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| APPLICATION NUMBER | FILING OR 371(C) DATE | FIRST NAMED APPLICANT | ATTY. DOCKET NO./TITLE |
|--------------------|-----------------------|-----------------------|------------------------|
| 18/592,441         | 02/29/2024            | Munjal SHAH           | HPAI1000USN01          |

**CONFIRMATION NO. 7098**

189741  
Flagship Patents - General  
2100 Geng Road, Suite210  
Palo Alto, CA 94303

## PUBLICATION NOTICE



\*OC00000080966661\*

Date Mailed: 11/22/2024

**Title:**Low-Latency Conversational Artificial Intelligence (Ai) Architecture With A Parallelized In-Depth Analysis Feedback Loop

**Publication No.**US-2024-0387025-A1

**Publication Date:**11/21/2024

## NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be viewed using the USPTO's publicly available Searchable Databases via the Patent Public Search tool at [www.uspto.gov](http://www.uspto.gov). The direct link to access the Patent Public Search tool is currently <https://ppubs.uspto.gov/pubwebapp/static/pages/ppubsbasic.html>.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Public Records Division. The Public Records Division can be reached by telephone at (571) 272-3150 or (800) 972-6382, by facsimile at (571) 273-3250, by mail addressed to the United States Patent and Trademark Office, Public Records Division, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through Patent Center, the USPTO's electronic patent application filing and management system. The direct link to access this status information is currently <https://patentcenter.uspto.gov/>. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of Patent Center.

Further assistance in electronically accessing the publication, or about Patent Center, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101



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| APPLICATION NO.                                                               | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-------------------------------------------------------------------------------|-------------|----------------------|---------------------|------------------|
| 18/592,441                                                                    | 02/29/2024  | Munjal SHAH          | HPAI1000USN01       | 7098             |
| 189741                                                                        | 7590        | 11/12/2024           | EXAMINER            |                  |
| Flagship Patents - General<br>2100 Geng Road, Suite210<br>Palo Alto, CA 94303 |             |                      | HANG, VU B          |                  |
|                                                                               |             |                      | ART UNIT            | PAPER NUMBER     |
|                                                                               |             |                      | 2654                |                  |
|                                                                               |             |                      | NOTIFICATION DATE   | DELIVERY MODE    |
|                                                                               |             |                      | 11/12/2024          | ELECTRONIC       |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

bruce@flagshippatents.com  
docket@flagshippatents.com  
cofficeaction@appcoll.com

| APPLICATION NO. | ISSUE DATE  | PATENT NO. |
|-----------------|-------------|------------|
| 18/592,441      | 12-Nov-2024 | 12142371   |

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Palo Alto, CA 94303

## EGRANT NOTIFICATION

Your electronic patent grant (eGrant) is now available, which can be accessed via Patent Center at <https://patentcenter.uspto.gov>

The electronic patent grant is the official patent grant under 35 U.S.C. 153. For more information, please visit <https://www.uspto.gov/electronicgrants>



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| APPLICATION NO. | ISSUE DATE | PATENT NO. | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|------------|------------|---------------------|------------------|
| 18/592,441      | 11/12/2024 | 12142371   | HPAI1000USN01       | 7098             |

189741 7590 10/23/2024  
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2100 Geng Road, Suite 210  
Palo Alto, CA 94303

## ISSUE NOTIFICATION

The projected patent number and issue date are specified above. The patent will issue electronically. The electronically issued patent is the official patent grant pursuant to 35 U.S.C. § 153. The patent may be accessed on or after the issue date through Patent Center at <https://patentcenter.uspto.gov/>. The patent will be available in both the public and the private sides of Patent Center. Further assistance in electronically accessing the patent, or about Patent Center, is available by calling the Patent Electronic Business Center at 1-888-217-9197.

The USPTO is implementing electronic patent issuance with a transition period, during which period the USPTO will mail a ceremonial paper copy of the electronic patent grant to the correspondence address of record. Additional copies of the patent (i.e., certified and presentation copies) may be ordered for a fee from the USPTO's Certified Copy Center at <https://certifiedcopycenter.uspto.gov/index.html>. The Certified Copy Center may be reached at (800)972-6382.

### **Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)** (application filed on or after May 29, 2000)

The Patent Term Adjustment is 0 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Center (<https://patentcenter.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Patents Stakeholder Experience (OPSE), Stakeholder Support Division (SSD) at (571)-272-4200.



**INVENTOR(s)** (Please see PATENT CENTER site <https://patentcenter.uspto.gov> for additional inventors):

Munjal SHAH, Palo Alto, CA;  
Vishal PARIKH, Palo Alto, CA;  
Meenesh BHIMANI, Palo Alto, CA;  
Subhabrata MUKHERJEE, Palo Alto, CA;  
Alex MILLER, Palo Alto, CA;

**APPLICANT(s)** (Please see PATENT CENTER site <https://patentcenter.uspto.gov> for additional applicants):

HealthGPT, Inc. DBA Hippocratic AI, Palo Alto, CA;

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## ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #  
**18/592,441**RECEIPT DATE / TIME  
**10/09/2024 03:40:06 PM Z ET**ATTORNEY DOCKET #  
**HPAI1000USN01**

### Title of Invention

Low-Latency Conversational Artificial Intelligence (Ai) Architecture With A Parallelized In-Depth Analysis Feedback Loop

### Application Information

APPLICATION TYPE    Utility - Nonprovisional Application  
under 35 USC 111(a)

PATENT #    -

CONFIRMATION #    7098

FILED BY    Sonam Suri

PATENT CENTER #    67502368

FILING DATE    02/29/2024

CUSTOMER #    189741

FIRST NAMED  
INVENTOR    Munjal SHAHCORRESPONDENCE  
ADDRESS    -

AUTHORIZED BY    Shiv Naimpally

### Documents

**TOTAL DOCUMENTS: 1**

| DOCUMENT                                           | PAGES | DESCRIPTION                 | SIZE<br>(KB) |
|----------------------------------------------------|-------|-----------------------------|--------------|
| 2024-10-03-Issue-Fee-Transmittal_HPAI1000USN01.pdf | 2     | Issue Fee Payment (PTO-85B) | 1736 KB      |

### Digest

| DOCUMENT                                           | MESSAGE DIGEST(SHA-512)                                                                                                                  |
|----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| 2024-10-03-Issue-Fee-Transmittal_HPAI1000USN01.pdf | EA1B4EB6BF1D7A52990BB20C746B2C62375F2BA4A5F2A56B<br>1F9C9773A5ECC79D2BA7C5AB39C14448ED4C00DF17B0712C<br>A8146C68E00E340FBBA992079EF3163D |

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as

**OSSI Ex. 1018**

described in MPEP 503.

**New Applications Under 35 U.S.C. 111**

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

**National Stage of an International Application under 35 U.S.C. 371**

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

**New International Application Filed with the USPTO as a Receiving Office**

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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## ELECTRONIC PAYMENT RECEIPT

APPLICATION #  
**18/592,441**RECEIPT DATE / TIME  
**10/09/2024 03:40:06 PM Z ET**ATTORNEY DOCKET #  
**HPAI1000USN01**

### Title of Invention

Low-Latency Conversational Artificial Intelligence (Ai) Architecture With A Parallelized In-Depth Analysis Feedback Loop

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APPLICATION TYPE    Utility - Nonprovisional Application  
under 35 USC 111(a)

PATENT #    -

CONFIRMATION #    7098

FILED BY    Sonam Suri

PATENT CENTER #    67502368

AUTHORIZED BY    Shiv Naimpally

CUSTOMER #    189741

FILING DATE    02/29/2024

CORRESPONDENCE  
ADDRESS    -FIRST NAMED  
INVENTOR    Munjal SHAH

### Payment Information

PAYMENT METHOD  
CARD / 5694PAYMENT TRANSACTION ID  
E202409F40346094PAYMENT AUTHORIZED BY  
Sonam Suri

PRE-AUTHORIZED ACCOUNT

-

PRE-AUTHORIZED CATEGORY

37 CFR 1.16 (National application filing, search, and examination fees); 37 CFR 1.17 (Patent application and reexamination processing fees); 37 CFR 1.19 (Document supply fees); 37 CFR 1.20 (Post Issuance fees); 37 CFR 1.21 (Miscellaneous fees and charges)

| FEE CODE                 | DESCRIPTION       | ITEM PRICE(\$) | QUANTITY | ITEM TOTAL(\$)  |
|--------------------------|-------------------|----------------|----------|-----------------|
| 2501                     | UTILITY ISSUE FEE | 480.00         | 1        | 480.00          |
| <b>TOTAL<br/>AMOUNT:</b> |                   |                |          | <b>\$480.00</b> |

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

OSSI Ex. 1018

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**New International Application Filed with the USPTO as a Receiving Office**

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**PART B – FEE(S) TRANSMITTAL**

Complete and send this form, together with the applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

By fax, send to: (571) 273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications. **Because electronic patent issuance may occur shortly after issue fee payment, any desired continuing application should preferably be filed prior to payment of this issue fee in order not to jeopardize copendency.**

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

Flagship Patents  
2100 GENG ROAD, SUITE 210  
Palo Alto, CALIFORNIA 94303 US  
Email: [docket@flagshippatents.com](mailto:docket@flagshippatents.com)

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

**Certificate of Mailing or Transmission**

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

|              |                         |
|--------------|-------------------------|
| Sonam Suri   | (Typed or printed name) |
| /Sonam Suri/ | (Signature)             |
| 2024-10-04   | (Date)                  |

| APPLICATION NO | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO | CONFIRMATION NO |
|----------------|-------------|----------------------|--------------------|-----------------|
| 18/592,441     | 2024-02-29  | Munjal SHAH          | HPAI1000USN01      | 7098            |

TITLE OF INVENTION:

| APPLN. TYPE                             | ENTITY STATUS | ISSUE FEE DUE | PUBLICATION FEE DUE | PREV. PAID ISSUE FEE | TOTAL FEE(S) DUE | DATE DUE   |
|-----------------------------------------|---------------|---------------|---------------------|----------------------|------------------|------------|
| Nonprovisional Application under 35 USC | Small         | \$480         | \$0                 | \$0                  | \$480            | 10/31/2024 |

| EXAMINER  | ART UNIT | CLASS-SUBCLASS |
|-----------|----------|----------------|
| Vu B HANG | 2654     | 704/257.000    |

- |                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                        |                                                                                   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| <p>1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363)</p> <p><input type="checkbox"/> Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.</p> <p><input type="checkbox"/> "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or PTO/SB/47; Rev 03-09 or more recent) attached. <b>Use of a Customer Number is required.</b></p> | <p>2. For printing on the patent front page, list</p> <p>(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,</p> <p>(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.</p> | <p>1. Flagship Patents</p> <p>2. Shiv S. NAIMPALLY</p> <p>3. Sikander M. Khan</p> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)
- PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.
- (A) NAME OF ASSIGNEE: HealthGPT, Inc. DBA Hippocratic AI
- (B) RESIDENCE: (CITY and STATE or COUNTRY) Palo Alto, US

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☒ Corporation or other private group entity ☐ Government4a. Fees Submitted: ☒ Issue Fee ☒ Publication Fee (if required)

4b. Method of Payment (Please first reapply any previously paid fee shown above):

- ☒ Electronic Payment via Patent Center or EFS-Web ☐ Enclosed check ☐ Non-electronic payment by credit card (Attach form PTO-2038)
- ☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. 604861

5. Change of Entity Status (from status indicated above)

- ☐ Applicant certifying micro entity status. See 37 CFR 1.29. NOTE: Absent a valid Certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
- ☒ Applicant asserting small entity status. See 37 CFR 1.27. NOTE: If the application was previously under micro entity status, checking this box will be taken as a notification of loss of entitlement to micro entity status.
- ☐ Applicant changing to regular undiscounted fee status. NOTE: Checking this box will be taken as a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature /Shivshanker S Naimpally/  
Typed or printed name Shivshanker NAIMPALLY

Date 2024-10-03  
Registration No. 66142

## OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

## Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

## NOTICE OF ALLOWANCE AND FEE(S) DUE

189741 7590 07/31/2024  
Flagship Patents - General  
2100 Geng Road, Suite 210  
Palo Alto, CA 94303

|            |              |
|------------|--------------|
| EXAMINER   |              |
| HANG, VU B |              |
| ART UNIT   | PAPER NUMBER |
| 2654       |              |

DATE MAILED: 07/31/2024

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 18/592,441      | 02/29/2024  | Munjal SHAH          | HPAI1000USN01       | 7098             |

TITLE OF INVENTION: Low-Latency Conversational Artificial Intelligence (Ai) Architecture With A Parallelized In-Depth Analysis Feedback Loop

| APPLN. TYPE    | ENTITY STATUS | ISSUE FEE DUE | PUBLICATION FEE DUE | PREV. PAID ISSUE FEE | TOTAL FEE(S) DUE | DATE DUE   |
|----------------|---------------|---------------|---------------------|----------------------|------------------|------------|
| nonprovisional | SMALL         | \$480         | \$0.00              | \$0.00               | \$480            | 10/31/2024 |

**THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.**

**THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.**

### HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 40% the amount of undiscounted fees, and micro entity fees are 20% the amount of undiscounted fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

**IMPORTANT REMINDER: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at [www.uspto.gov/PatentMaintenanceFees](http://www.uspto.gov/PatentMaintenanceFees).**



## PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via the USPTO patent electronic filing system.

By mail, send to: Mail Stop ISSUE FEE  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

**INSTRUCTIONS:** This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications. **Because electronic patent issuance may occur shortly after issue fee payment, any desired continuing application should preferably be filed prior to payment of this issue fee in order not to jeopardize copendency.**

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

**Certificate of Mailing or Transmission**

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via the USPTO patent electronic filing system or by facsimile to (571) 273-2885, on the date below.

|                         |
|-------------------------|
| (Typed or printed name) |
| (Signature)             |
| (Date)                  |

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 18/592,441      | 02/29/2024  | Munjal SHAH          | HPAI1000USN01       | 7098             |

TITLE OF INVENTION: Low-Latency Conversational Artificial Intelligence (Ai) Architecture With A Parallelized In-Depth Analysis Feedback Loop

| APPLN. TYPE    | ENTITY STATUS | ISSUE FEE DUE | PUBLICATION FEE DUE | PREV. PAID ISSUE FEE | TOTAL FEE(S) DUE | DATE DUE   |
|----------------|---------------|---------------|---------------------|----------------------|------------------|------------|
| nonprovisional | SMALL         | \$480         | \$0.00              | \$0.00               | \$480            | 10/31/2024 |

| EXAMINER   | ART UNIT | CLASS-SUBCLASS |
|------------|----------|----------------|
| HANG, VU B | 2654     | 704-257000     |

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/AIA/122 or PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,

(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 \_\_\_\_\_

2 \_\_\_\_\_

3 \_\_\_\_\_

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. Fees submitted: ☐ Issue Fee ☐ Publication Fee (if required)

4b. Method of Payment: (Please first reapply any previously paid fee shown above)

☐ Electronic Payment via the USPTO patent electronic filing system ☐ Enclosed check ☐ Non-electronic payment by credit card (Attach form PTO-2038)

☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. \_\_\_\_\_

5. Change in Entity Status (from status indicated above)

☐ Applicant certifying micro entity status. See 37 CFR 1.29

☐ Applicant asserting small entity status. See 37 CFR 1.27

☐ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature \_\_\_\_\_

Date \_\_\_\_\_

Typed or printed name \_\_\_\_\_

Registration No. \_\_\_\_\_



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
**United States Patent and Trademark Office**  
Address: COMMISSIONER FOR PATENTS  
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www.uspto.gov

| APPLICATION NO.                                                                | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--------------------------------------------------------------------------------|-------------|----------------------|---------------------|------------------|
| 18/592,441                                                                     | 02/29/2024  | Munjal SHAH          | HPAI1000USN01       | 7098             |
| 189741                                                                         | 7590        | 07/31/2024           | EXAMINER            |                  |
| Flagship Patents - General<br>2100 Geng Road, Suite 210<br>Palo Alto, CA 94303 |             |                      | HANG, VU B          |                  |
|                                                                                |             |                      | ART UNIT            | PAPER NUMBER     |
|                                                                                |             |                      | 2654                |                  |
| DATE MAILED: 07/31/2024                                                        |             |                      |                     |                  |

## Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

## OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

### Privacy Act Statement

**The Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. The United States Patent and Trademark Office (USPTO) collects the information in this record under authority of 35 U.S.C. 2. The USPTO's system of records is used to manage all applicant and owner information including name, citizenship, residence, post office address, and other information with respect to inventors and their legal representatives pertaining to the applicant's/owner's activities in connection with the invention for which a patent is sought or has been granted. The applicable Privacy Act System of Records Notice for the information collected in this form is COMMERCE/PAT-TM-7 Patent Application Files, available in the Federal Register at 78 FR 19243 (March 29, 2013).

<https://www.govinfo.gov/content/pkg/FR-2013-03-29/pdf/2013-07341.pdf>

Routine uses of the information in this record may include disclosure to:

- 1) law enforcement, in the event that the system of records indicates a violation or potential violation of law;
- 2) a federal, state, local, or international agency, in response to its request;
- 3) a contractor of the USPTO having need for the information in order to perform a contract;
- 4) the Department of Justice for determination of whether the Freedom of Information Act (FOIA) requires disclosure of the record;
- 5) a Member of Congress submitting a request involving an individual to whom the record pertains, when the individual has requested the Member's assistance with respect to the subject matter of the record;
- 6) a court, magistrate, or administrative tribunal, in the course of presenting evidence, including disclosures to opposing counsel in the course of settlement negotiations;
- 7) the Administrator, General Services Administration (GSA), or their designee, during an inspection of records conducted by GSA under authority of 44 U.S.C. 2904 and 2906, in accordance with the GSA regulations and any other relevant (i.e., GSA or Commerce) directive, where such disclosure shall not be used to make determinations about individuals;
- 8) another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c));
- 9) the Office of Personnel Management (OPM) for personnel research purposes; and
- 10) the Office of Management and Budget (OMB) for legislative coordination and clearance.

If you do not furnish the information requested on this form, the USPTO may not be able to process and/or examine your submission, which may result in termination of proceedings, abandonment of the application, and/or expiration of the patent.

|                               |                                      |                                    |                                 |
|-------------------------------|--------------------------------------|------------------------------------|---------------------------------|
| <b>Notice of Allowability</b> | <b>Application No.</b><br>18/592,441 | <b>Applicant(s)</b><br>SHAH et al. |                                 |
|                               | <b>Examiner</b><br>VU B HANG         | <b>Art Unit</b><br>2654            | <b>AIA (FITF) Status</b><br>Yes |

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 06/03/2024.  
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on \_\_\_\_\_.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on \_\_\_\_\_; the restriction requirement and election have been incorporated into this action.

3. ☒ The allowed claim(s) is/are 1-20. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see [http://www.uspto.gov/patents/init\\_events/pph/index.jsp](http://www.uspto.gov/patents/init_events/pph/index.jsp) or send an inquiry to [PPHfeedback@uspto.gov](mailto:PPHfeedback@uspto.gov).

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

**Certified copies:**

a) ☐ All      b) ☐ Some\*      c) ☐ None of the:

1. ☐ Certified copies of the priority documents have been received.

2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.

3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.  
☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.

**Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

|                                                                                                                     |                                                                                      |
|---------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892)                                                    | 5. <input type="checkbox"/> Examiner's Amendment/Comment                             |
| 2. <input checked="" type="checkbox"/> Information Disclosure Statements (PTO/SB/08),<br>Paper No./Mail Date _____. | 6. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| 3. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br>of Biological Material _____.   | 7. <input type="checkbox"/> Other _____.                                             |
| 4. <input type="checkbox"/> Interview Summary (PTO-413),<br>Paper No./Mail Date. _____.                             |                                                                                      |

|                                                |  |
|------------------------------------------------|--|
| /VU B HANG/<br>Primary Examiner, Art Unit 2654 |  |
|------------------------------------------------|--|

***Notice of Pre-AIA or AIA Status***

- The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.
- Claims 1-20 are allowed.

***Response to Arguments***

Applicant's arguments filed, with respect to the rejection of Claim 12 under 35 USC 112, have been fully considered and are persuasive. Therefore, the rejection of Claim 12 under 35 USC 112 has been withdrawn.

Applicant's arguments filed, with respect to the amended independent claims (Claims 1 and 19) and the previously cited prior art, have been fully considered and are persuasive. Therefore, the rejection of Claims 1-18 under 35 USC 103, and Claims 19 and 20 under 35 USC 102, has been withdrawn.

***Allowable Subject Matter***

Claims 1-20 are allowed.

The following is an examiner's statement of reasons for allowance:

The prior art of record does not teach, disclose or suggest the claimed limitation of (in combination with all other limitations in the claim) "a second opinion module comprising an additional large language model to perform research into a portion of the human-like conversation in parallel with the human-like conversation taking place between the conversation interface and the user", as found in **Claim 1**. Similar features are claimed in **Claims 2-20**.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to VU B HANG whose telephone number is (571)272-0582.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at <http://www.uspto.gov/interviewpractice>.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hai Phan, can be reached at (571)272-6338. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of published or unpublished applications may be obtained from Patent Center. Unpublished application information in Patent Center is available to registered users. To file and manage patent submissions in Patent Center, visit: <https://patentcenter.uspto.gov>. Visit <https://www.uspto.gov/patents/apply/patent-center> for more information about Patent Center and <https://www.uspto.gov/patents/docx> for information about filing in DOCX format. For additional questions, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/VU B HANG/  
Primary Examiner, Art Unit 2654

|                                                                                                                  |                                              |                                                               |
|------------------------------------------------------------------------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|
| <b>Issue Classification</b><br> | <b>Application/Control No.</b><br>18/592,441 | <b>Applicant(s)/Patent Under Reexamination</b><br>SHAH et al. |
|                                                                                                                  | <b>Examiner</b><br>VU B HANG                 | <b>Art Unit</b><br>2654                                       |

| CPC    |   |    |   |      |      |            |
|--------|---|----|---|------|------|------------|
| Symbol |   |    |   |      | Type | Version    |
| G16H   | / | 40 | / | 20   | F    | 2018-01-01 |
| G10L   | / | 25 | / | 66   | I    | 2013-01-01 |
| G10L   | / | 15 | / | 22   | I    | 2013-01-01 |
| G10L   | / | 15 | / | 183  | I    | 2013-01-01 |
| G10L   | / | 15 | / | 19   | A    | 2013-01-01 |
| G10L   | / | 15 | / | 1822 | A    | 2013-01-01 |

| CPC Combination Sets |   |      |     |         |
|----------------------|---|------|-----|---------|
| Symbol               |   | Type | Set | Ranking |
| /                    | / |      |     |         |

|                                                |                              |                     |
|------------------------------------------------|------------------------------|---------------------|
| NONE                                           | <b>Total Claims Allowed:</b> |                     |
| (Assistant Examiner)                           | (Date)                       | 20                  |
| /VU B HANG/<br>Primary Examiner, Art Unit 2654 | 18 July 2024                 | O.G. Print Claim(s) |
| (Primary Examiner)                             | (Date)                       | 1                   |

|                                                                                                                  |                                              |                                                               |
|------------------------------------------------------------------------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|
| <b>Issue Classification</b><br> | <b>Application/Control No.</b><br>18/592,441 | <b>Applicant(s)/Patent Under Reexamination</b><br>SHAH et al. |
|                                                                                                                  | <b>Examiner</b><br>VU B HANG                 | <b>Art Unit</b><br>2654                                       |

|                                     |   |    |      |
|-------------------------------------|---|----|------|
| <b>INTERNATIONAL CLASSIFICATION</b> |   |    |      |
| <b>CLAIMED</b>                      |   |    |      |
| G10L                                | / | 15 | / 00 |
| <b>NON-CLAIMED</b>                  |   |    |      |
|                                     | / |    | /    |

|                                   |                 |
|-----------------------------------|-----------------|
| <b>US ORIGINAL CLASSIFICATION</b> |                 |
| <b>CLASS</b>                      | <b>SUBCLASS</b> |
| 704                               | 257             |

|                            |                                          |  |  |  |  |  |
|----------------------------|------------------------------------------|--|--|--|--|--|
| <b>CROSS REFERENCES(S)</b> |                                          |  |  |  |  |  |
| <b>CLASS</b>               | <b>SUBCLASS (ONE SUBCLASS PER BLOCK)</b> |  |  |  |  |  |
|                            |                                          |  |  |  |  |  |

|                                                |              |                              |                   |
|------------------------------------------------|--------------|------------------------------|-------------------|
| NONE                                           |              | <b>Total Claims Allowed:</b> |                   |
| (Assistant Examiner)                           | (Date)       | 20                           |                   |
| /VU B HANG/<br>Primary Examiner, Art Unit 2654 | 18 July 2024 | O.G. Print Claim(s)          | O.G. Print Figure |
| (Primary Examiner)                             | (Date)       | 1                            | 1                 |



|                                                                                                                  |                                              |                                                               |
|------------------------------------------------------------------------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|
| <b>Issue Classification</b><br> | <b>Application/Control No.</b><br>18/592,441 | <b>Applicant(s)/Patent Under Reexamination</b><br>SHAH et al. |
|                                                                                                                  | <b>Examiner</b><br>VU B HANG                 | <b>Art Unit</b><br>2654                                       |

|                                                                                                                                                                                              |                 |              |                 |              |                 |              |                 |              |                 |              |                 |              |                 |              |                 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|--------------|-----------------|--------------|-----------------|--------------|-----------------|--------------|-----------------|--------------|-----------------|--------------|-----------------|--------------|-----------------|
| <input checked="" type="checkbox"/> Claims renumbered in the same order as presented by applicant <input type="checkbox"/> CPA <input type="checkbox"/> T.D. <input type="checkbox"/> R.1.47 |                 |              |                 |              |                 |              |                 |              |                 |              |                 |              |                 |              |                 |
| <b>CLAIMS</b>                                                                                                                                                                                |                 |              |                 |              |                 |              |                 |              |                 |              |                 |              |                 |              |                 |
| <b>Final</b>                                                                                                                                                                                 | <b>Original</b> | <b>Final</b> | <b>Original</b> | <b>Final</b> | <b>Original</b> | <b>Final</b> | <b>Original</b> | <b>Final</b> | <b>Original</b> | <b>Final</b> | <b>Original</b> | <b>Final</b> | <b>Original</b> | <b>Final</b> | <b>Original</b> |
|                                                                                                                                                                                              | 1               |              | 10              |              | 19              |              |                 |              |                 |              |                 |              |                 |              |                 |
|                                                                                                                                                                                              | 2               |              | 11              |              | 20              |              |                 |              |                 |              |                 |              |                 |              |                 |
|                                                                                                                                                                                              | 3               |              | 12              |              |                 |              |                 |              |                 |              |                 |              |                 |              |                 |
|                                                                                                                                                                                              | 4               |              | 13              |              |                 |              |                 |              |                 |              |                 |              |                 |              |                 |
|                                                                                                                                                                                              | 5               |              | 14              |              |                 |              |                 |              |                 |              |                 |              |                 |              |                 |
|                                                                                                                                                                                              | 6               |              | 15              |              |                 |              |                 |              |                 |              |                 |              |                 |              |                 |
|                                                                                                                                                                                              | 7               |              | 16              |              |                 |              |                 |              |                 |              |                 |              |                 |              |                 |
|                                                                                                                                                                                              | 8               |              | 17              |              |                 |              |                 |              |                 |              |                 |              |                 |              |                 |
|                                                                                                                                                                                              | 9               |              | 18              |              |                 |              |                 |              |                 |              |                 |              |                 |              |                 |

|                                                |                              |                     |
|------------------------------------------------|------------------------------|---------------------|
| NONE                                           | <b>Total Claims Allowed:</b> |                     |
| (Assistant Examiner)                           | (Date)                       | 20                  |
| /VU B HANG/<br>Primary Examiner, Art Unit 2654 | 18 July 2024                 | O.G. Print Claim(s) |
| (Primary Examiner)                             | (Date)                       | 1                   |
|                                                |                              | O.G. Print Figure   |
|                                                |                              | 1                   |

|                                                                                                          |                                              |                                                               |
|----------------------------------------------------------------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|
| <b>Search Notes</b><br> | <b>Application/Control No.</b><br>18/592,441 | <b>Applicant(s)/Patent Under Reexamination</b><br>SHAH et al. |
|                                                                                                          | <b>Examiner</b><br>VU B HANG                 | <b>Art Unit</b><br>2654                                       |

| CPC - Searched* |      |          |
|-----------------|------|----------|
| Symbol          | Date | Examiner |
|                 |      |          |

| CPC Combination Sets - Searched*                                                                                                           |            |          |
|--------------------------------------------------------------------------------------------------------------------------------------------|------------|----------|
| Symbol                                                                                                                                     | Date       | Examiner |
| G06F 40/30, 40/211, 40/253, 40/268, 40/284                                                                                                 | 05/17/2024 | VH       |
| G10L 15/07, 15/20, 15/22, 15/26, 15/30, 15/02, 15/063, 15/08, 15/16, 25/30, 21/0208, 25/78, 25/87, 15/1822, 15/183, 15/193, 15/19, 15/1815 | 05/17/2024 | VH       |
| G10L 15/07, 15/20, 15/22, 15/26, 15/30, 15/02, 15/063, 15/08, 15/16, 25/30, 13/02, 25/27, 17/18, 15/1822, 15/183, 15/193, 15/19            | 07/18/2024 | VH       |

| US Classification - Searched* |          |      |          |
|-------------------------------|----------|------|----------|
| Class                         | Subclass | Date | Examiner |
|                               |          |      |          |

\* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

| Search Notes                             |            |          |
|------------------------------------------|------------|----------|
| Search Notes                             | Date       | Examiner |
| PE2E Search, Limited Text Search         | 05/17/2024 | VH       |
| Updated PE2E Search, Limited Text Search | 07/18/2024 | VH       |
| NPL Search - Dialog                      | 07/18/2024 | VH       |
| Inventor Search                          | 07/18/2024 | VH       |

|                                                |  |
|------------------------------------------------|--|
| /VU B HANG/<br>Primary Examiner, Art Unit 2654 |  |
|------------------------------------------------|--|

|                                                                                                                 |                                              |                                                               |
|-----------------------------------------------------------------------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|
| <b><i>Search Notes</i></b><br> | <b>Application/Control No.</b><br>18/592,441 | <b>Applicant(s)/Patent Under Reexamination</b><br>SHAH et al. |
|                                                                                                                 | <b>Examiner</b><br>VU B HANG                 | <b>Art Unit</b><br>2654                                       |

| Interference Search |                       |            |          |
|---------------------|-----------------------|------------|----------|
| US Class/CPC Symbol | US Subclass/CPC Group | Date       | Examiner |
| G10L                | 15/22                 | 07/18/2024 | VH       |
| G10L                | 15/183                | 07/18/2024 | VH       |

|                                               |  |
|-----------------------------------------------|--|
| VU B HANG/<br>Primary Examiner, Art Unit 2654 |  |
|-----------------------------------------------|--|





