
120. On information and belief, *Erica* merges the speech-based transcription and the non-speech-based transcription to create a merged transcription. For example, in the dialogue below, *Erica* transcribed a non-speech communication (the words "I would like to" which were input via the keyboard interface) and the speech communications (the words "Transfer money" which were input as speech via the microphone interface), creating corresponding textual messages:

[redacted]



121. As another example, in the dialogue below, *Erica* transcribed a non-speech communication (tapping on the button "Let's go) and the speech communications ("Where's the nearest branch"), and merged the transcriptions:

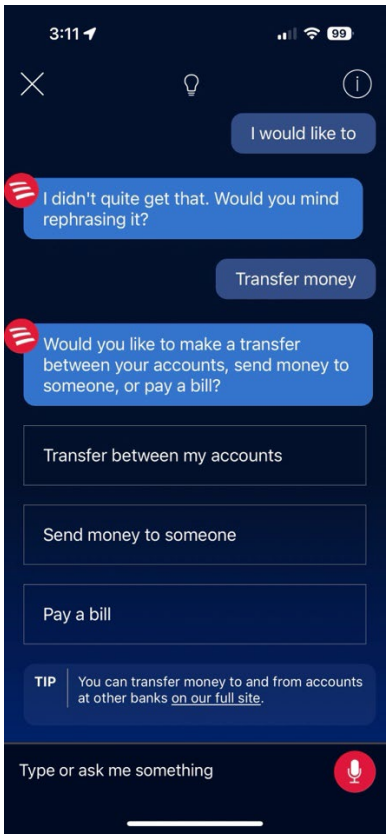




[redacted]

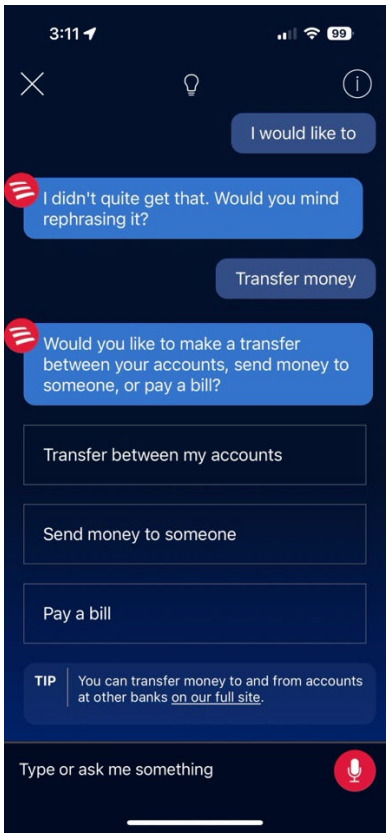
122. Based on *Erica's* responses and actions in the interaction, one can reasonably infer that the transcriptions from the keyboard input and voice input were merged through Bank of America's software.

123. On information and belief, *Erica* identifies one or more entries in a context stack, or the equivalent thereof, that match information contained in the merged transcription. For example, in the interaction below, Erica identifies one or more entries in a context stack relating to "Transfer between my accounts" matching information contained in the merged transcription of "I would like to Transfer money."



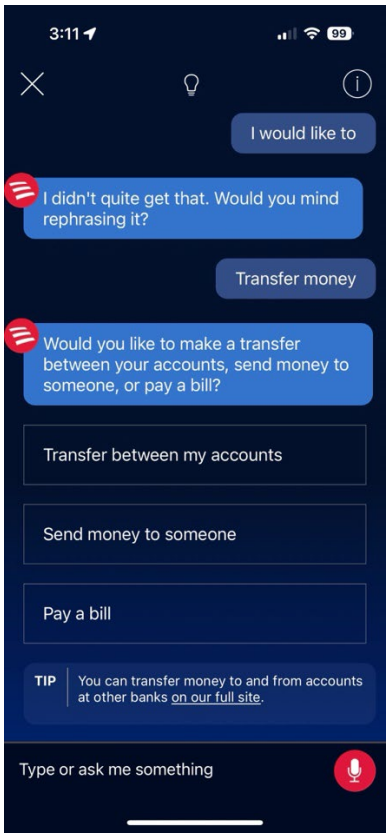
124. On information and belief, *Erica* identifies a domain agent associated with the most likely context for the multi-modal input. For example, on information and belief, in the interaction below, Erica identifies a domain agent associated with the most likely context for the multi-modal input, which relates to "Transfer between my accounts."

[redacted]



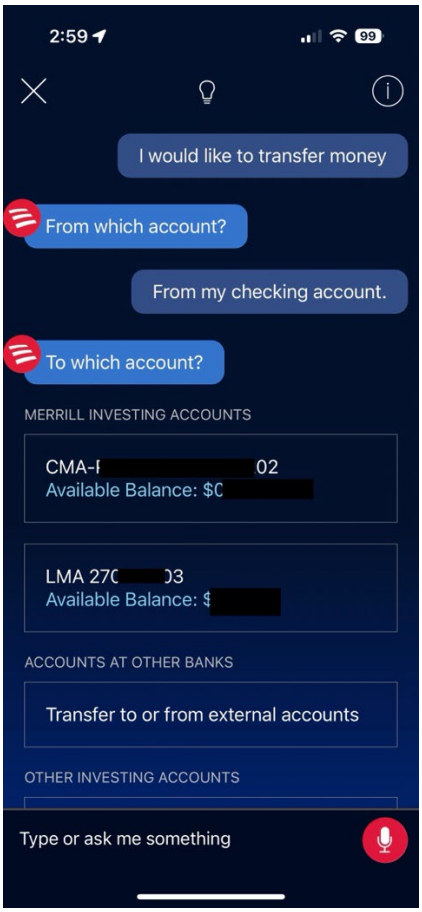
125. *Erica* communicates a request to a domain agent. For example, on information and belief, in the interaction below, Erica communicates the user request to a domain agent that is associated with "Transfer between my accounts."

[redacted]



126. Erica generates a response to the user from content provided by the identified domain agent as a result of processing the request. On information and belief, Erica generates a response to the user from the content provided by the domain agent associated with money transfer, and such content may include, for example, account information of the user.

[redacted]



127. Fact and expert discovery are expected to confirm that the Accused Products infringe the ’468 Patent, for which further evidence may lie in whole or in part in source code and technical documents to which Dialect does not presently have access.

128. Further, on information and belief, Defendant has actively induced and/or contributed to infringement of at least Claim 19 of the ’468 Patent in violation of at least 35 U.S.C. § 271(b), (c), and (f).

129. Users of the Accused Products directly infringe at least Claim 19 of the ’468 Patent when they use the Accused Products in the ordinary, customary, and intended way.

130. On information and belief, Defendant’s inducements in violation of 35 U.S.C. § 271(b) include, without limitation and with specific intent to encourage infringement, knowingly inducing consumers to use the ’468 Accused Products within the United States in the ordinary,

[redacted]

customary, and intended way by, directly or through intermediaries, supplying the Accused Products to consumers within the United States and instructing and encouraging such customers to use the Accused Products in the ordinary, customary, and intended way, which Defendant knew infringes at least Claim 19 of the ’468 Patent, or, alternatively, was willfully blind to the infringement.

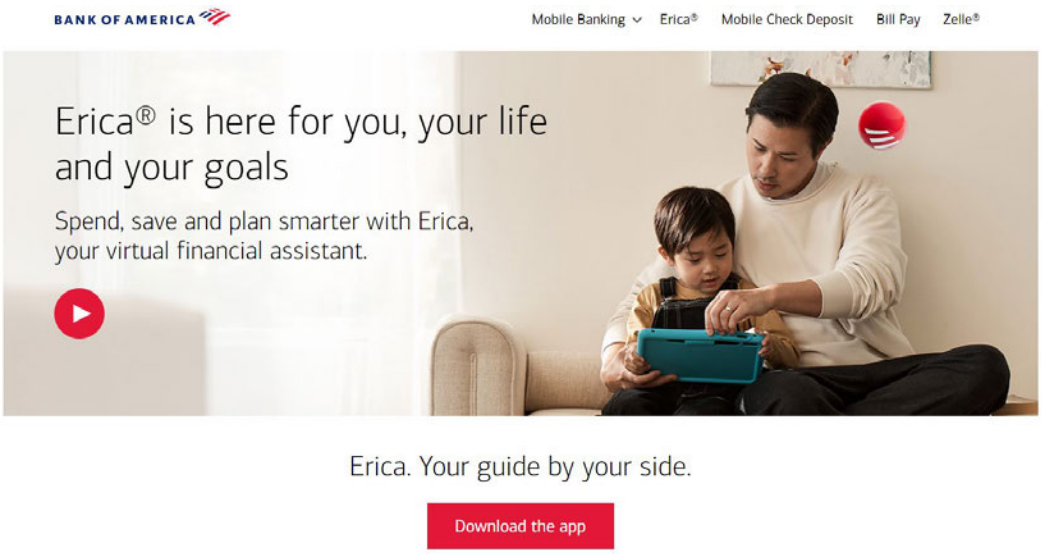
131. On information and belief, Defendant’s inducements in violation of 35 U.S.C. § 271(b) further include, without limitation and with specific intent to encourage the infringement, knowingly inducing customers to commit acts of infringement with respect to the Accused Products within the United States, by, directly or through intermediaries, instructing and encouraging such customers to import, make, use, sell, offer to sell, or otherwise commit acts of infringement with respect to the Accused Products in the United States, which Defendant knew infringes at least Claim 19 of the ’468 Patent, or, alternatively, was willfully blind to the infringement.

132. On information and belief, Defendant actively advertised Erica with instructions to users to encourage infringement. For example, Defendant describes specific examples of Erica usage on its website. The Erica features shown on Defendant’s website closely match the claim elements of the ’468 Patent, which supports a reasonable inference that Defendant encourages its users to infringe the ’468 Patent.

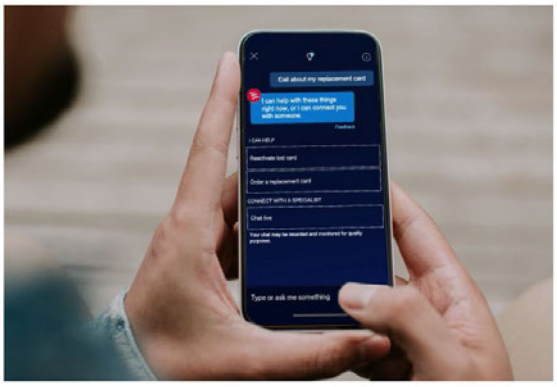
133. Specifically, the website shows that Erica processes multi-modal input because the website shows Erica presenting the text prompt of “Type or asking me something.” Erica identifies the user through username, password, and account-specific information. Erica uses a semantic knowledge-based model because “Erica is able to consider a range of data within Bank of America, like your cash flow, balances, transaction history and upcoming bills…” and “Erica learns from

[redacted]

the conversations with you and other Bank of America customers..." Erica merges the transcriptions of speech-based input and non-speech-based input, because it is able to utilize information from both. The website shows that Erica identifies a context relating to "rewards" by matching the transcription of "View my rewards." One may reasonably infer that Erica matches the transcription including "rewards" against multiple context entries (relating to account information, rewards, past transactions, etc.) and that Erica determines a most likely context to be related to awards. One may reasonably infer from the examples on the website that there are multiple domain agents, with each relating to different tasks, including finding rewards, finding account information, finding past transactions, etc. One may also reasonably infer that Erica communicates the request relating to awards to a domain agent that is configured to process this type of requests, and that the domain agent provides content on the user's awards.



