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G10L 17/24 (2013.01) G10L 17/04 (2013.01)

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(71) Applicant: **GOOGLE LLC** [US/US]; 1600 Amphitheatre Parkway, Mountain View, California 94043 (US).

(72) Inventors: **CHAO, Pu-sen**; 1600 Amphitheatre Parkway, Mountain View, California 94043 (US). **CASADO, Diego Melendo**; 1600 Amphitheatre Parkway, Mountain View, California 94043 (US). **MORENO, Ignacio Lopez**; 1600 Amphitheatre Parkway, Mountain View, California 94043 (US). **WANG, Quan**; 1600 Amphitheatre Parkway, Mountain View, California 94043 (US).

(74) Agent: **HIGDON, Scott et al.**; 401 S. Fourth Street, Suite 2600, Louisville, Kentucky 40202 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

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(54) Title: TEXT INDEPENDENT SPEAKER RECOGNITION

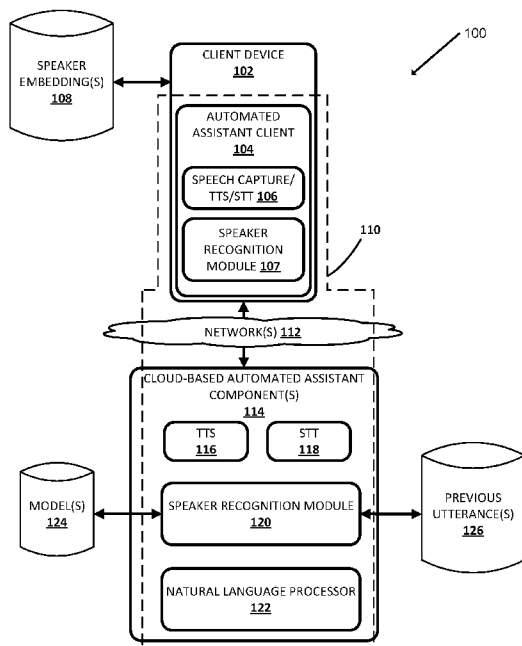


FIG. 1

(57) Abstract: Text independent speaker recognition models can be utilized by an automated assistant to verify a particular user spoke a spoken utterance and/or to identify the user who spoke a spoken utterance. Implementations can include automatically updating a speaker embedding for a particular user based on previous utterances by the particular user. Additionally or alternatively, implementations can include verifying a particular user spoke a spoken utterance using output generated by both a text independent speaker recognition model as well as a text dependent speaker recognition model. Furthermore, implementations can additionally or alternatively include prefetching content for several users associated with a spoken utterance prior to determining which user spoke the spoken utterance.

WO 2020/117639 A3

**Declarations under Rule 4.17:**

- *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

**Published:**

- *with international search report (Art. 21(3))*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

**(88) Date of publication of the international search report:**

06 August 2020 (06.08.2020)

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US2019/063927

## Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1.  Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
  
2.  Claims Nos.:  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
  
3.  Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1.  As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2.  As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.
3.  As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4.  No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-12, 28

### Remark on Protest

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

# INTERNATIONAL SEARCH REPORT

International application No PCT/US2019/063927
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<b>A. CLASSIFICATION OF SUBJECT MATTER</b> INV. G10L17/22 ADD. G10L17/24      G10L17/10      G10L17/04				
According to International Patent Classification (IPC) or to both national classification and IPC				
<b>B. FIELDS SEARCHED</b>				
Minimum documentation searched (classification system followed by classification symbols) G10L				
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched				
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) EPO-Internal, WPI Data				
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>				
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.		
A	US 2018/201226 A1 (FALKSON LISA E [US] ET AL) 19 July 2018 (2018-07-19) paragraphs [0132] - [0134], [0143] paragraph [0164] paragraph [0175]; figure 18C paragraphs [0182], [0183] paragraphs [0205] - [0210]; figure 21A paragraphs [0217] - [0221]; figure 22 -----	1,28		
A	US 5 897 616 A (KANEVSKY DIMITRI [US] ET AL) 27 April 1999 (1999-04-27) column 4, lines 26-31,45-46 column 5, line 39 - column 6, line 10 column 6, line 66 - column 7, line 5 column 8, lines 22-35,48-50 column 13, lines 14-47 ----- -/--	1,28		
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.				
* Special categories of cited documents : <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none; vertical-align: top;">                     "A" document defining the general state of the art which is not considered to be of particular relevance                      "E" earlier application or patent but published on or after the international filing date                      "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)                      "O" document referring to an oral disclosure, use, exhibition or other means                      "P" document published prior to the international filing date but later than the priority date claimed                 </td> <td style="width: 50%; border: none; vertical-align: top;">                     "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention                      "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone                      "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art                      "&amp;" document member of the same patent family                 </td> </tr> </table>			"A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family
"A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family			
Date of the actual completion of the international search	Date of mailing of the international search report			
28 February 2020	02/07/2020			
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer  Ramos Sánchez, U			

INTERNATIONAL SEARCH REPORT

International application No  
PCT/US2019/063927

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2015/255068 A1 (KIM JAEYOUN [US] ET AL) 10 September 2015 (2015-09-10) paragraphs [0032] - [0037], [0044]; figure 2  -----	1,28

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No  
PCT/US2019/063927

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2018201226	A1	19-07-2018	NONE
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US 5897616	A	27-04-1999	US 5897616 A 27-04-1999
			US 6161090 A 12-12-2000
			US 6529871 B1 04-03-2003
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US 2015255068	A1	10-09-2015	NONE
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**FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210**

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-12, 28

Update client-based speaker embedding  
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2. claims: 13, 14, 16-22

Improve speaker recognition accuracy  
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3. claims: 15, 23-27

Latency reduction while avoiding transmission of  
inappropriate content  
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