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CONFIRMATION NO. 7098

| SERIAL NUMBER                                                                                                                                                                                                                                                                                                           | FILING or<br>371(c) DATE                                                                                          | CLASS                                                          | GROUP ART UNIT                    | ATTORNEY<br>DOCKET NO.                                                                                                                                                                                                                 |                               |                                    |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|------------------------------------|
| 18/592,441                                                                                                                                                                                                                                                                                                              | 02/29/2024                                                                                                        | 704                                                            | 2654                              | HPAI1000USN01                                                                                                                                                                                                                          |                               |                                    |
| <b>RULE</b>                                                                                                                                                                                                                                                                                                             |                                                                                                                   |                                                                |                                   |                                                                                                                                                                                                                                        |                               |                                    |
| <b>APPLICANTS</b><br>HealthGPT, Inc. DBA Hippocratic AI, Palo Alto, CA;                                                                                                                                                                                                                                                 |                                                                                                                   |                                                                |                                   |                                                                                                                                                                                                                                        |                               |                                    |
| <b>INVENTORS</b><br>Munjal SHAH, Palo Alto, CA;<br>Vishal PARIKH, Palo Alto, CA;<br>Meenesh BHIMANI, Palo Alto, CA;<br>Subhabrata MUKHERJEE, Palo Alto, CA;<br>Alex MILLER, Palo Alto, CA;<br>Saad GODIL, Palo Alto, CA;<br>Debajyoti DATTA, Palo Alto, CA;<br>Paul GAMBLE, Palo Alto, CA;<br>Rae LASKO, Palo Alto, CA; |                                                                                                                   |                                                                |                                   |                                                                                                                                                                                                                                        |                               |                                    |
| <b>** CONTINUING DATA *****</b><br>This appln claims benefit of 63/611,762 12/18/2023<br>and claims benefit of 63/466,712 05/15/2023                                                                                                                                                                                    |                                                                                                                   |                                                                |                                   |                                                                                                                                                                                                                                        |                               |                                    |
| <b>** FOREIGN APPLICATIONS *****</b>                                                                                                                                                                                                                                                                                    |                                                                                                                   |                                                                |                                   |                                                                                                                                                                                                                                        |                               |                                    |
| <b>** IF REQUIRED, FOREIGN FILING LICENSE GRANTED *** SMALL ENTITY **</b><br>03/12/2024                                                                                                                                                                                                                                 |                                                                                                                   |                                                                |                                   |                                                                                                                                                                                                                                        |                               |                                    |
| Foreign Priority claimed <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br>35 USC 119(a-d) conditions met <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br>Verified and /VU B HANG/<br>Acknowledged Examiner's Signature                                                     |                                                                                                                   | <input type="checkbox"/> Met after Allowance<br>VH<br>Initials | <b>STATE OR<br/>COUNTRY</b><br>CA | <b>SHEETS<br/>DRAWINGS</b><br>21                                                                                                                                                                                                       | <b>TOTAL<br/>CLAIMS</b><br>20 | <b>INDEPENDENT<br/>CLAIMS</b><br>2 |
| <b>ADDRESS</b><br>Flagship Patents - General<br>2100 Geng Road, Suite210<br>Palo Alto, CA 94303<br>UNITED STATES                                                                                                                                                                                                        |                                                                                                                   |                                                                |                                   |                                                                                                                                                                                                                                        |                               |                                    |
| <b>TITLE</b><br>Low-Latency Conversational Artificial Intelligence (Ai) Architecture With A Parallelized In-Depth Analysis Feedback Loop                                                                                                                                                                                |                                                                                                                   |                                                                |                                   |                                                                                                                                                                                                                                        |                               |                                    |
| <b>FILING FEE<br/>RECEIVED</b><br>0.00                                                                                                                                                                                                                                                                                  | FEES: Authority has been given in Paper<br>No. _____ to charge/credit DEPOSIT ACCOUNT<br>No. _____ for following: |                                                                |                                   | <input type="checkbox"/> All Fees<br><input type="checkbox"/> 1.16 Fees (Filing)<br><input type="checkbox"/> 1.17 Fees (Processing Ext. of time)<br><input type="checkbox"/> 1.18 Fees (Issue)<br><input type="checkbox"/> Other _____ |                               |                                    |

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| <b>INFORMATION DISCLOSURE<br/>STATEMENT BY APPLICANT</b><br>( Not for submission under 37 CFR 1.99) | Application Number     |               | 18592441   |
|                                                                                                     | Filing Date            |               | 2024-02-29 |
|                                                                                                     | First Named Inventor   | Munjal SHAH   |            |
|                                                                                                     | Art Unit               | 2654          |            |
|                                                                                                     | Examiner Name          | Vu B HANG     |            |
|                                                                                                     | Attorney Docket Number | HPAI1000USN01 |            |

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|                                                                                                     | Filing Date            |               | 2024-02-29 |
|                                                                                                     | First Named Inventor   | Munjal SHAH   |            |
|                                                                                                     | Art Unit               | 2654          |            |
|                                                                                                     | Examiner Name          | Vu B HANG     |            |
|                                                                                                     | Attorney Docket Number | HPAI1000USN01 |            |

|         |   |                                                                                                                                                                                                                     |                          |
|---------|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| /V.B.H/ | 1 | Biao et al, Root Mean Square Layer Normalization, School of Informatics, University of Edinburgh, Retrieved on June 06, 2024, 12 pages. [NeurIPS 2019]                                                              | <input type="checkbox"/> |
| /V.B.H/ | 2 | Gao et al. Retrieval-Augmented Generation for Large Language Models: A Survey, Shanghai Research Institute for Intelligent Autonomous Systems, Tongji University, March 27, 2024, 21 pages. [Url: arXiv:2312.10997] | <input type="checkbox"/> |
| /V.B.H/ | 3 | Karan et al, Large Language Models Encode Clinical Knowledge, Google Research, December 26, 2022, 44 pages. [arXiv:2212.13138]                                                                                      | <input type="checkbox"/> |
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( Not for submission under 37 CFR 1.99)

|                        |               |
|------------------------|---------------|
| Application Number     | 18592441      |
| Filing Date            | 2024-02-29    |
| First Named Inventor   | Munjal SHAH   |
| Art Unit               | 2654          |
| Examiner Name          | Vu B HANG     |
| Attorney Docket Number | HPAI1000USN01 |

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Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

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- ☐ See attached certification statement.
- ☐ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.
- ☒ A certification statement is not submitted herewith.

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A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

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|------------|--------------------|---------------------|------------|
| Signature  | /Sikander M. Khan/ | Date (YYYY-MM-DD)   | 2024-06-07 |
| Name/Print | Sikander M. KHAN   | Registration Number | 78888      |

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## PE2E SEARCH - Search History (Prior Art)

| Ref # | Hits | Search Query      | DBs                                                                                                                                                                                                                                                                                                                  | Default Operator | Plurals | British Equivalents | Time Stamp          |
|-------|------|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|---------|---------------------|---------------------|
| L1    | 1180 | (G06F ADJ 40/211) | (US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR               | ON      | ON                  | 2024/05/09 08:29 PM |
| L2    | 1150 | (G06F ADJ 40/253) | (US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR               | ON      | ON                  | 2024/05/09 08:29 PM |
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| L14 | 2838 | (G10L ADJ 15/1815) | (US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2024/05/09 08:31 PM |

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|-----|------|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|------------------------|
| L15 | 2791 | (G10L ADJ 15/1822) | VN); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)<br><br>(US-PGPUB; USPAT;<br>USOCR; FIT (AU, AP,<br>AT, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, OA, RU, SU, WO,<br>MC, MD, MY, NL, NO,<br>NZ, PH, PL, PT, RO,<br>RS, SE, SG, SI, SK,<br>TH, TN, TR, TW, UA,<br>VN); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2024/05/09<br>08:31 PM |
| L16 | 1703 | (G10L ADJ 15/183)  | (US-PGPUB; USPAT;<br>USOCR; FIT (AU, AP,<br>AT, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, OA, RU, SU, WO,<br>MC, MD, MY, NL, NO,<br>NZ, PH, PL, PT, RO,<br>RS, SE, SG, SI, SK,<br>TH, TN, TR, TW, UA,<br>VN); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                                                     | OR | ON | ON | 2024/05/09<br>08:31 PM |
| L17 | 597  | (G10L ADJ 15/193)  | (US-PGPUB; USPAT;<br>USOCR; FIT (AU, AP,<br>AT, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, OA, RU, SU, WO,<br>MC, MD, MY, NL, NO,<br>NZ, PH, PL, PT, RO,<br>RS, SE, SG, SI, SK,<br>TH, TN, TR, TW, UA,<br>VN); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                                                     | OR | ON | ON | 2024/05/09<br>08:31 PM |
| L18 | 949  | (G10L ADJ 15/19)   | (US-PGPUB; USPAT;<br>USOCR; FIT (AU, AP,<br>AT, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,                                                                                                                                                                                                                                                                                                         | OR | ON | ON | 2024/05/09<br>08:32 PM |

|     |      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |    |    |    |                     |
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| L19 | 553  | (G10L ADJ 25/87) | EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)<br>(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2024/05/09 08:32 PM |
| L20 | 2474 | (G10L ADJ 25/78) | (US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                                                                                                                                                                                       | OR | ON | ON | 2024/05/09 08:32 PM |
| L21 | 1109 | (G10L ADJ 25/30) | (US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                                                                                                                                                                                       | OR | ON | ON | 2024/05/09 08:32 PM |



|     |       |                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                |    |    |    |                        |
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| L22 | 269   | (G10L ADJ 25/27)                                                                                                              | JPO; DERWENT;<br>IBM_TDB)<br>(US-PGPUB; USPAT;<br>USOCR; FIT (AU, AP,<br>AT, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, OA, RU, SU, WO,<br>MC, MD, MY, NL, NO,<br>NZ, PH, PL, PT, RO,<br>RS, SE, SG, SI, SK,<br>TH, TN, TR, TW, UA,<br>VN); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2024/05/09<br>08:32 PM |
| L23 | 2372  | (G10L ADJ 15/16)                                                                                                              | (US-PGPUB; USPAT;<br>USOCR; FIT (AU, AP,<br>AT, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, OA, RU, SU, WO,<br>MC, MD, MY, NL, NO,<br>NZ, PH, PL, PT, RO,<br>RS, SE, SG, SI, SK,<br>TH, TN, TR, TW, UA,<br>VN); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                              | OR | ON | ON | 2024/05/09<br>08:32 PM |
| L24 | 3621  | (G10L ADJ 21/0208)                                                                                                            | (US-PGPUB; USPAT;<br>USOCR; FIT (AU, AP,<br>AT, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, OA, RU, SU, WO,<br>MC, MD, MY, NL, NO,<br>NZ, PH, PL, PT, RO,<br>RS, SE, SG, SI, SK,<br>TH, TN, TR, TW, UA,<br>VN); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                              | OR | ON | ON | 2024/05/09<br>08:32 PM |
| L25 | 32881 | (L1 OR L2 OR L3 OR<br>L4 OR L5 OR L6 OR L7<br>OR L8 OR L9 OR L10<br>OR L11 OR L12 OR<br>L13 OR L14 OR L15<br>OR L16 OR L17 OR | (US-PGPUB; USPAT;<br>USOCR; FIT (AU, AP,<br>AT, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,                                                                                                                                                                                                                                                       | OR | ON | ON | 2024/05/09<br>08:34 PM |

|     |      |                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                   |    |    |    |                        |
|-----|------|------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|------------------------|
|     |      | L18 OR L19 OR L20<br>OR L21 OR L22 OR<br>L23 OR L24)                                                                   | HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, OA, RU, SU, WO,<br>MC, MD, MY, NL, NO,<br>NZ, PH, PL, PT, RO,<br>RS, SE, SG, SI, SK,<br>TH, TN, TR, TW, UA,<br>VN); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                                                                                                                                             |    |    |    |                        |
| L26 | 1215 | L25 AND (conversation<br>SAME turn\$1 OR<br>(question near5<br>answer) SAME<br>(language ADJ model))                   | (US-PGPUB; USPAT;<br>USOCR; FIT (AU, AP,<br>AT, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, OA, RU, SU, WO,<br>MC, MD, MY, NL, NO,<br>NZ, PH, PL, PT, RO,<br>RS, SE, SG, SI, SK,<br>TH, TN, TR, TW, UA,<br>VN); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2024/05/09<br>08:35 PM |
| L27 | 1170 | L25 AND (conversation<br>SAME turn\$1 OR<br>(question near5<br>answer) SAME trained<br>SAME (language ADJ<br>model))   | (US-PGPUB; USPAT;<br>USOCR; FIT (AU, AP,<br>AT, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, OA, RU, SU, WO,<br>MC, MD, MY, NL, NO,<br>NZ, PH, PL, PT, RO,<br>RS, SE, SG, SI, SK,<br>TH, TN, TR, TW, UA,<br>VN); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2024/05/09<br>08:36 PM |
| L28 | 0    | L25 AND (conversation<br>SAME turn\$1 SAME<br>(question near5<br>answer) SAME trained<br>SAME (language ADJ<br>model)) | (US-PGPUB; USPAT;<br>USOCR; FIT (AU, AP,<br>AT, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, OA, RU, SU, WO,<br>MC, MD, MY, NL, NO,<br>NZ, PH, PL, PT, RO,<br>RS, SE, SG, SI, SK,<br>TH, TN, TR, TW, UA,<br>VN); FPRS; EPO;<br>JPO; DERWENT;             | OR | ON | ON | 2024/05/09<br>08:36 PM |

|     |    |                                                                                                                      |                                                                                                                                                                                                                                                                                                                                  |    |    |    |                     |
|-----|----|----------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|---------------------|
| L29 | 0  | L25 AND ((conversation OR dialog OR multimodal) SAME turn\$1 SAME (question near5 answer) SAME (language ADJ model)) | IBM_TDB)<br>(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2024/05/09 08:36 PM |
| L30 | 3  | L25 AND ((conversation OR dialog OR multimodal) SAME turn\$1 SAME question SAME answer SAME (language ADJ model))    | (US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)             | OR | ON | ON | 2024/05/09 08:37 PM |
| L31 | 16 | L25 AND ((conversation OR dialog OR multimodal) SAME question SAME answer SAME (language ADJ model))                 | (US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)             | OR | ON | ON | 2024/05/09 08:37 PM |
| L32 | 9  | L25 AND ((conversation OR dialog OR multimodal OR dialogue) SAME turn\$1 SAME (trained near3 (language ADJ model)))  | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS,                                                                                                                                                                                | OR | ON | ON | 2024/05/09 08:59 PM |

|     |      |                                                                                                       |                                                                                                                                                                                                                                                                                                                      |    |    |    |                     |
|-----|------|-------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|---------------------|
| L33 | 1420 | L25 AND ((conversation OR dialog OR dialogue) SAME (question near3 answer))                           | IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                                                                                                                   | OR | ON | ON | 2024/05/09 11:19 PM |
| L34 | 12   | L25 AND ((conversation OR dialog OR dialogue) SAME (question near3 answer) SAME (language ADJ model)) | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2024/05/09 11:20 PM |
| L35 | 620  | L25 AND ((conversation OR dialog OR dialogue) SAME (language ADJ model))                              | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2024/05/09 11:23 PM |

|     |      |                                                                                                                                    |                                                                                                                                                                                                                                                                                                                      |    |    |    |                     |
|-----|------|------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|---------------------|
| L36 | 54   | L25 AND ((conversation OR dialog OR dialogue) SAME turn\$1 SAME (language ADJ model))                                              | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2024/05/09 11:24 PM |
| L37 | 5122 | L25 AND ((conversation OR dialog OR dialogue) SAME multimodal SAME (language ADJ model))                                           | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2024/05/09 11:24 PM |
| L38 | 17   | L25 AND ((conversation OR dialog OR dialogue) SAME multimodal SAME (language ADJ model))                                           | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2024/05/09 11:24 PM |
| L39 | 0    | L25 AND ((conversation OR dialog OR dialogue) SAME turn\$1 SAME (question near3 answer) SAME (trained near4 (language ADJ model))) | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL,                                                                                                                        | OR | ON | ON | 2024/05/10 11:36 PM |

|     |   |                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                |    |    |    |                     |
|-----|---|---------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|---------------------|
| L40 | 3 | ((conversation OR dialog OR dialogue) SAME turn\$1 SAME (question near3 answer) SAME (trained near4 (language ADJ model)))      | NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)<br>(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2024/05/10 11:36 PM |
| L41 | 0 | L25 AND ((conversation OR dialog OR dialogue) SAME turn\$1 SAME question SAME answer SAME (trained near4 (language ADJ model))) | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                                                                                           | OR | ON | ON | 2024/05/10 11:36 PM |
| L42 | 4 | ((conversation OR dialog OR dialogue) SAME turn\$1 SAME question SAME answer SAME (trained near4 (language ADJ model)))         | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                                                                                           | OR | ON | ON | 2024/05/10 11:37 PM |
| L43 | 0 | L25 AND ((conversation                                                                                                          | (US-PGPUB; USPAT;                                                                                                                                                                                                                                                                                                                                                                                                                              | OR | ON | ON | 2024/05/10          |

|     |     |                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                   |    |    |    |                        |
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|     |     | OR dialog OR dialogue)<br>SAME turn\$1 SAME<br>(question OR query)<br>SAME (answer OR<br>response) SAME<br>(trained near4<br>(language ADJ model)))                   | USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                      |    |    |    | 11:38 PM               |
| L44 | 9   | ((conversation OR<br>dialog OR dialogue)<br>SAME turn\$1 SAME<br>(question OR query)<br>SAME (answer OR<br>response) SAME<br>(trained near4<br>(language ADJ model))) | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2024/05/10<br>11:38 PM |
| L45 | 5   | L25 AND ((conversation<br>OR dialog OR dialogue)<br>SAME turn\$1 SAME<br>(question OR query)<br>SAME (answer OR<br>response) SAME<br>(language ADJ model))            | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2024/05/10<br>11:38 PM |
| L46 | 132 | ((conversation OR<br>dialog OR dialogue)<br>SAME turn\$1 SAME<br>(question OR query)<br>SAME (answer OR<br>response) SAME<br>(language ADJ model))                    | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,                                                                                                                      | OR | ON | ON | 2024/05/10<br>11:39 PM |

|     |   |                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                            |    |    |    |                     |
|-----|---|-------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|---------------------|
| L47 | 8 | L25 AND ((conversation OR dialog OR dialogue) SAME (large ADJ language ADJ model))                          | PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)<br>(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2024/05/14 02:46 PM |
| L48 | 1 | L25 AND ((conversation OR dialog OR dialogue) SAME turn SAME (large ADJ language ADJ model))                | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                                                                       | OR | ON | ON | 2024/05/14 02:47 PM |
| L49 | 0 | L25 AND ((conversation OR dialog OR dialogue) SAME (medical OR health) SAME (large ADJ language ADJ model)) | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                                                                       | OR | ON | ON | 2024/05/14 02:47 PM |
| L50 | 2 | L25 AND ((conversation OR dialog OR dialogue)                                                               | (US-PGPUB; USPAT; USOCR; FIT (AP, AT,                                                                                                                                                                                                                                                                                                                                                                                      | OR | ON | ON | 2024/05/14 02:49 PM |



|     |    |                                                                                      |                                                                                                                                                                                                                                                                                                                      |    |    |    |                     |
|-----|----|--------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|---------------------|
|     |    | SAME trained SAME (large ADJ language ADJ model))                                    | AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                       |    |    |    |                     |
| L51 | 4  | L25 AND (chatbot SAME (large ADJ language ADJ model))                                | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2024/05/14 02:51 PM |
| L52 | 31 | L25 AND (trained SAME (large ADJ language ADJ model))                                | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2024/05/14 02:51 PM |
| L53 | 5  | L25 AND (trained SAME (large ADJ language ADJ model) SAME (update\$1 OR iterations)) | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE,                                                                                | OR | ON | ON | 2024/05/14 02:52 PM |

|     |     |                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                        |    |    |    |                     |
|-----|-----|--------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|---------------------|
| L54 | 620 | L25 AND ((conversation OR dialog OR dialogue) SAME (language ADJ model))                                           | SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)<br>(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2024/05/14 03:00 PM |
| L55 | 54  | L25 AND ((conversation OR dialog OR dialogue) SAME turn\$1 SAME (language ADJ model))                              | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                                                   | OR | ON | ON | 2024/05/14 03:00 PM |
| L56 | 0   | L25 AND ((conversation OR dialog OR dialogue) SAME turn\$1 SAME (language ADJ model) SAME (medical OR healthcare)) | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                                                   | OR | ON | ON | 2024/05/14 03:01 PM |
| L57 | 0   | L25 AND ((conversation OR dialog OR dialogue OR chatbot) SAME                                                      | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY,                                                                                                                                                                                                                                                                                                                                              | OR | ON | ON | 2024/05/14 03:01 PM |

|     |    |                                                                                                                       |                                                                                                                                                                                                                                                                                                                      |    |    |    |                     |
|-----|----|-----------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|---------------------|
|     |    | turn\$1 SAME (language ADJ model) SAME (medical OR healthcare))                                                       | CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                           |    |    |    |                     |
| L58 | 26 | ((conversation OR dialog OR dialogue OR chatbot) SAME turn\$1 SAME (language ADJ model) SAME (medical OR healthcare)) | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2024/05/14 03:01 PM |
| L59 | 9  | L25 AND ((conversation OR dialog OR dialogue OR chatbot) SAME (language ADJ model) SAME (medical OR healthcare))      | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2024/05/14 03:03 PM |
| L60 | 0  | L25 AND (trigger SAME (language ADJ model) SAME (response OR answer) SAME (classification ADJ model))                 | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH,                                                            | OR | ON | ON | 2024/05/17 01:34 PM |

|     |   |                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                    |    |    |    |                     |
|-----|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|---------------------|
| L61 | 3 | (trigger SAME (language ADJ model) SAME (response OR answer) SAME (classification ADJ model))                                                                                                                 | TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)<br>(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2024/05/17 01:34 PM |
| L62 | 2 | L25 AND ((intent OR context) SAME (language ADJ model) SAME (response OR answer) SAME (classification ADJ model))                                                                                             | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                               | OR | ON | ON | 2024/05/17 01:35 PM |
| L63 | 0 | L25 AND ((dialog OR conversation OR dialogue) SAME (intent OR context) SAME ((second OR additional) near4 (language ADJ model)) SAME (parallel OR simultaneously) SAME (research\$3 OR (second ADJ opinion))) | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                               | OR | ON | ON | 2024/07/16 10:36 PM |
| L64 | 0 | L25 AND ((dialog OR conversation OR dialogue) SAME (intent OR context) SAME                                                                                                                                   | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU,                                                                                                                                                                                                                                                                                                      | OR | ON | ON | 2024/07/16 10:36 PM |

|     |   |                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                      |    |    |    |                     |
|-----|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|---------------------|
|     |   | ((second OR additional) near4 (language ADJ model)) SAME (parallel OR simultaneously))                                                                                                                | CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                                               |    |    |    |                     |
| L65 | 0 | L25 AND ((intent OR context) SAME ((second OR additional) near4 (language ADJ model)) SAME (parallel OR simultaneously) SAME (research\$3 OR (second ADJ opinion)))                                   | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2024/07/16 10:36 PM |
| L66 | 0 | L25 AND ((intent OR context) SAME ((second OR additional) near4 (language ADJ model)) SAME (parallel OR simultaneously OR concurrent\$2) SAME (research\$3 OR (second ADJ opinion)))                  | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2024/07/16 10:37 PM |
| L67 | 0 | ((dialog OR conversation OR dialogue) SAME (intent OR context) SAME ((second OR additional) near4 (language ADJ model)) SAME (parallel OR simultaneously) SAME (research\$3 OR (second ADJ opinion))) | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN,                                        | OR | ON | ON | 2024/07/16 10:37 PM |

|     |   |                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                |    |    |    |                     |
|-----|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|---------------------|
| L68 | 8 | ((dialog OR conversation OR dialogue) SAME (intent OR context) SAME ((second OR additional) near4 (language ADJ model)) SAME (parallel OR simultaneously))                   | WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)<br>(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2024/07/16 10:37 PM |
| L69 | 0 | ((intent OR context) SAME ((second OR additional) near4 (language ADJ model)) SAME (parallel OR simultaneously OR concurrent\$2) SAME (research\$3 OR (second ADJ opinion))) | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                           | OR | ON | ON | 2024/07/16 10:37 PM |
| L70 | 0 | ((intent OR context) SAME ((second OR additional) near4 (language ADJ model)) SAME (parallel OR simultaneously OR concurrent\$2) SAME (research\$3 OR (second ADJ opinion))) | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                           | OR | ON | ON | 2024/07/16 10:38 PM |
| L71 | 8 | ((dialog OR conversation OR dialogue) SAME (intent OR context) SAME ((second OR additional                                                                                   | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA,                                                                                                                                                                                                                                                              | OR | ON | ON | 2024/07/16 10:39 PM |

|     |        |                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                      |    |    |    |                     |
|-----|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|---------------------|
|     |        | OR specialized) near4 (language ADJ model)) SAME (parallel OR simultaneously))                                                                                                                                                  | EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                                                                   |    |    |    |                     |
| L72 | 8      | ((dialog OR conversation OR dialogue) SAME (intent OR context) SAME ((second OR additional OR specialized) near4 (language ADJ model)) SAME (parallel OR simultaneously OR concurrent\$2))                                      | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2024/07/16 10:39 PM |
| L73 | 12     | ((dialog OR conversation OR dialogue) SAME (intent OR context) SAME ((second OR additional OR specialized OR special OR custom OR personalized) near4 (language ADJ model)) SAME (parallel OR simultaneously OR concurrent\$2)) | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2024/07/16 10:39 PM |
| L74 | 101460 | shah.in.                                                                                                                                                                                                                        | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO;                        | OR | ON | ON | 2024/07/18 04:02 PM |

|     |        |               |                                                                                                                                                                                                                                                                                                                                                                                                |    |    |    |                        |
|-----|--------|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|------------------------|
| L75 | 12167  | parikh.in.    | JPO; DERWENT;<br>IBM_TDB)<br>(US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2024/07/18<br>04:02 PM |
| L76 | 264    | bhimani.in.   | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                              | OR | ON | ON | 2024/07/18<br>04:03 PM |
| L77 | 23099  | mukherjee.in. | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                              | OR | ON | ON | 2024/07/18<br>04:03 PM |
| L78 | 332616 | miller.in.    | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,                                                                                                                                                                                                                                                       | OR | ON | ON | 2024/07/18<br>04:03 PM |



|     |       |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |    |    |    |                        |
|-----|-------|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|------------------------|
| L79 | 377   | godil.in.  | HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)<br>(US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2024/07/18<br>04:03 PM |
| L80 | 15753 | datta.in.  | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                                                                                                                                                                                                                          | OR | ON | ON | 2024/07/18<br>04:04 PM |
| L81 | 5992  | gamble.in. | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                                                                                                                                                                                                                          | OR | ON | ON | 2024/07/18<br>04:04 PM |

|     |        |                                                                        |                                                                                                                                                                                                                                                                                                                                                                               |    |    |    |                        |
|-----|--------|------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|------------------------|
| L82 | 1304   | lasko.in.                                                              | IBM_TDB)<br>(US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2024/07/18<br>04:04 PM |
| L83 | 490390 | (L74 OR L75 OR L76<br>OR L77 OR L78 OR<br>L79 OR L80 OR L81<br>OR L82) | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)             | OR | ON | ON | 2024/07/18<br>04:05 PM |
| L84 | 1226   | (G10L ADJ 15/07)                                                       | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)             | OR | ON | ON | 2024/07/18<br>04:06 PM |
| L85 | 2667   | (G10L ADJ 15/20)                                                       | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,                                                                                                                                                                                                           | OR | ON | ON | 2024/07/18<br>04:06 PM |

|     |       |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |    |    |    |                        |
|-----|-------|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|------------------------|
| L86 | 12777 | (G10L ADJ 15/22) | IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)<br><br>(US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2024/07/18<br>04:06 PM |
| L87 | 7958  | (G10L ADJ 15/26) | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                                                                                                                                                                                                   | OR | ON | ON | 2024/07/18<br>04:06 PM |
| L88 | 4103  | (G10L ADJ 15/30) | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                                                                                                                                                                                                   | OR | ON | ON | 2024/07/18<br>04:06 PM |

|     |      |                    |                                                                                                                                                                                                                                                                                                                      |    |    |    |                        |
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| L89 | 2871 | (G10L ADJ 15/02)   | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2024/07/18<br>04:06 PM |
| L90 | 3548 | (G10L ADJ 15/08)   | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2024/07/18<br>04:06 PM |
| L91 | 3744 | (G10L ADJ 15/063)  | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2024/07/18<br>04:06 PM |
| L92 | 2875 | (G10L ADJ 15/1822) | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL,                                                                                                                        | OR | ON | ON | 2024/07/18<br>04:06 PM |

|     |      |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |    |    |    |                        |
|-----|------|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|------------------------|
| L93 | 1763 | (G10L ADJ 15/183) | NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)<br>(US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2024/07/18<br>04:07 PM |
| L94 | 608  | (G10L ADJ 15/193) | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                                                                                                                                             | OR | ON | ON | 2024/07/18<br>04:07 PM |
| L95 | 965  | (G10L ADJ 15/19)  | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                                                                                                                                             | OR | ON | ON | 2024/07/18<br>04:07 PM |
| L96 | 2472 | (G10L ADJ 15/16)  | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                                                                                                                                             | OR | ON | ON | 2024/07/18             |

|     |      |                  |                                                                                                                                                                                                                                                                                                                      |    |    |    |                     |
|-----|------|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|---------------------|
|     |      |                  | USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                   |    |    |    | 04:07 PM            |
| L97 | 279  | (G10L ADJ 25/27) | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2024/07/18 04:07 PM |
| L98 | 1163 | (G10L ADJ 25/30) | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2024/07/18 04:07 PM |
| L99 | 882  | (G10L ADJ 13/02) | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL,                                                                                                    | OR | ON | ON | 2024/07/18 04:07 PM |

|      |       |                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |    |    |    |                        |
|------|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|------------------------|
| L100 | 384   | (G10L ADJ 17/18)                                                                                                                                                                             | PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)<br><br>(US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2024/07/18<br>04:08 PM |
| L101 | 24618 | (L84 OR L85 OR L86<br>OR L87 OR L88 OR<br>L89 OR L90 OR L91<br>OR L92 OR L93 OR<br>L94 OR L95 OR L96<br>OR L97 OR L98 OR<br>L99 OR L100)                                                     | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                                                                                                                          | OR | ON | ON | 2024/07/18<br>04:10 PM |
| L102 | 72    | L101 AND<br>((conversation OR<br>dialog OR dialogue OR<br>interaction OR<br>multimodal) SAME<br>((first OR generic OR<br>primary OR general OR<br>universal) near3<br>(language ADJ model))) | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                                                                                                                          | OR | ON | ON | 2024/07/18<br>04:12 PM |
| L103 | 0     | L101 AND<br>(((conversation OR                                                                                                                                                               | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,                                                                                                                                                                                                                                                                                                                                                                                                                                                   | OR | ON | ON | 2024/07/18<br>04:22 PM |

|      |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                             |    |    |    |                     |
|------|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|---------------------|
|      |   | <p>dialog OR dialogue OR interaction OR multimodal) SAME ((first OR generic OR primary OR general OR universal) near3 ((language OR linguistic) ADJ model)) SAME ((checklist OR list) near3 task\$1)) SAME (multiple near3 turn\$1) SAME ((second OR secondary OR specailized OR additional OR custom OR personal OR special) near3 ((language OR linguistic) ADJ model)) SAME (parallel OR simultaneous\$2 OR concurrent\$2) SAME ((second ADJ opinion) OR research OR (background ADJ check)))</p>            | <p>AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)</p>                                       |    |    |    |                     |
| L104 | 0 | <p>L101 AND (((conversation OR dialog OR dialogue OR interaction OR multimodal) SAME ((first OR generic OR primary OR general OR universal) near3 ((language OR linguistic) ADJ model)) SAME ((checklist OR list) near3 task\$1)) SAME turn\$1 SAME ((second OR secondary OR specailized OR additional OR custom OR personal OR special) near3 ((language OR linguistic) ADJ model)) SAME (parallel OR simultaneous\$2 OR concurrent\$2) SAME ((second ADJ opinion) OR research OR (background ADJ check)))</p> | <p>(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)</p> | OR | ON | ON | 2024/07/18 04:23 PM |
| L105 | 0 | <p>L101 AND (((first OR generic OR primary OR general OR universal) near3 ((language OR</p>                                                                                                                                                                                                                                                                                                                                                                                                                     | <p>(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU,</p>                                                                                                                                                                                                                                        | OR | ON | ON | 2024/07/18 04:23 PM |



|      |   |                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                      |    |    |    |                     |
|------|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|---------------------|
|      |   | linguistic) ADJ model))<br>SAME ((checklist OR list) near3 task\$1))<br>SAME turn\$1 SAME ((second OR secondary OR specialized OR additional OR custom OR personal OR special) near3 ((language OR linguistic) ADJ model))<br>SAME (parallel OR simultaneous\$2 OR concurrent\$2) SAME ((second ADJ opinion) OR research OR (background ADJ check)))                                                                | CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                                               |    |    |    |                     |
| L106 | 0 | L101 AND (((first OR generic OR primary OR general OR universal) near3 ((language OR linguistic) ADJ model)) SAME ((checklist OR list) near3 task\$1)) SAME ((second OR secondary OR specialized OR additional OR custom OR personal OR special) near3 ((language OR linguistic) ADJ model)) SAME (parallel OR simultaneous\$2 OR concurrent\$2) SAME ((second ADJ opinion) OR research OR (background ADJ check))) | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2024/07/18 04:24 PM |
| L107 | 0 | L101 AND (((first OR generic OR primary OR general OR universal) near3 ((language OR linguistic) ADJ model)) SAME ((checklist OR list) near3 task\$1)) SAME ((second OR secondary OR specialized OR additional OR custom OR personal OR special) near3 ((language OR linguistic) ADJ model)) SAME (parallel OR simultaneous\$2 OR concurrent\$2) SAME ((second ADJ opinion) OR research OR (background ADJ check))) | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2024/07/18 04:24 PM |

|      |    |                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                      |    |    |    |                     |
|------|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|---------------------|
| L108 | 0  | concurrent\$2))<br>L101 AND (((first OR generic OR primary OR general OR universal) near3 ((language OR linguistic) ADJ model)) SAME (checklist OR list OR task\$1) SAME ((second OR secondary OR specailized OR additional OR custom OR personal OR special) near3 ((language OR linguistic) ADJ model)) SAME (parallel OR simultaneous\$2 OR concurrent\$2)) | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2024/07/18 04:24 PM |
| L109 | 10 | L101 AND (((first OR generic OR primary OR general OR universal) near3 ((language OR linguistic) ADJ model)) SAME ((second OR secondary OR specailized OR additional OR custom OR personal OR special) near3 ((language OR linguistic) ADJ model)) SAME (parallel OR simultaneous\$2 OR concurrent\$2))                                                        | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2024/07/18 04:25 PM |
| L110 | 0  | L101 AND (((first OR generic OR primary OR general OR universal) near3 ((language OR linguistic) ADJ model)) SAME ((second OR secondary OR specailized OR additional OR custom OR personal OR special) near3 ((language OR linguistic) ADJ model)) SAME (parallel OR simultaneous\$2 OR concurrent\$2) SAME (research OR (second ADJ opinion)))                | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2024/07/18 04:25 PM |
| L111 | 3  | L101 AND ((conversation OR dialog OR dialogue OR (multimodal near3                                                                                                                                                                                                                                                                                             | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU,                                                                                                                                                                                                                                        | OR | ON | ON | 2024/07/18 04:26 PM |

|      |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                   |    |    |    |                        |
|------|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|------------------------|
|      |   | turn\$1)) SAME<br>((second OR secondary<br>OR specailized OR<br>additional OR custom<br>OR personal OR<br>special) near3<br>((language OR<br>linguistic) ADJ model))<br>SAME (parallel OR<br>simultaneous\$2 OR<br>concurrent\$2))                                                                                                                                                                                                                                                                                                                                                              | CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                                                                                           |    |    |    |                        |
| L112 | 0 | ((((conversation OR<br>dialog OR dialogue OR<br>interaction OR<br>multimodal) SAME<br>((first OR generic OR<br>primary OR general OR<br>universal) near3<br>((language OR<br>linguistic) ADJ model))<br>SAME ((checklist OR<br>list) near3 task\$1))<br>SAME (multiple near3<br>turn\$1) SAME ((second<br>OR secondary OR<br>specailized OR<br>additional OR custom<br>OR personal OR<br>special) near3<br>((language OR<br>linguistic) ADJ model))<br>SAME (parallel OR<br>simultaneous\$2 OR<br>concurrent\$2) SAME<br>((second ADJ opinion)<br>OR research OR<br>(background ADJ<br>check))) | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2024/07/18<br>04:35 PM |
| L113 | 0 | ((((conversation OR<br>dialog OR dialogue OR<br>interaction OR<br>multimodal) SAME<br>((first OR generic OR<br>primary OR general OR<br>universal) near3<br>((language OR<br>linguistic) ADJ model))<br>SAME ((checklist OR<br>list) near3 task\$1))<br>SAME turn\$1 SAME<br>((second OR secondary<br>OR specailized OR<br>additional OR custom<br>OR personal OR<br>special) near3<br>((language OR                                                                                                                                                                                            | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2024/07/18<br>04:35 PM |