[redacted]

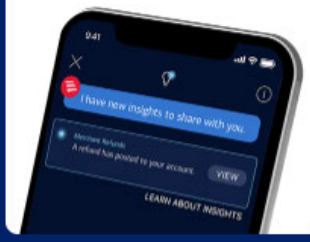


Get the answers you need

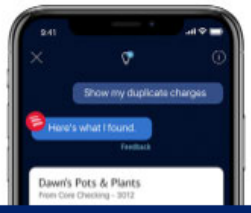
Erica includes more ways to quickly answer your questions, including a live chat with a Bank of America specialist.[2]

Stay on top of your finances with Erica, your virtual financial assistant

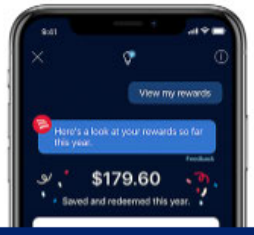
Be alerted when merchant refunds post to your account



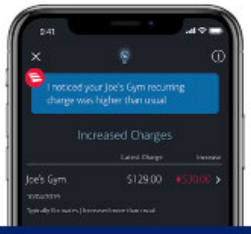
Get notified when duplicate charges occur



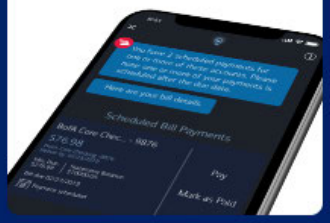
View and redeem rewards in one place



Monitor recurring charges and increases

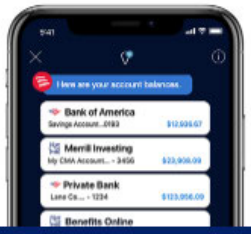


Receive bill reminders when payments are scheduled to be made

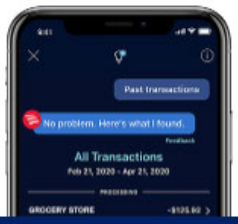


Review weekly updates on monthly spending

View balances across all your accounts

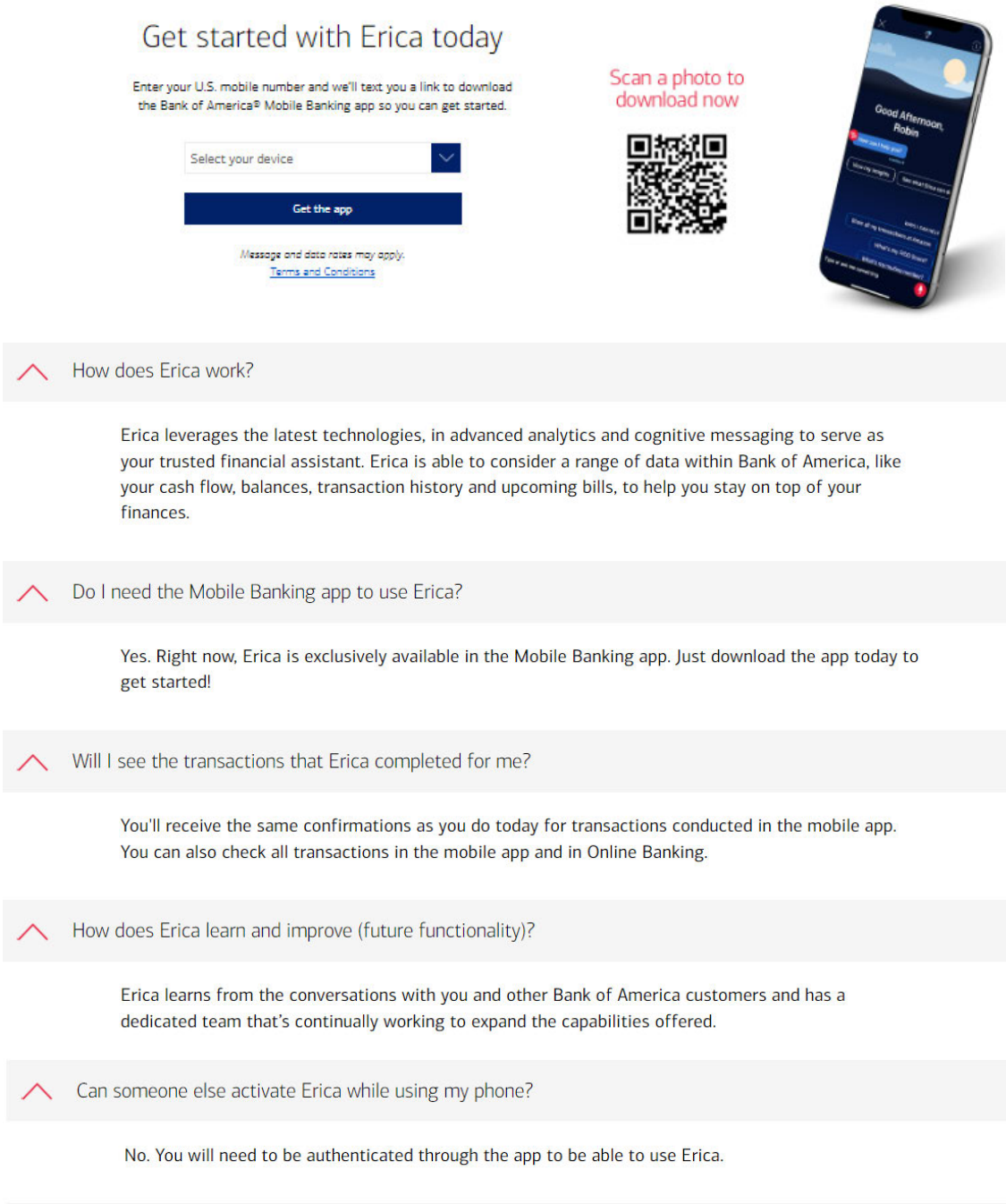


Locate past transactions across accounts



FICO® Score Insights[3] notifies you of important credit score changes

[redacted]



134. On information and belief, in violation of 35 U.S.C. § 271(c), Defendant's contributory infringement further includes making, offering to sell or selling within the United States, or importing into the United States, components of the patented invention of and/or a material or apparatus for use in practicing at least Claim 19 of the '468 Patent, constituting a

[redacted]

material part of the invention. On information and belief, Defendant knows and has known the same to be especially made or especially adapted for use in an infringement of the ’468 Patent, and such components are not a staple article or commodity of commerce suitable for substantial non-infringing use. For example, on information and belief, the Erica system is not a staple article and is not a commodity of commerce suitable for substantial non-infringing use, at least because the Erica system is “exclusively available in Bank of America’s Mobile Banking app,” and the Mobile Banking app infringes at least Claim 19 of the ’468 Patent. The Erica system is especially made or especially adapted for use in an infringement of the ’468 Patent, because it is designed to receive and interpret natural language utterances in a manner claimed by the ‘468 Patent, and it is not capable of substantial non-infringing use.

Do I need the Mobile Banking app to use Erica?

Yes. Right now, Erica is exclusively available in the Mobile Banking app. Just download the app today to get started!

135. Defendant is not licensed or otherwise authorized to practice the claims of the ’468 Patent.

136. Thus, by its acts, Defendant has injured Dialect and is liable to Dialect for directly and/or indirectly infringing one or more claims of the ’468 Patent, whether literally or under the doctrine of equivalents, including without limitation Claim 19.

137. On information and belief, Bank of America deployed Erica in as early as June 2018, and became aware of the infringement of the Asserted Patents in as early as June 2018. At a minimum, Defendant has knowledge of the ’468 Patent and its infringement at least as of the filing of the Original Complaint. Defendant has had, and continues to have, the specific intent to infringe, through its deliberate and intentional infringement or, alternatively, through its willfully blind disregard of the ’468 Patent by knowing there was a high probability of infringement but

[redacted]

taking deliberate actions to avoid confirming that infringement. The filing of this action has also made Defendant aware of the unjustifiably high risk that its actions constituted and continue to constitute infringement of the ’468 Patent. On information and belief, discovery will reveal additional facts and circumstances from which Defendant’s knowledge and intent to infringe (or willful indifference), both before and after the filing of this action, may be inferred.

138. Accordingly, Defendant’s infringement of the ’468 Patent has been and continues to be deliberate, intentional, and willful, and this is therefore an exceptional case warranting an award of enhanced damages and attorneys’ fees and costs pursuant to 35 U.S.C. §§ 284 and 285.

139. As a result of Defendant’s infringement of the ’468 Patent, Dialect has suffered monetary damages, and seeks recovery, in an amount to be proven at trial, adequate to compensate for Defendant’s infringement, but in no event less than a reasonable royalty with interest and costs.

140. On information and belief, Defendant will continue to infringe the ’468 Patent unless enjoined by this Court. Defendant’s infringement of Dialect’s rights under the ’468 Patent will continue to damage Dialect, causing irreparable harm for which there is no adequate remedy at law, unless enjoined by this Court.

THIRD COUNT
(Infringement of U.S Patent No. 8,447,607)

141. Dialect incorporates by reference the allegations set forth in Paragraphs 1-140 of the Complaint as though fully set forth herein.

142. The claims of the ’607 Patent are valid and enforceable.

143. The claims of the ’607 Patent are directed to patentable subject matter. The ’607 Patent is directed to innovations that implement and improve a voice recognition system and natural language processing. The inventive claimed steps of the ’607 Patent improve on the

processing of a natural language utterance by a user. The claimed inventions provide specific concrete solutions to the problem of speech recognition in existing systems.

144. On information and belief, in violation of 35 U.S.C. § 271(a), Defendant has directly infringed and continues to directly infringe one or more claims of the ’607 Patent, including at least Claim 12 of the ’607 Patent, in the state of Texas, in this judicial district, and elsewhere in the United States by, among other things, making, using, selling, offering for sale, and/or importing into the United States products and services that embody one or more of the inventions claimed in the ’607 Patent, including the Accused Products.

145. Each of the Accused Products contains elements that are identical or equivalent to each claimed element of the patented invention pointed out by at least Claim 12 of the ’607 Patent, which recites:

12. A method for processing natural language inputs, comprising:

> receiving, by one or more processors, a multi-modal natural language input from a user, the multi-modal natural language input including a natural language utterance and a non-speech input;
>
> generating, by the one or more processors, a non-speech transcription from the non-speech input;
>
> identifying, by the one or more processors, the user who provided the multi-modal natural language input;
>
> generating, by the one or more processors, a speech-based transcription based on a cognitive model associated with the user, wherein the cognitive model includes information on one or more prior interactions between the user and the device;
>
> generating, by the one or more processors, a merged transcription from the speech-based transcription and the non-speech transcription;
>
> identifying, by the one or more processors, an entry in a context stack, from among a plurality of entries that are in the context stack and that are each indicative of context, wherein the identified entry matches information in the merged transcription;

[redacted]

identifying, by the one or more processors, a domain agent associated with the entry in the context stack;

determining, by the one or more processors, a request based on the merged transcription; and

communicating, by the one or more processors, the request to the domain agent, wherein the domain agent is configured to generate a response to the user.

'607 Patent at Claim 12.

146. *Erica* implements a method of processing natural language inputs. For example, Bank of America touts the ability of *Erica* to answer questions "through spoken conversation and/or visual text" and informs customers that they "can speak or type to *Erica*" and can interact with *Erica* by "Speaking to *Erica*" or by "Typing [their] requests":

How Does Erica Help Clients Manage Their Finances?

Erica helps ensure clients know and understand all that our Mobile Banking app can do for them. Erica is new to the world and she is still learning, but she's pretty smart and eager to help. She can make it easier for clients to stay on top of their finances in three different ways:

	Erica Can:	Examples of What Clients Can Type/Say:	Outcome:
1	**Answer questions through spoken conversation and/or visual text.**	*"What is my checking account balance?"* *"When is my mortgage due?"* *"What is my credit card limit?"*	*Erica provides relevant account information on screen (and aloud, if spoken to).*

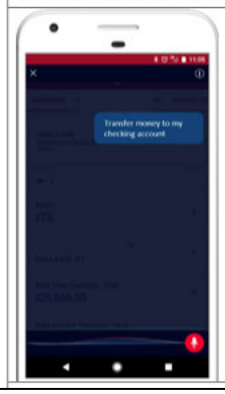
Erica Financial Center Job Aid, Updated 03.26.18, at p. 1. https://message.bankofamerica.com/onlinebanking_demo/mobileApp_Simulator/erica_qrg/Erica_Financial_Center_Job_Aid_PDF.pdf

Demonstrating Erica: Three Critical Elements

BOTTOM LINE: Encourage your client to treat Erica like a person and *just have a conversation* with her.

1. Help your client understand that you can speak or type to Erica – and she'll respond in kind.

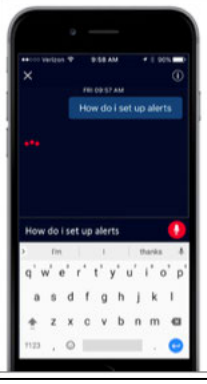
"Mr. Client, the best way to use Erica is to just interact with her like you would a person…"



Speaking to Erica

"If you tap the microphone icon and speak to Erica, she will respond both on-screen and aloud.[2]

When appropriate, she'll listen for a response for 15 seconds.[3]"



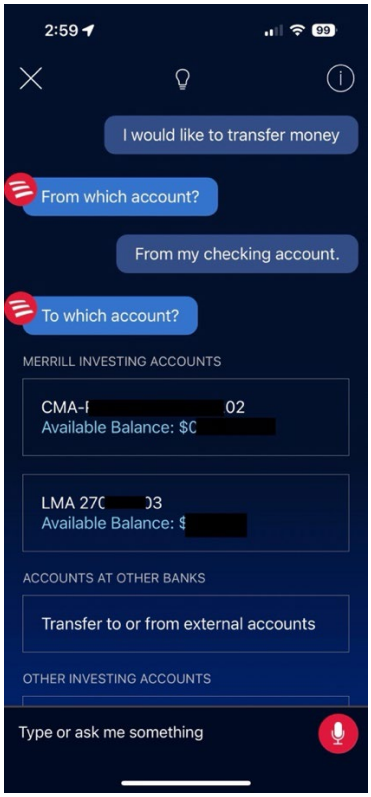
Typing your requests

"If you type your request, Erica will respond only on-screen."

[redacted]

Id. at p. 4.