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|------|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|------------------------|
| L114 | 0 | linguistic) ADJ model))<br>SAME (parallel OR<br>simultaneous\$2 OR<br>concurrent\$2) SAME<br>((second ADJ opinion)<br>OR research OR<br>(background ADJ<br>check)))<br><br>((((first OR generic OR<br>primary OR general OR<br>universal) near3<br>((language OR<br>linguistic) ADJ model))<br>SAME ((checklist OR<br>list) near3 task\$1))<br>SAME turn\$1 SAME<br>((second OR secondary<br>OR specailized OR<br>additional OR custom<br>OR personal OR<br>special) near3<br>((language OR<br>linguistic) ADJ model))<br>SAME (parallel OR<br>simultaneous\$2 OR<br>concurrent\$2) SAME<br>((second ADJ opinion)<br>OR research OR<br>(background ADJ<br>check))) | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2024/07/18<br>04:35 PM |
| L115 | 0 | ((((first OR generic OR<br>primary OR general OR<br>universal) near3<br>((language OR<br>linguistic) ADJ model))<br>SAME ((checklist OR<br>list) near3 task\$1))<br>SAME ((second OR<br>secondary OR<br>specailized OR<br>additional OR custom<br>OR personal OR<br>special) near3<br>((language OR<br>linguistic) ADJ model))<br>SAME (parallel OR<br>simultaneous\$2 OR<br>concurrent\$2) SAME<br>((second ADJ opinion)<br>OR research OR<br>(background ADJ<br>check)))                                                                                                                                                                                         | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2024/07/18<br>04:35 PM |
| L116 | 0 | ((((first OR generic OR<br>primary OR general OR<br>universal) near3<br>((language OR<br>linguistic) ADJ model))<br>SAME ((checklist OR<br>list) near3 task\$1))<br>SAME ((second OR<br>secondary OR<br>specailized OR<br>additional OR custom<br>OR personal OR<br>special) near3<br>((language OR<br>linguistic) ADJ model))<br>SAME (parallel OR<br>simultaneous\$2 OR<br>concurrent\$2) SAME<br>((second ADJ opinion)<br>OR research OR<br>(background ADJ<br>check)))                                                                                                                                                                                         | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,                                                                                                                                                                                                                                                     | OR | ON | ON | 2024/07/18<br>04:35 PM |

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|      |    | SAME ((checklist OR list) near3 task\$1))<br>SAME ((second OR secondary OR specailized OR additional OR custom OR personal OR special) near3 ((language OR linguistic) ADJ model))<br>SAME (parallel OR simultaneous\$2 OR concurrent\$2))                                                                                                  | EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                                                                   |    |    |    |                     |
| L117 | 17 | ((first OR generic OR primary OR general OR universal) near3 ((language OR linguistic) ADJ model))<br>SAME (checklist OR list OR task\$1) SAME ((second OR secondary OR specailized OR additional OR custom OR personal OR special) near3 ((language OR linguistic) ADJ model))<br>SAME (parallel OR simultaneous\$2 OR concurrent\$2))     | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2024/07/18 04:35 PM |
| L118 | 2  | ((first OR generic OR primary OR general OR universal) near3 ((language OR linguistic) ADJ model))<br>SAME ((second OR secondary OR specailized OR additional OR custom OR personal OR special) near3 ((language OR linguistic) ADJ model))<br>SAME (parallel OR simultaneous\$2 OR concurrent\$2) SAME (research OR (second ADJ opinion))) | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2024/07/18 04:36 PM |
| L119 | 41 | ((conversation OR dialog OR dialogue OR (multimodal near3 turn\$1)) SAME ((second OR secondary OR specailized OR additional OR custom OR personal OR special) near3                                                                                                                                                                         | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL,                                                                                                                        | OR | ON | ON | 2024/07/18 04:36 PM |

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|      |   | ((language OR linguistic) ADJ model))<br>SAME (parallel OR simultaneous\$2 OR concurrent\$2))                                                                                                                                                                                                                | NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                                                                                                                                                               |    |    |    |                     |
| L120 | 8 | L86 AND (((first OR generic OR primary OR general OR universal) near3 ((language OR linguistic) ADJ model)) SAME ((second OR secondary OR specailized OR additional OR custom OR personal OR special) near3 ((language OR linguistic) ADJ model)) SAME (parallel OR simultaneous\$2 OR concurrent\$2))       | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2024/07/18 04:39 PM |
| L121 | 1 | L86 AND (((first OR generic OR primary OR general OR universal) near3 ((language OR linguistic) ADJ model)) SAME ((second OR secondary OR specailized OR additional OR custom OR personal OR special) near3 ((language OR linguistic) ADJ model)) SAME (parallel OR simultaneous\$2 OR concurrent\$2)).clm.) | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2024/07/18 04:39 PM |
| L122 | 1 | L93 AND (((first OR generic OR primary OR general OR universal) near3 ((language OR linguistic) ADJ model)) SAME ((second OR secondary OR specailized OR additional OR custom OR personal OR special) near3 ((language OR linguistic) ADJ model)) SAME (parallel OR simultaneous\$2 OR concurrent\$2)).clm.) | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2024/07/18 04:39 PM |
| L123 | 6 | L93 AND (((first OR                                                                                                                                                                                                                                                                                          | (US-PGPUB; USPAT;                                                                                                                                                                                                                                                                                                    | OR | ON | ON | 2024/07/18          |

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|  |  | generic OR primary OR<br>general OR universal)<br>near3 ((language OR<br>linguistic) ADJ model))<br>SAME ((second OR<br>secondary OR<br>specailized OR<br>additional OR custom<br>OR personal OR<br>special) near3<br>((language OR<br>linguistic) ADJ model))<br>SAME (parallel OR<br>simultaneous\$2 OR<br>concurrent\$2)) | USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) |  |  |  | 04:39 PM |
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## PE2E SEARCH - Search History (Interference)

| Ref # | Hits | Search Query                                                                                                                                                                                                                                                                                                                                              | DBs               | Default Operator | Plurals | British Equivalents | Time Stamp             |
|-------|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|------------------|---------|---------------------|------------------------|
| N1    | 8    | L86 AND (((first OR<br>generic OR primary OR<br>general OR universal)<br>near3 ((language OR<br>linguistic) ADJ model))<br>SAME ((second OR<br>secondary OR<br>specailized OR<br>additional OR custom<br>OR personal OR<br>special) near3<br>((language OR<br>linguistic) ADJ model))<br>SAME (parallel OR<br>simultaneous\$2 OR<br>concurrent\$2))       | (US-PGPUB; USPAT) | OR               | ON      | ON                  | 2024/07/18<br>04:37 PM |
| N2    | 1    | L86 AND (((first OR<br>generic OR primary OR<br>general OR universal)<br>near3 ((language OR<br>linguistic) ADJ model))<br>SAME ((second OR<br>secondary OR<br>specailized OR<br>additional OR custom<br>OR personal OR<br>special) near3<br>((language OR<br>linguistic) ADJ model))<br>SAME (parallel OR<br>simultaneous\$2 OR<br>concurrent\$2)).clm.) | (US-PGPUB; USPAT) | OR               | ON      | ON                  | 2024/07/18<br>04:38 PM |
| N3    | 1    | L93 AND (((first OR<br>generic OR primary OR<br>general OR universal)<br>near3 ((language OR                                                                                                                                                                                                                                                              | (US-PGPUB; USPAT) | OR               | ON      | ON                  | 2024/07/18<br>04:38 PM |

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| N4 | 6 | linguistic) ADJ model))<br>SAME ((second OR<br>secondary OR<br>specailized OR<br>additional OR custom<br>OR personal OR<br>special) near3<br>((language OR<br>linguistic) ADJ model))<br>SAME (parallel OR<br>simultaneous\$2 OR<br>concurrent\$2)).clm.)<br>L93 AND (((first OR<br>generic OR primary OR<br>general OR universal)<br>near3 ((language OR<br>linguistic) ADJ model))<br>SAME ((second OR<br>secondary OR<br>specailized OR<br>additional OR custom<br>OR personal OR<br>special) near3<br>((language OR<br>linguistic) ADJ model))<br>SAME (parallel OR<br>simultaneous\$2 OR<br>concurrent\$2)) | (US-PGPUB; USPAT) | OR | ON | ON | 2024/07/18<br>04:38 PM |
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| <b>INFORMATION DISCLOSURE<br/>STATEMENT BY APPLICANT</b><br>( Not for submission under 37 CFR 1.99) | Application Number     |               | 18592441   |
|                                                                                                     | Filing Date            |               | 2024-02-29 |
|                                                                                                     | First Named Inventor   | Munjal SHAH   |            |
|                                                                                                     | Art Unit               | 2654          |            |
|                                                                                                     | Examiner Name          | Vu B HANG     |            |
|                                                                                                     | Attorney Docket Number | HPAI1000USN01 |            |

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| Examiner Initial* | Cite No | Patent Number | Kind Code <sup>1</sup> | Issue Date | Name of Patentee or Applicant of cited Document | Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear |        |
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| Examiner Initials*              | Cite No | Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published. | T <sup>5</sup> |        |
|                                 |         |                                                                                                                                                                                                                                                                 |                |        |

|                                                                                                     |                        |               |            |
|-----------------------------------------------------------------------------------------------------|------------------------|---------------|------------|
| <b>INFORMATION DISCLOSURE<br/>STATEMENT BY APPLICANT</b><br>( Not for submission under 37 CFR 1.99) | Application Number     |               | 18592441   |
|                                                                                                     | Filing Date            |               | 2024-02-29 |
|                                                                                                     | First Named Inventor   | Munjal SHAH   |            |
|                                                                                                     | Art Unit               | 2654          |            |
|                                                                                                     | Examiner Name          | Vu B HANG     |            |
|                                                                                                     | Attorney Docket Number | HPAI1000USN01 |            |

|   |                                                                                                                                                                                                                     |                          |
|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| 1 | Biao et al, Root Mean Square Layer Normalization, School of Informatics, University of Edinburgh, Retrieved on June 06, 2024, 12 pages. [NeurIPS 2019]                                                              | <input type="checkbox"/> |
| 2 | Gao et al. Retrieval-Augmented Generation for Large Language Models: A Survey, Shanghai Research Institute for Intelligent Autonomous Systems, Tongji University, March 27, 2024, 21 pages. [Url: arXiv:2312.10997] | <input type="checkbox"/> |
| 3 | Karan et al, Large Language Models Encode Clinical Knowledge, Google Research, December 26, 2022, 44 pages. [arXiv:2212.13138]                                                                                      | <input type="checkbox"/> |
| 4 | Peter et al, Benefits, Limits, and Risks of GPT-4 as an AI Chatbot for Medicine. The New England Journal of Medicine, March 30, 2023, 7 pages [N ENGL MED 388;13]                                                   | <input type="checkbox"/> |
| 5 | Tao et al, Towards Conversational Diagnostic AI, Google Research, January 11, 2024, 46 pages. [arXiv:2401.05654]                                                                                                    | <input type="checkbox"/> |

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#### EXAMINER SIGNATURE

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| Examiner Signature |  | Date Considered |  |
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**\*EXAMINER:** Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> See Kind Codes of USPTO Patent Documents at [www.USPTO.GOV](http://www.USPTO.GOV) or MPEP 901.04. <sup>2</sup> Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>3</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>4</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>5</sup> Applicant is to place a check mark here if English language translation is attached.

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

|                        |               |
|------------------------|---------------|
| Application Number     | 18592441      |
| Filing Date            | 2024-02-29    |
| First Named Inventor   | Munjal SHAH   |
| Art Unit               | 2654          |
| Examiner Name          | Vu B HANG     |
| Attorney Docket Number | HPAI1000USN01 |

**CERTIFICATION STATEMENT**

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

- ☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).
- OR**
- ☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).
- ☐ See attached certification statement.
- ☐ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.
- ☒ A certification statement is not submitted herewith.

**SIGNATURE**

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

|            |                    |                     |            |
|------------|--------------------|---------------------|------------|
| Signature  | /Sikander M. Khan/ | Date (YYYY-MM-DD)   | 2024-06-07 |
| Name/Print | Sikander M. KHAN   | Registration Number | 78888      |

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
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5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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Alexandria, VA 22313 - 1450  
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## ELECTRONIC PAYMENT RECEIPT

APPLICATION #  
18/592,441RECEIPT DATE / TIME  
06/07/2024 11:54:09 PM Z ETATTORNEY DOCKET #  
HPAI1000USN01

## Title of Invention

Low-Latency Conversational Artificial Intelligence (AI) Architecture With A Parallelized In-Depth Analysis Feedback Loop

## Application Information

APPLICATION TYPE Utility - Nonprovisional Application  
under 35 USC 111(a)

PATENT # -

CONFIRMATION # 7098

FILED BY Shahzina Khan

PATENT CENTER # 65885750

AUTHORIZED BY Sikander Khan

CUSTOMER # 189741

FILING DATE 02/29/2024

CORRESPONDENCE  
ADDRESS -FIRST NAMED  
INVENTOR Munjai SHAH

## Payment Information

PAYMENT METHOD  
CARD / 5694PAYMENT TRANSACTION ID  
E202467N55105405PAYMENT AUTHORIZED BY  
Shahzina KhanPRE-AUTHORIZED ACCOUNT  
604861PRE-AUTHORIZED CATEGORY  
37 CFR 1.16 (National application filing, search, and examination fees); 37  
CFR 1.17 (Patent application and reexamination processing fees); 37 CFR 1.19  
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| 2506             | SUBMISSION OF AN INFORMATION<br>DISCLOSURE STATEMENT | 104.00         | 1        | 104.00         |
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**New Applications Under 35 U.S.C. 111**

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

**National Stage of an International Application under 35 U.S.C. 371**

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**New International Application Filed with the USPTO as a Receiving Office**

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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## ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #  
**18/592,441**RECEIPT DATE / TIME  
**06/07/2024 11:54:09 PM Z ET**ATTORNEY DOCKET #  
**HPAI1000USN01**

## Title of Invention

Low-Latency Conversational Artificial Intelligence (Ai) Architecture With A Parallelized In-Depth Analysis Feedback Loop

## Application Information

APPLICATION TYPE Utility - Nonprovisional Application  
under 35 USC 111(a)

PATENT # -

CONFIRMATION # 7098

FILED BY Shahzina Khan

PATENT CENTER # 65885750

FILING DATE 02/29/2024

CUSTOMER # 189741

FIRST NAMED INVENTOR Munjal SHAH

CORRESPONDENCE ADDRESS -

AUTHORIZED BY Sikander Khan

## Documents

**TOTAL DOCUMENTS: 7**

| DOCUMENT                                                           | PAGES | DESCRIPTION                                        | SIZE (KB) |
|--------------------------------------------------------------------|-------|----------------------------------------------------|-----------|
| 2024-06-07_IDS_HPAI1000USN01.pdf                                   | 4     | Information Disclosure Statement (IDS) Form (SB08) | 1253 KB   |
| Gao_et_al- Retrieval Augmented Generation- March 2024-21 pages.pdf | 21    | Non Patent Literature                              | 2514 KB   |
| Biao.pdf                                                           | 12    | Non Patent Literature                              | 877 KB    |
| Peter.pdf                                                          | 7     | Non Patent Literature                              | 701 KB    |
| Karan.pdf                                                          | 44    | Non Patent Literature                              | 3554 KB   |

|                                              |    |                       |         |
|----------------------------------------------|----|-----------------------|---------|
| Tao.pdf                                      | 46 | Non Patent Literature | 6166 KB |
| 2024-06-07_IDS_Transmittal_HPAI1000USN01.pdf | 2  | Transmittal Letter    | 119 KB  |

## Digest

| DOCUMENT                                                                 | MESSAGE DIGEST(SHA-512)                                                                                                                  |
|--------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| 2024-06-07_IDS_HPAI1000USN01.pdf                                         | E67449B9A07EC9C5A3C712A5AD8C8513D4CFC90C46E2BB0A<br>B427829518EA2ED712EE38465F2DCC44A828828EBE35017954<br>F5B06192D099EBE471AA0EAC8EDDD8 |
| Gao_et_al- Retrieval<br>Augmented Generation- March<br>2024-21 pages.pdf | 8172A4788FEE5DF3E899C4322523ACFA900DE8BFD8BBA7A56<br>F90D5C71D9DD71C6D7BA4123A32D3281131C9FF42366508E2<br>6E49D9CFAFD7B47ECE7EF051A00598 |
| Biao.pdf                                                                 | 0E23241C28BD5BAD89EA6B1C0DE969FEF9379F4740E769F9E<br>0EDA8622474719757D307D9034AC4974145E7259CAF314B808<br>518DABE19811B44239642C13F3729 |
| Peter.pdf                                                                | 64E886CFB01D5EF8123B502541472C621B5EA15C7178830600<br>A4E77AEE20F046BE5D601B7D40DA4E6F53FD5790F95205294<br>21752708A1CA2C7C82508500858B6 |
| Karan.pdf                                                                | DC910C7591D6B81A5A9D6F093D77EB23CB066FC4847275B9C<br>6E3818329F53981FB3F17E54BA456AC8584E837EE88FC5CFA<br>DBBD7D9B90F59E14A92AD6ED4C64E6 |
| Tao.pdf                                                                  | 8735096FC1013F41E7BE2B77ABA99AF30B60363C49D65625C3<br>6EC7DC156500A7D333081358AD37C0F2A9CA0849745558210B<br>E346175D8CB02F5C5112162542C9 |
| 2024-06-07_IDS_Transmittal_HPAI1000<br>USN01.pdf                         | B7A8EEB84284E4B0C69EA6D51C481956B49D745177FA743B6<br>7A32F90CADF5C6170B48578D6513A93FDAEA9AD016877E1D0<br>197083F263A80D77CD01EEACF55AB1 |



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**New International Application Filed with the USPTO as a Receiving Office**

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I hereby certify that this correspondence is being electronically transmitted to United States Patent and Trademark Office on 06-06-2024.

/Shahzina Khan/  
Shahzina KHAN

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re application of inventor:

Munjal SHAH

Application No.: 18/592,441

Confirmation No.: 7098

Filing Date: February 29, 2024

Title: Low-Latency Conversational Artificial Intelligence (Ai) Architecture With A Parallelized In-Depth Analysis Feedback Loop

Group Art Unit: 2654

Examiner: Vu B HANG

CUSTOMER NO.: 189741

**MAIL STOP AMENDMENT**

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

**INFORMATION DISCLOSURE STATEMENT (IDS)**

MS Amendment

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

Sir:

Pursuant to 37 C.F.R. §§ 1.56, 1.97, and 1.98, the attention of the United States Patent and Trademark Office is hereby directed to the references listed on the attached PTO/SB/08. It is respectfully requested that the information be expressly considered during the prosecution of the above-identified application, and that the references be made of record therein and appear among the "References Cited" on any patent to issue therefrom.

This Information Disclosure Statement is filed more than three months after the filing date of this application, AND after the mailing date of a first Office Action on the merits, but before the mailing date of any of a Final Action under 37 C.F.R. § 1.113, a Notice of Allowance under 37 C.F.R. § 1.311 or an action that otherwise closes prosecution in this application (37 C.F.R. § 1.97(c)).

In accordance with 37 C.F.R. § 1.98(a)(2)(ii), copies of U.S. patents and U.S. patent application publications are not submitted. Submitted herewith are copies of foreign patents and non-patent literature in accordance with 37 C.F.R. § 1.98(a)(2).

In accordance with 37 C.F.R. § 1.97(g), the filing of this Information Disclosure Statement shall not be construed as a representation that a search has been made. In accordance with 37 C.F.R. § 1.97(h), the filing of this Information Disclosure Statement shall not be construed to be an admission that the information cited in this Information Disclosure Statement is, or is considered to be, material to patentability as defined in 37 C.F.R. § 1.56(b).

It is submitted that the Information Disclosure Statement is in compliance with 37 C.F.R. § 1.98, and the Examiner is respectfully requested to consider the listed references.

The Director is hereby authorized to charge any deficiency in the fees filed, asserted to be filed or which should have been filed herewith (or with any paper hereafter filed in this application by this firm) to our Deposit Account No. 604861, under Order No. HPAI1000USN01.

Respectfully submitted,

Dated: June 07, 2024

/Sikander M. Khan/  
Sikander M. KHAN, Reg. No. 78888

**FLAGSHIP PATENTS**  
2100 Geng Road, Suite 210  
Palo Alto, CA 94303  
Phone: (415) 608-3356



## ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #  
**18/592,441**

RECEIPT DATE / TIME  
**06/03/2024 06:02:57 PM Z ET**

ATTORNEY DOCKET #  
**HPAI1000USN01**

### Title of Invention

Low-Latency Conversational Artificial Intelligence (Ai) Architecture With A Parallelized In-Depth Analysis Feedback Loop

### Application Information

APPLICATION TYPE    Utility - Nonprovisional Application  
                                         under 35 USC 111(a)

PATENT #    -

CONFIRMATION #    7098

FILED BY    Sonam Suri

PATENT CENTER #    65797042

FILING DATE    02/29/2024

CUSTOMER #    189741

FIRST NAMED    Munjal SHAH  
INVENTOR

CORRESPONDENCE    -  
ADDRESS

AUTHORIZED BY    Shiv Naimpally

### Documents

**TOTAL DOCUMENTS: 4**

| DOCUMENT                                                   |       | PAGES | DESCRIPTION                                                            | SIZE (KB) |
|------------------------------------------------------------|-------|-------|------------------------------------------------------------------------|-----------|
| 2024-06-03-<br>Response_to_NFOA_HPAI10<br>00USN01.pdf      |       | 10    | -                                                                      | 189 KB    |
| 2024-06-03-<br>Response_to_NFOA_HPAI1<br>000USN01-A....pdf | (1-1) | 1     | Amendment/Request for<br>Reconsideration-After Non-<br>Final Rejection | 96 KB     |
| 2024-06-03-<br>Response_to_NFOA_HPAI1<br>000USN01-CLM.pdf  | (2-5) | 4     | Claims                                                                 | 124 KB    |
| 2024-06-03-<br>Response_to_NFOA_HPAI1                      | (6-6) | 1     | Applicant summary of interview<br>with examiner                        | 113 KB    |

**OSSI Ex. 1018**

000USN01-  
INTRVIEW.APP.pdf

|                                                           |        |   |                                                     |        |
|-----------------------------------------------------------|--------|---|-----------------------------------------------------|--------|
| 2024-06-03-<br>Response_to_NFOA_HPAI1<br>000USN01-REM.pdf | (7-10) | 4 | Applicant Arguments/Remarks<br>Made in an Amendment | 131 KB |
|-----------------------------------------------------------|--------|---|-----------------------------------------------------|--------|

## Digest

### DOCUMENT

### MESSAGE DIGEST(SHA-512)

|                                                                    |                                                                                                                                          |
|--------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| 2024-06-03-<br>Response_to_NFOA_HPAI1000<br>USN01.pdf              | 12B91F61E2D69A93F502592B092A45343634B210675A7FD8995<br>5C2283FD723686F65F55CDF44C8E8E93F6E64D4F1238D1319<br>AA738352C3071FB67D16110A6088 |
| 2024-06-03-<br>Response_to_NFOA_HPAI1000<br>USN01-A....pdf         | E67A121E6119A46BA4C893245C1BF98F4DA845084A24B83A9<br>D65DF5C371EF48DA2229D046EC103AFC187E4E3EDAAB8EC6<br>CB09FF7C3E7B29A377503B8888C16AE |
| 2024-06-03-<br>Response_to_NFOA_HPAI1000<br>USN01-CLM.pdf          | BD3A56492CFEAEDF0FD5538618CEC6A7C709139B5C52DB40<br>15FD279F321E3385CF872D04C679680B8CE102BCCAD1BA78E<br>6CCEC1BC20AA1E84D6B8A098332245B |
| 2024-06-03-<br>Response_to_NFOA_HPAI1000<br>USN01-INTRVIEW.APP.pdf | 54F6871AB075FB1DD46107703B5A84C25CFFC0CC4BEFB334E<br>C935E46DF637B814197C52249892F89B3F81FCA269D6353059<br>924221647BD19AA87326AC264420B |
| 2024-06-03-<br>Response_to_NFOA_HPAI1000<br>USN01-REM.pdf          | AD2CAED1316C6844DCC6FF7EA22BFAA3009235C9A02FD002<br>54946B5818E9F005E54C388D55028F471A71C5E9662C825DFF<br>DFA9CCD08F749BBB179335299130D0 |

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#### New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

**National Stage of an International Application under 35 U.S.C. 371**

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

**New International Application Filed with the USPTO as a Receiving Office**

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Inventors: Munjal SHAH, Vishal PARIKH, Meenesh BHIMANI, Subhabrata MUKHERJEE,

Alex MILLER, Saad GODIL, Debajyoti DATTA, Paul GAMBLE, Rae LASKO

Title: Low-Latency Conversational Artificial Intelligence (Ai) Architecture With A Parallelized  
In-Depth Analysis Feedback Loop

Application No.: 18/592,441

Filing Date: February 29, 2024

Examiner: Vu B HANG

Group Art Unit: 2654

Attorney Docket No. HPAI1000USN01

Confirmation No.: 7098

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Austin, Texas  
Date: May 31, 2024

MAIL STOP AMENDMENT  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

**RESPONSE TO OFFICE ACTION DATED MAY 22, 2024**

Dear Sir:

This paper is responsive to the Office Action dated May 22, 2024. Further examination and reconsideration are respectfully requested in view of the amendments and remarks set forth below.

**Amendments to the Claims** begin on **page 2** of this paper.

An **Interview Summary** begins on **page 6** of this paper.

**Remarks** begin on **page 7** of this paper.

## AMENDMENTS TO THE CLAIMS

The following list, if entered, replaces all prior versions of the claims.

1. (Currently Amended) A multi-turn conversational system, comprising:
  - a ~~first large language model-based~~ conversation interface that is based on a first large language model and is configured to execute multiple turns of human-like conversation with a user based on a checklist that identifies tasks that the first large language model is to complete during the human-like conversation, wherein the first large language model-based conversation interface is trained with over one thousand gradient update iterations; [[and]]
  - a control logic, in communication with the ~~first large language model-based~~ conversation interface, and configured to generate ~~one or more~~ control signals based on evaluating multiple turns of upstream human-like conversation between the ~~first large language model-based~~ conversation interface and the user, wherein the control signals contribute in part to construction of multiple turns of downstream human-like conversation between the ~~first large language model-based~~ conversation interface and the user; and
  - a second opinion module comprising an additional large language model to perform research into a portion of the human-like conversation in parallel with the human-like conversation taking place between the conversation interface and the user.
  
2. (Currently Amended) The multi-turn conversational system of claim 1, wherein:
  - the control logic comprises a trigger detection logic, a question insertion logic, and an answer classification logic;
  - the trigger detection logic comprises a second large language model; and
  - the answer classification logic comprises a third large language model.



3. (Currently Amended) The multi-turn conversational system of claim ~~[[2]]~~<sup>1</sup>, wherein the second opinion module performs research into the portion of the human-like conversation based on one or more of:

determining one or more prescriptions associated with the user;

determining one or more co-morbidities associated with the user;

determining a family history associated with the user; or

any combination thereof

~~the trigger detection logic is a second large language model, and wherein the answer classification logic is a third large language model.~~

4. (Original) The multi-turn conversational system of claim 2, wherein the trigger detection logic is configured to evaluate the multiple turns of upstream human-like conversation and detect trigger exchanges in the multiple turns of upstream human-like conversation that require invoking the question insertion logic.