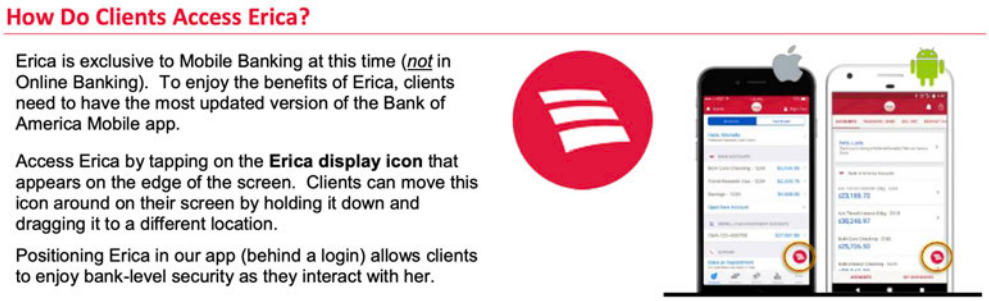
147. *Erica* receives multi-modal natural language input from a user, including natural language utterances and non-speech inputs. For example, *Erica* enables users to communicate by typing text and/or selecting (e.g., by tapping on the touchscreen) icons and text boxes containing natural language statements displayed on the screen. Each of these input methods (speech, typed text, and text/icon selection) can be used either alone or in combination during a single dialogue with *Erica*. For example, *Erica* can receive a voice speech natural language input ("I would like to transfer money"), then a non-speech, keyboard-entered natural language input ("From my checking account"), and then a non-speech, icon-selection natural language input (by tapping one of the provided selection boxes containing the natural language input text):



148. These inputs are received through the *Erica* interface on Bank of America's Mobile Banking App available on smartphone and tablet devices. On information and belief, the inputs

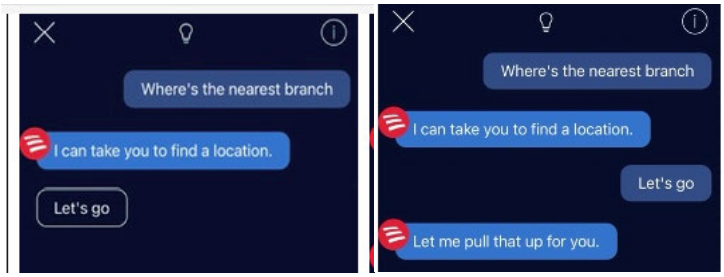
[redacted]

are received by one or more processors, including the touch interface and/or applications processor(s) on the user's smartphone and/or by processors running on remote servers to which the Bank of America Mobile Banking Application sends data inputs and information to Bank of America for processing. *See, e.g.*:



Erica Financial Center Job Aid, Updated 03.26.18, at p. 2. https://message.bankofamerica.com/onlinebanking_demo/mobileApp_Simulator/erica_qrg/Erica_Financial_Center_Job_Aid_PDF.pdf

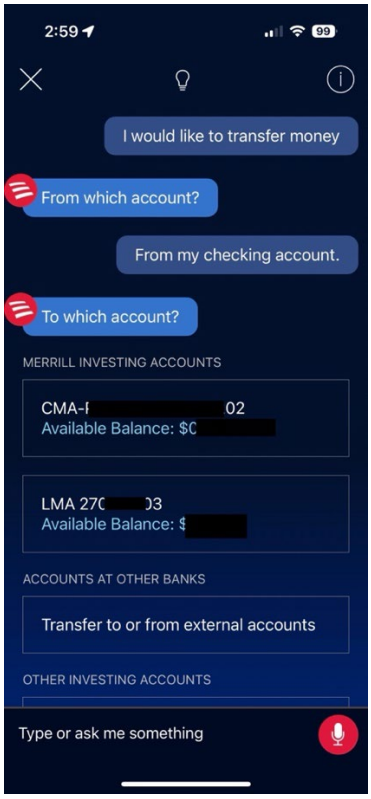
149. On information and belief, the *Erica* system generates a non-speech transcription from the non-speech input and identifies, by the one or more processors (see above) the user who provided the multi-modal natural language input. For example, in the dialogue below, *Erica* transcribed a non-speech input (tapping on box provided by *Erica* with the words "Let's go") into a non-speech based transcription (displayed/represented to the user in the form of "Let's go" in the user's dialogue stream):



150. On information and belief, one or more processors executing *Erica* operations also generate a non-speech transcription from non-speech input even when such transcriptions are not

[redacted]

directly presented to the user, e.g., when an icon or text box is selected that results in an action by *Erica* (e.g., selection of one of multiple accounts presented in response to a dialogue concerning transferring of money, as shown below). On information and belief, selection of one of the presented accounts results in generation and processing of a non-speech (text-based) transcription upon which the *Erica* server processors act in response to such selection, based on the context that is determined from the prior utterances in the dialogue (e.g., "I want to transfer money.")



151. On information and belief, *Erica* identifies the user that provided the multi-modal input. For example, to use *Erica*, a user must be logged into their banking accounts, through which *Erica* can and does access profile and account information specific to that user.

152. On information and belief, one or more of the processors executing *Erica* operations generate a speech-based transcription based on a cognitive model associated with the user, wherein the cognitive model includes information on one or more prior interactions between

[redacted]

the user and the device. For example, Bank of America's press releases and websites tout *Erica's* combination of artificial intelligence, predictive analytics, and natural language, including that "*Erica* is designed to learn from clients' behaviors over time", and that information is stored and aggregated from "clients" (e.g., "*Erica* learns from the conversations with you and other Bank of America customers"):

> Erica combines the latest technology in artificial intelligence, predictive analytics and natural language to be a virtual financial assistant to clients. Currently, clients can ask Erica to:

> Erica is designed to learn from clients' behaviors over time, helping them accomplish simple to complex tasks within the mobile banking app with easy-to-follow prompts. Clients can interact with Erica any way they choose, including texting, talking or tapping options on their screen.

https://www.businesswire.com/news/home/20180518005038/en/Bank-of-Ame...elivers-First-Widely-Available-AI–Driven-Virtual-Financial-Assistant

> How does Erica learn and improve (future functionality)?
>
> Erica learns from the conversations with you and other Bank of America customers and has a dedicated team that's continually working to expand the capabilities offered.

> Are my conversations with Erica recorded?
>
> Yes, we keep a record of your conversations with Erica for quality assurance, to maintain an accurate account of your requests, identify opportunities to make Erica's responses more helpful and ensure Erica's performance is optimal. When you speak with Erica by voice, the discussions are recorded and saved for 90 days so they can be analyzed to help refine listening skills.

https://promotions.bankofamerica.com/digitalbanking/mobilebanking/erica

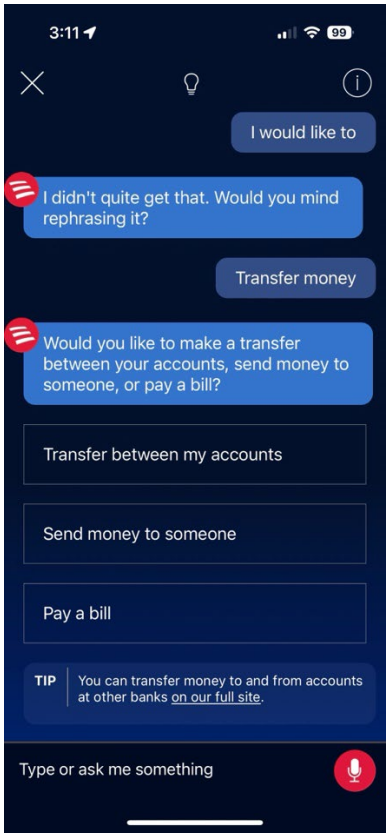
See also:

[redacted]

> When it comes to data collection, conversations with Erica are recorded for reference and quality assurance purposes to help enhance the usefulness of Erica's responses. According to BoA, voice interactions with Erica are saved for 90 days to help refine the AI's listening skills.

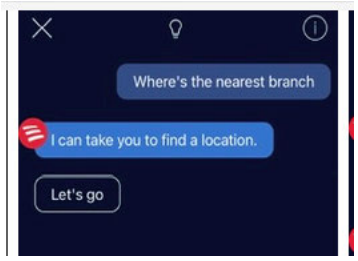
https://cointelegraph.com/learn/bank-of-america-erica-ai-powered-chatbot

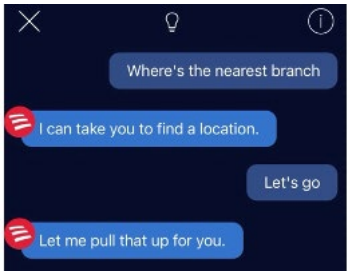
153. On information and belief, one or more of the processors executing *Erica* operations generate a merged transcription from the speech-based transcription and the non-speech-based transcription to create a merged transcription that constitutes the combined formulated query. For example, in the dialogue below, *Erica* transcribed a non-speech communication (the words "I would like to" which were input via the keyboard interface) and the speech communication (the words "Transfer money" which were input as speech via the microphone interface,) creating a merged transcription:



[redacted]

154. As another example, in the dialogue below, *Erica* transcribed a non-speech communication (tapping on the button "Let's go") and a speech communication ("Where's the nearest branch"), and merged the transcriptions:

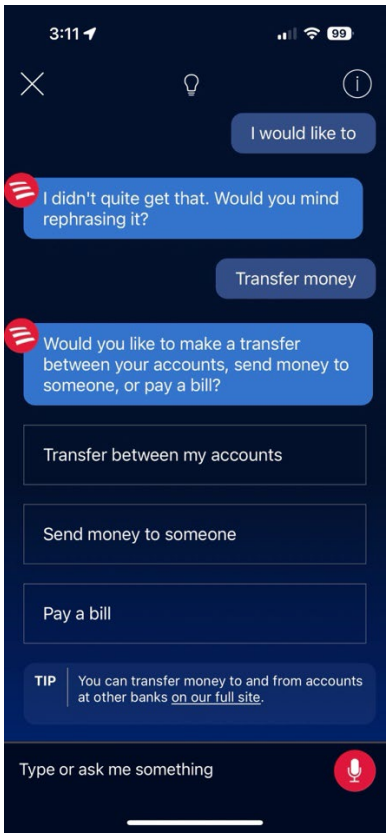




155. Based on *Erica's* responses and actions in the interaction, one can reasonably infer that the transcriptions from the keyboard input and voce input were merged through Bank of America's software.

156. On information and belief, *Erica* identifies an entry in a context stack, or the equivalent thereof, from a plurality of entries that are in the context stack and that are each indicative of a context, wherein the identified entry matches information contained in the merged transcription. For example, on information and belief, in the interaction below, Erica has a context stack comprising context information corresponding to prior utterances, which relate to "Transfer between my accounts," "Send money to someone," and "Pay a bill." Erica identifies an entry in the context stack matching information contained in the merged transcription of "I would like to" and "Transfer money."

[redacted]



157. On information and belief, one or more of the processors executing *Erica* operations identify a domain agent associated with the entry in the context stack. For example, in the interaction above, Erica identifies a domain agent associated with "Transfer between my accounts."

158. On information and belief, one or more of the processors executing *Erica* operations determine(s) a request based on the merged transcription. For example, in the interaction above, Erica determines a request based on the merged transcription that relates to "Transfer between my accounts."

159. On information and belief, *Erica* determines a request based on the merged transcription and communicates that request to a domain agent, wherein the domain agent is configured to generate a response to the user. For example, on information and belief, in the interaction above, Erica communicates the user request to a domain agent that is associated with

[redacted]

"Transfer between my accounts." On information and belief, the domain agent is configured to generate a response to the user relating to money transfer between the user's accounts.

160. Fact and expert discovery are expected to confirm that the Accused Products infringe the '607 Patent, for which further evidence may lie in whole or in part in source code and technical documents to which Dialect does not presently have access.

161. Further, on information and belief, Defendant has actively induced and/or contributed to infringement of at least Claim 12 of the '607 Patent in violation of at least 35 U.S.C. § 271(b), (c), and (f).

162. Users of the Accused Products directly infringe at least Claim 12 of the '607 Patent when they use the Accused Products in the ordinary, customary, and intended way.

163. On information and belief, Defendant's inducements in violation of 35 U.S.C. § 271(b) include, without limitation and with specific intent to encourage infringement, knowingly inducing consumers to use the '607 Accused Products within the United States in the ordinary, customary, and intended way by, directly or through intermediaries, supplying the Accused Products to consumers within the United States and instructing and encouraging such customers to use the Accused Products in the ordinary, customary, and intended way, which Defendant knew infringes at least Claim 12 of the '607 Patent, or, alternatively, was willfully blind to the infringement.

164. On information and belief, Defendant's inducements in violation of 35 U.S.C. § 271(b) further include, without limitation and with specific intent to encourage the infringement, knowingly inducing customers to commit acts of infringement with respect to the Accused Products within the United States, by, directly or through intermediaries, instructing and encouraging such customers to import, make, use, sell, offer to sell, or otherwise commit acts of

[redacted]

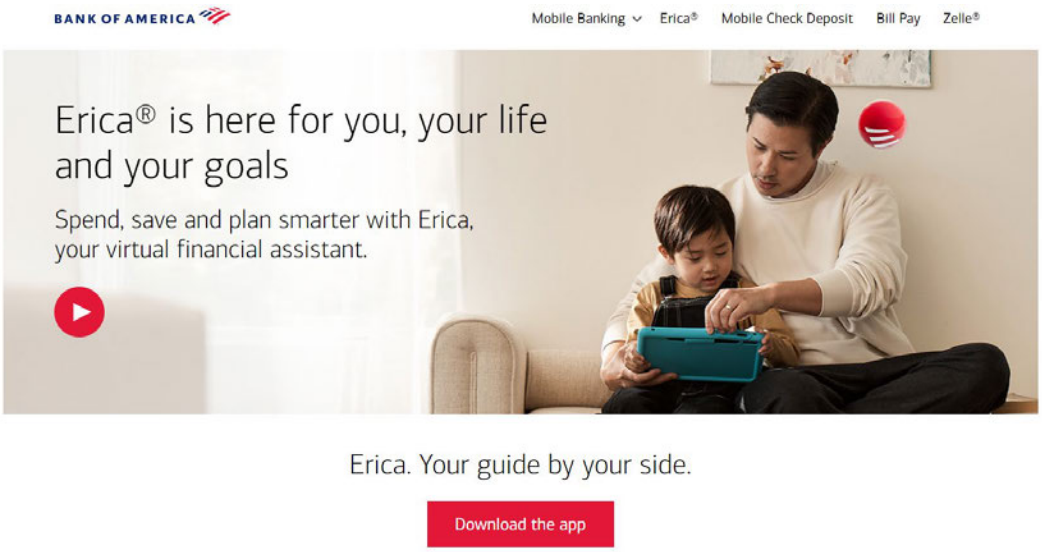
infringement with respect to the Accused Products in the United States, which Defendant knew infringes at least Claim 12 of the ’607 Patent, or, alternatively, was willfully blind to the infringement.

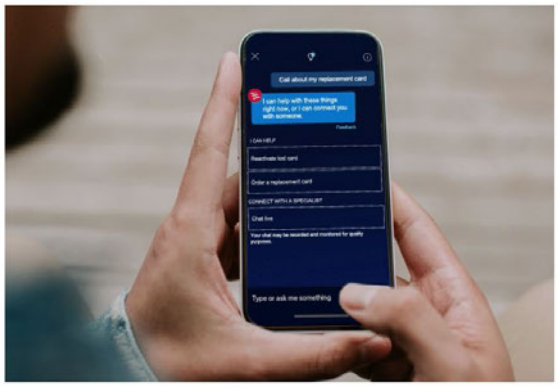
165. For example, Defendant actively advertised Erica with instructions to users to encourage infringement. Defendant describes specific examples of Erica usage on its website. The Erica features shown on Defendant’s website closely match the claim elements of the ’607 Patent, which supports a reasonable inference that Defendant encourages its users to infringe the ’607 Patent.

166. Specifically, the website shows that Erica processes multi-modal input because the website shows Erica presenting the text prompt of “Type or asking me something.” Erica generates a transcription from the non-speech input, because it is able to record and use information from non-speech input (e.g., user’s type or touch on options presented by Erica). Erica identifies the user through username, password, and account-specific information. Erica uses a cognitive model to create a speech-based transcription because “Erica is able to consider a range of data within Bank of America, like your cash flow, balances, transaction history and upcoming bills…” and “Erica learns from the conversations with you and other Bank of America customers...” Erica merges the transcriptions of speech-based input and non-speech-based input, because it is able to utilize information from both. The website shows that Erica identifies a context relating to “rewards” by matching the transcription of “View my rewards.” One may reasonably infer that Erica matches the transcription including “rewards” against one context entry relating to rewards. One may also reasonably infer that Erica communicates the request relating to awards to a domain agent that is configured to process this type of requests and to provide a response on the user’s awards. One may also reasonably infer from the examples on the website that there are multiple

[redacted]

domain agents, with each relating to different tasks, including finding rewards, finding account information, finding transactions, etc.

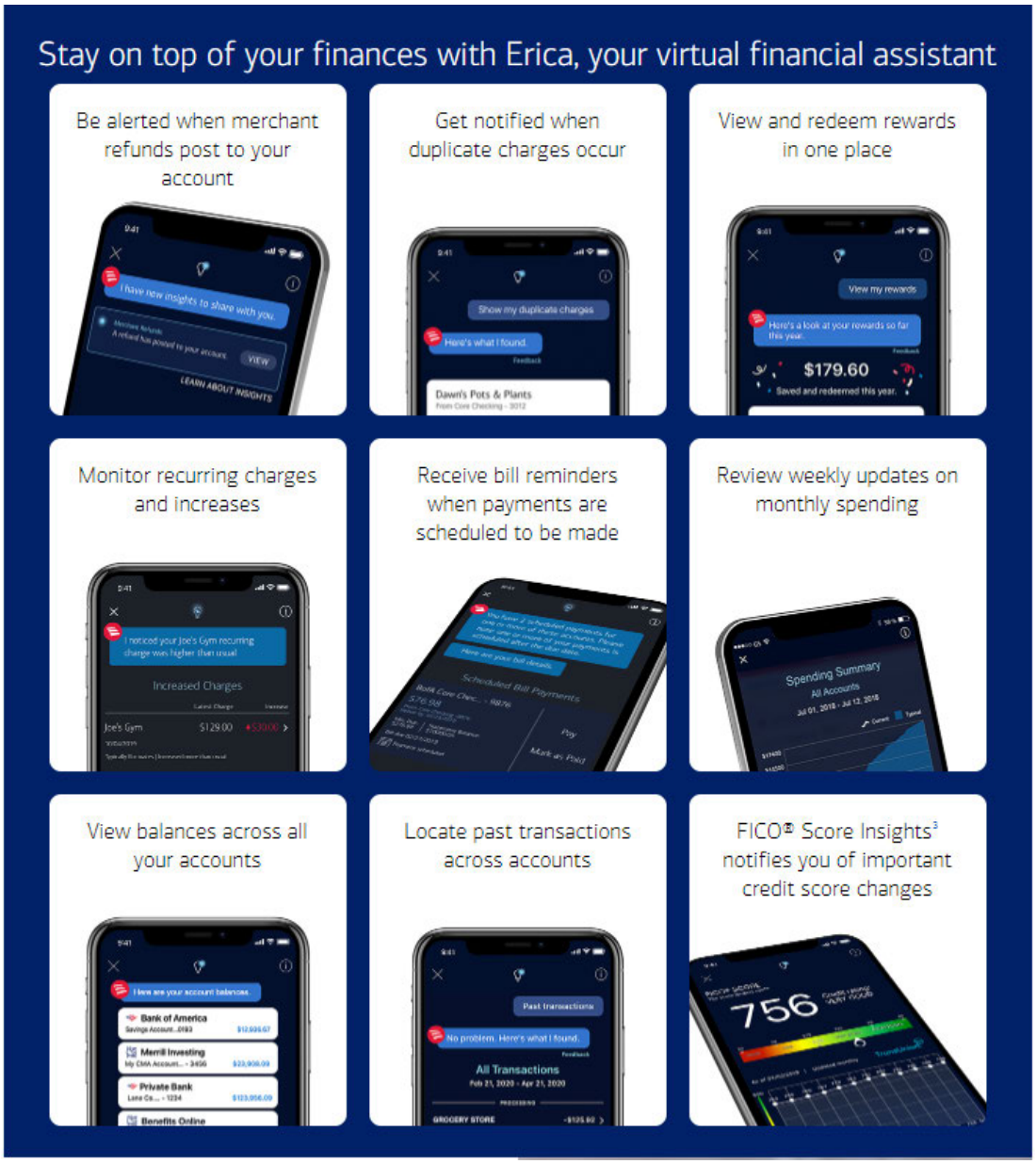




Get the answers you need

Erica includes more ways to quickly answer your questions, including a live chat with a Bank of America specialist.[2]

[redacted]



Get started with Erica today

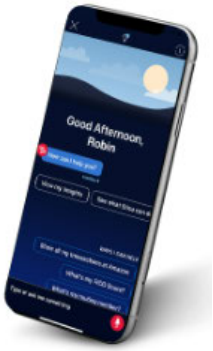
Enter your U.S. mobile number and we'll text you a link to download the Bank of America® Mobile Banking app so you can get started.

Select your device

Get the app

Message and data rates may apply.
Terms and Conditions

Scan a photo to download now



[redacted]

How does Erica work?

Erica leverages the latest technologies, in advanced analytics and cognitive messaging to serve as your trusted financial assistant. Erica is able to consider a range of data within Bank of America, like your cash flow, balances, transaction history and upcoming bills, to help you stay on top of your finances.

Do I need the Mobile Banking app to use Erica?

Yes. Right now, Erica is exclusively available in the Mobile Banking app. Just download the app today to get started!

Will I see the transactions that Erica completed for me?

You'll receive the same confirmations as you do today for transactions conducted in the mobile app. You can also check all transactions in the mobile app and in Online Banking.

How does Erica learn and improve (future functionality)?

Erica learns from the conversations with you and other Bank of America customers and has a dedicated team that's continually working to expand the capabilities offered.

Can someone else activate Erica while using my phone?

No. You will need to be authenticated through the app to be able to use Erica.

167. On information and belief, in violation of 35 U.S.C. § 271(c), Defendant's contributory infringement further includes offering to sell or selling within the United States, or importing into the United States, components of the patented invention of and/or a material or apparatus for use in practicing at least Claim 12 of the '607 Patent, constituting a material part of the invention. On information and belief, Defendant knows and has known the same to be especially made or especially adapted for use in an infringement of the '607 Patent, and such components are not a staple article or commodity of commerce suitable for substantial non-infringing use. For example, on information and belief, the Erica system is not a staple article and is not a commodity of commerce suitable for substantial non-infringing use, at least because the Erica system is "exclusively available in Bank of America's Mobile Banking app," and the Mobile

[redacted]

Banking app infringes at least Claim 12 of the ’607 Patent. The Erica system is especially made or especially adapted for use in an infringement of the ’607 Patent, because it is designed to receive and interpret natural language utterances in a manner claimed by the ’607 Patent, and it is not capable of substantial non-infringing use.

Do I need the Mobile Banking app to use Erica?

Yes. Right now, Erica is exclusively available in the Mobile Banking app. Just download the app today to get started!

168. Defendant is not licensed or otherwise authorized to practice the claims of the ’607 Patent.

169. Thus, by its acts, Defendant has injured Dialect and is liable to Dialect for directly and/or indirectly infringing one or more claims of the ’607 Patent, whether literally or under the doctrine of equivalents, including without limitation Claim 12.

170. On information and belief, Bank of America deployed Erica in as early as June 2018, and became aware of the infringement of the Asserted Patents in as early as June 2018. At a minimum, Defendant has knowledge of the ’607 Patent and its infringement at least as of the filing of the Original Complaint. Defendant has had, and continues to have, the specific intent to infringe, through its deliberate and intentional infringement or, alternatively, through its willfully blind disregard of the ’607 Patent by knowing there was a high probability of infringement but taking deliberate actions to avoid confirming that infringement. The filing of this action has also made Defendant aware of the unjustifiably high risk that its actions constituted and continue to constitute infringement of the ’607 Patent. On information and belief, discovery will reveal additional facts and circumstances from which Defendant’s knowledge and intent to infringe (or willful indifference), both before and after the filing of this action, may be inferred.

171. Accordingly, Defendant's infringement of the '607 Patent has been and continues to be deliberate, intentional, and willful, and this is therefore an exceptional case warranting an award of enhanced damages and attorneys' fees and costs pursuant to 35 U.S.C. §§ 284 and 285.

172. As a result of Defendant's infringement of the '607 Patent, Dialect has suffered monetary damages, and seeks recovery, in an amount to be proven at trial, adequate to compensate for Defendant's infringement, but in no event less than a reasonable royalty with interest and costs.

173. On information and belief, Defendant will continue to infringe the '607 Patent unless enjoined by this Court. Defendant's infringement of Dialect's rights under the '607 Patent will continue to damage Dialect, causing irreparable harm for which there is no adequate remedy at law, unless enjoined by this Court.

FOURTH COUNT
(Infringement of U.S Patent No. 9,263,039)

174. Dialect incorporates by reference the allegations set forth in Paragraphs 1-178 of the Complaint as though fully set forth herein.

175. The claims of the '039 Patent are valid and enforceable.

176. The claims of the '039 Patent are directed to patentable subject matter. The '039 Patent is directed to innovations that implement and improve a voice recognition system and natural language processing. The inventive claimed steps of the '039 Patent improve on the processing of a natural language utterance by a user. The claimed inventions provide specific concrete solutions to the problem of speech recognition in existing systems.

177. On information and belief, in violation of 35 U.S.C. § 271(a), Defendant has directly infringed and continues to directly infringe one or more claims of the '039 Patent, including at least Claim 13 of the '039 Patent, in the state of Texas, in this judicial district, and elsewhere in the United States by, among other things, making, using, selling, offering for sale,

[redacted]

and/or importing into the United States products and services that embody one or more of the inventions claimed in the ’039 Patent, including the Accused Products.

178. Each of the Accused Products contains elements that are identical or equivalent to each claimed element of the patented invention pointed out by at least claim 13 of the ’039 Patent, which recites:

> 13. A method of processing speech and non-speech communications, comprising:
>
> receiving the speech and non-speech communications;
>
> transcribing the speech and non-speech communications to create a speech-based textual message and a non-speech-based textual message;
>
> merging the speech-based textual message and the non-speech-based textual message to generate a query;
>
> searching the query for text combinations;
>
> comparing the text combinations to entries in a context description grammar;
>
> accessing a plurality of domain agents that are associated with the context description grammar;
>
> generating a relevance score based on results from comparing the text combinations to entries in the context description grammar;
>
> selecting one or more domain agents based on results from the relevance score;
>
> obtaining content that is gathered by the selected domain agents; and
>
> generating a response from the content, wherein the content is arranged in a selected order based on results from the relevance score.

’039 Patent, Cl. 13.

179. *Erica* implements a method of processing speech and non-speech communications. For example, Bank of America touts the ability of *Erica* to answer questions “through spoken conversation and/or visual text” and informs customers that they “can speak or type to *Erica*” and can interact with *Erica* by “Speaking to *Erica*” or by “Typing [their] requests”:

[redacted]

How Does Erica Help Clients Manage Their Finances?