5. (Currently Amended) The multi-turn conversational system of claim 4, wherein the question insertion logic is configured to select ~~one or more~~ questions that correspond to the ~~detected~~ trigger exchanges, and to cause the ~~first large language model-based~~ conversation interface to use the ~~selected~~ questions to construct the multiple turns of downstream human-like conversation.

6. (Currently Amended) The multi-turn conversational system of claim 5, wherein the ~~selected~~ questions ~~[[are]]~~<sup>comprise</sup> the control signals.

7. (Currently Amended) The multi-turn conversational system of claim 5, wherein the ~~first large language model-based~~ conversation interface is further configured to pose to the user the ~~selected~~ questions, to receive<sub>x</sub> from the user<sub>x</sub> answers to the ~~selected~~ questions, and to transmit the ~~received~~ answers to the answer classification logic.

8. (Currently Amended) The multi-turn conversational system of claim 7, wherein the answer classification logic is configured to analyze the ~~received~~ answers and ~~classify~~ to perform

a classification of the received answers to at least one answer category in a plurality of answer categories, and to generate the control signals based on the classification.

9. (Currently Amended) The multi-turn conversational system of claim 8, wherein the control signals, generated in response to the answer classification logic classifying the ~~received~~ answers to a first kickout category, cause the ~~first large language model-based~~ conversation interface to end the human-like conversation with the user.

10. (Currently Amended) The multi-turn conversational system of claim ~~[[1]]~~5, wherein the ~~first large language model-based~~ conversation interface emulates a human healthcare professional, wherein the user is a human, and wherein the human-like conversation is a healthcare conversation.

11. (Original) The multi-turn conversational system of claim 10, wherein the trigger exchanges include symptom descriptors that identify one or more symptoms.

12. (Currently Amended) The multi-turn conversational system of claim 11, wherein the ~~selected~~ questions ~~[[are]]~~comprise medical condition queries that probe at least one symptom mentioned by the human and identified by at least one symptom descriptor associated with the ~~detected~~ trigger exchanges.

13. (Currently Amended) The multi-turn conversational system of claim 12, wherein the ~~received~~ answers identify ~~one or more~~ medical conditions associated with the at least one symptom and experienced by the human.

14. (Currently Amended) The multi-turn conversational system of claim 13, wherein the answer classification logic is further configured to classify the ~~received~~ answers and generate the control signals based on a severity of the ~~identified~~ medical conditions.

15. (Currently Amended) The multi-turn conversational system of claim 14, wherein the control signals, generated in response to the answer classification logic classifying the ~~received~~

answers to a second kickout category, cause the ~~first large language model-based~~ conversation interface to connect the user with a human healthcare professional.

16. (Currently Amended) The multi-turn conversational system of claim 15, wherein the control signals, generated in response to the answer classification logic classifying the ~~received~~ answers to a third kickout category, cause the ~~first large language model-based~~ conversation interface to schedule a healthcare appointment of the user with a human healthcare professional.

17. (Original) The multi-turn conversational system of claim 1, wherein the human-like conversation is text-based.

18. (Original) The multi-turn conversational system of claim 1, wherein the human-like conversation is audio-based.

19. (Currently Amended) A ~~multi-turn conversational~~ system, comprising:  
 a conversation interface that is based on a first large language model and is configured to execute multiple turns of human-like conversation with a user based on a checklist that identifies tasks that the first large language model is to complete during the human-like conversation; [[and]]  
 a control logic, in communication with the conversation interface, and configured to generate one or more control signals based on evaluating multiple turns of upstream human-like conversation between the conversation interface and the user; and  
a second opinion module comprising an additional large language model to perform research into a portion of the human-like conversation in parallel with the human-like conversation taking place between the conversation interface and the user.

20. (Currently Amended) The ~~multi-turn conversational~~ system of claim 19, wherein the one or more control signals contribute in part to construction of multiple turns of downstream human-like conversation between the conversation interface and the user.

**INTERVIEW SUMMARY**

Applicant's representative Shiv S. Naimpally ("Applicant") thanks Primary Examiner Vu B. Hang for the telephonic interview conducted on May 29, 2024. During the interview, Applicant's representative went over figure 3 and pointed out several of the unique aspects in the system. Applicant's representative thanks the Examiner for agreeing in the interview that amending the independent claims to indicate that (i) the conversational LLM is checklist driven and that (ii) a second opinion module operates in parallel with the conversational LLM would appear to overcome the cited references, subject to further search and consideration. Applicant has amended the claims accordingly and respectfully submits that the claims are in condition for allowance.

**REMARKS**

In the Office Action dated **May, 22, 2024**, the Examiner reviewed claims 1-20.

- claims 19 and 20 were rejected under 35 U.S.C. §102(a)(1)
- claims 1-18 were rejected under 35 U.S.C. §103.
- claim 12 was rejected under 35 U.S.C. 112(b)

Applicant has amended claims 1-3, 5-10, 12-16, 19, and 20 without prejudice or disclaimer of the subject matter recited therein. Support for these amendments can be found in the application as originally filed. Applicant does not intend to introduce any new matter in these amendments. Claims 1-20 are pending after entry of this amendment. Applicant respectfully submits that the claims are in condition for allowance.

**Rejection of Claims 12 under 35 U.S.C. 112(b)**

The Office Action rejected claims 12 for failing to particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention. Accordingly, Applicant respectfully submits that the amendments to overcome the 112(b) rejections. As such, Applicant requests that the 112(b) rejection of claims 12 be withdrawn.

**Rejection of Claims 19 and 20 under 35 U.S.C. §102(a)(1)**

The Office Action rejected claims 19 and 20 as being anticipated by Brown et al. (US Patent 9,824,188 B2). Applicant respectfully submits that the amendments made herein overcome the 102(a)(1) rejections. As such, Applicant requests that the 102(a)(1) rejection of claims 19 and 20 be withdrawn.

For example, the cited references fail to teach or suggest “a conversation interface that is based on a first large language model and is configured to execute multiple turns of human-like conversation with a user *based on a checklist that identifies tasks that the first large language model is to complete during the human-like conversation*, wherein the first large language model is trained with over one thousand gradient update iterations; ... and *a second opinion module comprising an additional large language model to perform research into a portion of the human-like conversation in parallel with the human-like conversation taking place between the conversation interface and the user*,” as recited in amended claims 1 and 19. Applicant’s

representative thanks the Examiner for agreeing in the interview that amending the independent claims with these features would appear to overcome the cited references, subject to further search and consideration. Therefore, claims 1 and 19 are allowable. Claims 2-18 depend from claim 1 and claim 20 depends from claim 19 and are allowable, at least from depending from an allowable claim, in addition to the features that each claim recites. Therefore, claims 1-20 are allowable.

### **Rejections of Claims 1-2 and 4-18 under 35 U.S.C. §103**

The Office Action rejected claims 1-2 and 4-18 under 35 U.S.C. 103 as being unpatentable over Brown et al. (US Patent 9,824,188 B2) in view of Tunstall-Pedoe et al. (US Patent 11,977,854 B2). Applicant respectfully submits that the claims, as amended herein, overcome the cited references and that claims 1-2 and 4-18 are therefore allowable.

For example, the cited references fail to teach or suggest “a conversation interface that is based on a first large language model and is configured to execute multiple turns of human-like conversation with a user *based on a checklist that identifies tasks that the first large language model is to complete during the human-like conversation*, wherein the first large language model is trained with over one thousand gradient update iterations; ... and *a second opinion module comprising an additional large language model to perform research into a portion of the human-like conversation in parallel with the human-like conversation taking place between the conversation interface and the user,*” as recited in amended claims 1 and 19. Applicant’s representative thanks the Examiner for agreeing in the interview that amending the independent claims with these features would appear to overcome the cited references, subject to further search and consideration. Therefore, claims 1 and 19 are allowable. Claims 2-18 depend from claim 1 and claim 20 depends from claim 19 and are allowable, at least from depending from an allowable claim, in addition to the features that each claim recites. Therefore, claims 1-20 are allowable.

### **Rejections of Claim 3 under 35 U.S.C. §103**

The Office Action rejected claim 3 under 35 U.S.C. 103 as being unpatentable over Brown et al. (US Patent 9,824,188 B2) in view of Tunstall-Pedoe et al. (US Patent 11,977,854 B2), and in further view of Lee et al.(US Patent 11,843,565 B2). Applicant respectfully submits that the claims, as amended herein, overcome the cited references and that claims 3 are therefore allowable.

For example, the cited references fail to teach or suggest “a conversation interface that is based on a first large language model and is configured to execute multiple turns of human-like conversation with a user *based on a checklist that identifies tasks that the first large language model is to complete during the human-like conversation*, wherein the first large language model is trained with over one thousand gradient update iterations; ... and *a second opinion module comprising an additional large language model to perform research into a portion of the human-like conversation in parallel with the human-like conversation taking place between the conversation interface and the user*,” as recited in amended claims 1 and 19. Applicant’s representative thanks the Examiner for agreeing in the interview that amending the independent claims with these features would appear to overcome the cited references, subject to further search and consideration. Therefore, claims 1 and 19 are allowable. Claims 2-18 depend from claim 1 and claim 20 depends from claim 19 and are allowable, at least from depending from an allowable claim, in addition to the features that each claim recites. Therefore, claims 1-20 are allowable.

**CONCLUSION**

For at least the reasons provided herein, it is believed that claims 1-20 are allowable. Please note that silence regarding any claim or specific rejection is not to be interpreted as agreement with, or acquiescence to, the rejection of such claim or as waiving any argument regarding that claim. Should any issues remain that might be subject to resolution through a telephonic interview, the Examiner is requested to telephone the undersigned.

If any extensions of time under 37 C.F.R. § 1.136(a) are required in order for this submission to be considered timely, Applicant hereby petitions for such extensions and request that the undersigned be contacted to provide credit card information.

Respectfully submitted,

**FLAGSHIP PATENTS**  
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Palo Alto, CA 94303

/Shivshanker S. Naimpally/  
Shiv S. Naimpally  
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| APPLICATION NO.                                                               | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-------------------------------------------------------------------------------|-------------|----------------------|---------------------|------------------|
| 18/592,441                                                                    | 02/29/2024  | Munjat SHAH          | HPAI1000USN01       | 7098             |
| 189741                                                                        | 7590        | 06/03/2024           | EXAMINER            |                  |
| Flagship Patents - General<br>2100 Geng Road, Suite210<br>Palo Alto, CA 94303 |             |                      | HANG, VU B          |                  |
|                                                                               |             |                      | ART UNIT            | PAPER NUMBER     |
|                                                                               |             |                      | 2654                |                  |
|                                                                               |             |                      | NOTIFICATION DATE   | DELIVERY MODE    |
|                                                                               |             |                      | 06/03/2024          | ELECTRONIC       |

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|-----------------------------------------------------|--------------------------------------|------------------------------------|---------------------------------------------------|-----------------------|
| <b><i>Applicant-Initiated Interview Summary</i></b> | <b>Application No.</b><br>18/592,441 | <b>Applicant(s)</b><br>SHAH et al. |                                                   |                       |
|                                                     | <b>Examiner</b><br>VU B HANG         | <b>Art Unit</b><br>2654            | <b>AIA (First Inventor to File) Status</b><br>Yes | <b>Page</b><br>1 of 1 |

| <b>All Participants</b> (applicant, applicants representative, PTO personnel) | <b>Title</b>     | <b>Type</b> |
|-------------------------------------------------------------------------------|------------------|-------------|
| VU B HANG                                                                     | Primary Examiner | Telephonic  |
| Shiv Naimpally (Reg. No. 66,142)                                              |                  |             |

**Date of Interview:** 29 May 2024

**Issues Discussed:**

**Proposed Amendment(s)**

The applicant's representative discussed possible claim amendment to Claim 1. The applicant's representative explained the differences between the current invention and the cited prior art. The applicant's representative intends to amend the claim to include the features of performing a research on the user while responding to the user inquiry wherein the the research and feedback to the device is being performed by a second opinion module and a checklist language model. It appears that the proposed claim amendment will overcome the cited prior art. Further consideration and search will be conducted when a formal response is received.

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| /VU B HANG/<br>Primary Examiner, Art Unit 2654                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
| <p><b>Applicant is reminded that a complete written statement as to the substance of the interview must be made of record in the application file. It is the applicants responsibility to provide the written statement, unless the interview was initiated by the Examiner and the Examiner has indicated that a written summary will be provided. See MPEP 713.04</b></p> <p>Please further see:<br/>MPEP 713.04<br/>Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews, paragraph (b)<br/>37 CFR § 1.2 Business to be transacted in writing</p> |  |

**Applicant recordation instructions:** The formal written reply to the last Office action must include the substance of the interview. (See MPEP section 713.04). If a reply to the last Office action has already been filed, applicant is given a non-extendable period of the longer of one month or thirty days from this interview date, or the mailing date of this interview summary form, whichever is later, to file a statement of the substance of the interview.

**Examiner recordation instructions:** Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.



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2. file the Applicant Initiated Interview Request form (PTOL-413A) ([www.uspto.gov/sites/default/files/documents/PTOL413A.pdf](http://www.uspto.gov/sites/default/files/documents/PTOL413A.pdf)); or
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| APPLICATION NO.                                                               | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-------------------------------------------------------------------------------|-------------|----------------------|---------------------|------------------|
| 18/592,441                                                                    | 02/29/2024  | Munjal SHAH          | HPAI1000USN01       | 7098             |
| 189741                                                                        | 7590        | 05/22/2024           | EXAMINER            |                  |
| Flagship Patents - General<br>2100 Geng Road, Suite210<br>Palo Alto, CA 94303 |             |                      | HANG, VU B          |                  |
|                                                                               |             |                      | ART UNIT            | PAPER NUMBER     |
|                                                                               |             |                      | 2654                |                  |
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***Notice of Pre-AIA or AIA Status***

- The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.
- This office action is responsive to the application filed on 02/09/2024.
- Claims 1-20 are pending.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a)(1) the claimed invention was patented, described in a printed publication, or in public use, on sale, or otherwise available to the public before the effective filing date of the claimed invention.

Claims 19 and 20 are rejected under 35 U.S.C. 102 (a)(1) as being anticipated by Brown et al. (US Patent 9,824,188 B2).

Regarding **Claim 19**, Brown teaches a multi-turn conversational system (see Fig.1 (114), Fig.6 (114) and Col.8, Line 51-65), comprising:

a conversation interface configured to execute multiple turns of human-like conversation with a user (see Fig.2A (216), Fig.6 (114) and Col.12, Line 38-46, a communication interface for interaction between a user and the conversation system including a series of questions and answers);

and a control logic, in communication with the conversation interface, and configured to generate one or more control signals based on evaluating multiple turns of upstream human-like conversation between the conversation interface and the user (see Fig.1 (152), Fig.6 (114), Col.9, Line 19-34 and Col.14, Line 44-67, determining the intent from a query and mapping the query to intent based on context information).

Regarding **Claim 20**, Brown further teaches wherein the control signals contribute in part to construction of multiple turns of downstream human-like conversation between the conversation interface and the user (see Fig.1 (152), Fig.6 (114), Col.9, Line 19-34 and Col.14, Line 44-67, responses to the queries or questions).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-2 and 4-18 are rejected under 35 U.S.C. 103 as being unpatentable over Brown et al. (US Patent 9,824,188 B2) in view of Tunstall-Pedoe et al. (US Patent 11,977,854 B2).

Regarding **Claim 1**, Brown teaches a multi-turn conversational system (see Fig.1 (114), Fig.6 (114) and Col.8, Line 51-65), comprising:

a first language model-based conversation interface configured to execute multiple turns of human-like conversation with a user (see Fig.2A (216), Fig.6 (114) and Col.12, Line 38-46, a communication interface for interaction between a user and the conversation system including a series of questions and answers);

and a control logic, in communication with the first language model-based conversation interface, and configured to generate one or more control signals based on evaluating multiple turns of upstream human-like conversation between the first language model-based conversation interface and the user (see Fig.1 (152), Fig.6 (114), Col.9, Line 19-34 and Col.14, Line 44-67, determining the intent from a query and mapping the query to intent based on context information), wherein the control

signals contribute in part to construction of multiple turns of downstream human-like conversation between the first large language model-based conversation interface and the user (see Fig.1 (152), Fig.6 (114), Col.9, Line 19-34 and Col.14, Line 44-67, responses to the queries or questions).

Brown fails to teach wherein the first language model is a large language model trained with over one thousand gradient update iterations.

Tunstall-Pedoe, however, teaches utilizing a large language model that is trained with at least one thousand gradient update iterations in a conversational system (see Col.6, Line 55 – Col.6, Line 5).

It would have been obvious for one skilled in the art, before the effective filing date of the application, to incorporate into Brown's conversational system a large language model that is trained with at least one thousand gradient update iterations in a conversational system. The motivation would be to utilize a refined language model that is re-trained a number of times.

Regarding **Claim 2**, Brown further teaches wherein the control logic comprises a trigger detection logic, a question insertion logic, and an answer classification logic (see Fig.1 (102,104), Fig.3 and Col.9, Line 21-31, receiving a query, determining the intent based on context information and generating a specific response based on the determined intent).

Regarding **Claim 4**, Brown further teaches wherein the trigger detection logic is configured to evaluate the multiple turns of upstream human-like conversation and detect trigger exchanges in the multiple turns of upstream human-like conversation that require invoking the question insertion logic (see Fig.6 (114) and Col.14, Line 44-67, querying user for symptoms).

Regarding **Claim 5**, Brown further teaches wherein the question insertion logic is configured to select one or more questions that correspond to the detected trigger exchanges, and to cause the first large language model-based conversation interface to use the selected questions to construct the multiple turns of downstream human-like conversation (see Fig.6 (114) and Col.14, Line 44-67, responses to the queries or questions based on context information).



Regarding **Claim 6**, Brown further teaches wherein the selected questions are the control signals (see Fig.6 (114) and Col.14, Line 44-67, querying user for symptoms via the communication interface).

Regarding **Claim 7**, Brown further teaches wherein the first language model-based conversation interface is further configured to pose to the user the selected questions, to receive from the user answers to the selected questions, and to transmit the received answers to the answer classification logic (see Fig.6 (114) and Col.14, Line 44-67, querying user for symptoms and generating responses to the queries or questions based on context information).

Regarding **Claim 8**, Brown further teaches wherein the answer classification logic is configured to analyze the received answers and classify the received answers to at least one answer category in a plurality of answer categories, and to generate the control signals based on the classification (see Fig.6 (114) and Col.14, Line 44-67, identifying a serious medical problem and initiating a call for emergency medical assistance).

Regarding **Claim 9**, Brown further teaches wherein the control signals, generated in response to the answer classification logic classifying the received answers to a first kickout category, cause the first large language model-based conversation interface to end the human-like conversation with the user (see Fig.6 (114) and Col.14, Line 44-67, identifying a serious medical problem and initiating a call for emergency medical assistance).

Regarding **Claim 10**, Brown further teaches wherein the first large language model-based conversation interface emulates a human healthcare professional, wherein the user is a human, and wherein the human-like conversation is a healthcare conversation (see Fig.1 (102,128), Fig.3 and Col.11, Line 4-12).

Regarding **Claim 11**, Brown further teaches wherein the trigger exchanges include symptom descriptors that identify one or more symptoms (see Fig.6 (114) and Col.14, Line 44-60).

Regarding **Claim 12**, Brown further teaches using medical condition queries that probe at least one symptom mentioned by the human and identified by at least one symptom descriptor associated with the detected trigger exchanges (see Fig.6 (114) and Col.14, Line 44-60).

Regarding **Claim 13**, Brown further teaches wherein the received answers identify one or more medical conditions associated with the symptom and experienced by the human (see Fig.6 (114) and Col.14, Line 44-60, the user responses indicate influenza).

Regarding **Claim 14**, Brown further teaches wherein the answer classification logic is further configured to classify the received answers and generate the control signals based on severity of the identified medical conditions (see Fig.6 (114) and Col.14, Line 44-60, recommend emergency medical assistance when symptoms indicate a serious medical problem).

Regarding **Claim 15**, Brown further teaches wherein the control signal generated in response to the answer classification logic classifying the received answers to a second kickout category, cause the first language model-based conversation interface to connect the user with a human healthcare professional (see Fig.6 (114) and Col.14, Line 44-60, initiate call for emergency medical assistance when symptoms indicate a serious medical problem).

Regarding **Claim 16**, Brown further teaches wherein the control signals, generated in response to the answer classification logic classifying the received answers to a third kickout category, cause the first large language model-based conversation interface to schedule a healthcare appointment of the user with a human healthcare professional (see Fig.6 (114) and Col.14, Line 44-60, scheduling an appointment with a doctor based on the symptoms indicating influenza).

Regarding **Claim 17**, Brown further teaches wherein the human-like conversation is text-based (see Fig.3 and Col.11, Line 20-33).

Regarding **Claim 18**, Brown further teaches wherein the human-like conversation is audio-based (see Fig.7A and Col.11, Line 20-33).

Claim 3 is rejected under 35 U.S.C. 103 as being unpatentable over Brown et al. (US Patent 9,824,188 B2) in view of Tunstall-Pedoe et al. (US Patent 11,977,854 B2), and in further view of Lee et al. (US Patent 11,843,565 B2).

Regarding **Claim 3**, Brown and Tunstall-Pedoe teach the conversational system of Claim 1 but fail to teach wherein the trigger detection logic is a second large language model, and wherein the answer classification logic is a third large language model.

Lee, however, teaches utilizing a language model to extract contextual information from a dialogue input while utilizing a classification model for providing a higher quality or higher accuracy responses (see Col.5, Line 64 – Col.6, Line 31).

It would have been obvious for one skilled in the art, before the effective filing date of the application, to incorporate into the conversational system of Claim 1 a second language model for trigger detection and a third language model for answer classification. The motivation would be to generate a higher quality or more accurate conversational system by utilizing multiple language models for identifying context information and classifying the user intents based on the user inputs or responses to the system.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of 35 U.S.C. 112(b):

(b) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

Claim 12 is rejected under 35 U.S.C. 112(b) for failing to particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

Regarding **Claim 12**, the claim recites the limitation "*wherein the selected questions are medical condition queries*". There is insufficient antecedent basis for this limitation in the claim. Claim 12 is

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dependent upon Claim 11, and Claim 11 does not include any limitation for questions that are being selected.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to VU B HANG whose telephone number is (571)272-0582.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at <http://www.uspto.gov/interviewpractice>.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hai Phan, can be reached at (571)272-6338. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of published or unpublished applications may be obtained from Patent Center. Unpublished application information in Patent Center is available to registered users. To file and manage patent submissions in Patent Center, visit: <https://patentcenter.uspto.gov>. Visit <https://www.uspto.gov/patents/apply/patent-center> for more information about Patent Center and <https://www.uspto.gov/patents/docx> for information about filing in DOCX format. For additional questions, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/VU B HANG/  
Primary Examiner, Art Unit 2654

|                                   |                                       |  |                                                           |             |
|-----------------------------------|---------------------------------------|--|-----------------------------------------------------------|-------------|
| <b>Notice of References Cited</b> | Application/Control No.<br>18/592,441 |  | Applicant(s)/Patent Under<br>Reexamination<br>SHAH et al. |             |
|                                   | Examiner<br>VU B HANG                 |  | Art Unit<br>2654                                          | Page 1 of 1 |

U.S. PATENT DOCUMENTS

| * |   | Document Number<br>Country Code-Number-Kind Code | Date<br>YYYY-MM-DD | Name                    | CPC Classification | US Classification |
|---|---|--------------------------------------------------|--------------------|-------------------------|--------------------|-------------------|
| * | A | US-9824188-B2                                    | 2017-11-21         | Brown; Fred A           | G06F3/04886        | 1/1               |
| * | B | US-11977854-B2                                   | 2024-05-07         | Tunstall-Pedoe; William | G06N3/0895         | 1/1               |
| * | C | US-11843565-B2                                   | 2023-12-12         | Lee; Sunhwan            | H04L51/02          | 1/1               |
|   | D |                                                  |                    |                         |                    |                   |
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FOREIGN PATENT DOCUMENTS

| * |   | Document Number<br>Country Code-Number-Kind Code | Date<br>YYYY-MM-DD | Country | Name | CPC Classification |
|---|---|--------------------------------------------------|--------------------|---------|------|--------------------|
|   | N |                                                  |                    |         |      |                    |
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NON-PATENT DOCUMENTS

| * |   | Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages) |
|---|---|-------------------------------------------------------------------------------------------|
|   | U |                                                                                           |
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\*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)  
Dates in YYYY-MM-DD format are publication dates. Classifications may be US or foreign.

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|----------------------------------------------------------------------------------------------------------|----------------------------------------------|---------------------------------------------------------------|
| <b>Search Notes</b><br> | <b>Application/Control No.</b><br>18/592,441 | <b>Applicant(s)/Patent Under Reexamination</b><br>SHAH et al. |
|                                                                                                          | <b>Examiner</b><br>VU B HANG                 | <b>Art Unit</b><br>2654                                       |

| CPC - Searched* |      |          |
|-----------------|------|----------|
| Symbol          | Date | Examiner |
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| CPC Combination Sets - Searched*                                                                                                           |            |          |
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| Symbol                                                                                                                                     | Date       | Examiner |
| G06F 40/30, 40/211, 40/253, 40/268, 40/284                                                                                                 | 05/17/2024 | VH       |
| G10L 15/07, 15/20, 15/22, 15/26, 15/30, 15/02, 15/063, 15/08, 15/16, 25/30, 21/0208, 25/78, 25/87, 15/1822, 15/183, 15/193, 15/19, 15/1815 | 05/17/2024 | VH       |

| US Classification - Searched* |          |      |          |
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| Class                         | Subclass | Date | Examiner |
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\* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

| Search Notes                     |            |          |
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| Search Notes                     | Date       | Examiner |
| PE2E Search, Limited Text Search | 05/17/2024 | VH       |

| Interference Search |                       |      |          |
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| US Class/CPC Symbol | US Subclass/CPC Group | Date | Examiner |
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| /VU B HANG/<br>Primary Examiner, Art Unit 2654 |  |
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## PE2E SEARCH - Search History (Prior Art)

| Ref # | Hits | Search Query      | DBs                                                                                                                                                                                                                                                                                                                  | Default Operator | Plurals | British Equivalents | Time Stamp          |
|-------|------|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|---------|---------------------|---------------------|
| L1    | 1180 | (G06F ADJ 40/211) | (US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR               | ON      | ON                  | 2024/05/09 08:29 PM |
| L2    | 1150 | (G06F ADJ 40/253) | (US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR               | ON      | ON                  | 2024/05/09 08:29 PM |
| L3    | 607  | (G06F ADJ 40/268) | (US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR               | ON      | ON                  | 2024/05/09 08:29 PM |
| L4    | 2371 | (G06F ADJ 40/284) | (US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY,                                                                                                                                                                                                                                                            | OR               | ON      | ON                  | 2024/05/09 08:30 PM |



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| L5 | 6479 | (G06F ADJ 40/30) | CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)<br>(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2024/05/09 08:30 PM |
| L6 | 1197 | (G10L ADJ 15/07) | (US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                                                                                                                                                                                                                               | OR | ON | ON | 2024/05/09 08:30 PM |
| L7 | 2621 | (G10L ADJ 15/20) | (US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                                                                                                                                                                                                                               | OR | ON | ON | 2024/05/09 08:30 PM |

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| L8  | 12403 | (G10L ADJ 15/22) | TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)<br>(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2024/05/09 08:30 PM |
| L9  | 7715  | (G10L ADJ 15/26) | (US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                               | OR | ON | ON | 2024/05/09 08:30 PM |
| L10 | 3994  | (G10L ADJ 15/30) | (US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                               | OR | ON | ON | 2024/05/09 08:30 PM |
| L11 | 2780  | (G10L ADJ 15/02) | (US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU,                                                                                                                                                                                                                                                                                                      | OR | ON | ON | 2024/05/09 08:31 PM |

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| L12 | 3627 | (G10L ADJ 15/063)  | CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                                               | OR | ON | ON | 2024/05/09 08:31 PM |
| L13 | 3454 | (G10L ADJ 15/08)   | (US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2024/05/09 08:31 PM |
| L14 | 2838 | (G10L ADJ 15/1815) | (US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2024/05/09 08:31 PM |

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| L15 | 2791 | (G10L ADJ 15/1822) | VN); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)<br><br>(US-PGPUB; USPAT;<br>USOCR; FIT (AU, AP,<br>AT, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, OA, RU, SU, WO,<br>MC, MD, MY, NL, NO,<br>NZ, PH, PL, PT, RO,<br>RS, SE, SG, SI, SK,<br>TH, TN, TR, TW, UA,<br>VN); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2024/05/09<br>08:31 PM |
| L16 | 1703 | (G10L ADJ 15/183)  | (US-PGPUB; USPAT;<br>USOCR; FIT (AU, AP,<br>AT, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, OA, RU, SU, WO,<br>MC, MD, MY, NL, NO,<br>NZ, PH, PL, PT, RO,<br>RS, SE, SG, SI, SK,<br>TH, TN, TR, TW, UA,<br>VN); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                                                     | OR | ON | ON | 2024/05/09<br>08:31 PM |
| L17 | 597  | (G10L ADJ 15/193)  | (US-PGPUB; USPAT;<br>USOCR; FIT (AU, AP,<br>AT, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, OA, RU, SU, WO,<br>MC, MD, MY, NL, NO,<br>NZ, PH, PL, PT, RO,<br>RS, SE, SG, SI, SK,<br>TH, TN, TR, TW, UA,<br>VN); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                                                     | OR | ON | ON | 2024/05/09<br>08:31 PM |
| L18 | 949  | (G10L ADJ 15/19)   | (US-PGPUB; USPAT;<br>USOCR; FIT (AU, AP,<br>AT, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,                                                                                                                                                                                                                                                                                                         | OR | ON | ON | 2024/05/09<br>08:32 PM |

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| L19 | 553  | (G10L ADJ 25/87) | EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)<br>(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2024/05/09 08:32 PM |
| L20 | 2474 | (G10L ADJ 25/78) | (US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                                                                                                                                                                                       | OR | ON | ON | 2024/05/09 08:32 PM |
| L21 | 1109 | (G10L ADJ 25/30) | (US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                                                                                                                                                                                       | OR | ON | ON | 2024/05/09 08:32 PM |