Erica helps ensure clients know and understand all that our Mobile Banking app can do for them. Erica is new to the world and she is still learning, but she's pretty smart and eager to help. She can make it easier for clients to stay on top of their finances in three different ways:

	Erica Can:	Examples of What Clients Can Type/Say:	Outcome:
1	**Answer questions through spoken conversation and/or visual text.**	*"What is my checking account balance?"* *"When is my mortgage due?"* *"What is my credit card limit?"*	*Erica provides relevant account information on screen (and aloud, if spoken to).*

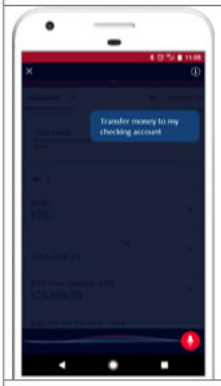
Erica Financial Center Job Aid, Updated 03.26.18, at p. 1. https://message.bankofamerica.com/onlinebanking_demo/mobileApp_Simulator/erica_qrg/Erica_Financial_Center_Job_Aid_PDF.pdf

Demonstrating Erica: Three Critical Elements

BOTTOM LINE: Encourage your client to treat Erica like a person and *just have a conversation* with her.

1. Help your client understand that you can speak or type to Erica – and she'll respond in kind.

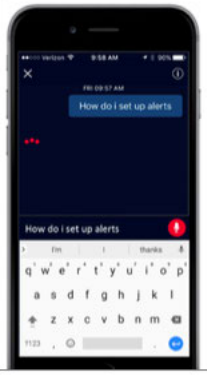
"Mr. Client, the best way to use Erica is to just interact with her like you would a person…"



Speaking to Erica

"If you tap the microphone icon and speak to Erica, she will respond both on-screen and aloud.[2]

When appropriate, she'll listen for a response for 15 seconds.[3]"



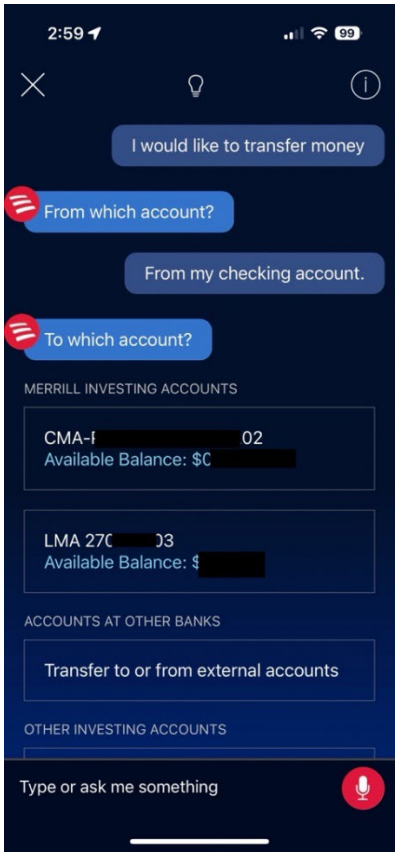
Typing your requests

"If you type your request, Erica will respond only on-screen."

Id. at p. 4.

180. *Erica* also allows users to communicate by selecting (e.g., by tapping on the touchscreen) icons displayed on the screen. Each of these input methods (speech, typed text, and icon-selection) can be used either alone or in combination during a single dialogue with *Erica*, and even while constructing a single utterance for submission to *Erica*. For example, *Erica* can receive a voice speech communication ("I would like to transfer money"), then a non-speech, keyboard-entered communication ("From my checking account"), and then a non-speech, icon-selection communication (by tapping one of the provided selection boxes):

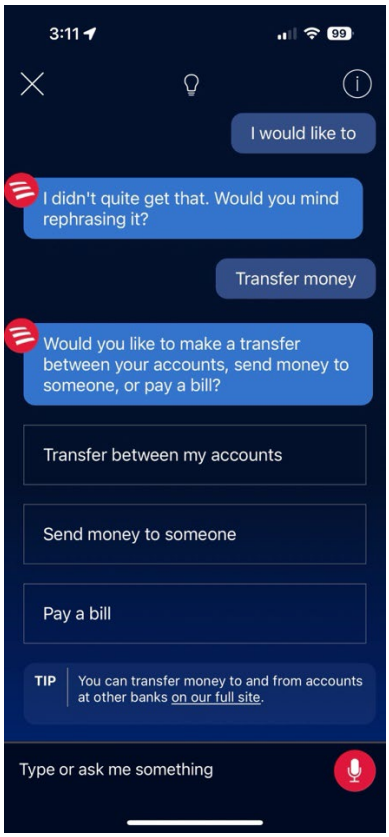
[redacted]



181. *Erica* receives the speech and non-speech communications from the user as described above.

182. On information and belief, *Erica* transcribes speech and non-speech communications to create a speech-based textual message and a non-speech-based textual message. For example, in the dialogue below, *Erica* transcribed a non-speech communication (the words "I would like to" which were input via the keyboard interface) and a speech communication (the words "Transfer money" which were input as speech via the microphone interface), creating corresponding textual messages:

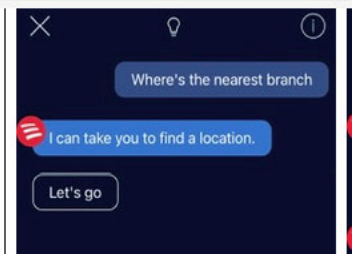
[redacted]

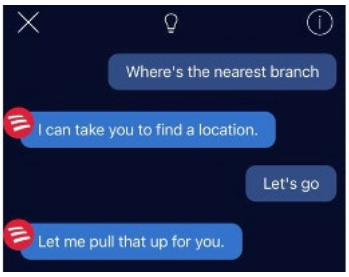


183. On information and belief, *Erica* merges the speech-based and non-speech-based textual messages to generate a query. For example, in the above-referenced dialogue, one can reasonably infer that the textual messages transcribed from the keyboard input and voce input were merged to generate a query through Bank of America's software.

184. As another example, in the dialogue below, *Erica* transcribed a non-speech communication (tapping on the button "Let's go) and the speech communications ("Where's the nearest branch"), and merged the transcriptions:

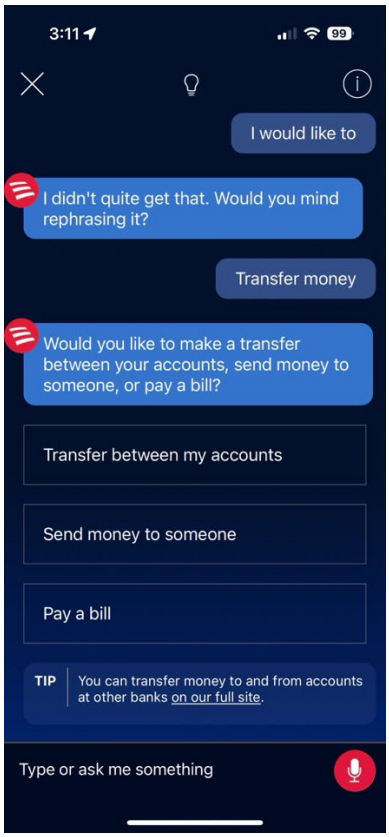
[redacted]





185. On information and belief, *Erica* searches and/or parses the queries generated from the textual messages derived from the speech and non-speech inputs for text combinations. For example, on information and belief, in the interaction below, Erica searches the query for the term "Transfer" to determine intent associated with "transfer." On information and belief, Erica searches user query for keywords that are associated with user intents.

[redacted]



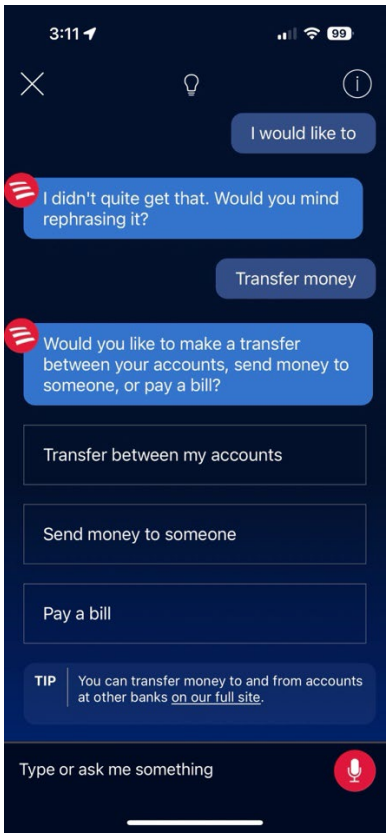
186. On information and belief, *Erica* undertakes a comparison of the text combinations ("associated with the user's request" as indicated below) to entries in a context description grammar, or an equivalent thereof. For example, on information and belief, in the interaction above, Erica compares the text combinations including "Transfer" to entries in a context description grammar. On information and belief, Erica uses regular expression patterns and rules that serve as context description grammars to determine meaning and intent of user input. On information and belief, for example, a context description grammar relating to transfer money would include at least values of the account to transfer from, the account to transfer to, and the amount of transfer.

187. On information and belief, *Erica* accesses a plurality of domain agents that are associated the context description grammar, or its equivalent. For example, on information and belief, in the interaction above, Erica accesses a plurality of domain agents that are associated with

the context description grammar, including the domain agent associated with "Transfer between my accounts," "Send money to someone," and "Pay a bill." On information and belief, Erica accesses domain agents to determine whether the domain agents can process user input associated with the context description grammar.

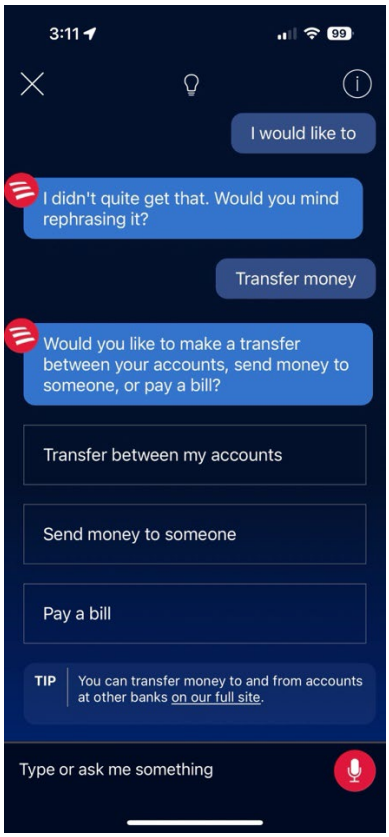
188. On information and belief, in determining which of the domain agents to obtain content from, *Erica* implements processes to generate relevance scores based on the comparisons of text combinations to the entries in a context description grammar (e.g., keyword sets associated with one or more of a plurality of domain agents). For example, on information and belief, in the interaction below, Erica generates a relevance score (or confidence score or confidence level) for each of the three options "Transfer between my accounts," "Send money to someone," and "Pay a bill," based on results from comparing the text combinations to entries in the context description grammar. On information and belief, the three options are ranked based on their relevance scores. On information and belief, the "Transfer between my accounts" option is ranked first because it has the highest relevance scored based on comparing the text combination of "Transfer money" to entries in the context description grammar relating to money transfer.

[redacted]



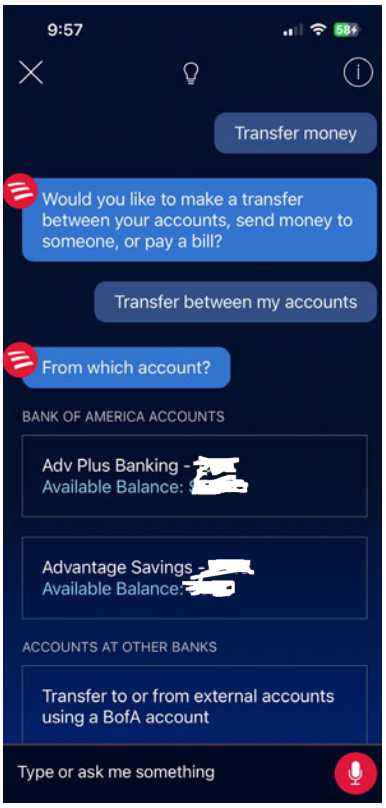
189. On information and belief, *Erica* selects one or more domain agents based on results from the relevance score. For example, on information and belief, in the interaction below, Erica selects one or more domain agents associated with "Transfer between my accounts," "Send money to someone," and "Pay a bill" based on results from the relevant score.

[redacted]



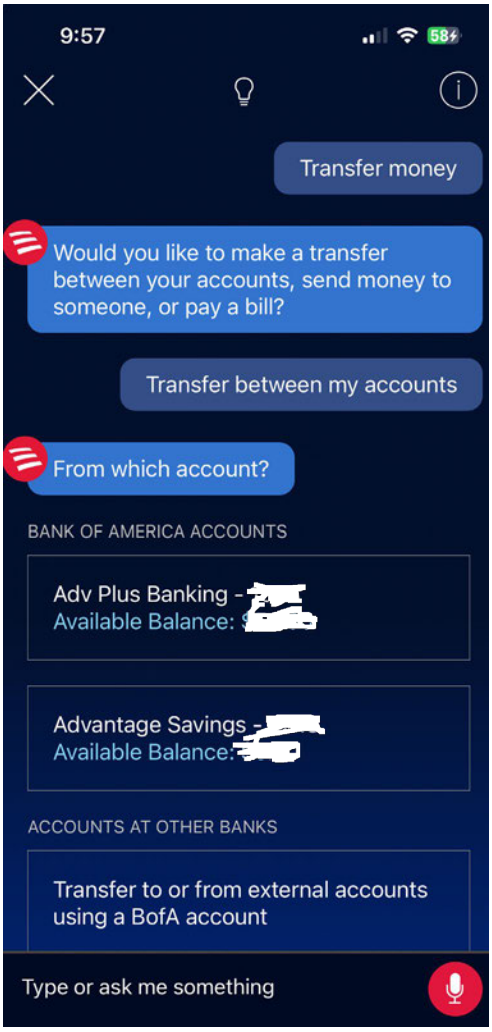
190. On information and belief, *Erica* obtains content gathered from the selected domain agents. For example, on information and belief, in the interaction below, Erica obtains content that is gathered by the domain agent associated with "Transfer between my accounts", which may include information relating to the user's account information:

[redacted]



191. On information and belief, *Erica* generates responses from the content obtained from the one or more domain agents and arranges them in a selected order based on the results from the relevance score. For example, "Transfer between my accounts" is arranged above "Send money to someone" and "Pay a bill":

[redacted]



192. Fact and expert discovery are expected to confirm that the Accused Products infringe the ’039 Patent, for which further evidence may lie in whole or in part in source code and technical documents to which Dialect does not presently have access.

193. Further, on information and belief, Defendant has actively induced and/or contributed to infringement of at least Claim 13 of the ’039 Patent in violation of at least 35 U.S.C. § 271(b), (c), and (f).

194. Users of the Accused Products directly infringe at least claim 13 of the ’039 Patent when they use the Accused Products in the ordinary, customary, and intended way.

[redacted]

195. On information and belief, Defendant's inducements in violation of 35 U.S.C. § 271(b) include, without limitation and with specific intent to encourage infringement, knowingly inducing consumers to use the '039 Accused Products within the United States in the ordinary, customary, and intended way by, directly or through intermediaries, supplying the Accused Products to consumers within the United States and instructing and encouraging such customers to use the Accused Products in the ordinary, customary, and intended way, which Defendant knew infringes at least Claim 13 of the '039 Patent, or, alternatively, was willfully blind to the infringement.

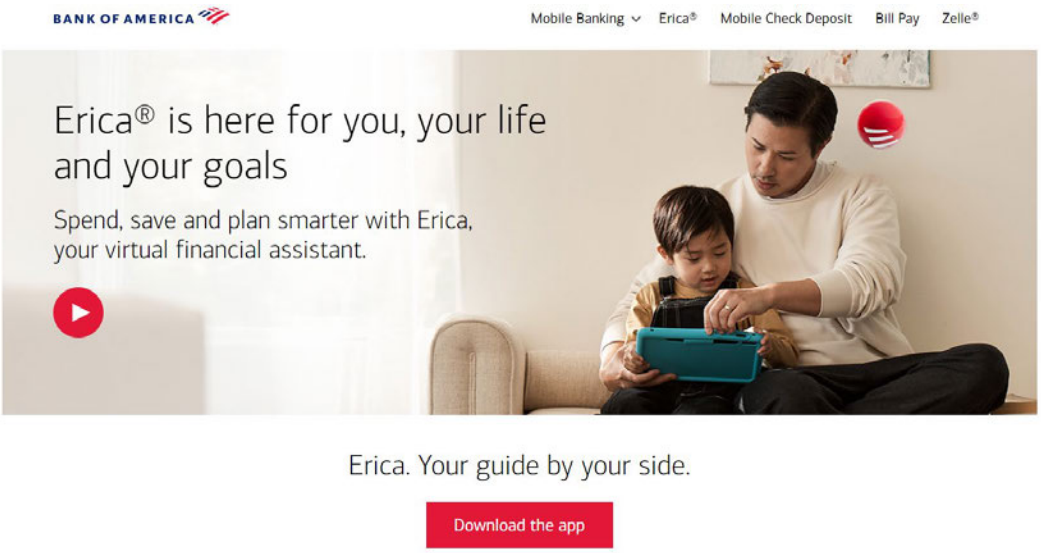
196. On information and belief, Defendant's inducements in violation of 35 U.S.C. § 271(b) further include, without limitation and with specific intent to encourage the infringement, knowingly inducing customers to commit acts of infringement with respect to the Accused Products within the United States, by, directly or through intermediaries, instructing and encouraging such customers to import, make, use, sell, offer to sell, or otherwise commit acts of infringement with respect to the Accused Products in the United States, which Defendant knew infringes at least Claim 13 of the '039 Patent, or, alternatively, was willfully blind to the infringement.

197. On information and belief, Defendant actively advertised Erica with instructions to users to encourage infringement. For example, Defendant describes specific examples of Erica usage on its website. The Erica features shown on Defendant's website closely match the claim elements of the '039 Patent, which supports a reasonable inference that Defendant encourages its users to infringe the '039 Patent.

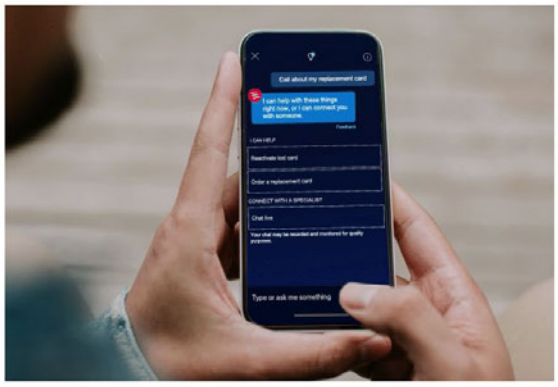
198. Specifically, the website shows that Erica processes speech and non-speech communications because the website shows Erica presenting the text prompt of "Type or asking

[redacted]

me something." Erica merges the transcriptions of speech-based input and non-speech-based input, because it is able to utilize information from both. The website shows that Erica identifies a context relating to "rewards" by matching the transcription of "View my rewards." One may reasonably infer that Erica searches the query for text combinations including "rewards", and compares the text combinations to entries in a context description grammar (which may include entries relating to different contexts, including account information, rewards, past transaction, etc.). One may also reasonably infer that Erica selects a domain agent relating to rewards based on scores generated by comparing multiple entries in the context description grammar to the text combinations including "rewards". One may reasonably infer from the examples on the website that there are multiple domain agents, with each relating to different tasks, including finding rewards, finding account information, finding transactions, etc. One may reasonably infer that Erica communicates the request relating to awards to a domain agent that is configured to process this type of requests, and that the domain agent provides content on the user's awards.



[redacted]

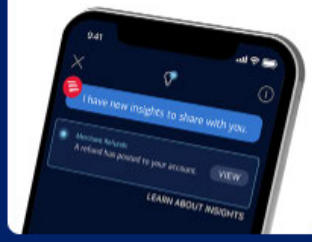


Get the answers you need

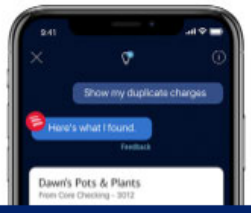
Erica includes more ways to quickly answer your questions, including a live chat with a Bank of America specialist.[2]

Stay on top of your finances with Erica, your virtual financial assistant

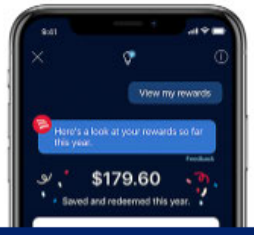
Be alerted when merchant refunds post to your account



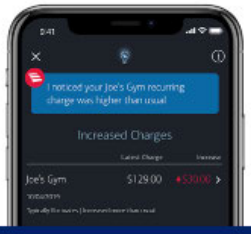
Get notified when duplicate charges occur



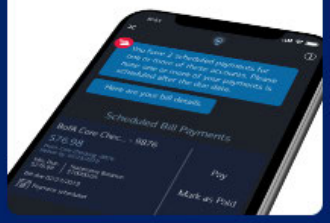
View and redeem rewards in one place



Monitor recurring charges and increases

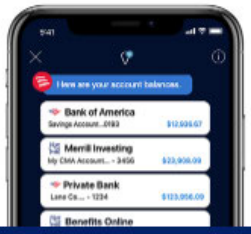


Receive bill reminders when payments are scheduled to be made

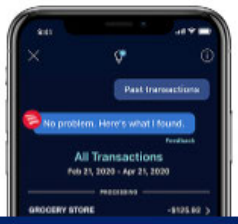


Review weekly updates on monthly spending

View balances across all your accounts



Locate past transactions across accounts



FICO® Score Insights[3] notifies you of important credit score changes

[redacted]

Get started with Erica today

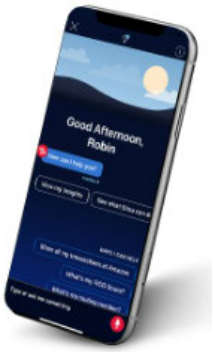
Enter your U.S. mobile number and we'll text you a link to download the Bank of America® Mobile Banking app so you can get started.

Select your device

Get the app

Message and data rates may apply.
Terms and Conditions

Scan a photo to download now



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How does Erica learn and improve (future functionality)?

Erica learns from the conversations with you and other Bank of America customers and has a dedicated team that's continually working to expand the capabilities offered.

Can someone else activate Erica while using my phone?

No. You will need to be authenticated through the app to be able to use Erica.

199. On information and belief, in violation of 35 U.S.C. § 271(c), Defendant's contributory infringement further includes offering to sell or selling within the United States, or importing into the United States, components of the patented invention of and/or a material or apparatus for use in practicing at least Claim 13 of the '039 Patent, constituting a material part of the invention. On information and belief, Defendant knows and has known the same to be

[redacted]

especially made or especially adapted for use in an infringement of the ’039 Patent, and such components are not a staple article or commodity of commerce suitable for substantial non-infringing use. For example, on information and belief, the Erica system is not a staple article and is not a commodity of commerce suitable for substantial non-infringing use, at least because the Erica system is “exclusively available in Bank of America’s Mobile Banking app,” and the Mobile Banking app infringes at least Claim 13 of the ’039 Patent. The Erica system is especially made or especially adapted for use in an infringement of the ’039 Patent, because it is designed to receive and interpret natural language utterances in a manner claimed by the ’039 Patent, and it is not capable of substantial non-infringing use.

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.

200. Defendant is not licensed or otherwise authorized to practice the claims of the ’039 Patent.

201. Thus, by its acts, Defendant has injured Dialect and is liable to Dialect for directly and/or indirectly infringing one or more claims of the ’039 Patent, whether literally or under the doctrine of equivalents, including without limitation Claim 13.

202. On information and belief, Bank of America deployed Erica in as early as June 2018, and became aware of the infringement of the Asserted Patents in as early as June 2018. At a minimum, Defendant has knowledge of the ’039 Patent and its infringement at least as of the filing of the Original Complaint. Defendant has had, and continues to have, the specific intent to infringe, through its deliberate and intentional infringement or, alternatively, through its willfully blind disregard of the ’039 Patent by knowing there was a high probability of infringement but taking deliberate actions to avoid confirming that infringement. The filing of this action has also

made Defendant aware of the unjustifiably high risk that its actions constituted and continue to constitute infringement of the ’039 Patent. On information and belief, discovery will reveal additional facts and circumstances from which Defendant’s knowledge and intent to infringe (or willful indifference), both before and after the filing of this action, may be inferred.

203. Accordingly, Defendant’s infringement of the ’039 Patent has been and continues to be deliberate, intentional, and willful, and this is therefore an exceptional case warranting an award of enhanced damages and attorneys’ fees and costs pursuant to 35 U.S.C. §§ 284 and 285.

204. As a result of Defendant’s infringement of the ’039 Patent, Dialect has suffered monetary damages, and seeks recovery, in an amount to be proven at trial, adequate to compensate for Defendant’s infringement, but in no event less than a reasonable royalty with interest and costs.

205. On information and belief, Defendant will continue to infringe the ’039 Patent unless enjoined by this Court. Defendant’s infringement of Dialect’s rights under the ’039 Patent will continue to damage Dialect, causing irreparable harm for which there is no adequate remedy at law, unless enjoined by this Court.

FIFTH COUNT
(Infringement of U.S Patent No. 9,495,957)

206. Dialect incorporates by reference the allegations set forth in Paragraphs 1-205 of the Complaint as though fully set forth herein.

207. The claims of the ’957 Patent are valid and enforceable.

208. The claims of the ’957 Patent are directed to patentable subject matter. Particularly, the ’957 Patent is directed to innovations that implement and improve a voice recognition system and natural language processing. The inventive claimed steps of the ’957 Patent improve on the processing of a natural language utterance by a user. The claimed inventions provide specific concrete solutions to the problem of speech recognition in existing systems.

[redacted]

209. On information and belief, in violation of 35 U.S.C. § 271(a), Defendant has directly infringed and continues to directly infringe one or more claims of the ’957 Patent, including at least Claim 7 of the ’957 Patent, in the state of Texas, in this judicial district, and elsewhere in the United States by, among other things, making, using, selling, offering for sale, and/or importing into the United States products and services that embody one or more of the inventions claimed in the ’957 Patent, including the Accused Products.