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| L22 | 269   | (G10L ADJ 25/27)                                                                                                              | JPO; DERWENT;<br>IBM_TDB)<br>(US-PGPUB; USPAT;<br>USOCR; FIT (AU, AP,<br>AT, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, OA, RU, SU, WO,<br>MC, MD, MY, NL, NO,<br>NZ, PH, PL, PT, RO,<br>RS, SE, SG, SI, SK,<br>TH, TN, TR, TW, UA,<br>VN); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2024/05/09<br>08:32 PM |
| L23 | 2372  | (G10L ADJ 15/16)                                                                                                              | (US-PGPUB; USPAT;<br>USOCR; FIT (AU, AP,<br>AT, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, OA, RU, SU, WO,<br>MC, MD, MY, NL, NO,<br>NZ, PH, PL, PT, RO,<br>RS, SE, SG, SI, SK,<br>TH, TN, TR, TW, UA,<br>VN); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                              | OR | ON | ON | 2024/05/09<br>08:32 PM |
| L24 | 3621  | (G10L ADJ 21/0208)                                                                                                            | (US-PGPUB; USPAT;<br>USOCR; FIT (AU, AP,<br>AT, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, OA, RU, SU, WO,<br>MC, MD, MY, NL, NO,<br>NZ, PH, PL, PT, RO,<br>RS, SE, SG, SI, SK,<br>TH, TN, TR, TW, UA,<br>VN); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                              | OR | ON | ON | 2024/05/09<br>08:32 PM |
| L25 | 32881 | (L1 OR L2 OR L3 OR<br>L4 OR L5 OR L6 OR L7<br>OR L8 OR L9 OR L10<br>OR L11 OR L12 OR<br>L13 OR L14 OR L15<br>OR L16 OR L17 OR | (US-PGPUB; USPAT;<br>USOCR; FIT (AU, AP,<br>AT, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,                                                                                                                                                                                                                                                       | OR | ON | ON | 2024/05/09<br>08:34 PM |

|     |      |                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                   |    |    |    |                        |
|-----|------|------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|------------------------|
|     |      | L18 OR L19 OR L20<br>OR L21 OR L22 OR<br>L23 OR L24)                                                                   | HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, OA, RU, SU, WO,<br>MC, MD, MY, NL, NO,<br>NZ, PH, PL, PT, RO,<br>RS, SE, SG, SI, SK,<br>TH, TN, TR, TW, UA,<br>VN); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                                                                                                                                             |    |    |    |                        |
| L26 | 1215 | L25 AND (conversation<br>SAME turn\$1 OR<br>(question near5<br>answer) SAME<br>(language ADJ model))                   | (US-PGPUB; USPAT;<br>USOCR; FIT (AU, AP,<br>AT, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, OA, RU, SU, WO,<br>MC, MD, MY, NL, NO,<br>NZ, PH, PL, PT, RO,<br>RS, SE, SG, SI, SK,<br>TH, TN, TR, TW, UA,<br>VN); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2024/05/09<br>08:35 PM |
| L27 | 1170 | L25 AND (conversation<br>SAME turn\$1 OR<br>(question near5<br>answer) SAME trained<br>SAME (language ADJ<br>model))   | (US-PGPUB; USPAT;<br>USOCR; FIT (AU, AP,<br>AT, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, OA, RU, SU, WO,<br>MC, MD, MY, NL, NO,<br>NZ, PH, PL, PT, RO,<br>RS, SE, SG, SI, SK,<br>TH, TN, TR, TW, UA,<br>VN); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2024/05/09<br>08:36 PM |
| L28 | 0    | L25 AND (conversation<br>SAME turn\$1 SAME<br>(question near5<br>answer) SAME trained<br>SAME (language ADJ<br>model)) | (US-PGPUB; USPAT;<br>USOCR; FIT (AU, AP,<br>AT, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, OA, RU, SU, WO,<br>MC, MD, MY, NL, NO,<br>NZ, PH, PL, PT, RO,<br>RS, SE, SG, SI, SK,<br>TH, TN, TR, TW, UA,<br>VN); FPRS; EPO;<br>JPO; DERWENT;             | OR | ON | ON | 2024/05/09<br>08:36 PM |

|     |    |                                                                                                                      |                                                                                                                                                                                                                                                                                                                                  |    |    |    |                     |
|-----|----|----------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|---------------------|
| L29 | 0  | L25 AND ((conversation OR dialog OR multimodal) SAME turn\$1 SAME (question near5 answer) SAME (language ADJ model)) | IBM_TDB)<br>(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2024/05/09 08:36 PM |
| L30 | 3  | L25 AND ((conversation OR dialog OR multimodal) SAME turn\$1 SAME question SAME answer SAME (language ADJ model))    | (US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)             | OR | ON | ON | 2024/05/09 08:37 PM |
| L31 | 16 | L25 AND ((conversation OR dialog OR multimodal) SAME question SAME answer SAME (language ADJ model))                 | (US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)             | OR | ON | ON | 2024/05/09 08:37 PM |
| L32 | 9  | L25 AND ((conversation OR dialog OR multimodal OR dialogue) SAME turn\$1 SAME (trained near3 (language ADJ model)))  | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS,                                                                                                                                                                                | OR | ON | ON | 2024/05/09 08:59 PM |



|     |      |                                                                                                       |                                                                                                                                                                                                                                                                                                                      |    |    |    |                     |
|-----|------|-------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|---------------------|
| L33 | 1420 | L25 AND ((conversation OR dialog OR dialogue) SAME (question near3 answer))                           | IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                                                                                                                   | OR | ON | ON | 2024/05/09 11:19 PM |
| L34 | 12   | L25 AND ((conversation OR dialog OR dialogue) SAME (question near3 answer) SAME (language ADJ model)) | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2024/05/09 11:20 PM |
| L35 | 620  | L25 AND ((conversation OR dialog OR dialogue) SAME (language ADJ model))                              | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2024/05/09 11:23 PM |

|     |      |                                                                                                                                    |                                                                                                                                                                                                                                                                                                                      |    |    |    |                     |
|-----|------|------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|---------------------|
| L36 | 54   | L25 AND ((conversation OR dialog OR dialogue) SAME turn\$1 SAME (language ADJ model))                                              | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2024/05/09 11:24 PM |
| L37 | 5122 | L25 AND ((conversation OR dialog OR dialogue) SAME multimodal SAME (language ADJ model))                                           | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2024/05/09 11:24 PM |
| L38 | 17   | L25 AND ((conversation OR dialog OR dialogue) SAME multimodal SAME (language ADJ model))                                           | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2024/05/09 11:24 PM |
| L39 | 0    | L25 AND ((conversation OR dialog OR dialogue) SAME turn\$1 SAME (question near3 answer) SAME (trained near4 (language ADJ model))) | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL,                                                                                                                        | OR | ON | ON | 2024/05/10 11:36 PM |

|     |   |                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                |    |    |    |                     |
|-----|---|---------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|---------------------|
| L40 | 3 | ((conversation OR dialog OR dialogue) SAME turn\$1 SAME (question near3 answer) SAME (trained near4 (language ADJ model)))      | NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)<br>(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2024/05/10 11:36 PM |
| L41 | 0 | L25 AND ((conversation OR dialog OR dialogue) SAME turn\$1 SAME question SAME answer SAME (trained near4 (language ADJ model))) | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                                                                                           | OR | ON | ON | 2024/05/10 11:36 PM |
| L42 | 4 | ((conversation OR dialog OR dialogue) SAME turn\$1 SAME question SAME answer SAME (trained near4 (language ADJ model)))         | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                                                                                           | OR | ON | ON | 2024/05/10 11:37 PM |
| L43 | 0 | L25 AND ((conversation                                                                                                          | (US-PGPUB; USPAT;                                                                                                                                                                                                                                                                                                                                                                                                                              | OR | ON | ON | 2024/05/10          |

|     |     |                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                   |    |    |    |                        |
|-----|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|------------------------|
|     |     | OR dialog OR dialogue)<br>SAME turn\$1 SAME<br>(question OR query)<br>SAME (answer OR<br>response) SAME<br>(trained near4<br>(language ADJ model)))                   | USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                      |    |    |    | 11:38 PM               |
| L44 | 9   | ((conversation OR<br>dialog OR dialogue)<br>SAME turn\$1 SAME<br>(question OR query)<br>SAME (answer OR<br>response) SAME<br>(trained near4<br>(language ADJ model))) | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2024/05/10<br>11:38 PM |
| L45 | 5   | L25 AND ((conversation<br>OR dialog OR dialogue)<br>SAME turn\$1 SAME<br>(question OR query)<br>SAME (answer OR<br>response) SAME<br>(language ADJ model))            | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,<br>PT, RO, RS, RU, SE,<br>SG, SI, SK, SU, TH,<br>TN, TR, TW, UA, VN,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2024/05/10<br>11:38 PM |
| L46 | 132 | ((conversation OR<br>dialog OR dialogue)<br>SAME turn\$1 SAME<br>(question OR query)<br>SAME (answer OR<br>response) SAME<br>(language ADJ model))                    | (US-PGPUB; USPAT;<br>USOCR; FIT (AP, AT,<br>AU, BE, BG, BR, BY,<br>CA, CH, CN, CS, CU,<br>CZ, DD, DE, DK, EA,<br>EE, EP, ES, FI, FR, GB,<br>HR, HU, ID, IE, IL, IS,<br>IT, JP, KR, LT, LU, LV,<br>MA, MC, MD, MY, NL,<br>NO, NZ, OA, PH, PL,                                                                                                                      | OR | ON | ON | 2024/05/10<br>11:39 PM |

|     |   |                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                            |    |    |    |                     |
|-----|---|-------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|---------------------|
| L47 | 8 | L25 AND ((conversation OR dialog OR dialogue) SAME (large ADJ language ADJ model))                          | PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)<br>(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2024/05/14 02:46 PM |
| L48 | 1 | L25 AND ((conversation OR dialog OR dialogue) SAME turn SAME (large ADJ language ADJ model))                | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                                                                       | OR | ON | ON | 2024/05/14 02:47 PM |
| L49 | 0 | L25 AND ((conversation OR dialog OR dialogue) SAME (medical OR health) SAME (large ADJ language ADJ model)) | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                                                                       | OR | ON | ON | 2024/05/14 02:47 PM |
| L50 | 2 | L25 AND ((conversation OR dialog OR dialogue)                                                               | (US-PGPUB; USPAT; USOCR; FIT (AP, AT,                                                                                                                                                                                                                                                                                                                                                                                      | OR | ON | ON | 2024/05/14 02:49 PM |

|     |    |                                                                                      |                                                                                                                                                                                                                                                                                                                      |    |    |    |                     |
|-----|----|--------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|---------------------|
|     |    | SAME trained SAME (large ADJ language ADJ model))                                    | AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                       |    |    |    |                     |
| L51 | 4  | L25 AND (chatbot SAME (large ADJ language ADJ model))                                | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2024/05/14 02:51 PM |
| L52 | 31 | L25 AND (trained SAME (large ADJ language ADJ model))                                | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2024/05/14 02:51 PM |
| L53 | 5  | L25 AND (trained SAME (large ADJ language ADJ model) SAME (update\$1 OR iterations)) | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE,                                                                                | OR | ON | ON | 2024/05/14 02:52 PM |

|     |     |                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                        |    |    |    |                     |
|-----|-----|--------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|---------------------|
| L54 | 620 | L25 AND ((conversation OR dialog OR dialogue) SAME (language ADJ model))                                           | SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)<br>(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2024/05/14 03:00 PM |
| L55 | 54  | L25 AND ((conversation OR dialog OR dialogue) SAME turn\$1 SAME (language ADJ model))                              | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                                                   | OR | ON | ON | 2024/05/14 03:00 PM |
| L56 | 0   | L25 AND ((conversation OR dialog OR dialogue) SAME turn\$1 SAME (language ADJ model) SAME (medical OR healthcare)) | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                                                   | OR | ON | ON | 2024/05/14 03:01 PM |
| L57 | 0   | L25 AND ((conversation OR dialog OR dialogue OR chatbot) SAME                                                      | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY,                                                                                                                                                                                                                                                                                                                                              | OR | ON | ON | 2024/05/14 03:01 PM |

|     |    |                                                                                                                       |                                                                                                                                                                                                                                                                                                                      |    |    |    |                     |
|-----|----|-----------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|---------------------|
|     |    | turn\$1 SAME (language ADJ model) SAME (medical OR healthcare))                                                       | CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                           |    |    |    |                     |
| L58 | 26 | ((conversation OR dialog OR dialogue OR chatbot) SAME turn\$1 SAME (language ADJ model) SAME (medical OR healthcare)) | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2024/05/14 03:01 PM |
| L59 | 9  | L25 AND ((conversation OR dialog OR dialogue OR chatbot) SAME (language ADJ model) SAME (medical OR healthcare))      | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2024/05/14 03:03 PM |
| L60 | 0  | L25 AND (trigger SAME (language ADJ model) SAME (response OR answer) SAME (classification ADJ model))                 | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH,                                                            | OR | ON | ON | 2024/05/17 01:34 PM |



|     |   |                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                    |    |    |    |                     |
|-----|---|-------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|---------------------|
| L61 | 3 | (trigger SAME (language ADJ model) SAME (response OR answer) SAME (classification ADJ model))                     | TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)<br>(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2024/05/17 01:34 PM |
| L62 | 2 | L25 AND ((intent OR context) SAME (language ADJ model) SAME (response OR answer) SAME (classification ADJ model)) | (US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)                                                               | OR | ON | ON | 2024/05/17 01:35 PM |

## PE2E SEARCH - Search History (Interference)

There are no Interference searches to show.



UNITED STATES PATENT AND TRADEMARK OFFICE

# USPTO Automated Interview Request (AIR)

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May 21 2024

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This paper requesting to schedule and/or conduct an interview is appropriate because:

This submission is requested to be accepted as an authorization for this interview to communicate via the internet. Recognizing that Internet communications are not secure, I hereby authorize the USPTO to communicate with the undersigned concerning scheduling of the interview via video conference, instant messaging, or electronic mail, and to conduct the interview in accordance with office practice including video conferencing.

Name(s) :

Shiv S Naimpally

S-signature:

/Shiv S Naimpally/

Registration Number:

66142

U.S. Application Number:

18592441

Confirmation Number:

7098

E-mail Address:

shiv@flagshippatents.com

Phone Number:

+1 2142824215

Proposed Time of Interview:

5-29-2024 11:00 AM ET

Alternative Proposed Time(s) of Interview:

5-29-2024 2:00 PM ET

Alternative Proposed Time(s) of Interview:

5-29-2024 3:00 PM ET

Preferred Interview Type:

Telephonic

I am the applicant or applicant's representative for this application.

Topic for Discussion:

Identify possible allowable subject matter to expedite prosecution



UNITED STATES  
PATENT AND TRADEMARK OFFICE



UNITED STATES PATENT AND TRADEMARK OFFICE

# USPTO Automated Interview Request (AIR)

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May 14 2024

---

This paper requesting to schedule and/or conduct an interview is appropriate because:

This submission is requested to be accepted as an authorization for this interview to communicate via the internet. Recognizing that Internet communications are not secure, I hereby authorize the USPTO to communicate with the undersigned concerning scheduling of the interview via video conference, instant messaging, or electronic mail, and to conduct the interview in accordance with office practice including video conferencing.

Name(s) :

Shiv Naimpally

S-signature:

/Shiv S Naimpally/

Registration Number:

66142

U.S. Application Number:

18592441

Confirmation Number:

7098

E-mail Address:

docket@flagshippatents.com

Phone Number:

+1 (214) 282-4215

Proposed Time of Interview:

5-21-2024 11:00 AM ET

Alternative Proposed Time(s) of Interview:

5-22-2024 1:00 PM ET

Alternative Proposed Time(s) of Interview:

5-23-2024 3:00 PM ET

Preferred Interview Type:

Telephonic

I am the applicant or applicant's representative for this application.

Topic for Discussion:

Identifying allowable subject matter



UNITED STATES  
PATENT AND TRADEMARK OFFICE

OSSI Ex. 1018



# UNITED STATES PATENT AND TRADEMARK OFFICE

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P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

| APPLICATION NO.                                                               | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-------------------------------------------------------------------------------|-------------|----------------------|---------------------|------------------|
| 18/592,441                                                                    | 02/29/2024  | Munjat SHAH          | HPAI1000USN01       | 7098             |
| 189741                                                                        | 7590        | 05/01/2024           | EXAMINER            |                  |
| Flagship Patents - General<br>2100 Geng Road, Suite210<br>Palo Alto, CA 94303 |             |                      | CENTRAL, DOCKET     |                  |
|                                                                               |             |                      | ART UNIT            | PAPER NUMBER     |
|                                                                               |             |                      | OPAP                |                  |
|                                                                               |             |                      | NOTIFICATION DATE   | DELIVERY MODE    |
|                                                                               |             |                      | 05/01/2024          | ELECTRONIC       |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

bruce@flagshippatents.com  
docket@flagshippatents.com  
cofficeaction@appcoll.com



UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents  
United States Patent and Trademark Office  
P.O. Box 1450  
Alexandria, VA 22313-1450  
www.uspto.gov

Doc Code: TRACK1.GRANT

**Decision Granting Request for  
Prioritized Examination  
(Track I or After RCE)**

Application No.:18/592,441

The petition filed April 18, 2024, under 37 CFR 1.181, requesting reconsideration of the decision issued April 11, 2024, is GRANTED. The original request for prioritized examination, filed February 29, 2024, is hereby accepted in view of the properly executed request for prioritized examination submitted on April 18, 2024.

1. THE REQUEST FILED February 29, 2024 IS **GRANTED**.

The above-identified application has met the requirements for prioritized examination

- A. ☒ for an original nonprovisional application (Track I).  
B. ☐ for an application undergoing continued examination (RCE).

2. **The above-identified application will undergo prioritized examination.** The application will be accorded special status throughout its entire course of prosecution until one of the following occurs:

- A. filing a **petition for extension of time** to extend the time period for filing a reply;  
B. filing an **amendment to amend the application to contain more than four independent claims, more than thirty total claims**, or a multiple dependent claim;  
C. filing a **request for continued examination**;  
D. filing a notice of appeal;  
E. filing a request for suspension of action;  
F. mailing of a notice of allowance;  
G. mailing of a final Office action;  
H. completion of examination as defined in 37 CFR 41.102; or  
I. abandonment of the application.

Telephone inquiries with regard to this decision should be directed to Vanitha Elgart at 571-272-7395.

/VANITHA M ELGART/  
Petitions Examiner, OPET

UNITED STATES  
PATENT AND TRADEMARK OFFICEP.O. Box 1450  
Alexandria, VA 22313 - 1450  
www.uspto.gov

## ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #  
**18/592,441**RECEIPT DATE / TIME  
**04/18/2024 11:53:05 PM Z ET**ATTORNEY DOCKET #  
**HPAI1000USN01**

## Title of Invention

Low-Latency Conversational Artificial Intelligence (Ai) Architecture With A Parallelized In-Depth Analysis Feedback Loop

## Application Information

APPLICATION TYPE Utility - Nonprovisional Application  
under 35 USC 111(a)

PATENT # -

CONFIRMATION # 7098

FILED BY Shahzina Khan

PATENT CENTER # 65156788

FILING DATE 02/29/2024

CUSTOMER # 189741

FIRST NAMED INVENTOR Munjal SHAH

CORRESPONDENCE ADDRESS -

AUTHORIZED BY Shiv Naimpally

## Documents

**TOTAL DOCUMENTS: 2**

| DOCUMENT                                                     | PAGES | DESCRIPTION                                       | SIZE (KB) |
|--------------------------------------------------------------|-------|---------------------------------------------------|-----------|
| 2024-04-18_HPAI1000USN01-1-181<br>Petition.pdf               | 2     | Petition for review by the Office<br>of Petitions | 104 KB    |
| 2024-02-27_Trackone-<br>Request-SB-<br>434_HPAI1000USN01.pdf | 2     | Track One Request                                 | 142 KB    |

## Digest

| DOCUMENT | MESSAGE DIGEST(SHA-512) |
|----------|-------------------------|
|----------|-------------------------|

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|                                                  |                                                                                                                                          |
|--------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| 2024-04-18__HPAI1000USN01-<br>1-181 Petition.pdf | DF7B220160964DABF204B8D5216E739680EA3F8506263E8DE<br>E1E3A6C1E3F9162A578C443989DA598CCC533A5242071ADD1<br>228DFB921CA947732EDA9F5EB02EF9 |
|--------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|

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|                                                            |                                                                                                                                          |
|------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| 2024-02-27__Trackone-Request-<br>SB-434__HPAI1000USN01.pdf | 10E97CDFEFB956339AE29E813F1694579BCC761DBF2EBE61A<br>333091D5D66DF6E446330D9D11778489D43C67CF01C235E24<br>D1021A6A2590C901A378E36AA1DF28 |
|------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

**New Applications Under 35 U.S.C. 111**

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

**National Stage of an International Application under 35 U.S.C. 371**

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

**New International Application Filed with the USPTO as a Receiving Office**

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

**CERTIFICATION AND REQUEST FOR PRIORITIZED EXAMINATION  
UNDER 37 CFR 1.102(e) (Page 1 of 1)**

|                       |                                                                                                                          |                                               |            |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|------------|
| First Named Inventor: | Munjal SHAH                                                                                                              | Nonprovisional Application Number (if known): | 18/592,441 |
| Title of Invention:   | Low-Latency Conversational Artificial Intelligence (AI) Architecture With A Parallelized In-Depth Analysis Feedback Loop |                                               |            |

**APPLICANT HEREBY CERTIFIES THE FOLLOWING AND REQUESTS PRIORITIZED EXAMINATION FOR THE ABOVE-IDENTIFIED APPLICATION.**

1. The processing fee set forth in 37 CFR 1.17(i)(1) and the prioritized examination fee set forth in 37 CFR 1.17(c) have been filed with the request. The publication fee requirement is met because that fee, set forth in 37 CFR 1.18(d), is currently \$0. The basic filing fee, search fee, and examination fee are filed with the request or have been already been paid. I understand that any required excess claims fees or application size fee must be paid for the application.
2. I understand that the application may not contain, or be amended to contain, more than four independent claims, more than thirty total claims, or any multiple dependent claims, and that any request for an extension of time will cause an outstanding Track I request to be dismissed.
3. The applicable box is checked below:

**I. ☒ Original Application (Track One) - Prioritized Examination under § 1.102(e)(1)**

- i. (a) The application is an original nonprovisional utility application filed under 35 U.S.C. 111(a). This certification and request is being filed with the utility application via EFS-Web.  
---OR---  
(b) The application is an original nonprovisional plant application filed under 35 U.S.C. 111(a). This certification and request is being filed with the plant application in paper.
- ii. An executed inventor's oath or declaration under 37 CFR 1.63 or 37 CFR 1.64 for each inventor, or the application data sheet meeting the conditions specified in 37 CFR 1.53(f)(3)(i) is filed with the application.

**II. ☐ Request for Continued Examination - Prioritized Examination under § 1.102(e)(2)**

- i. A request for continued examination has been filed with, or prior to, this form.
- ii. If the application is a utility application, this certification and request is being filed via EFS-Web.
- iii. The application is an original nonprovisional utility application filed under 35 U.S.C. 111(a), or is a national stage entry under 35 U.S.C. 371.
- iv. This certification and request is being filed prior to the mailing of a first Office action responsive to the request for continued examination.
- v. No prior request for continued examination has been granted prioritized examination status under 37 CFR 1.102(e)(2).

|                       |                           |                                     |            |
|-----------------------|---------------------------|-------------------------------------|------------|
| Signature             | /Shivshanker S Naimpally/ | Date                                | 2024-02-27 |
| Name<br>(Print/Typed) | Shivshanker S. NAIMPALLY  | Practitioner<br>Registration Number | 66142      |

**Note:** This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. Submit multiple forms if more than one signature is required.\*

☒ \*Total of 1 forms are submitted.



## Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

**CERTIFICATE OF ELECTRONIC TRANSMISSION**

I hereby certify that this correspondence is being electronically transmitted to United States Patent and Trademark Office on April 17, 2024.

/Shahzina Khan/  
Shahzina KHAN

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re application of inventor:

Munjal SHAH

Application No.: 18/592,441

Confirmation No.: 7098

Filing Date: February 29, 2024

Title: Low-Latency Conversational Artificial Intelligence (Ai) Architecture With A Parallelized In-Depth Analysis Feedback Loop

Group Art Unit: OPAP

Examiner: Docket CENTRAL

CUSTOMER NO.: 189741

**MAIL STOP OFFICE OF PETITIONS**

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

**REQUEST UNDER 37 CFR §1.181 REQUESTING CORRECTION OF A DEFECTIVE EXECUTION OF THE TRACK ONE REQUEST UNDER 35 U.S.C. §26**

Dear Commissioner,

On February 29, 2024, the above referenced patent application was submitted to the USPTO with an incorrectly signed Track One request form (the application is believed to have otherwise met all of the requirements for a Track One filing).

On April 12, 2024, the USPTO sent a Decision Dismissing Request for Prioritized Examination (Track One) and noted that the request was dismissed due to the incorrectly signed request form.

To rectify the error in the Track One request form, applicant called the USPTO requesting a solution. It was recommended that the applicant re-submit a corrected Track One request form along with a petition under 37 CFR §1.181 requesting to accept the corrected form and granting the Request for Prioritized Exam. Upon further research, applicant found a similar petition filed for application number US 14/045,092, filed on October 03, 2013.

Accordingly, Applicants hereby respectfully petition the USPTO under 37 CFR §1.181 for reconsideration of the defective Track One request filed with the above-referenced application under 35 U.S.C. §26. A correctly signed copy of the Track One request is submitted herewith and is believed to address the defect in the originally submitted Track One request.

Respectfully submitted,

Dated: April 18, 2024

/Shivshanker S Naimpally/

Shivshanker S. NAIMPALLY, Reg. No. 66142

**FLAGSHIP PATENTS**

2100 Geng Road, Suite 210

Palo Alto, CA 94303

Phone: (415) 608-3356



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
**United States Patent and Trademark Office**  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

| APPLICATION NO.                                                               | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-------------------------------------------------------------------------------|-------------|----------------------|---------------------|------------------|
| 18/592,441                                                                    | 02/29/2024  | Munjal SHAH          | HPAI1000USN01       | 7098             |
| 189741                                                                        | 7590        | 04/11/2024           | EXAMINER            |                  |
| Flagship Patents - General<br>2100 Geng Road, Suite210<br>Palo Alto, CA 94303 |             |                      | CENTRAL, DOCKET     |                  |
|                                                                               |             |                      | ART UNIT            | PAPER NUMBER     |
|                                                                               |             |                      | OPAP                |                  |
|                                                                               |             |                      | NOTIFICATION DATE   | DELIVERY MODE    |
|                                                                               |             |                      | 04/11/2024          | ELECTRONIC       |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

bruce@flagshippatents.com  
docket@flagshippatents.com  
cofficeaction@appcoll.com

|                                                                                     |                                         |                                    |                                 |
|-------------------------------------------------------------------------------------|-----------------------------------------|------------------------------------|---------------------------------|
| <b><i>Decision Dismissing Request for<br/>Prioritized Examination (Track I)</i></b> | <b>Application No.</b><br>18/592,441    | <b>Applicant(s)</b><br>SHAH et al. |                                 |
|                                                                                     | <b>Examiner</b><br>FIKIRTE A<br>GEREMEW | <b>Art Unit</b><br>OMBL            | <b>AIA (FITF) Status</b><br>Yes |

1. THE REQUEST FILED 29 February 2024 IS **DISMISSED** BECAUSE:

- A. ☐ The application is not a utility application under 35 U.S.C. 111(a) filed by Patent Electronic System or a plant application under 35 U.S.C. 111(a):
- ☐ The application is a utility application that was not filed by Patent Electronic System.
  - ☐ The application is neither a utility application nor a plant application, but rather is a \_\_\_\_\_, which is excluded from the Track I program.
- B. ☐ The request was not filed with the application or on the same date of the application.
- C. ☐ One or more of the following fees were not filed with the application:
- ☐ Basic filing fee, as set forth in 37 CFR 1.16(a), or for a plant application, 37 CFR 1.16(c).
  - ☐ Search fee, as set forth in 37 CFR 1.16(k), or for a plant application, 37 CFR 1.16(m).
  - ☐ Examination fee, as set forth in 37 CFR 1.16(o), or for a plant application, 37 CFR 1.16(q).
  - ☐ Publication fee, as set forth in 37 CFR 1.18(d).
  - ☐ Track I processing fee, as set forth in 37 CFR 1.17(i).
  - ☐ Track I prioritized examination fee, as set forth in 37 CFR 1.17(c).
  - ☐ Application size fee, due because the specification and drawings exceed 100 sheets of paper, as set forth in 37 CFR 1.16(s).
  - ☐ Excess independent claim fee, due because the number of independent claims exceeds three, as set forth in 37 CFR 1.16(h).
  - ☐ Excess claim fee, due because the number of claims exceeds twenty, as set forth in 37 CFR 1.16(i).
- D. ☐ The executed inventor's oath or declaration, or an application data sheet meeting the conditions specified in 37 CFR 1.53(f)(3)(i) was not filed with the application or on the same date the application was filed.
- E. ☐ The application contains or has been amended to contain:
- ☐ More than four independent claims.
  - ☐ More than thirty total claims.
  - ☐ One or more multiple dependent claims.
- F. ☐ The Track I program has exceeded its limit of 15,000 requests for the current fiscal year.
- G. ☒ Other: See Continuation Sheet

2. CONCLUSION

- ☐ **ALL** of the above defect(s) consist only of one or more of items E (i-iii). Applicant is hereby accorded a **non-extendable ONE MONTH** time period from the mailing date of this Decision to (1) correct the subject defect(s) and (2) file a petition under 37 CFR 1.181 requesting reconsideration of prioritized examination. If no such petition is timely filed, the application will not undergo prioritized examination.

- OR -

- ☒ **The application will not undergo prioritized examination, because the request was not accompanied by all of the required items.**

Telephone inquiries with regard to this decision should be directed to FIKIRTE A GEREMEW at (703) 756-1930. In his/her absence, calls may be directed to Petition Help Desk at (571) 272-3282.

/FIKIRTE A GEREMEW/  
PROGRAM SUPPORT SPECIALIST, OMBL



Continuation of 1(g) Other. The Certification and Request for Prioritized Examination was not properly signed. A proper S-signature consists of only letters and/or Arabic numerals, with appropriate spaces and commas, periods, apostrophes, or hyphens for punctuation contained between a first single forward slash mark before, and a second single forward slash mark after, the S-signature. See 37 CFR 1.4(d)(2)(i). For this reason, the application is disqualified from the Track 1 Prioritized Examination Program.



# United States Patent and Trademark Office

*Office of the Chief Financial Officer*

Document Code:WFEE

User :Fikirte Geremew

Sale Accounting Date:04/10/2024

Sale Item Reference Number

18592441

Effective Date

02/29/2024

Document Number

I202440701085793

Fee Code

2830

Fee Code Description

PROCESSING FEE, EXCEPT  
PROV. APPLS.

Amount Paid

\$56.00

Payment Method

Deposit Account





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| APPLICATION<br>NUMBER | FILING or<br>371(c) DATE | GRP ART<br>UNIT | FIL FEE REC'D | ATTY. DOCKET NO | TOT CLAIMS | IND CLAIMS |
|-----------------------|--------------------------|-----------------|---------------|-----------------|------------|------------|
| 18/592,441            | 02/29/2024               |                 | 664           | HPAI1000USN01   | 20         | 2          |

CONFIRMATION NO. 7098

189741

Flagship Patents - General  
2100 Geng Road, Suite 210  
Palo Alto, CA 94303

## FILING RECEIPT



0000000069609637

Date Mailed: 03/15/2024

Receipt is acknowledged of this non-provisional utility patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF FIRST INVENTOR, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection.

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### Inventor(s)

Munjal SHAH, Palo Alto, CA;  
Vishal PARIKH, Palo Alto, CA;  
Meenesh BHIMANI, Palo Alto, CA;  
Subhabrata MUKHERJEE, Palo Alto, CA;  
Alex MILLER, Palo Alto, CA;  
Saad GODIL, Palo Alto, CA;  
Debajyoti DATTA, Palo Alto, CA;  
Paul GAMBLE, Palo Alto, CA;  
Rae LASKO, Palo Alto, CA;

### Applicant(s)

HealthGPT, Inc. DBA Hippocratic AI, Palo Alto, CA;

### Assignment For Published Patent Application

HealthGPT, Inc. DBA Hippocratic AI, Palo Alto, CA

**Power of Attorney:** The patent practitioners associated with Customer Number 189741

### Domestic Priority data as claimed by applicant

This appln claims benefit of 63/611,762 12/18/2023  
and claims benefit of 63/466,712 05/15/2023

Foreign Applications for which priority is claimed (You may be eligible to benefit from the Patent Prosecution Highway program at the USPTO. Please see <http://www.uspto.gov> for more information.) - None.

Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

**Permission to Access Application via Priority Document Exchange:** Yes

**Permission to Access Search Results:** Yes

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

**If Required, Foreign Filing License Granted:** 03/12/2024

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 18/592,441**

**Projected Publication Date:** 11/21/2024

**Non-Publication Request:** No

**Early Publication Request:** No

**\*\* SMALL ENTITY \*\***

**Title**

Low-Latency Conversational Artificial Intelligence (Ai) Architecture With A Parallelized In-Depth Analysis Feedback Loop

**Preliminary Class**

**Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications:** No

## **PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES**

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

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# PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number  
18/592,441

## APPLICATION AS FILED - PART I

| (Column 1)                                        |                                                                                                                                                                                                                               | (Column 2)   |          | SMALL ENTITY |   | OR | OTHER THAN SMALL ENTITY |         |
|---------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|----------|--------------|---|----|-------------------------|---------|
| FOR                                               | NUMBER FILED                                                                                                                                                                                                                  | NUMBER EXTRA | RATE(\$) | FEE(\$)      |   |    | RATE(\$)                | FEE(\$) |
| BASIC FEE<br>(37 CFR 1.16(a), (b), or (c))        | N/A                                                                                                                                                                                                                           | N/A          | N/A      | 64           |   |    | N/A                     |         |
| SEARCH FEE<br>(37 CFR 1.16(k), (l), or (m))       | N/A                                                                                                                                                                                                                           | N/A          | N/A      | 280          |   |    | N/A                     |         |
| EXAMINATION FEE<br>(37 CFR 1.16(o), (p), or (q))  | N/A                                                                                                                                                                                                                           | N/A          | N/A      | 320          |   |    | N/A                     |         |
| TOTAL CLAIMS<br>(37 CFR 1.16(i))                  | 20                                                                                                                                                                                                                            | minus 20 =   | *        | 0            | x | =  | 0                       | OR      |
| INDEPENDENT CLAIMS<br>(37 CFR 1.16(h))            | 2                                                                                                                                                                                                                             | minus 3 =    | *        | 0            | x | =  | 0                       |         |
| APPLICATION SIZE FEE<br>(37 CFR 1.16(s))          | If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s). |              |          | 0            |   |    |                         |         |
| MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j)) |                                                                                                                                                                                                                               |              |          | 0            |   |    |                         |         |
|                                                   |                                                                                                                                                                                                                               |              |          | TOTAL        |   |    | TOTAL                   |         |

\* If the difference in column 1 is less than zero, enter "0" in column 2.

## APPLICATION AS AMENDED - PART II

|                                                                 |                                       | (Column 1)                       |       | (Column 2)                         |               | (Column 3)      |                    | SMALL ENTITY |                 | OR | OTHER THAN SMALL ENTITY |                    |
|-----------------------------------------------------------------|---------------------------------------|----------------------------------|-------|------------------------------------|---------------|-----------------|--------------------|--------------|-----------------|----|-------------------------|--------------------|
| AMENDMENT A                                                     |                                       | CLAIMS REMAINING AFTER AMENDMENT |       | HIGHEST NUMBER PREVIOUSLY PAID FOR | PRESENT EXTRA | RATE(\$)        | ADDITIONAL FEE(\$) |              |                 |    | RATE(\$)                | ADDITIONAL FEE(\$) |
|                                                                 | Total<br>(37 CFR 1.16(i))             | *                                | Minus | **                                 | =             | x               | =                  |              | OR              | x  | =                       |                    |
|                                                                 | Independent<br>(37 CFR 1.16(h))       | *                                | Minus | ***                                | =             | x               | =                  |              | OR              | x  | =                       |                    |
|                                                                 | Application Size Fee (37 CFR 1.16(s)) |                                  |       |                                    |               |                 |                    |              |                 |    |                         |                    |
| FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) |                                       |                                  |       |                                    |               |                 |                    |              |                 |    |                         |                    |
|                                                                 |                                       |                                  |       |                                    |               | TOTAL ADD'L FEE |                    | OR           | TOTAL ADD'L FEE |    |                         |                    |

|                                                                 |                                       | (Column 1)                       |       | (Column 2)                         |               | (Column 3)      |                    | SMALL ENTITY |                 | OR | OTHER THAN SMALL ENTITY |                    |
|-----------------------------------------------------------------|---------------------------------------|----------------------------------|-------|------------------------------------|---------------|-----------------|--------------------|--------------|-----------------|----|-------------------------|--------------------|
| AMENDMENT B                                                     |                                       | CLAIMS REMAINING AFTER AMENDMENT |       | HIGHEST NUMBER PREVIOUSLY PAID FOR | PRESENT EXTRA | RATE(\$)        | ADDITIONAL FEE(\$) |              |                 |    | RATE(\$)                | ADDITIONAL FEE(\$) |
|                                                                 | Total<br>(37 CFR 1.16(i))             | *                                | Minus | **                                 | =             | x               | =                  |              | OR              | x  | =                       |                    |
|                                                                 | Independent<br>(37 CFR 1.16(h))       | *                                | Minus | ***                                | =             | x               | =                  |              | OR              | x  | =                       |                    |
|                                                                 | Application Size Fee (37 CFR 1.16(s)) |                                  |       |                                    |               |                 |                    |              |                 |    |                         |                    |
| FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) |                                       |                                  |       |                                    |               |                 |                    |              |                 |    |                         |                    |
|                                                                 |                                       |                                  |       |                                    |               | TOTAL ADD'L FEE |                    | OR           | TOTAL ADD'L FEE |    |                         |                    |

\* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

\*\* If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

\*\*\* If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.



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Kathi Vidal

Under Secretary of Commerce for Intellectual Property and  
Director of the United States Patent and Trademark Office

Derrick Brent

Deputy Under Secretary of Commerce for Intellectual Property and  
Deputy Director of the United States Patent and Trademark Office

OSSI Ex. 1018

**TRANSMITTAL FOR POWER OF ATTORNEY TO ONE OR MORE  
REGISTERED PRACTITIONERS**

NOTE: This form is to be submitted with the Power of Attorney by Applicant form (PTO/AIA/82B) to identify the application to which the Power of Attorney is directed, in accordance with 37 CFR 1.5, unless the application number and filing date are identified in the Power of Attorney by Applicant form. If neither form PTO/AIA/82A nor form PTO/AIA/82B identifies the application to which the Power of Attorney is directed, the Power of Attorney will not be recognized in the application.

|                        |                                                                                                                          |
|------------------------|--------------------------------------------------------------------------------------------------------------------------|
| Application Number     |                                                                                                                          |
| Filing Date            |                                                                                                                          |
| First Named Inventor   | Munjai SHAH                                                                                                              |
| Title                  | Low-Latency Conversational Artificial Intelligence (Ai) Architecture With A Parallelized In-Depth Analysis Feedback Loop |
| Art Unit               |                                                                                                                          |
| Examiner Name          |                                                                                                                          |
| Attorney Docket Number | HPAI1000USN01                                                                                                            |

**SIGNATURE of Applicant or Patent Practitioner**

|                                                    |                                    |                     |            |
|----------------------------------------------------|------------------------------------|---------------------|------------|
| Signature                                          | /Shivshanker S Naimpally/          | Date (Optional)     | 2024-02-27 |
| Name                                               | Shivshanker S. NAIMPALLY           | Registration Number | 66142      |
| Title (if Applicant is a juristic entity)          | Attorney to Applicant              |                     |            |
| Applicant Name (if Applicant is a juristic entity) | HealthGPT, Inc. DBA Hippocratic AI |                     |            |

**NOTE:** This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. If more than one applicant, use multiple forms.



\*Total of 2 forms are submitted.

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**OSSI Ex. 1018**

**POWER OF ATTORNEY BY APPLICANT**

I hereby revoke all previous powers of attorney given in the application identified in either the attached transmittal letter or the boxes below.

Application Number

Filing Date

(Note: The boxes above may be left blank if information is provided on form PTO/AIA/82A.)



I hereby appoint the Patent Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above:

189741

OR



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**Please recognize or change the correspondence address for the application identified in the attached transmittal letter or the boxes above to:**



The address associated with the above-mentioned Customer Number

OR



The address associated with Customer Number: 189741

OR



Firm or  
Individual Name

Address

City

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Email

I am the Applicant (if the Applicant is a juristic entity, list the Applicant name in the box):

**HealthGPT, Inc. DBA Hippocratic AI**

Inventor or Joint Inventor (title not required below)



Legal Representative of a Deceased or Legally Incapacitated Inventor (title not required below)



Assignee or Person to Whom the Inventor is Under an Obligation to Assign (provide signer's title if applicant is a juristic entity)



Person Who Otherwise Shows Sufficient Proprietary Interest (e.g., a petition under 37 CFR 1.46(b)(2) was granted in the application or is concurrently being filed with this document) (provide signer's title if applicant is a juristic entity)

**SIGNATURE of Applicant for Patent**

The undersigned (whose title is supplied below) is authorized to act on behalf of the applicant (e.g., where the applicant is a juristic entity).

Signature

DocuSigned by:

Date (Optional)

10/13/2023

Name

Maulik Shah

Title

General Counsel

AB4DA60AE5084B8...

**NOTE:** Signature - This form must be signed by the applicant in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. If more than one applicant, use multiple forms.

☐ Total of

forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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## COMBINED DECLARATION (37 C.F.R. 1.63) AND ASSIGNMENT

***Docket No.: HPAI1000USN01***

***Title of Invention: Low-Latency Conversational Artificial Intelligence (Ai) Architecture With A Parallelized In-Depth Analysis Feedback Loop***

***Application No.:***

***Filing Date:***

***Inventor: Munjal SHAH; Vishal PARIKH; Meenesh BHIMANI; Subhabrata MUKHERJEE; Alex MILLER; Saad GODIL; Debajyoti DATTA; Paul GAMBLE; Rae LASKO***

WHEREAS, as the above-identified inventor (“the Assignor”), I have made certain inventions, improvements, and discoveries (“the Inventions”). The Inventions are disclosed in the above-identified patent application and further identified by the application number, the filing date, the docket number, and the title provided above in the header of this document.

### **I hereby declare that:**

This declaration is directed to the above-identified patent application filed currently herewith.

The above-identified patent application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

I hereby state that I have reviewed and understand the contents of the above-identified patent application, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to the patentability of this application in accordance with Title 37, CFR § 1.56.

### **I now convey all worldwide right, title, and interest in:**

- the Inventions,
- the above-identified patent application/s, and any other applications for patent, design, utility model, certificate of invention, trademark, or trade dress, in any country or under any international or regional authority (e.g., WIPO/PCT, USPTO, EPO, ARIPO, EAPO, OAPI), to the extent some or all of its subject matter is disclosed and entitled to the benefit of priority in the above-identified patent application/s, including PCT, national, regional, unitary, provisional, nonprovisional, continuation, divisional, continuation-in-part, reissue, and reexamination applications (collectively “the Application/s”),
- the benefit of earlier filing date and right to claim priority to the Inventions and the Application/s under applicable law and treaties, including the Paris Convention for the Protection of Industrial Property as revised and amended and 35 U.S.C. §§ 119, 120,

## COMBINED DECLARATION (37 C.F.R. 1.63) AND ASSIGNMENT

**Docket No.: HPAI1000USN01**

**Title of Invention: Low-Latency Conversational Artificial Intelligence (Ai) Architecture With A Parallelized In-Depth Analysis Feedback Loop**

**Application No.:**

**Filing Date:**

**Inventor: Munjal SHAH; Vishal PARIKH; Meenesh BHIMANI; Subhabrata MUKHERJEE; Alex MILLER; Saad GODIL; Debajyoti DATTA; Paul GAMBLE; Rae LASKO**

- any rights accrued by the publication of the Application/s, such as 35 U.S.C. § 154(d), Art. 67(1) EPC,
- any Letters Patent or Certificates of Invention that may be issued or granted from the Application/s, including reissued patents, reexamination certificates, renewals, and any rights resulting from an extension or adjustment of patent term, and
- any rights arising from the Inventions under laws and conventions protecting copyright, trademark, trade dress, or other industrial property,

(collectively “the IP Rights”), and

WHEREAS, **HealthGPT, Inc. DBA Hippocratic AI**, a corporation organized and existing under the laws of the State of **Delaware** and having a principal place of business at **167 Hamilton Ave., Palo Alto, CA 94301, United States**, desires to acquire the entire worldwide right, title, and interest for itself, its successors, and its assigns (collectively “the Assignee”) in the IP Rights.

I warrant and represent to the Assignee that I have the full right to convey my right, title, and interest in the IP Rights without encumbrance, and that I have not made any earlier assignment, license, grant, or mortgage to another, or made any agreement with another, that would affect my right, title, and interest in the IP Rights.

By this Assignment and by virtue of any earlier agreements to assign, I hereby assign, transfer, convey, and sell my entire right, title, and interest in the IP Rights to the Assignee, including any claims or causes of action for damages or other remedies arising out of any earlier violation of the IP Rights, for and to inure to the Assignee’s full benefit of the IP Rights as fully as they would have been held by me if this Assignment had not been made.

NOW, THEREFORE, to all whom it may concern, be it known that, for good and valuable consideration, the receipt and sufficiency of which I hereby acknowledge and hereby waive the right to any additional compensation concerning the IP Rights.

I authorize the Assignee and its legal representatives to:

- (a) insert into this Assignment any supplemental information to make the identification more complete for any of the Application/s or Letters Patent already listed above,
- (b) prosecute the Application/s, file new applications for the Invention/s, and do all acts permitted by law to protect and enforce the IP Rights, and

## COMBINED DECLARATION (37 C.F.R. 1.63) AND ASSIGNMENT

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(c) request that Letters Patent and Certificates of Invention be issued and granted to and in the name of the Assignee by the issuing or granting authority, such as the U.S. Commissioner for Patents, 37 C.F.R. § 3.81.

I agree with the Assignee that I and my legal representatives, heirs, and executors will perform all acts deemed necessary or desirable by the Assignee to permit and assist it to secure the entire right, title, and interest in the IP Rights so that the Assignee may benefit from this Assignment, including:

(a) communicating to the Assignee all facts known to me that relate to the history and extent of my individual contribution to the IP Rights, including the circumstances of the conception of the invention and its development and reduction to practice, and furnishing supporting documents or items in my control,

(b) assisting in the preparation of the Application/s and their prosecution by the Assignee, 37 C.F.R. § 3.71, and in the enforcement of the IP Rights, including making, executing, and delivering to the Assignee any other necessary documents, such as further application papers, declarations, affidavits, disclaimers, petitions, or assignments, and

(c) assisting and cooperating in administrative and legal proceedings, including giving written and oral testimony, so that these will be performed without further consideration, except for reasonable actual expenses to be reimbursed.

I further agree with the Assignee that I will not perform any future act, execute any subsequent document, or make any subsequent agreement with another person or party that conflicts with this Assignment, that purports to transfer any right, title, or interest in the IP Rights that are the subject of this Assignment, unless agreed to in writing by the Assignee or that prevents the Assignee from receiving the full benefit of the bargain under this Assignment.

I further authorize the Assignee, or anyone it may properly designate, to insert on each page of this instrument (where indicated) the filing date and application number of the Application/s when known.

If any provision of this Assignment is held invalid or unenforceable, that provision shall be enforced to the maximum extent permissible in order to put into effect the intent of the Assignors and the Assignee, and the remainder of this Assignment shall not be affected but continue in full force and effect.

I acknowledge my prior and ongoing obligations to sell, assign, and transfer the IP Rights under this Assignment to the Assignee. I am unaware of any reason why the Assignee may not have the

## COMBINED DECLARATION (37 C.F.R. 1.63) AND ASSIGNMENT

**Docket No.: HPAI1000USN01**

**Title of Invention: Low-Latency Conversational Artificial Intelligence (Ai) Architecture With A Parallelized In-Depth Analysis Feedback Loop**

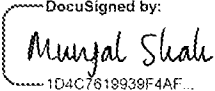
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**Filing Date:**

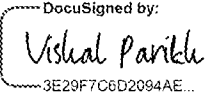
**Inventor: Munjal SHAH; Vishal PARIKH; Meenesh BHIMANI; Subhabrata MUKHERJEE; Alex MILLER; Saad GODIL; Debajyoti DATTA; Paul GAMBLE; Rae LASKO**

full and unencumbered right to sell, assign, and transfer the IP Rights hereby sold, assigned, and transferred. I have not executed, and will not execute, any document or instrument in conflict with this Assignment.

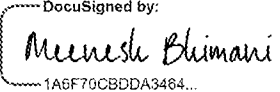
Legal Name of Inventor: **Munjal SHAH**

Signature: /  / Date: 2/27/2024

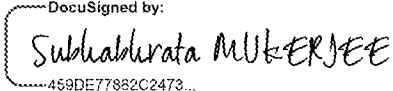
Legal Name of Inventor: **Vishal PARIKH**

Signature: /  / Date: 2/29/2024

Legal Name of Inventor: **Meenesh BHIMANI**

Signature: /  / Date: 2/27/2024

Legal Name of Inventor: **Subhabrata MUKHERJEE**

Signature: /  / Date: 2/27/2024

**COMBINED DECLARATION (37 C.F.R. 1.63) AND ASSIGNMENT**

**Docket No.: HPAI1000USN01**

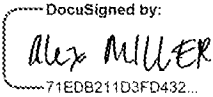
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**Application No.:**

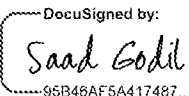
**Filing Date:**

**Inventor: Munjal SHAH; Vishal PARIKH; Meenesh BHIMANI; Subhabrata MUKHERJEE; Alex MILLER; Saad GODIL; Debajyoti DATTA; Paul GAMBLE; Rae LASKO**

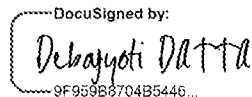
Legal Name of Inventor: **Alex MILLER**

Signature: /  / Date: 2/28/2024

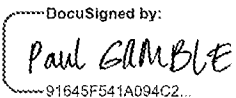
Legal Name of Inventor: **Saad GODIL**

Signature: /  / Date: 2/27/2024

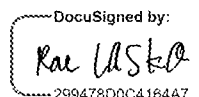
Legal Name of Inventor: **Debajyoti DATTA**

Signature: /  / Date: 2/28/2024

Legal Name of Inventor: **Paul GAMBLE**

Signature: /  / Date: 2/27/2024

Legal Name of Inventor: **Rae LASKO**

Signature: /  / Date: 2/27/2024

**COMBINED DECLARATION (37 C.F.R. 1.63) AND ASSIGNMENT**

***Docket No.: HPAI1000USN01***

***Title of Invention: Low-Latency Conversational Artificial Intelligence (Ai) Architecture With A Parallelized In-Depth Analysis Feedback Loop***

***Application No.:***

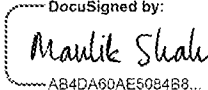
***Filing Date:***

***Inventor: Munjal SHAH; Vishal PARIKH; Meenesh BHIMANI; Subhabrata MUKHERJEE; Alex MILLER; Saad GODIL; Debajyoti DATTA; Paul GAMBLE; Rae LASKO***

**RECEIVED AND HEREBY ACCEPTED BY HealthGPT, Inc. DBA Hippocratic AI, a Corporation**

Name: **Maulik Shah**

Title: General Counsel, HealthGPT, Inc. DBA Hippocratic AI

Signature: /  /  
AB4DA60AE5084B8...

Date: 2/29/2024

# **LOW-LATENCY CONVERSATIONAL ARTIFICIAL INTELLIGENCE (AI) ARCHITECTURE WITH A PARALLELIZED IN-DEPTH ANALYSIS FEEDBACK LOOP**

## **PRIORITY DATA**

**[0001]** The present non-provisional patent application claims priority to and the benefit from U.S. Provisional Application 63/611,762 filed on December 18, 2023, and U.S. Provisional Application 63/466,712 filed on May 15, 2023, both of which are incorporated herein by reference in their entirety and for all purposes as if completely and fully set forth herein.

## **BACKGROUND OF THE TECHNOLOGY DISCLOSED**

### **Field of the Technology Disclosed**

**[0002]** The technology disclosed relates to artificial intelligence type computers and digital data processing systems and corresponding data processing methods and products for emulation of intelligence (i.e., knowledge based systems, reasoning systems, and knowledge acquisition systems); and including systems for reasoning with uncertainty (e.g., fuzzy logic systems), adaptive systems, machine learning systems, and artificial neural networks. In particular, the technology disclosed relates generally to systems and techniques to provide a low-latency conversational artificial intelligence (AI) architecture with a parallelized in-depth analysis feedback loop for healthcare-related applications.

### **Description of the Related Art**

**[0003]** Current AI virtual assistants (which include chat bots), such as ChatGPT and the like, are not designed for use in healthcare fields and so have a variety of issues. For example, current AI virtual assistants are incapable of following a checklist, are too verbose for multi-turn conversations, are not designed to engage with humans, and are not designed to comply with medical safety laws, regulations, and procedures.

## **SUMMARY OF THE TECHNOLOGY DISCLOSED**

**[0004]** This Summary provides a simplified form of concepts that are further described below in the Detailed Description. This Summary is not intended to identify key or essential features and should therefore not be used for determining or limiting the scope of the claimed subject matter.

**[0005]** In some aspects, a multi-turn conversational system includes: an artificial intelligence to provide a conversation interface configured to execute multiple turns of human-like conversation with a user and a control logic, in communication with the conversation interface, and configured to generate one or more control signals based on evaluating multiple turns of upstream human-like conversation between the conversation interface and the user. The control signals contribute in part to construction of multiple turns of downstream human-like conversation between the conversation interface and the user.

**[0006]** In some aspects, a retro-improving conversational system includes a conversation interface configured to execute multiple turns of human-like conversation with a user, wherein at least some of the multiple turns include a human-machine response pair, and wherein the human-machine response pair includes a human response by the user and a machine response by the conversation interface to the human response. The retro-improving conversational system includes a retro-improvement logic, in communication with the conversation interface, and configured to detect that at least one previously expressed human-machine response pair requires an improvement. The previously expressed human-machine response pair includes a previously expressed human response by the user and a previously expressed machine response by the conversation interface to the previously expressed human response. The retro-improvement logic is further configured to generate an improved machine response that improves the previously expressed machine response, and to cause expression of the improved machine response to the user.

## **BRIEF DESCRIPTION OF THE DRAWINGS**

**[0007]** A more complete understanding of the present disclosure may be obtained by



reference to the following Detailed Description when taken in conjunction with the accompanying Drawings. In the figures, the left-most digit(s) of a reference number identifies the figure in which the reference number first appears. The same reference numbers in different figures indicate similar or identical items.

**[0008]** FIG. 1 is a block diagram of a system illustrating large language models (LLMs) to perform specialized healthcare-related functions, according to some implementations.

**[0009]** FIG. 2 is a block diagram illustrating an artificial intelligence (AI) architecture, according to some implementations.

**[0010]** FIG. 3 is a block diagram of a system that includes a low-latency conversational artificial intelligence (AI) architecture with a parallelized in-depth analysis and feedback loop, according to some implementations.

**[0011]** FIG. 4 is a block diagram illustrating components of training data, according to some implementations.

**[0012]** FIG. 5 is a block diagram illustrating an AI checklist, according to some implementations.

**[0013]** FIG. 6 is a block diagram illustrating AI-human engagement, according to some implementations.

**[0014]** FIG. 7 is a block diagram of system that includes an LLM routing system, according to some implementations.

**[0015]** FIG. 8 is a flowchart of a process that includes analyzing a human response using a second opinion module, according to some implementations.

**[0016]** FIG. 9 is a flowchart of a process that includes accessing a conversation summary, a knowledge graph, or both, according to some implementations.

**[0017]** FIG. 10 is a flowchart of a process to train a machine learning algorithm, according to some implementations.

**[0018]** FIG. 11 illustrates an example configuration of a computing device that can be used to implement the systems and techniques described herein.

**[0019]** FIG. 12 is a schematic representation of an encoder-decoder architecture.

**[0020]** FIG. 13 shows an overview of an attention mechanism added onto an RNN encoder-decoder architecture.

**[0021]** FIG. 14 is a schematic representation of the calculation of self-attention showing one attention head.

**[0022]** FIG. 15 is a depiction of several attention heads in a Transformer block.

**[0023]** FIG. 16 is an illustration that shows how one can use multiple workers to compute the multi-head attention in parallel, as the respective heads compute their outputs independently of one another.

**[0024]** FIG. 17 is a portrayal of one encoder layer of a Transformer network.

**[0025]** FIG. 18 shows a schematic overview of a Transformer model.

**[0026]** FIG. 19 is a depiction of a Vision Transformer (ViT).

**[0027]** FIG. 20 illustrates a processing flow of the Vision Transformer (ViT).

**[0028]** FIG. 21 shows example software code that implements a Transformer block.

## **DETAILED DESCRIPTION**

**[0029]** The technology disclosed can be practiced as a system, method, or article of manufacture. One or more features of an implementation can be combined with the base implementation. Implementations that are not mutually exclusive are taught to be combinable. One or more features of an implementation can be combined with other implementations. This disclosure periodically reminds the user of these options. Omission from some implementations of recitations that repeat these options should not be taken as limiting the combinations taught in

the preceding sections – these recitations are hereby incorporated forward by reference into each of the following implementations.

**[0030]** One or more implementations and clauses of the technology disclosed, or elements thereof can be implemented in the form of a computer product, including a non-transitory computer readable storage medium with computer usable program code for performing the method steps indicated. Furthermore, one or more implementations and clauses of the technology disclosed, or elements thereof can be implemented in the form of an apparatus including a memory and at least one processor that is coupled to the memory and operative to perform exemplary method steps. Yet further, in another aspect, one or more implementations and clauses of the technology disclosed or elements thereof can be implemented in the form of means for carrying out one or more of the method steps described herein; the means can include (i) hardware module(s), (ii) software module(s) executing on one or more hardware processors, or (iii) a combination of hardware and software modules; any of (i)-(iii) implement the specific techniques set forth herein, and the software modules are stored in a computer readable storage medium (or multiple such media).

**[0031]** The clauses described in this section can be combined as features. In the interest of conciseness, the combinations of features are not individually enumerated and are not repeated with each base set of features. The reader will understand how features identified in the clauses described in this section can readily be combined with sets of base features identified as implementations in other sections of this application. These clauses are not meant to be mutually exclusive, exhaustive, or restrictive; and the technology disclosed is not limited to these clauses but rather encompasses all possible combinations, modifications, and variations within the scope of the claimed technology and its equivalents.

**[0032]** Other implementations of the clauses described in this section can include a non-transitory computer readable storage medium storing instructions executable by a processor to perform any of the clauses described in this section. Yet another implementation of the clauses described in this section can include a system including memory and one or more processors operable to execute instructions, stored in the memory, to perform any of the clauses described in this section.

**[0033]** The systems and techniques described herein provide an artificial intelligence (AI) based virtual assistant, which may use a large language model (LLM), for use in healthcare. For example, the AI based virtual assistant may be implemented as a virtual assistant to perform tasks that are normally performed by medical professionals (e.g., nurses, medical assistants, care coordinators, etc.). The AI-based virtual assistants invented herein are (i) capable of following a checklist (e.g., they do not get distracted while engaging in a conversation with a human), (ii) designed to engage in multi-turn conversations with humans, (iii) designed to comply with medical safety laws, regulations, and procedures, and (iv) show a consistent level of empathy towards the human. For example, the AI-based virtual assistant may engage in tasks such as preventative screenings, performing intake-related tasks, performing scheduling and waitlisting, pre-op related tasks, discharge-related tasks (including explanation of benefits (EOB) and billing), and chronic care related tasks (e.g., periodic follow ups). In this way, when the AI-based virtual assistant are used, staff shortages can be ameliorated, costs reduced, and human medical staff can be refocused on in-person tasks. An LLM is used herein as an example of an AI to implement the systems and techniques. It should be understood that other types of AI may be used along with or in place of an LLM.

**[0034]** The systems and techniques described herein provide several advantages over conventional virtual assistants, including commercially available LLM based chatbots. First, the systems and techniques enable an AI-based virtual assistant to engage in long conversations (e.g., 50 or more turns) with a human. The term “turn” is used in reference to a multi-party interaction, and means each piece of content communicated by one party between communications by other parties. For example: Person 1: “Hello” (turn 1), Person 2: “Hi, how are you? (turn 2), 3. Person 1: “I’m doing well, how about you?” (turn 3), Person 2: “Also good. This is my friend.” (turn 4), Person 3 “Nice to meet you.” (turn 5), etc. Traditional virtual assistant interactions typically involve fewer than four turns, and thus do poorly on tasks that involve greater interaction with memory of earlier parts of a conversation. The systems and techniques described herein allow for a virtual assistant to engage in longer, multi-turn conversations. The AI-based virtual assistant described herein can also complete a checklist; a task that conventional virtual assistants struggle with. For example, the AI-based virtual assistant may be trained using multi-turn reinforcement learning through human feedback (RLHF) or

other similar techniques. Multi-turn reinforcement learning through human feedback involves assessing the output of the LLM over an entire conversation (or multiple turns) rather than conventional methods which assess each question-answer pair. The AI-based virtual assistant may be trained to identify turn-yielding cues, interruption detection, and identifying non-verbal cues. For example, if the human coughs, sneezes, starts crying, or the like, the AI-based virtual assistant asks follow-up questions, such as “How long have you had that cough/congestion?” and the like. The AI-based virtual assistant may also be trained to exhibit a desired level of empathy towards the human. For example, certain humans may respond better to a more direct conversational tone, while others may respond better to more supportive conversational styles. The virtual assistant’s level of empathy may be implemented using multi-turn reinforcement learning with human feedback. The desired level of empathy may be dynamic, based on information known about the human. Such information may be derived from previous conversations between the AI-based virtual assistant and the human, or other profile information of the human. Such personalization may lead to better outcomes for the human, such as better compliance with prescriptions, more sustained lifestyle changes, etc., and also create an effective health coach. The AI-based virtual assistant may also be used to collect longitudinal health information to track and respond to patient progress over time.

**[0035]** Second, the systems and techniques are designed to reduce the latency of the AI-based virtual assistant’s output during a conversation with a human. The AI-based virtual assistant may perform predictive answering by continuously generating multiple possible responses and then accepting/discarding responses based on receiving an additional human response from the human, thereby reducing latency. During the conversation, the systems and techniques may extract facts from the conversation (e.g., based on information provided by the human) and construct a knowledge graph that can be accessed by the AI-based virtual assistant during the conversation. In this way, if the human mentions something related to a much earlier human utterance, the AI-based virtual assistant is able to quickly determine what the human is referring to, thereby reducing latency (compared to searching through the entire conversation up to that point in time). The purpose of reducing latency is to prevent the human from ending the conversation in frustration or due to the human erroneously concluding that the conversation has concluded or the virtual assistant has encountered an error.

**[0036]** Third, the systems and techniques provide for a retro-generative conversational system in which, while the conversation between the AI-based virtual assistant and the human is taking place, a second AI performs an in-depth analysis, thereby creating a low-latency conversational artificial intelligence (AI) architecture with a parallelized in-depth analysis feedback loop. If the second AI determines that a previous response provided by the AI-based virtual assistant could be clarified (or expanded upon), the second AI provides information regarding the clarification (or expansion), and the AI-based virtual assistant provides the clarification (or expansion) in the conversation. In this way, the human does not notice any latency because the in-depth analysis performed by the second AI is performed in parallel, e.g., while the AI-based virtual assistant is engaged in a conversation with the human.

**[0037]** Fourth, the systems and techniques provide for a set of kickout conditions. When the AI-based virtual assistant determines that a particular kickout condition has occurred, it transfers the conversation to a medical professional (human being). For example, if the human indicates that they are experiencing a particular symptom that requires more immediate medical attention, then the conversation is transferred to a medical professional (human), such as a nurse. To illustrate, if the human mentions that they are experiencing pain in a particular area of their body (e.g., chest pains, abdominal pains, or the like), then the AI-based virtual assistant may transfer the conversation to a medical professional. In addition, the AI-based virtual assistant may provide the medical professional with a text-based summary, including why the conversation was initiated and what information the human had provided up to that point in time. For example, the AI-based virtual assistant may indicate that the human underwent a medical procedure (e.g., surgery) on a particular date, the conversation was initiated as a post-operative follow-up, and the human indicated during the conversation that they are experiencing particular symptoms (e.g., shortness of breath, rapid heartbeat, dizziness, or the like).