210. Each of the Accused Products contains elements that are identical or equivalent to each claimed element of the patented invention pointed out by at least Claim 7 of the ’957 Patent, which recites:

> 7. A computer-implemented method of processing a natural language utterance, the method comprising:
>
> generating a context stack comprising context information that corresponds to a plurality of prior utterances, wherein the context stack includes a plurality of context entries;
>
> receiving, by one or more computer processors, the natural language utterance, wherein the natural language utterance is associated with a command or is associated with a request;
>
> determining one or more words of the natural language utterance by performing speech recognition on the natural language utterance;
>
> identifying, from among the plurality of context entries, one or more context entries that correspond to the one or more words, wherein the context information includes the one or more context entries, wherein identifying the one or more context entries comprises:
>
> comparing the plurality of context entries to the one or more words;
>
> generating, based on the comparison, one or more rank scores for individual context entries of the plurality of context entries; and
>
> identifying, based on the one or more rank scores, the one or more context entries from among the plurality of context entries; and
>
> determining based on the determined one or more words and the context information, the command or the request associated with the natural language utterance.

’957 Patent, Cl. 7.

[redacted]

211. *Erica* implements a computer-implemented method of processing natural language inputs. For example, Bank of America touts the ability of *Erica* to answer questions "through spoken conversation" and informs customers that they "can speak or type to *Erica*" and can interact with *Erica* by "Speaking to *Erica*" or by "Typing [their] requests":

How Does Erica Help Clients Manage Their Finances?

Erica helps ensure clients know and understand all that our Mobile Banking app can do for them. Erica is new to the world and she is still learning, but she's pretty smart and eager to help. She can make it easier for clients to stay on top of their finances in three different ways:

Erica Can:		Examples of What Clients Can Type/Say:	Outcome:
1	**Answer questions through spoken conversation and/or visual text.**	*"What is my checking account balance?"* *"When is my mortgage due?"* *"What is my credit card limit?"*	*Erica provides relevant account information on screen (and aloud, if spoken to).*

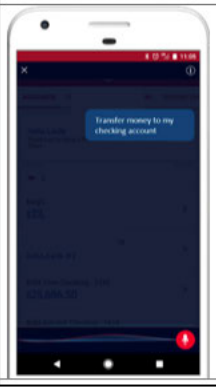
Erica Financial Center Job Aid, Updated 03.26.18, at p. 1. https://message.bankofamerica.com/onlinebanking_demo/mobileApp_Simulator/erica_qrg/Erica_Financial_Center_Job_Aid_PDF.pdf

Demonstrating Erica: Three Critical Elements

BOTTOM LINE: Encourage your client to treat Erica like a person and *just have a conversation* with her.

1. Help your client understand that you can speak or type to Erica – and she'll respond in kind.

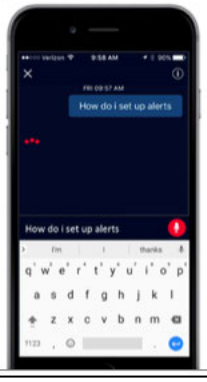
"Mr. Client, the best way to use Erica is to just interact with her like you would a person…"



Speaking to Erica

"If you tap the microphone icon and speak to Erica, she will respond both on-screen and aloud.[2]

When appropriate, she'll listen for a response for 15 seconds.[3]"



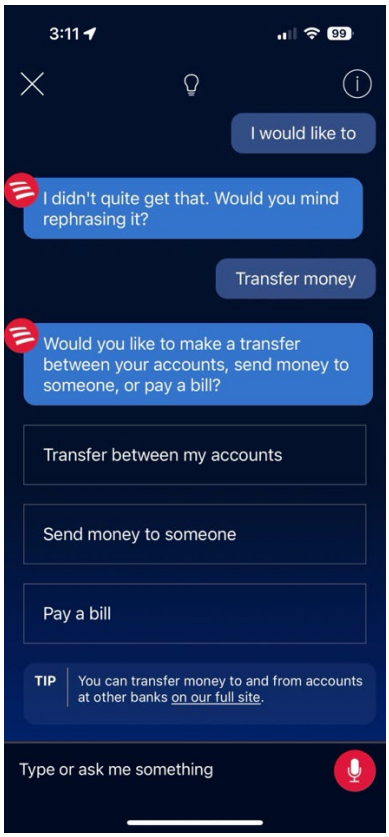
Typing your requests

"If you type your request, Erica will respond only on-screen."

Id. at p. 4.

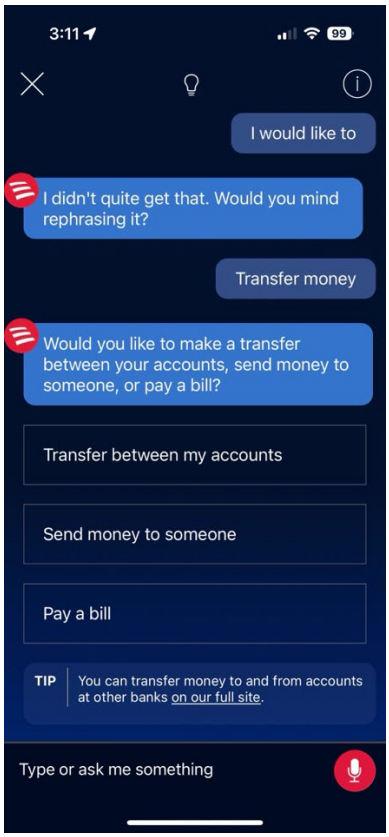
212. On information and belief, *Erica* generates a context stack comprising context information that corresponds to a plurality of prior utterances. For example, on information and belief, for the interaction below, Erica generates a context stack comprising context information corresponding to prior utterances, which relate to "Transfer between my accounts," "Send money to someone," and "Pay a bill."

[redacted]



213. *Erica* receives a natural language utterance associated with a command or request of the user. For example, in the interaction below, Erica receives the natural language utterance of "Transfer money" which is associated with a command or a request.

[redacted]

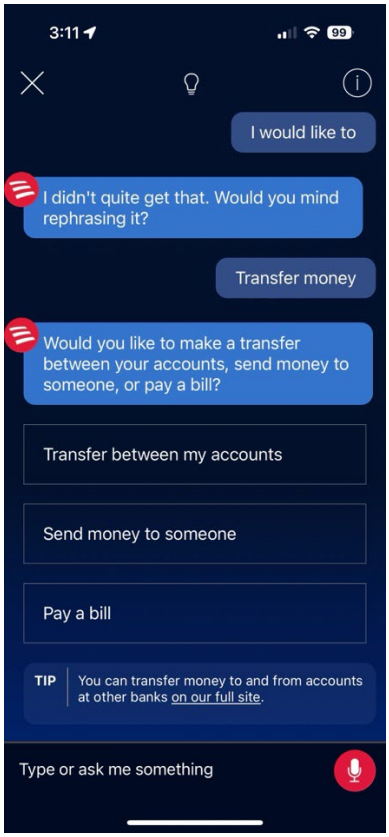


214. The *Erica* system determines one or more words of the natural language utterance by performing speech recognition on the natural language utterance. For example, in the interaction above, the user uttered the words "I would like to" and "transfer money" into the microphone of a smartphone running *Erica* on Bank of America's Mobile Banking application, and *Erica* performed speech recognition on the utterances and transcribed the words of the utterances into text.

215. On information and belief, *Erica* identifies from among the plurality of context entries, one or more context entries that correspond to the one or more words, wherein the context information includes the one or more context entries. For example, on information and belief, in the interaction above, Erica identifies one or more context entries that corresponds to words in the natural language utterance such as "Transfer" and "money." On the information and belief, the word "Transfer" may correspond to a context entry relating to the "transfer" intent.

[redacted]

216. On information and belief, *Erica* compares the plurality of context entries to the one or more words. For example, Erica compares the plurality of context entries to one or more words such as "Transfer" and "money."



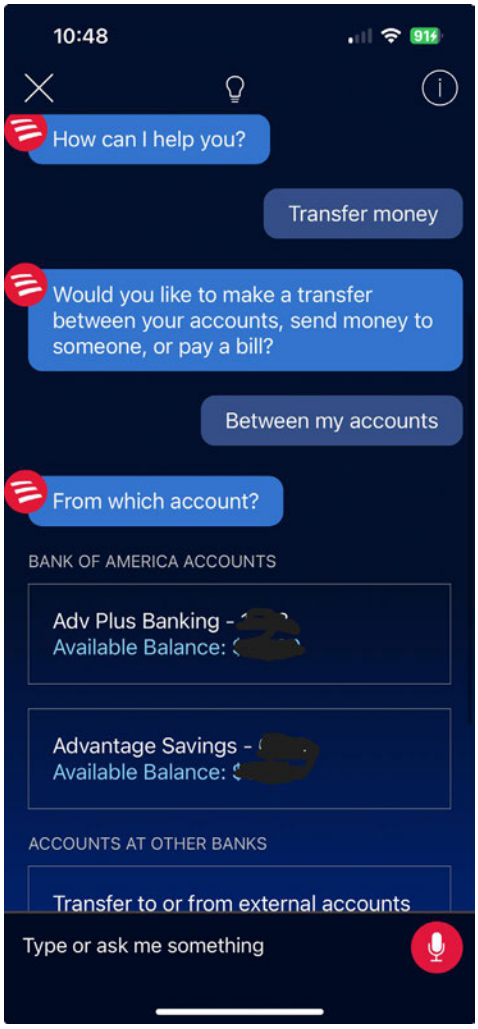
217. On information and belief, *Erica* generates rank scores for individual context entries of the plurality of context entries. For example, on information and belief, in the interaction above, Erica generates one or more rank scores for individual context entries of the plurality of context entries. On information and belief, the three user options are listed in the order of their associated rank scores. On information and belief, the "Transfer between my accounts" option is ranked first based on its highest rank score, because it matches the words "Transfer money" more closely than the other two options "Send money to someone" or "Pay a bill".

218. On information and belief, *Erica* identifies the one or more context entries from among the plurality of context entries based on the one or more rank scores. For example, in the

[redacted]

interaction above, Erica identifies one or more context entries associated with "Transfer between my accounts," "Send money to someone," and "Pay a bill" based on the rank scores.

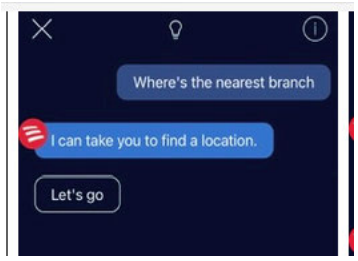
219. On information and belief, *Erica* determines, based on the words and context information, including identification and selection of the most likely context or domain agent, the command or request associated with the natural language utterance. For example, in the interaction below, Erica determines the request of "Transfer between my accounts" based on one or more words and the context information.

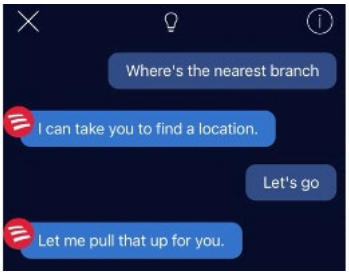


220. For example, in response to a speech utterance to *Erica* via the microphone interface "Where's the nearest branch" and the non-speech communication of tapping on the Let's Go button provided by *Erica* (which is then transcribed into a textual message), *Erica* responds

[redacted]

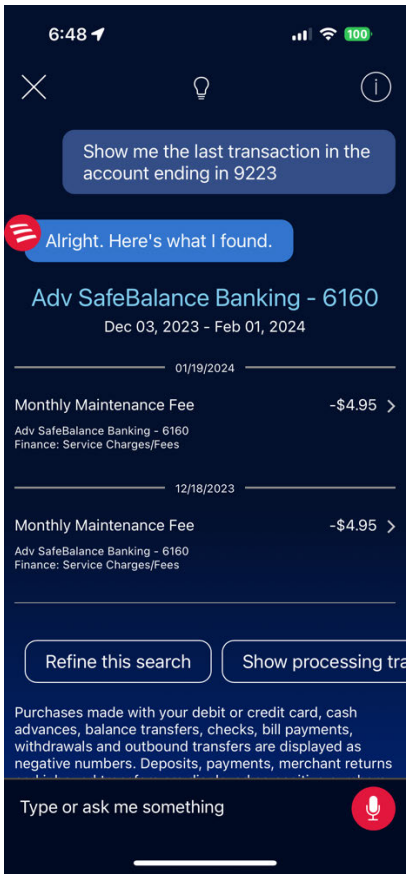
"Let me pull that up for you." and sends the request to a branch finder "agent" and presents that information to the user:





221. Similarly, in the dialogue represented by the screenshot below, the user uttered the words "Show me the last transaction in the account ending in 9223" into the microphone of a smartphone running *Erica* on Bank of America's Mobile Banking application, and *Erica* performed speech recognition on the utterances and transcribed the words of the utterance and, on information and belief, used the processes described above to determine the context and to determine the request associated with the utterance, as evidenced by providing the information responsive to the request:

[redacted]



222. Fact and expert discovery are expected to confirm that the Accused Products infringe the ’957 Patent, for which further evidence may lie in whole or in part in source code and technical documents to which Dialect does not presently have access.

223. Further, on information and belief, Defendant has actively induced and/or contributed to infringement of at least Claim 7 of the ’957 Patent in violation of at least 35 U.S.C. § 271(b), (c), and (f).