**[0038]** As a first example, a multi-turn conversational system, includes a first large language model-based conversation interface configured to execute multiple turns of human-like conversation with a user. The first large language model-based conversation interface is trained with over one thousand gradient update iterations. The multi-turn conversational system includes a control logic that is in communication with the first large language model-based conversation

interface and is configured to generate one or more control signals based on evaluating multiple turns of upstream human-like conversation between the first large language model-based conversation interface and the user. The control signals contribute in part to construction of multiple turns of downstream human-like conversation between the first large language model-based conversation interface and the user. The control logic may include a trigger detection logic, a question insertion logic, and an answer classification logic. The trigger detection logic may include a second large language model. The answer classification logic may include a third large language model. The trigger detection logic may be configured to evaluate the multiple turns of upstream human-like conversation and to detect trigger exchanges in the multiple turns of upstream human-like conversation that require invoking the question insertion logic. The question insertion logic may be configured to select one or more questions that correspond to the detected trigger exchanges and to cause the first large language model-based conversation interface to use the selected questions to construct the multiple turns of downstream human-like conversation. For example, the selected questions may include the control signals. The first large language model-based conversation interface may be further configured (i) to pose to the user the selected questions, (ii) to receive from the user answers to the selected questions, and (iii) to transmit the received answers to the answer classification logic. The answer classification logic may be configured (i) to analyze the received answers and classify the received answers to at least one answer category in a plurality of answer categories and (ii) to generate the control signals based on the classification. The control signals, generated in response to the answer classification logic classifying the received answers to a first kickout category, may cause the first large language model-based conversation interface to end the human-like conversation with the user. The first large language model-based conversation interface emulates a human healthcare professional. The user is a human being. The human-like conversation is a healthcare-related conversation. The trigger exchanges include symptom descriptors that identify one or more symptoms. The selected questions may include medical condition queries that probe at least one symptom mentioned by the human and identified by at least one symptom descriptor associated with the detected trigger exchanges. The received answers may identify one or more medical conditions associated with the symptom and experienced by the human. The answer classification logic may be further configured to classify the received answers and generate the

control signals based on severity of the identified medical conditions. The control signals, generated in response to the answer classification logic classifying the received answers to a second kickout category, may cause the first large language model-based conversation interface to connect the user with a human healthcare professional. The control signals, generated in response to the answer classification logic classifying the received answers to a third kickout category, may cause the first large language model-based conversation interface to schedule a healthcare appointment of the user with a human healthcare professional. The human-like conversation may be text-based, audio-based, or a combination of both.

**[0039]** As a second example, a multi-turn conversational system includes: (i) a conversation interface configured to execute multiple turns of human-like conversation with a user and (ii) a control logic, in communication with the conversation interface, and configured to generate one or more control signals based on evaluating multiple turns of upstream human-like conversation between the conversation interface and the user. In some cases, the control signals may contribute in part to construction of multiple turns of downstream human-like conversation between the conversation interface and the user.

**[0040]** As a third example, a retro-improving conversational system includes a large language model-based conversation interface configured to execute multiple turns of human-like conversation with a user. At least some of the multiple turns include a human-machine response pair. The human-machine response pair includes a human response by the user and a machine response by the large language model-based conversation interface to the human response. The large language model-based conversation interface is trained with over one thousand gradient update iterations. The retro-improving conversational system includes a retro-improvement logic that is in communication with the large language model-based conversation interface and is configured to detect that at least one previously expressed human-machine response pair requires an improvement. The previously expressed human-machine response pair includes a previously expressed human response by the user and a previously expressed machine response by the large language model-based conversation interface to the previously expressed human response. The retro-improvement logic is further configured to generate an improved machine response that improves the previously expressed machine response and to cause expression of the improved



machine response to the user. The retro-improvement logic may be further configured to analyze the previously expressed human-machine response pair and, based on the analysis, select from a plurality of specialist engines, at least one specialist engine that is specific to the previously expressed human-machine response pair. The selected specialist engine may be configured to generate the improved machine response in response to processing the previously expressed human-machine response pair. The improved machine response may correct the previously expressed machine response. The previously expressed machine response may be supplemented by the improved machine response. The improved machine response may be concurrently presented with the previously expressed machine response. The large language model-based conversation interface may be a multi-head attention model. The respective specialist engines in the plurality of specialist engines may be respective large language models. The specialist engines may have different model parameter footprints than the large language model based conversation interface. The model parameter footprints of the specialist engines may be smaller than a model parameter footprint of the large language model-based conversation interface. The respective specialist engines may be configured to execute respective follow-on tasks in response to processing the previously expressed human-machine response pair. The improved machine response may be preceded by one or more intermediate human-machine response pairs being exchanged between the large language model-based conversation interface and the user. The improved machine response immediately may succeed the previously expressed machine response. The large language model-based conversation interface may emulate a human healthcare professional, the user may be a human being, and the human-like conversation may be a healthcare-related conversation. The plurality of specialist engines may include a kickout to human healthcare professional engine, a dosage engine, a co-morbidity engine, a family history engine, or any combination thereof. The kickout to human healthcare professional engine's follow-on task may immediately transfer the human-like conversation to a human nurse and the dosage engine's follow-on task may include to seek a review of the human's medication by a human nurse and schedule a dosage review call. The human-like conversation may be text-based, audio-based, or a combination of both.

**[0041]** As a fourth example, a retro-improving conversational system may include a conversation interface configured to execute multiple turns of human-like conversation with a

user. At least some of the multiple turns include a human-machine response pair. The human-machine response pair includes a human response by the user and a machine response by the conversation interface to the human response. The retro-improving conversational system may include a retro-improvement logic that is in communication with the conversation interface and is configured to detect that at least one previously expressed human-machine response pair requires an improvement. The previously expressed human-machine response pair includes a previously expressed human response by the user and a previously expressed machine response by the conversation interface to the previously expressed human response. The retro-improvement logic is further configured (1) to generate an improved machine response that improves the previously expressed machine response and (2) to cause expression of the improved machine response to the user. In some cases, the conversation interface may be a large language model.

**[0042]** FIG. 1 is a block diagram of a system 100 illustrating large language models (LLMs) to perform specialized healthcare-related functions (e.g., roles), according to some implementations. The system 100 includes a device 102 connected to one or more servers 104 via one or more networks 106. The device 102 may be, for example, a smart phone, or another type of user device associated with a human 108. For example, the human 108 may be a current patient, a past patient, or a potential (future) patient. In some cases, the device 102 may be linked (“paired”) with a monitoring device (“monitor”) 103, such as a smart watch, a continuous glucose monitor (CGM), or another type of device that is capable of providing biometric readings associated with the human 108 to the device 102.

**[0043]** One or more provider devices 110 may be connected to the network 106. The provider devices 110 may be used by one or more medical professionals 112 (e.g., medical technicians, nurses, nurse practitioners, doctors, and the like) associated with a medical provider.

**[0044]** The server 104 may host multiple AI-based virtual assistants, such as the large language model (LLM) 130 virtual assistants. The virtual assistants LLM 130(1) to 130(6) shown in FIG. 1 each perform a particular healthcare-related role. Six LLM 130 are shown purely for illustration purposes. It should be understood that the number of virtual assistants LLM 130 may vary depending on how the healthcare functions (roles) are divided. The division

of the healthcare functions influences the algorithm design, training data, and other details associated with the virtual assistants 130. A different division of the healthcare functions may result in fewer or more than six virtual assistants LLM 130. For illustration purposes, the six functions (roles) include orders 114, intake 116, scheduling 118, pre-op 120, discharge 122, and chronic care 124.

**[0045]** The orders 114 role may include the LLM 130(1) engaging in a conversation 154 with the human 108 to resolve unfilled orders 126. Unfilled orders 126 refers to prescribed medications that the human 108 has not picked up, prescribed medical procedures or follow-up appointments that the human 108 has not scheduled, and so on. The orders 114 role may include the LLM 130(1) entering into a conversation 154 with the human 108 to perform preventative screenings 128, including gathering data relative to Healthcare Effectiveness Data and Information Set (HEDIS) calculations.

**[0046]** The conversation 154 may include audio data 150 output by one of the LLM 130 and one or more utterances 152 from the human 108. The human 108 may speak the utterances 152 into a microphone of the device 102 and the device 102 may send the utterances 152 to the LLM 130 over the network 106. The LLM 130 may provide audio data 150 over the network 106 for playback by the device 102 to the human 108. The conversation 154 may be initiated by the LLM 130 or by the human 108.

**[0047]** The intake 116 role may include the LLM 130(2) engaging in the conversation 154 to perform the role of an intake nurse 132. For example, the conversation 154 may include the LLM 130(2) providing the human 108 with appointment-related information, such as a location and date and time associated with the appointment. The intake 116 role may include the LLM 130(2) engaging in the conversation 154 to perform a Health Records Assessment (HRA), determine a Risk Adjustment Factor (RAF), or the like.

**[0048]** The scheduling 118 role may include the LLM 130(3) engaging in the conversation 154 with the human 108 to perform scheduling and waitlisting related actions. For example, the LLM 130(3) may schedule the human 108 for an appointment and/or waitlist the human 108 for a consultation, surgery, or another type of appointment. The scheduling 118 role may include the

LLM 130(3) engaging in the conversation 154 with the human 108 to access a provider directory to select a provider for the human 108. For example, if the human 108 has been asked (e.g., by a primary care physician) to have a consultation with a specialist, then the LLM 130(3) may identify a particular specialist in the provider directory 138 and schedule the human 108's consultation with the particular specialist.

**[0049]** The pre-op 120 role may include the LLM 130(4) engaging in the conversation 154 and taking on the role of a pre-op nurse 140 to go through a pre-op checklist with the human 108. For example, the pre-op checklist may include various pre-op do's and don'ts, such as what to eat, what not to eat (e.g., avoid solid foods at least 24 hours prior to a colonoscopy, avoid eating 12 hours prior to a blood glucose test, etc.), what medications to take, what medications to avoid taking (e.g., no beta blockers prior to a treadmill stress test), type of clothing to wear (e.g., loose clothing prior to a treadmill stress test), and so on.

**[0050]** The discharge 122 role may include the LLM 130(5) engaging in the conversation 154 to go over a discharge checklist 142. For example, the discharge checklist 142 may include describing what to do and what not to do (e.g., don't perform certain action for a particular period of time after certain types of surgery), reviewing medications to take (e.g., take X every day, take Y as needed, and the like), highlighting warning signs (e.g., call medical provider immediately if the human 108 experiences particular symptoms, such as shortness of breath, dizziness, blurry vision, or the like), making follow-up appointments, and the like. The discharge 122 role may include the LLM 130(5) providing information regarding insurance coverage, explanation of benefits (EOB), and other billing-related information (e.g., amount that insurance should cover, amount that the human is responsible for paying, and so on).

**[0051]** The chronic care 124 role may include the LLM 130(6) performing the role of a chronic care nurse when engaging in the conversation 154 with the human 108. For example, the chronic care 124 role may include reviewing medical records and test results, and providing information regarding self-management, such as diet/nutrition suggestions, exercise suggestions, advice on managing prescription regimens, and information regarding monitoring symptoms. The chronic care 124 role may include the LLM 130(6) engaging in the conversation 154 to determine social determinants of health (SDOH), which are the non-medical factors that

influence health outcomes. SDOH include the conditions in which people are born, grow, work, live, and age, and the systems shaping the conditions of daily life, such as economic policies, development agendas, social norms, social policies, and political systems.

**[0052]** Thus, a medical provider may deploy AI engines, in the form of a large language model (LLM) or similar AI, to perform specialized health-related tasks. Each AI engine may be designed and trained for a particular purpose, such as screening, intake, scheduling, pre-op, discharge, chronic care, and the like. The advantages of using AI engines include (i) reducing costs compared to using a human, (ii) freeing up humans to perform in-person functions (roles), (iii) performing the health-related tasks at times that are convenient, including outside regular business hours, and (iv) reducing human error when performing the health-related tasks.

**[0053]** FIG. 2 is a block diagram 200 illustrating an artificial intelligence (AI) architecture 202, according to some implementations. The AI architecture 202 may be used to implement one or more of the LLMs (e.g., LLM 130(1), 130(2), 130(3), 130(4), 130(5), and 130(6) of FIG. 1) described herein.

**[0054]** The AI architecture 202 may include a primary model 204 which implements a primary role, such as screening, intake, scheduling, pre-op, discharge, chronic care, or any combination thereof. One or more second opinion models 206(1) to 206(N) ( $N > 0$ ) may be associated with the primary model 204. The second opinion models 206 are AI models, such as LLMs, that are trained to perform a more in-depth analysis than the LLM 130. Based on information extracted from the conversation 154 (of FIG. 1), one of the second opinion models 206 may perform a detailed (e.g., lengthy) analysis while the human 108 is engaged in the conversation 154 with one of the LLM 130. For example, the primary model 204 may have a 50 millisecond (ms) latency while the individual second opinion models 206 may have a 200ms latency. If the second opinion model 206 determines that particular information provided by the LLM 130 during the conversation 154 can be clarified or expanded upon, then the second opinion model 206 may provide, to the LLM 130, the particular information along with a suggestion regarding how to present the particular information to the human 108. In this way, the primary model tool for and the second opinion models 206 are part of a low-latency conversational artificial intelligence (AI) architecture with a parallelized in-depth analysis

feedback loop for healthcare-related applications. The purpose of reducing latency is to prevent the human from hanging up in frustration or due to the human erroneously concluding that the conversation has concluded or the virtual assistant has encountered an error.

**[0055]** A large corpus of medical facts 208 are gathered and converted into a Question & Answer (Q&A) dataset 210. The Q&A dataset 210 may be used to create a set of questions 212. For example, the medical facts 208, such as a description of an illness from a textbook, and converting the description into a Q&A structure, including “What is <illness>?”, “What are the symptoms of <illness>?”, “How is <illness> treated?”, “Who usually gets <illness>?”, “Is <illness> common?”, and so on. Similarly, tables and other structured data included in the medical facts 208 are converted into a Q&A structure. One or more additional LLMs may be used to determine whether a particular question in the set of questions 212 is relevant. A classifier 214 (e.g., a support vector machine (SVM) or another type of classifier) is used to determine (predict) a distance between individual questions and their corresponding answer to determine if the answer is correct. In pre-training 216, a question is a prompt (e.g., a query presented to the models 204, 206) and the answer is the response predicted by the models 204, 206. The Q&A dataset 210 may be used to fine tune the LLM 130. For example, instruction tuning may be used to further train the LLM 130 on the Q&A dataset 210 (e.g., that is in the form of (instruction, output) pairs), in a supervised fashion.

**[0056]** Training data 218 includes human-provider (e.g., patient-medical professional) conversations 220 in the form of audio data and electronic healthcare records (EHR) 221. By training the LLM 130 using conversation data, the LLM 130 is more suited to engaging in the conversation 154 with the human 108. The AI architecture 202 includes providing the LLM 130 with reinforcement learning with human feedback (RLHF) in which the LLM 130 is trained using a reward function (“reward model”) based on human feedback. The reward function provides the LLM 130 with a high reward for good output and a low reward for bad (poor) output. In this way, the LLM 130 is trained to provide the appropriate at each turn in a conversation.

**[0057]** The LLM 130 (representing one of the LLMs 130(1) to 130(6) of FIG. 1) includes a task completion engine 226 that is tasked with completing a checklist during a particular

conversation with the human. The task completion engine 226 enables the LLM 130 to complete tasks included in the checklist even while pursuing peripheral matters during the conversation, where such peripheral matters may help to build rapport between the virtual assistant and the human. For example, during the conversation with the human, the human may ask a question, such as a request for clarification of a particular topic (“Can I eat X prior to having the procedure?”). In response, the LLM 130 may provide information to answer the human’s question. The LLM may also engage in banter about favorite foods, or the human’s experiences with the foods, etc. After the LLM 130 answers the human’s question and or engages in banter, the task completion engine 226 causes the LLM 130 to resume addressing items in the checklist. The LLM 130 may include a safety engine 228 to determine a medical accuracy of the information provided by the LLM 130 to the human. The safety engine 228 may determine when to perform a “kick out” and transfer a conversation between a human and an LLM to a medical professional.

**[0058]** The LLM 130 includes an automatic speech recognition module (ASR) 230 to perform speech recognition of the utterances 152 provided by the human 108. The LLM 130 includes a speech synthesis module 232 to perform text-to-speech (TTS) conversion. For example, after the LLM 130 looks up text-based information, the information is provided to the human in the form of speech using the speech synthesis module 232.

**[0059]** The LLM 130 includes a retrieval augmented generation (RAG) module 234. The RAG 234 is an AI framework to retrieve facts from an external knowledge base to provide the LLM 130 accurate and up-to-date information. The RAG 234 grounds the LLM 130 on external sources of knowledge to supplement the LLM 130. Implementing RAG 234 in an LLM-based question answering system enables the LLM 130 to access current, reliable facts, and the access to the sources of the LLM 130, enables output of the LLM 130 to be checked for accuracy. Using RAG, the AI-based virtual assistant described herein can provide accurate answers to a large number of questions that a human could not, such as menu options for a large number of local restaurants, details for a large number of insurance policies, details about a large number of hospital facilities (such as parking information, department locations, etc.).

**[0060]** The LLM 130 includes the conversation engine 236. The conversation engine 236

includes a turn engine 238, dialect detection 240, predictive answering 242, tone detection 244, nonverbal detection 246, and interruption detection 248. The turn engine 238 determines when the human has completed a turn and the LLM 130 has a turn in the conversation. The dialect detection 240 detects a dialect in the utterances of the human and causes the LLM 130 to output audio data having the same (or similar) dialect. For example, the dialect detection 240 may detect the dialect based on a particular word or a particular phrase in the human's utterances. To illustrate, the particular word or the particular phrase may be a vernacular term used in a particular geographic region.

**[0061]** The predictive answering 242 may predict multiple responses that the human may utter based on what the LLM 130 previously provided to the human. For example, the LLM 130 may provide a particular output (audio data) during the LLM's turn and then listen to the human during the human's turn. The predictive answering 242 may predict (i) possible human responses and (ii) corresponding answers based at least in part on the particular output provided during the LLM's turn. After the human has completed providing utterances in the human's turn, the LLM 130 may determine which of the predicted human responses the human provided and select a corresponding predicted answer. In this way, the predictive answering 242 is able to reduce the latency when providing a response after the human's turn.

**[0062]** The tone detection 244 is able to detect that the tone and changes to the tone in the human's utterances during the conversation. For example, the tone detection 244 may be able to detect a tone of the human's utterances, correlate the tone with a particular mood, and adjust the audio data output by the LLM 130 accordingly. To illustrate, the tone of the human's utterances may be determined based on a pitch of the utterances, a volume of the utterances, a particular word in the utterances, a particular phrase in the utterances, or any combination thereof. If a particular tone is detected, such as that of anger or frustration, then the LLM 130 may adjust the audio data output accordingly, including changing the pitch of the audio data, changing a volume of the audio data, inserting a particular word or a particular phrase in the audio data, or any combination thereof. In some cases, if the tone of the human is regressing instead of progressing (e.g., the human has become more angry or more frustrated in a subsequent turn), then the LLM 130 may offer to transfer ("kick out") the conversation to a human. The non-verbal detection 246



may detect the human coughing, sneezing, sighing, crying, or providing another nonverbal audio cue. Detecting one of the nonverbal audio cues may cause the LLM 130 ask additional (e.g., follow-up) questions, such as “How long have you had that cough?” (in response to detecting a cough), “How long have you had nasal congestion?” (in response to detecting a sneeze or sniffing), “Are you feeling okay?” (in response to detecting a loud sigh or crying), or the like. The interruption detection 248 may detect when the human is attempting to interrupt the LLM 130 and cause the LLM 132 yield its turn and provide the human with a turn to enable the human to interject additional utterances into the conversation.

**[0063]** Thus, an AI architecture may include a primary model and one or more second opinion models to provide a low-latency conversational AI with a parallelized in-depth analysis and feedback loop in which the primary model engages in a low latency conversation with the human while the second opinion model gathers additional data and provides feedback (e.g., clarification or expansion of something that the primary model said to the human). Unlike conventional conversational AI's, the training data includes human provider audio-based conversations in addition to text-based training data. The LLM is trained using RLHF to provide improved conversational abilities to the LLM. The LLM may use a task completion engine to avoid missing any items on a checklist of items to be covered with the human. The conversation engine used by the LLM may include a turn engine to determine when the human's turn has ended and the LLM's turn begins, dialect detection to understand and respond to the human in a local dialect, predictive answering to reduce latency by predicting possible answers while the human is talking, tone detection to detect emotional cues (e.g., based on a change in pitch, a change in volume, or the like) in the human's voice, non-verbal detection (e.g., coughing, sneezing, crying, or the like), and interruption detection to detect when the human is attempting to interrupt the LLM. In this way, the LLM is able to provide an engage in a conversation with a human in a manner similar to a human. The purpose of reducing latency is to prevent the human from hanging up in frustration or due to the human erroneously concluding that the conversation has concluded or the virtual assistant has encountered an error.

**[0064]** FIG. 3 is a block diagram of a system 300 that includes a low-latency conversational artificial intelligence (AI) architecture with a parallelized in-depth analysis and feedback loop,

according to some implementations. The system 300 includes a low latency architecture 302 in which the LLM 130 receives a (first) response 304(1) from the human 108. The LLM 130 may engage in the conversation 154 with the human 108 based on a checklist 317 that identifies tasks that the LLM 130 is to complete during the conversation 154. The LLM 130 provides a (first) response 306(1) to the human 108. The LLM 130 receives a (second) response 304(2) from the human 108 and provides a (second) response 306(2) to the human 108. While the LLM 130 is engaged in the conversation 154 with the human 108, the second opinion module 206 may, in parallel (substantially at the same time), do a lengthier “deep dive” by performing research into the human response 304(1) and the AI response 306(1). For example, the research may include prescriptions 308, co-morbidity 310, family history 312 and the like. The prescriptions 308 may include determining whether the human 108 is being prescribed prescriptions appropriate to the human’s conditions, determining whether the human 108 is being prescribed the correct dosages of the prescriptions, determining whether the prescribed prescriptions have any undesirable interactions or contraindications, and other prescription related information. The prescriptions 308 may include a dosage engine that is invoked every time there is mention of a drug, dosage, or both. The co-morbidity 310 may include determining whether the human 108 has two or more medical conditions that may be related to an underlying cause or that have an undesirable interaction. The family history 312 may include determining whether the human’s parents, siblings, or other relatives have a history of medical conditions similar to that of the human 108.

**[0065]** Based on determining the research into the prescriptions 308, the co-morbidity 310, and the family history 312, the second opinion module 206 may determine whether the AI response 306(1) was appropriate or whether the AI response 306(1) may be clarified. If the second opinion module 206 determines that the response 306(1) is appropriate, the second opinion module 206 does not take further action. If the second opinion module 206 determines that the response 306(1) may be clarified, then the second opinion module 206 may provide feedback 311 to the LLM 130, causing the LLM 130 to provide a clarification 316. For example, the human response 304(1) may be “Can I have soup?” and the AI response 306(1) may be “yes, you can have soup.”. The clarification 316 may be “I previously said you could have soup. I noticed that either you or at least one of your family members have high blood pressure, so please check the sodium content of any pre-packaged soups and avoid soups with high sodium.”

In this example, “you ... have high blood pressure” was determined by checking co-morbidity 310 and “at least one of your family members have high blood pressure” was determined by checking family history 312. As another example, the clarification 316 may be “I noticed that you are currently taking <1st prescription> in the morning. Instead of taking <2nd prescription> in the morning as I previously suggested, I suggest taking <2nd prescription> in the evening, around 12 hours after taking <1st prescription>.” In this example, by checking the prescription 308, the second opinion module 206 may determine that the patient is taking the 1st prescription and that the 2nd prescription (mentioned in the AI response 306(1)) is not to be taken at the same time as the 1st prescription and instruct the LLM 130 to clarify when to take the 2nd prescription. As a further example, the clarification 316 may be “I noticed that your potassium was high in your most recent blood work. While I had previously suggested eating more avocados (for the oil), I suggest not having more than one avocado a week to avoid raising your potassium further, as avocados are high in potassium”. In this example, by checking the co-morbidity 310 that includes test results (such as the results of a blood workup, e.g., comprehensive metabolic panel), the second opinion module 206 may determine that the patient has a high potassium level and that avocados are high in potassium and clarify how many avocados the human can have in a particular time frame.

**[0066]** In some cases, the second opinion module 206 may determine that providing the clarification 316 is insufficient and that the conversation 154 would benefit from human intervention 318. In such cases, the second opinion module 206 may use a kick out 314 engine to determine to transfer the conversation 154 to the medical professional 320 (e.g., human nurse or doctor). In addition, if the second opinion module 206 determines that a risk to the human 108 is greater than a predetermined threshold, then the second opinion module 206 may initiate a request for a third opinion 322 in which a human (e.g., a doctor, such as a specialist) reviews the human’s case and takes appropriate action (e.g., provides a call (to the human 108) to clarify 324 the situation). The kick out engine will be invoked for qualitative statements that suggest symptoms that require further evaluation.

**[0067]** While the LLM 130 is engaged in the conversation 154 (e.g., the responses 304, 306), one or more background processes may perform data extraction 326 to extract data 330 (e.g.,

pertinent information, such as facts) to create a conversation summary 328 which is stored in the form of a knowledge graph 332 (or another type of data structure). The conversation summary 328 and the data 330 may enable the LLM 130 to quickly access earlier information in a lengthy conversation. With medical-related AI, conversations may be lengthy and involve many turns (e.g., 50 to 100 turns is common and the conversation may, in some cases, include 200 or even 300 turns). In such a lengthy conversations, the human 108 may reference previously provided information (“referenced information”) in a current response. If the referenced information was provided early in the conversation, a conventional virtual assistant may have “forgotten” the referenced information and thus provide responses that are frustrating to the human.

Alternatively, a conventional virtual assistant may have to scan through a transcript of the conversation to determine the referenced information. Such a scan may cause a lengthy delay and introduce latency into the conversation 154. By performing data extraction 326 and creating the conversation summary 328 and maintaining the knowledge graph 332 storing the data 330, the LLM 130 is able to quickly access the information (data 330) referenced by the human, thereby reducing latency. The purpose of reducing latency is to provide a natural sounding conversation and prevent the human from hanging up (i) in frustration or (ii) due to the human erroneously concluding that the conversation has concluded or the virtual assistant has encountered an error.

**[0068]** Thus, a low latency architecture for a conversational AI includes an AI, such as an LLM, engaged in a conversation with the human. While the AI is engaged in the conversation with the human, a second opinion module does a more in-depth analysis of information provided by the human. If the second opinion module determines that a response provided by the conversational AI is to be clarified, the second opinion module provides feedback that the conversational AI uses to provide a clarification to the human during the conversation. By parallelizing the second opinion module with the conversational AI, latency is reduced, thereby making the conversation more natural. In addition, while the conversational AI is engaged in the conversation with the human, a data extraction module (in parallel) extracts facts from each human response and creates a conversation summary in the form a data structure that can be quickly searched, such as a knowledge graph. The conversational AI can quickly access the conversation summary to look up information previously provided by the human that the human

is referencing in a current turn in the conversation. The access to the conversation summary enables the conversational AI to reduce latency because the conversation AI is not pausing the conversation to perform a search of a transcript of the conversation.

**[0069]** FIG. 4 is a block diagram 400 illustrating components of training data, according to some implementations. The training data 218 may include call recordings 402 between humans and human representatives of a healthcare provider from which personally identifiable information (PII) has been removed. The training data one 218 may include durable medical equipment (DME) reviews and specifications 404 for products ordered or prescribed by a health care provider for use by a human. The training data 218 and may include insurance carrier plan data including an explanation of benefits (EOB) and other insurance related information. The training data 218 may include food information, such as menu data, including a breakdown of various components of various food items, such as amounts (and percentages) of protein, carbohydrates, sodium, and the like. The training data 218 may include health records from which personally identifiable information (PII) has been removed. The training data 218 may include malpractice suit-related data 412, regulatory data 414, and hospital policies and procedures 416. The training data 218 may include data from drug databases 418, such as databases maintained by the food and drug administration (FDA), pharmaceutical companies, and the like. The training data 218 may include standards of care 420, such as guidelines that are generally accepted in the medical community for the treatment of a disease or a condition.

**[0070]** FIG. 5 is a block diagram 500 illustrating an AI checklist, according to some implementations. An AI checklist 502 that may be used by the task completion engine 226 of FIG. 2 to complete a set of tasks during a conversation with a human.

**[0071]** The AI checklist 502 may include verifying an identity of the human 504, confirming date and time of a visit (e.g., to a medical facility) 506, providing arrival time 508, providing information about an arrival site 510, checking for kick outs 512 by checking for conditions that when present may cause the human visit to be delayed, such as the human having an infectious disease, such as Covid, Respiratory syncytial virus (RSV), cold, flu, or the like. The AI checklist 502 may include confirming procedures to travel to and from the site 514, such as whether the human should arrange to be driven to and/or from the site. The AI checklist 502 may include

providing NPO (from the Latin nil per os, which means “nothing by mouth”) information 516 (e.g., what can and cannot be consumed by the human prior to a visit). The AI checklist 502 may include reviewing prep instructions 518, such as foods to eat before the visit, foods not to eat before the visit, liquids to drink before the visit, liquids not to drink before the visit, what to wear before the visit, what to bring to the visit, and so on. The AI checklist 502 may include answering human questions 520, providing a call back number 522, and ending the call properly 524, including summarizing next steps, saying goodbye. The AI checklist 502 may include outputting some or all of the interaction in a form suitable for input to an electronic health records (EHR) platform, and may be integrated with an EHR platform.

**[0072]** FIG. 6 is a block diagram 600 illustrating AI-human engagement 602, according to some implementations. The AI-human engagement 602 may include tone detection 244 and tone generation 606. The AI (LLM 130) may detect a particular tone in the human’s utterances and generate a similar or complementary tone. For example, if the tone of the human’s utterances indicates that the human is getting angry, agitated, frustrated, or the like, then the AI may adopt a tone designed to calm the human and decrease the anger, agitation, frustration, or the like. As another example, if the tone of the human’s utterances indicates that the human is calm, happy, content, or the like, then the AI may adopt a tone similar to that of the human. The term “tone” as used herein refers to a pitch (e.g., frequency) and inflection (of words and phrases) and cadence (e.g., speed of speaking) along with the words and phrases selected or output in the audio data provided to the human during the AI’s turn in the conversation.

**[0073]** The AI-human engagement 602 may include integrating with a food database and determining social determinants of health (SDOH) 608. For example, the AI may provide dietary suggestions based on an existing diagnosis and/or medical recommendations. SDOH includes socio-economic conditions that influence the human’s health, such as living conditions, working conditions, and the like.

**[0074]** The AI-human engagement 602 may include the AI engaging in tangential conversations to build a relationship or rapport with the human. For example, the LLM may tell jokes, or discuss hobbies or based on accessing data associated with a particular human, the AI may engage in a tangential conversation, such as inquiring about a child/parent or the like.

**[0075]** The AI-human engagement 602 may include the AI providing just-in-time instructions. For example, the AI may provide pre-op details at an appropriate time prior to the human visiting a medical facility for medical procedure and may provide post-op details at appropriate times after the procedure has been completed. In this way, the human is not overwhelmed with information that may be too early or too late to be currently applicable to the human.

**[0076]** The AI-human engagement 602 may include the AI accessing the human's history or profile prior to performing tone generation 606, accessing the food database and STO H608, engaging in tangential conversations 610, providing just-in-time construction 612 or any combination thereof.

**[0077]** FIG. 7 is a block diagram of system 700 that includes an LLM routing system, according to some implementations. FIG. 7 illustrates an example conversational AI system, according to some implementations. In some examples, the system 700 can be implemented using one or more servers that collectively implement processes for enabling examples as described. In variations, system 100 can be implemented in part using client or user devices, such that an architecture described with an example of FIG. 1 is distributed. Further, with reference to FIG. 1, the system illustrates an LLM-based architecture to process system input and generate output. The system 100 can be implemented for a variety of applications, such as, for example, medical-related applications, and applications for implementing bedside manners.