224. Users of the Accused Products directly infringe at least Claim 7 of the ‘957 Patent when they use the Accused Products in the ordinary, customary, and intended way.

225. On information and belief, Defendant’s inducements in violation of 35 U.S.C. § 271(b) include, without limitation and with specific intent to encourage infringement, knowingly inducing consumers to use the Accused Products within the United States in the ordinary,

[redacted]

customary, and intended way by, directly or through intermediaries, supplying the Accused Products to consumers within the United States and instructing and encouraging such customers to use the Accused Products in the ordinary, customary, and intended way, which Defendant knew infringes at least Claim 7 of the '957 Patent, or, alternatively, was willfully blind to the infringement.

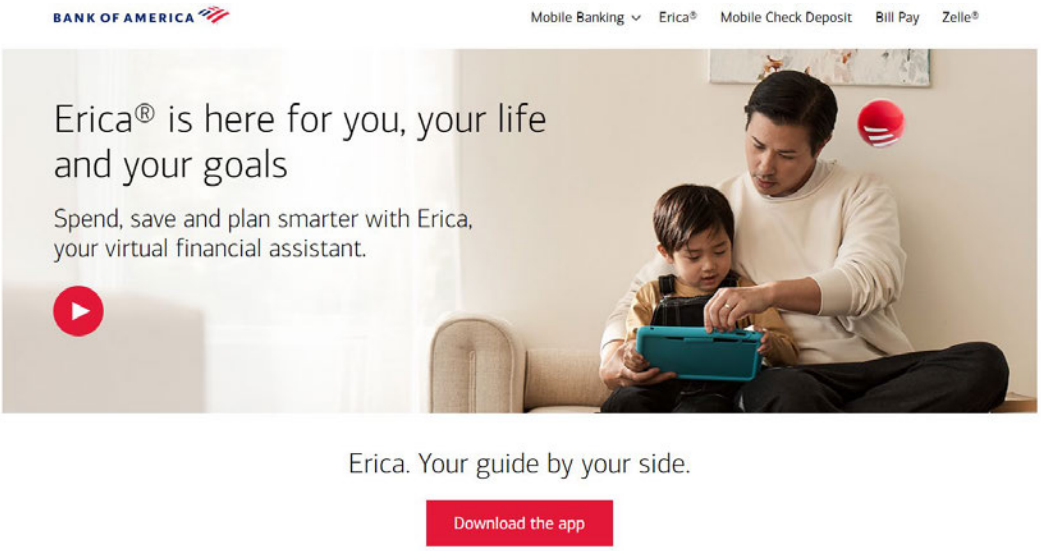
226. On information and belief, Defendant's inducements in violation of 35 U.S.C. § 271(b) further include, without limitation and with specific intent to encourage the infringement, knowingly inducing customers to commit acts of infringement with respect to the Accused Products within the United States, by, directly or through intermediaries, instructing and encouraging such customers to import, make, use, sell, offer to sell, or otherwise commit acts of infringement with respect to the Accused Products in the United States, which Defendant knew infringes at least Claim 7 of the '957 Patent, or, alternatively, was willfully blind to the infringement.

227. On information and belief, Defendant actively advertised Erica with instructions to users to encourage infringement. For example, Defendant describes specific examples of Erica usage on its website. The Erica features shown on Defendant's website closely match the claim elements of the '957 Patent, which supports a reasonable inference that Defendant encourages its users to infringe the '957 Patent.

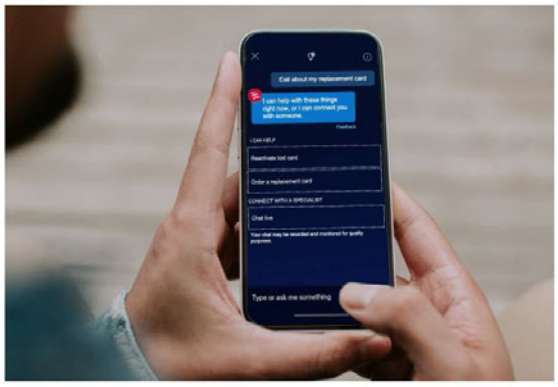
228. Specifically, the website shows that Erica receives and processes natural language utterance because the website shows Erica presenting the text prompt of "Type or asking me something." The website shows that "Erica is able to consider a range of data within Bank of America, like your cash flow, balances, transaction history and upcoming bills…" and "Erica learns from the conversations with you and other Bank of America customers..." One may

[redacted]

reasonably infer that Erica generates a context stack comprising context information that corresponds to a plurality of prior utterance of a user. Erica determines one or more words of the natural language utterance by performing speech recognition on the natural language utterance. For example, the website shows that Erica determines the words "View my rewards." The website also shows that Erica identifies a context relating to "rewards." One may reasonably infer that Erica compares "rewards" against multiple context entries (including, for example, money transfer, account information, reward in formation), generates scores based on the comparison, determines a context entry related to awards. One may also reasonably infer that Erica determines the user request of asking about awards based on the words recognized ("View my rewards") and the context information. As another example, Erica determines the user request of asking about duplicate charges based on the words recognized ("Show my duplicate charges") and context information.



[redacted]

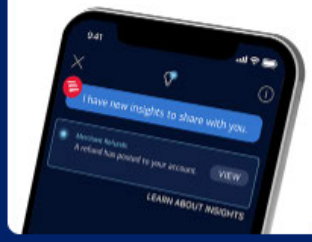


Get the answers you need

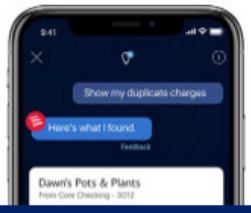
Erica includes more ways to quickly answer your questions, including a live chat with a Bank of America specialist.[2]

Stay on top of your finances with Erica, your virtual financial assistant

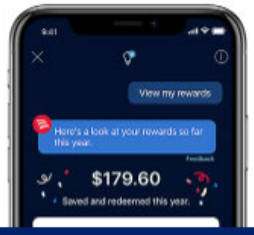
Be alerted when merchant refunds post to your account



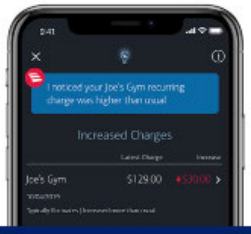
Get notified when duplicate charges occur



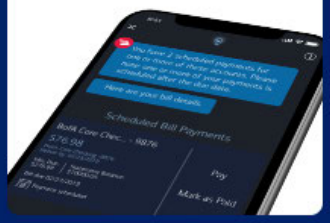
View and redeem rewards in one place



Monitor recurring charges and increases

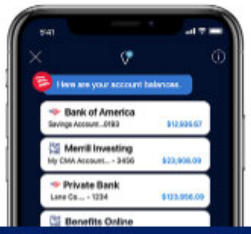


Receive bill reminders when payments are scheduled to be made

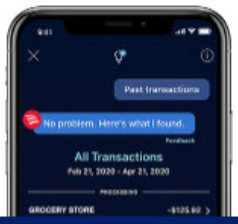


Review weekly updates on monthly spending

View balances across all your accounts



Locate past transactions across accounts



FICO® Score Insights[3] notifies you of important credit score changes

[redacted]

Get started with Erica today

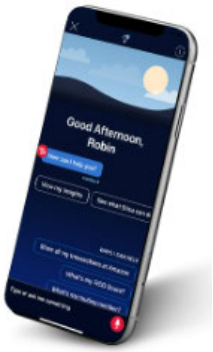
Enter your U.S. mobile number and we'll text you a link to download the Bank of America® Mobile Banking app so you can get started.

Select your device

Get the app

Message and data rates may apply.
Terms and Conditions

Scan a photo to download now



How does Erica work?

Erica leverages the latest technologies, in advanced analytics and cognitive messaging to serve as your trusted financial assistant. Erica is able to consider a range of data within Bank of America, like your cash flow, balances, transaction history and upcoming bills, to help you stay on top of your finances.

Do I need the Mobile Banking app to use Erica?

Yes. Right now, Erica is exclusively available in the Mobile Banking app. Just download the app today to get started!

Will I see the transactions that Erica completed for me?

You'll receive the same confirmations as you do today for transactions conducted in the mobile app. You can also check all transactions in the mobile app and in Online Banking.

How does Erica learn and improve (future functionality)?

Erica learns from the conversations with you and other Bank of America customers and has a dedicated team that's continually working to expand the capabilities offered.

Can someone else activate Erica while using my phone?

No. You will need to be authenticated through the app to be able to use Erica.

229. On information and belief, in violation of 35 U.S.C. § 271(c), Defendant's contributory infringement further includes offering to sell or selling within the United States, or importing into the United States, components of the patented invention of and/or a material or apparatus for use in practicing at least Claim 7 of the '957 Patent, constituting a material part of the invention. On information and belief, Defendant knows and has known the same to be

[redacted]

especially made or especially adapted for use in an infringement of the '957 Patent, and such components are not a staple article or commodity of commerce suitable for substantial non-infringing use. For example, on information and belief, the Erica system is not a staple article and is not a commodity of commerce suitable for substantial non-infringing use, at least because the Erica system is "exclusively available in Bank of America's Mobile Banking app," and the Mobile Banking app infringes at least Claim 7 of the '957 Patent. The Erica system is especially made or especially adapted for use in an infringement of the '957 Patent, because it is designed to receive and interpret natural language utterances in a manner claimed by the '957 Patent, and it is not capable of substantial non-infringing use.

Do I need the Mobile Banking app to use Erica?

Yes. Right now, Erica is exclusively available in the Mobile Banking app. Just download the app today to get started!

230. Defendant is not licensed or otherwise authorized to practice the claims of the '957 Patent.

231. Thus, by its acts, Defendant has injured Dialect and is liable to Dialect for directly and/or indirectly infringing one or more claims of the '957 Patent, whether literally or under the doctrine of equivalents, including without limitation Claim 7.

232. On information and belief, Bank of America deployed Erica in as early as June 2018, and became aware of the infringement of the Asserted Patents in as early as June 2018. At a minimum, Defendant has knowledge of the '957 Patent and its infringement at least as of the filing of the Original Complaint. Defendant has had, and continues to have, the specific intent to infringe, through its deliberate and intentional infringement or, alternatively, through its willfully blind disregard of the '957 Patent by knowing there was a high probability of infringement but taking deliberate actions to avoid confirming that infringement. The filing of this action has also

made Defendant aware of the unjustifiably high risk that its actions constituted and continue to constitute infringement of the ’957 Patent. On information and belief, discovery will reveal additional facts and circumstances from which Defendant’s knowledge and intent to infringe (or willful indifference), both before and after the filing of this action, may be inferred.

233. Accordingly, Defendant’s infringement of the ‘957 Patent has been and continues to be deliberate, intentional, and willful, and this is therefore an exceptional case warranting an award of enhanced damages and attorneys’ fees and costs pursuant to 35 U.S.C. §§ 284 and 285.

234. As a result of Defendant’s infringement of the ’957 Patent, Dialect has suffered monetary damages, and seeks recovery, in an amount to be proven at trial, adequate to compensate for Defendant’s infringement, but in no event less than a reasonable royalty with interest and costs.

235. On information and belief, Defendant will continue to infringe the ’957 Patent unless enjoined by this Court. Defendant’s infringement of Dialect’s rights under the ’957 Patent will continue to damage Dialect, causing irreparable harm for which there is no adequate remedy at law, unless enjoined by this Court.

PRAYER FOR RELIEF

WHEREFORE, Plaintiff prays for judgment and seeks relief from Defendant as follows:

a. For judgment that Defendant has infringed and continues to infringe the claims of the ‘160,’468, ’607, ’039, and ’957 Patents;

b. For a permanent injunction against Defendant and its respective officers, directors, agents, servants, affiliates, employees, divisions, branches, subsidiaries, parents, and all other acting in active concert therewith from infringement of the ’160, ’468, ’607, ’039, and ’957 Patents;

[redacted]

c. For an accounting of all damages sustained by Plaintiff as a result of Defendant's acts of infringement;

d. For a mandatory future royalty payable by Defendant in relation to each use of an Accused Product that is found to infringe one or more of the Asserted Patents and all future products which are not colorably different from products found to infringe;

e. For a judgment and order finding that Defendant's infringement is willful and/or egregious and awarding to Plaintiff enhanced damages pursuant to 35 U.S.C. § 284;

f. For a judgment and order requiring Defendant to pay Plaintiff's damages, costs, expenses, and pre- and post-judgment interest for its infringement of the '160, '468, '607, '039, and '957 Patents as provided under 35 U.S.C. § 284;

g. For a judgment and order finding that this is an exceptional case within the meaning of 35 U.S.C. § 285 and awarding to Plaintiff its reasonable attorneys' fees; and

h. For such other and further relief in law and in equity as the Court may deem just and proper.

DEMAND FOR JURY TRIAL

Pursuant to Rule 38(b) of the Federal Rules of Civil Procedure, Plaintiff demands a trial by jury in this action for all issues triable by a jury.

Dated: December 17, 2024

Respectfully Submitted,

/s/ Garland Stephens by permission Charles Everingham IV

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ATTORNEYS FOR PLAINTIFF

[redacted]

CERTIFICATE OF SERVICE

I hereby certify that on December 17, 2024, a true and correct copy of the foregoing was served on all counsel of record via electronic mail.

/s/ *Charles Everingham, IV*

[redacted]