**[0078]** In some examples, the input of system 700 can be in multiple modalities, such as text, speech, images, audio and video. The system 700 can accept input from a variety of sources, such as users, sensors, and other systems. Further, the system 700 may use a commercial (off-the-shelf) large language model (LLM) 706 (that has been trained with specific data) to process the system input 702. The LLM 706 can be used to understand the input 702, generate text, translate languages, and answer questions. In some examples, the system 700 may use a proprietary LLM 708 instead of or in addition to the commercial LLM 706. The proprietary LLM 708 can be trained on a specific dataset to improve its performance for a particular task.

**[0079]** In some examples, the system 700 can use an LLM application programming interface

(API) to access the LLMs 706, 708. For example, LLM APIs 710(1) to 710(M) (M>0) may be used to access commercial LLMs 706. The LLM APIs 712(1) to 712(N) (N>0) may be used to access the proprietary LLMs 708. The LLM APIs 710, 712 can be used to send requests to the LLMs 706, 708 and receive responses from the LLMs 706, 708. The system 700 can use a proprietary LLM routing system 712 to route requests, such as a representative request 704 to the appropriate LLMs 706, 708. The LLM routing system 712 can be used to improve the performance and efficiency of the system 700 by routing requests to the LLMs 706, 708 that are best suited for the task associated with the request 704.

**[0080]** Further, in examples, the system 700 can use one or more databases 714 to store data. The data can be stored in a variety of formats, such as text, images, and video. The system 700 can use a variety of tools and agents 716(1) to 716(P) (P>0) to perform tasks. The tools and agents 716 can be used to generate text, translate languages, answer questions, and perform other tasks. The system 700 can use safety modules 718 to prevent the system from performing unsafe actions. The safety modules 718 can be used to prevent the system 700 from generating text that is harmful, offensive, illegal, or the like and that complies with various medical standards.

**[0081]** The system 700 can generate output 720 in multiple modalities, such as text, speech, images, and video. The output 720 can be sent to a variety of destinations, such as users, sensors, and other systems. The output of the system 700 is combined to provide appropriate vocal utterances to the human. In examples, system 700 implements voice conversations in a healthcare setting or environment. The system 700 can incorporate multiple large language models (LLMs) 706, 708 and a conversation manager 722 to facilitate natural language interactions between humans and healthcare providers. The system 700 includes a front-end interface that is accessible via voice assistants or mobile applications. When a human initiates a conversation, the system uses automatic speech recognition (ASR) technology to transcribe the spoken input and convert it into text. The text is then processed by the conversation manager 722, which uses advanced natural language understanding (NLU) techniques to identify the intent of the human's request and route it to the appropriate LLM.

**[0082]** The LLMs 706, 708 may be fine-tuned for specific healthcare domains, such as cardiology, radiology, or dermatology, to ensure high accuracy and relevance of the responses.



Each LLM 706, 708 is trained on a large corpus of healthcare data, including electronic health records, medical literature, and human feedback, to provide a comprehensive knowledge base for the conversation. The system 700 also includes a set of targeted sub-domain adapter models for medical coding, compliance, pharmacist, nurse practitioner, and dentist. Each domain-specific module has a distinct set of self-auditing correction mechanisms and utilizes separate knowledge retrieval databases.

**[0083]** The conversation manager 722 coordinates the flow of the conversation between an LLM and a human by selecting the appropriate LLM based on the human's request and ensuring a coherent and engaging dialogue. The system 700 incorporates conversational strategies, such as open-ended questions, feedback loops, and active listening techniques, to maintain human engagement and satisfaction. The system 700 implements processes and functionality to ensure that the LLM is factually accurate during conversations with humans to build trust, credibility, and reduce anxiety and stress for humans. To ensure human safety and privacy, the system 700 employs several security and compliance measures. All data can be encrypted and stored securely, and access to the system is restricted to authorized healthcare providers and staff. The system 700 adheres to relevant healthcare regulations, such as the Health Insurance Portability and Accountability Act (HIPAA) and the General Data Protection Regulation (GDPR).

**[0084]** Among other advantages, the system 700 offers a valuable solution for natural language interactions for healthcare-related functions. By incorporating multiple LLMs 706, 708 and a conversation manager 722, the system 700 enables accurate and engaging conversations between humans and LLMs of healthcare providers, leading to improved healthcare outcomes and human satisfaction.

**[0085]** In cases where humans exhibit mild cognitive impairment, the system 700 provides for the LLMs 706, 708 to employ additional adaptive techniques, such as simplified language, visual aids or diagrams, repeating and/or summarizing information, and providing reminders to aid comprehension and retention. The system 700 adapts to the human's level of medical understanding, using appropriate language for effective communication. A proprietary conversational benchmark testing suite to assess the system's ability to communicate effectively and agreeably.

**[0086]** The system 700 implements multiple techniques to reduce latency, such as by using cached conversational elements and parallel layered processing of semantic information. The system 700 performs tone detection to identify mood information and self-modulation to respond appropriately. The system 700 can implement one or more processes to manage dialog by keeping track of existing human information from the database along with new information gathered during the course of the conversation and purposefully accomplishing particular conversational objectives (set an appointment, confirm a prescription is being taken, explain a medical bill, etc.).

**[0087]** The system 700 can implement one or more processes to embed user queries in a high dimensional space, classifying input within several categorical domains, in order to modify and direct it to a matched internal model as part of a pre-processing pipeline. Further, the system 700 can also develop, train, implement or otherwise use a set of safety-focused language models that function to audit the output of the core models for accuracy and agreement with scientific literature and clinical best-practices. Additionally, the system 700 can implement one or more processes to combine domain specific and general retrieval corpuses to improve performance in targeted domains (e.g., medical coding) without sacrificing performance.

**[0088]** In the flow diagram of FIGS. 8, 9, and 10, each block represents one or more operations that can be implemented in hardware, software, or a combination thereof. In the context of software, the blocks represent computer-executable instructions that, when executed by one or more processors, cause the processors to perform the recited operations. Generally, computer-executable instructions include routines, programs, objects, modules, components, data structures, and the like that perform particular functions or implement particular abstract data types. The order in which the blocks are described is not intended to be construed as a limitation, and any number of the described operations can be combined in any order and/or in parallel to implement the processes. For discussion purposes, the processes 800, 900, and 1000 are described with reference to FIGS. 1, 2, 3, 4, 5, 6, and 7 as described above, although other models, frameworks, systems and environments may be used to implement these processes.

**[0089]** FIG. 8 is a flowchart of a process 800 that includes analyzing a human response using a second opinion module, according to some implementations. The process 800 may be

performed by one or more of the LLM's 130 of FIGS. 1, 2, 3, and 7.

**[0090]** At 802, the process may initiate (or receive) a call to (from) a human. At 804, the process may initiate a checklist-based conversation with the human. At 806, the process may receive a human response from the human. For example, in FIG. 3, the LLM 130 may engage in the conversation 154 with the human 108. Either the LLM 130 or the human 108 may initiate a call prior to the conversation 154. The LLM 130 may use the checklist 317 to drive the conversation 154 with the human 108.

**[0091]** At 806, the process may receive a human response from the human. At 810, the process may provide, to the human, an AI response. At 812, the process may receive a subsequent human response. At 814, the process may provide, to the human, a subsequent AI response, and the process may proceed to 816. For example, in FIG. 3, the LLM 130 may receive the human response 304 from the human 108. The LLM 130 may provide, to the human 108, the AI response 306(1). The LLM 130 may receive a subsequent human response 304(2). The LLM 130 may provide, to the human 108, a subsequent AI response 306(2).

**[0092]** In parallel with 810, 812, and 814, a second opinion module (an AI) may, at 820, review the human response. At 822, the second opinion module may examine additional factors associated with the human (such as, dosage, co-morbidity, and the like). At 824, the second opinion module may determine whether the first AI response is to be clarified. If the second opinion module determines, at 824, that “no” the first AI response is not to be clarified, then the second opinion module may allow the process to continue conversing with the human. If the second opinion model module determines, at 824, that “yes” the first AI response is to be clarified, then the second opinion module may determine, at 826, whether to transfer the conversation to a human. If the second opinion module determines, at 826, that “yes” the conversation is to be transferred to a human, then, at 828, the second opinion module may transfer the conversation to a human. If the second opinion module determines, at 826, that “no” the conversation is not to be transferred to a human, then then the second opinion module may provide, at 830, feedback to the AI, causing the AI to provide a clarification (during the conversation) to the human response. The clarification may be to request additional information from the human for examination by the second opinion module. The second opinion module may

then proceed to 816. For example, in FIG. 3, while the LLM 130 is engaged in the conversation 154 (e.g., responses 304(1), 306(1), 304(2), 306(2)), the second opinion module may examine the human response 304(1) in more depth/detail. For example, the second opinion module 206 may examine additional factors associated with the human 108, such as prescriptions (e.g., dosage, interactions, contraindications, or the like), co-morbidity 310, family history 312, and the like. After examining the additional factors, the second opinion module 206 may determine whether the AI response 306(1) is to be clarified. If the second opinion module 206 determines, that the AI response 306(1) is not to be clarified, then the second opinion module 206 allows the LLM 130 to continue the conversation 154 with the human 108. If the second opinion model module 206 determines that the first AI response 306(1) is to be clarified, then the second opinion module 206 may determine whether to transfer the conversation 154 to a human. If the second opinion module 206 determines that the conversation 154 is to be transferred to a human, then the second opinion module may transfer the conversation 154 to one of the medical professionals 112. If the second opinion module 206 determines that the conversation 154 is not to be transferred to a human, then then the second opinion module 206 may provide feedback 311 to the LLM 130, causing the LLM 130 to provide the clarification 316 during the conversation 154.

**[0093]** At 816, the process may determine whether a checklist is complete. If the process determines, at 816, that “yes” the checklist is complete, then the process may end the conversation. If the process determines, at 816 that “no” the checklist is incomplete, then the process may proceed back to 806 to receive a next human response from the human. For example, in FIG. 3, The LLM 130 may continue with the conversation 154 until the LLM 130 has completed the tasks in the checklist 317.

**[0094]** Thus, an AI, such as an LLM, may engage in a conversation with a human. The conversation may be initiated by the AI or by the human (e.g., human was asked to call a number that was routed to the AI). While the AI is engaged in the conversation with the human, a second opinion module does a more in-depth analysis of information provided by the human. If the second opinion module determines that a response provided by the conversational AI is to be clarified, the second opinion module provides feedback that the conversational AI uses to

provide a clarification to the human during the conversation. By parallelizing the second opinion module with the conversational AI, latency is reduced, thereby making the conversation more natural while at the same time, enabling a second AI to perform a lengthier and more detailed analysis of information provided by the human.

**[0095]** FIG. 9 is a flowchart of a process 900 that includes accessing a conversation summary, a knowledge graph, or both, according to some implementations. The process 900 may be performed by one or more of the LLM's 130 of FIGS. 1, 2, 3, and 7. While FIG. 8 and 9 are shown as being separate flowcharts, it should be understood that the two flowcharts should be taken together, with 802, 804 and 806 corresponding to 902, 904 and 906, respectively. FIG. 8 illustrates the second opinion module operating in parallel with the primary LLM engaging in a conversation with the human. FIG. 9 illustrates creating a conversation summary in parallel with the primary LLM engaging in a conversation with the human.

**[0096]** At 902, the process may initiate (or receive) a call to (from) a human. At 904, the process may initiate a checklist-based conversation with the human. For example, in FIG. 3, the LLM 130 may engage in the conversation 154 with the human 108. Either the LLM 130 or the human 108 may initiate a call prior to the conversation 154. The LLM 130 may use the checklist 317 to drive the conversation 154 with the human 108.

**[0097]** At 906, the process may receive a human response from the human. At 908, the process may provide, to the human, an AI response. At 910, the process may receive a subsequent human response. At 916, the process may determine whether the subsequent human response referenced previously provided data. If the process determines, at 916, that "yes" the subsequent human response references previously provided data, then, at 918, the process may access a conversation summary. In some cases, the conversation summary may be stored in the form of a knowledge graph or another type of data structure. After accessing the conversation summary, the process may access data 920, and provide to the human, at 922, a subsequent AI response (based on accessing the data 920 in the conversation summary). At 924 the process may determine whether a checklist is complete. If the process determines, at 924, that "no" the checklist is not complete, then the process may proceed back to 906 to receive an additional human response. If the process determines, at 924, that "yes" the checklist is complete, then the

process may end, at 926. For example, in FIG. 3, the LLM 130 may receive the human response 304(1) from the human 108. The LLM 130 may provide, to the human 108, the AI response 306(1). The LLM 130 may receive a subsequent human response 304(2). The LLM 130 may determine whether the subsequent human response 304(2) references previously provided data. If the LLM 130 determines that the subsequent human response 304(2) references previously provided data, then the LLM 130 may access the conversation summary 328. In some cases, the conversation summary 328 may be stored in the form of the knowledge graph 332 (or another type of data structure). After accessing the conversation summary 328, the LLM 130 may provide, to the human 108, a subsequent AI response 306(2), based on accessing the data in the conversation summary. The LLM 130 may determine whether the checklist 317 is complete. If the LLM 130 determines the checklist 317 is not complete, then the LLM 130 may receive an additional human response 304. If the LLM 130 determines the checklist 317 is complete, then the LLM 130 may end the conversation 154.

**[0098]** In parallel with 908 and 910, a data extraction module may, at 912, extract data (e.g., facts and other pertinent information) from the human response. At 914, the data extraction module may add the data to a conversation summary. For example, the conversation summary may be stored in the form of a knowledge graph or another type of data structure. The data extraction module may repeatedly monitor the human responses received at 906, extract data from the human response, at 912, and add the data to the conversation summary, at 914. In this way, the conversation summary is kept up to date. For example, in FIG. 3, while the LLM 130 is engaged in the conversation 154 with the human 108, the data extraction module 326 may extract data 330 (e.g., facts and other pertinent information) from the human response 304(1) and add the data 330 to the conversation summary 328. For example, the conversation summary 328 may be stored in the form of the knowledge graph 332 or another type of data structure. The data extraction module 326 may repeatedly monitor the human responses 304, extract data 330 from the human responses 304 and add the data 330 to the conversation summary 328. In this way, the conversation summary 328 is kept up to date.

**[0099]** Thus, a low latency architecture for a conversational AI includes an AI, such as an LLM, engaged in a conversation with the human. While the AI is engaged in the conversation

with the human, a data extraction module (in parallel) extracts facts from each human response and creates a conversation summary in the form a data structure that can be quickly searched, such as a knowledge graph. The conversational AI can quickly access the conversation summary to look up data that was previously provided by the human that the human is referencing in a current response (turn) in the conversation. The access to the conversation summary enables the conversational AI to reduce latency because the conversational AI is not pausing the conversation to perform a search of a transcript of the conversation.

**[00100]** FIG. 10 is a flowchart of a process 1000 to train a machine learning algorithm, according to some implementations. For example, the process 1000 may be performed during the pre-training 216 or other training described herein.

**[00101]** At 1002, a machine learning algorithm (e.g., software code) may be created by one or more software designers. For example, the LLMs 130 may be created by software designers. At 1004, the machine learning algorithm may be trained using pre-classified training data 1006. For example, the training data 1006 may have been pre-classified by humans, by machine learning, or a combination of both. After the machine learning has been trained using the pre-classified training data 1006, the machine learning may be tested, at 1008, using test data 1010 to determine a performance metric of the machine learning. The performance metric may include, for example, precision, recall, Frechet Inception Distance (FID), or a more complex performance metric. For example, in the case of a classifier, the accuracy of the classification may be determined using the test data 1010.

**[00102]** If the performance metric of the machine learning does not satisfy a desired measurement (e.g., 95%, 98%, 99% in the case of accuracy), at 1008, then the machine learning code may be tuned, at 1012, to achieve the desired performance measurement. For example, at 1012, the software designers may modify the machine learning software code to improve the performance of the machine learning algorithm. After the machine learning has been tuned, at 1012, the machine learning may be retrained, at 1004, using the pre-classified training data 1006. In this way, 1004, 1008, 1012 may be repeated until the performance of the machine learning is able to satisfy the desired performance metric. For example, in the case of a classifier, the classifier may be tuned to be able to classify the test data 1010 with the desired accuracy.

**[00103]** After determining, at 1008, that the performance of the machine learning satisfies the desired performance metric, the process may proceed to 1014, where verification data 1016 may be used to verify the performance of the machine learning. After the performance of the machine learning is verified, at 1014, the machine learning 1002, which has been trained to provide a particular level of performance may be used as an artificial intelligence (AI) 1018, such as the LLM 130.

**[00104]** FIG. 11 illustrates an example configuration of a device 1100 that can be used to implement the systems and techniques described herein. For example, the device 1100 may be a server (or a set of servers) used to host one or more of the components described herein. In some cases, the systems and techniques described herein may be implemented as an application programming interface (API), a plugin, or another type of implementation.

**[00105]** The device 1100 may include one or more processors 1102 (e.g., central processing unit (CPU), graphics processing unit (GPU), or the like), a memory 1104, communication interfaces 1106, a display device 1108, other input/output (I/O) devices 1110 (e.g., keyboard, trackball, and the like), and one or more mass storage devices 1112 (e.g., disk drive, solid state disk drive, or the like), configured to communicate with each other, such as via one or more system buses 1114 or other suitable connections. While a single system bus 1114 is illustrated for ease of understanding, it should be understood that the system bus 1114 may include multiple buses, such as a memory device bus, a storage device bus (e.g., serial ATA (SATA) and the like), data buses (e.g., universal serial bus (USB) and the like), video signal buses (e.g., ThunderBolt®, digital video interface (DVI), high definition media interface (HDMI), and the like), power buses, etc.

**[00106]** The processors 1102 are one or more hardware devices that may include a single processing unit or a number of processing units, all of which may include single or multiple computing units or multiple cores. The processors 1102 may include a graphics processing unit (GPU) that is integrated into the CPU or the GPU may be a separate processor device from the CPU. The processors 1102 may be implemented as one or more microprocessors, microcomputers, microcontrollers, digital signal processors, central processing units, graphics processing units, state machines, logic circuitries, and/or any devices that manipulate signals



based on operational instructions. Among other capabilities, the processors 1102 may be configured to fetch and execute computer-readable instructions stored in the memory 1104, mass storage devices 1112, or other computer-readable media.

**[00107]** Memory 1104 and mass storage devices 1112 are examples of computer storage media (e.g., memory storage devices) for storing instructions that can be executed by the processors 1102 to perform the various functions described herein. For example, memory 1104 may include both volatile memory and non-volatile memory (e.g., random access memory (RAM), read only memory (ROM), or the like) devices. Further, mass storage devices 1112 may include hard disk drives, solid-state drives, removable media, including external and removable drives, memory cards, flash memory, floppy disks, optical disks (e.g., compact disc (CD), digital versatile disc (DVD), a storage array, a network attached storage (NAS), a storage area network (SAN), or the like. Both memory 1104 and mass storage devices 1112 may be collectively referred to as memory or computer storage media herein and may be any type of non-transitory media capable of storing computer-readable, processor-executable program instructions as computer program code that can be executed by the processors 1102 as a particular machine configured for carrying out the operations and functions described in the implementations herein.

**[00108]** The device 1100 may include one or more communication interfaces 1106 for exchanging data via the network 110. The communication interfaces 1106 can facilitate communications within a wide variety of networks and protocol types, including wired networks (e.g., Ethernet, Data Over Cable Service Interface Specification (DOCSIS), digital subscriber line (DSL), Fiber, universal serial bus (USB) etc.) and wireless networks (e.g., wireless local area network (WLAN), global system for mobile (GSM), code division multiple access (CDMA), 802.11, Bluetooth, Wireless USB, ZigBee, cellular, satellite, etc.), the Internet and the like. Communication interfaces 1106 can also provide communication with external storage, such as a storage array, network attached storage, storage area network, cloud storage, or the like.

**[00109]** The display device 1108 may be used for displaying content (e.g., information and images) to users. Other I/O devices 1110 may be devices that receive various inputs from a user and provide various outputs to the user, and may include a keyboard, a touchpad, a mouse, a

gaming controller (e.g., joystick, steering controller, accelerator pedal, brake pedal controller, virtual reality (VR) headset, VR glove, or the like), a printer, audio input/output devices, and so forth.

**[00110]** The computer storage media, such as memory 1104 and mass storage devices 1112, may be used to store any of the software and data described herein.

**[00111]** The example systems and computing devices described herein are merely examples suitable for some implementations and are not intended to suggest any limitation as to the scope of use or functionality of the environments, architectures and frameworks that can implement the processes, components and features described herein. Thus, implementations herein are operational with numerous environments or architectures, and may be implemented in general purpose and special-purpose computing systems, or other devices having processing capability. Generally, any of the functions described with reference to the figures can be implemented using software, hardware (e.g., fixed logic circuitry) or a combination of these implementations. The term “module,” “mechanism” or “component” as used herein generally represents software, hardware, or a combination of software and hardware that can be configured to implement prescribed functions. For instance, in the case of a software implementation, the term “module,” “mechanism” or “component” can represent program code (and/or declarative-type instructions) that performs specified tasks or operations when executed on a processing device or devices (e.g., CPUs or processors). The program code can be stored in one or more computer-readable memory devices or other computer storage devices. Thus, the processes, components and modules described herein may be implemented by a computer program product.

**[00112]** Furthermore, this disclosure provides various example implementations, as described and as illustrated in the drawings. However, this disclosure is not limited to the implementations described and illustrated herein, but can extend to other implementations, as would be known or as would become known to those skilled in the art. Reference in the specification to “one implementation,” “this implementation,” “these implementations” or “some implementations” means that a particular feature, structure, or characteristic described is included in at least one implementation, and the appearances of these phrases in various places in the specification are not necessarily all referring to the same implementation.

**[00113]** Although the present technology disclosed has been described in connection with several implementations, the technology disclosed is not intended to be limited to the specific forms set forth herein. On the contrary, it is intended to cover such alternatives, modifications, and equivalents as can be reasonably included within the scope of the technology disclosed as defined by the appended claims.

**[00114]** Some implementations of the technology disclosed relate to using a Transformer model to provide a multi-turn conversational system. In particular, the technology disclosed proposes a parallel input, parallel output (PIPO) multi-turn conversational system based on the Transformer architecture. The Transformer model relies on a self-attention mechanism to compute a series of context-informed vector-space representations of elements in the input sequence and the output sequence, which are then used to predict distributions over subsequent elements as the model predicts the output sequence element-by-element. Not only is this mechanism straightforward to parallelize, but as each input's representation is also directly informed by all other inputs' representations, this results in an effectively global receptive field across the whole input sequence. This stands in contrast to, *e.g.*, convolutional architectures which typically only have a limited receptive field.

**[00115]** In one implementation, the disclosed multi-turn conversational system is a multilayer perceptron (MLP). In another implementation, the disclosed multi-turn conversational system is a feedforward neural network. In yet another implementation, the disclosed multi-turn conversational system is a fully connected neural network. In a further implementation, the disclosed multi-turn conversational system is a fully convolution neural network. In a yet further implementation, the disclosed multi-turn conversational system is a semantic segmentation neural network. In a yet another further implementation, the disclosed multi-turn conversational system is a generative adversarial network (GAN) (*e.g.*, CycleGAN, StyleGAN, pixelRNN, text-2-image, DiscoGAN, IsGAN). In a yet another implementation, the disclosed multi-turn conversational system includes self-attention mechanisms like Transformer, Vision Transformer (ViT), Bidirectional Transformer (BERT), Detection Transformer (DETR), Deformable DETR, UP-DETR, DeiT, Swin, GPT, iGPT, GPT- 2, GPT-3, various ChatGPT versions, various LLaMA versions, BERT, SpanBERT, RoBERTa, XLNet, ELECTRA, UniLM, BART, T5,

ERNIE (THU), KnowBERT, DeiT-Ti, DeiT-S, DeiT-B, T2T-ViT-14, T2T-ViT-19, T2T-ViT-24, PVT- Small, PVT-Medium, PVT-Large, TNT-S, TNT-B, CPVT-S, CPVT-S-GAP, CPVT-B, Swin-T, Swin-S, Swin-B, Twins-SVT-S, Twins-SVT-B, Twins-SVT-L, Shuffle-T, Shuffle-S, Shuffle-B, XCiT-S12/16, CMT-S, CMT-B, VOLO-D1, VOLO-D2, VOLO-D3, VOLO-D4, MoCo v3, ACT, TSP, Max-DeepLab, VisTR, SETR, Hand-Transformer, HOT-Net, METRO, Image Transformer, Taming transformer, TransGAN, IPT, TTSR, STTN, Masked Transformer, CLIP, DALL-E, Cogview, UniT, ASH, TinyBert, FullyQT, ConvBert, FCOS, Faster R-CNN + FPN, DETR-DC5, TSP-FCOS, TSP-RCNN, ACT+MKDD (L=32), ACT+MKDD (L=16), SMCA, Efficient DETR, UP-DETR, UP-DETR, ViTB/16-FRCNN, ViT-B/16-FRCNN, PVT-Small+RetinaNet, Swin-T+RetinaNet, Swin-T+ATSS, PVT-Small+DETR, TNT-S+DETR, YOLOS-Ti, YOLOS-S, and YOLOS-B.

**[00116]** In one implementation, the disclosed multi-turn conversational system is a convolution neural network (CNN) with a plurality of convolution layers. In another implementation, the disclosed multi-turn conversational system is a recurrent neural network (RNN) such as a long short-term memory network (LSTM), bi-directional LSTM (Bi- LSTM), or a gated recurrent unit (GRU). In yet another implementation, the disclosed multi-turn conversational system includes both a CNN and an RNN.

**[00117]** In yet other implementations, the disclosed multi-turn conversational system can use 1D convolutions, 2D convolutions, 3D convolutions, 4D convolutions, 5D convolutions, dilated or atrous convolutions, transpose convolutions, depthwise separable convolutions, pointwise convolutions, 1 x 1 convolutions, group convolutions, flattened convolutions, spatial and cross-channel convolutions, shuffled grouped convolutions, spatial separable convolutions, and deconvolutions. The disclosed multi-turn conversational system can use one or more loss functions such as logistic regression/log loss, multi- class cross-entropy/softmax loss, binary cross-entropy loss, mean-squared error loss, L1 loss, L2 loss, smooth L1 loss, and Huber loss. The disclosed multi-turn conversational system can use any parallelism, efficiency, and compression schemes such TFRecords, compressed encoding (*e.g.*, PNG), sharding, parallel calls for map transformation, batching, prefetching, model parallelism, data parallelism, and synchronous/asynchronous stochastic gradient descent (SGD). The disclosed multi-turn

conversational system can include upsampling layers, downsampling layers, recurrent connections, gates and gated memory units (like an LSTM or GRU), residual blocks, residual connections, highway connections, skip connections, peephole connections, activation functions (*e.g.*, non-linear transformation functions like rectifying linear unit (ReLU), leaky ReLU, exponential liner unit (ELU), sigmoid and hyperbolic tangent (tanh)), batch normalization layers, regularization layers, dropout, pooling layers (*e.g.*, max or average pooling), global average pooling layers, and attention mechanisms.

**[00118]** The disclosed multi-turn conversational system can be a linear regression model, a logistic regression model, an Elastic Net model, a support vector machine (SVM), a random forest (RF), a decision tree, and a boosted decision tree (*e.g.*, XGBoost), or some other tree-based logic (*e.g.*, metric trees, kd-trees, R-trees, universal B-trees, X-trees, ball trees, locality sensitive hashes, and inverted indexes). The disclosed multi-turn conversational system can be an ensemble of multiple models, in some implementations.

**[00119]** In some implementations, the disclosed multi-turn conversational system can be trained using backpropagation-based gradient update techniques. Example gradient descent techniques that can be used for training the disclosed multi-turn conversational system include stochastic gradient descent, batch gradient descent, and mini-batch gradient descent. Some examples of gradient descent optimization algorithms that can be used to train the disclosed multi-turn conversational system are Momentum, Nesterov accelerated gradient, Adagrad, Adadelata, RMSprop, Adam, AdaMax, Nadam, and AMSGrad.

**[00120]** Transformer Logic

**[00121]** Machine learning is the use and development of computer systems that can learn and adapt without following explicit instructions, by using algorithms and statistical models to analyze and draw inferences from patterns in data. Some of the state-of-the-art models use Transformers, a more powerful and faster model than neural networks alone. Transformers originate from the field of natural language processing (NLP), but can be used in computer vision and many other fields. Neural networks process input in series and weight relationships by distance in the series. Transformers can process input in parallel and do not necessarily weigh by

distance. For example, in natural language processing, neural networks process a sentence from beginning to end with the weights of words close to each other being higher than those further apart. This leaves the end of the sentence very disconnected from the beginning causing an effect called the vanishing gradient problem. Transformers look at each word in parallel and determine weights for the relationships to each of the other words in the sentence. These relationships are called hidden states because they are later condensed for use into one vector called the context vector. Transformers can be used in addition to neural networks. This architecture is described here.

### **Encoder-Decoder Architecture**

**[00122]** FIG. 12 is a schematic representation 1200 of an encoder-decoder architecture. This architecture is often used for NLP and has two main building blocks. The first building block is the encoder that encodes an input into a fixed-size vector. In the system we describe here, the encoder is based on a recurrent neural network (RNN). At each time step,  $t$ , a hidden state of time step,  $t-1$ , is combined with the input value at time step  $t$  to compute the hidden state at timestep  $t$ . The hidden state at the last time step, encoded in a context vector, contains relationships encoded at all previous time steps. For NLP, each step corresponds to a word. Then the context vector contains information about the grammar and the sentence structure. The context vector can be considered a low-dimensional representation of the entire input space. For NLP, the input space is a sentence, and a training set consists of many sentences.

**[00123]** The context vector is then passed to the second building block, the decoder. For translation, the decoder has been trained on a second language. Conditioned on the input context vector, the decoder generates an output sequence. At each time step,  $t$ , the decoder is fed the hidden state of time step,  $t-1$ , and the output generated at time step,  $t-1$ . The first hidden state in the decoder is the context vector, generated by the encoder. The context vector is used by the decoder to perform the translation.

**[00124]** The whole model is optimized end-to-end by using backpropagation, a method of training a neural network in which the initial system output is compared to the desired output and the system is adjusted until the difference is minimized. In backpropagation, the encoder is

trained to extract the right information from the input sequence, the decoder is trained to capture the grammar and vocabulary of the output language. This results in a fluent model that uses context and generalizes well. When training an encoder-decoder model, the real output sequence is used to train the model to prevent mistakes from stacking. When testing the model, the previously predicted output value is used to predict the next one.

**[00125]** When performing a translation task using the encoder-decoder architecture, all information about the input sequence is forced into one vector, the context vector. Information connecting the beginning of the sentence with the end is lost, the vanishing gradient problem. Also, different parts of the input sequence are important for different parts of the output sequence, information that cannot be learned using only RNNs in an encoder-decoder architecture.

### **Attention Mechanism**

**[00126]** Attention mechanisms distinguish Transformers from other machine learning models. The attention mechanism provides a solution for the vanishing gradient problem. FIG. 13 shows an overview 1300 of an attention mechanism added onto an RNN encoder-decoder architecture. At every step, the decoder is given an attention score,  $e$ , for each encoder hidden state. In other words, the decoder is given weights for each relationship between words in a sentence. The decoder uses the attention score concatenated with the context vector during decoding. The output of the decoder at time step  $t$  is based on all encoder hidden states and the attention outputs. The attention output captures the relevant context for time step  $t$  from the original sentence. Thus, words at the end of a sentence may now have a strong relationship with words at the beginning of the sentence. In the sentence “The quick brown fox, upon arriving at the doghouse, jumped over the lazy dog,” fox and dog can be closely related despite being far apart in this complex sentence.

**[00127]** To weight encoder hidden states, a dot product between the decoder hidden state of the current time step, and all encoder hidden states, is calculated. This results in an attention score for every encoder hidden state. The attention scores are higher for those encoder hidden states that are similar to the decoder hidden state of the current time step. Higher values for the dot

product indicate the vectors are pointing more closely in the same direction. The attention scores are converted to fractions that sum to one using the SoftMax function.

**[00128]** The SoftMax scores provide an attention distribution. The x-axis of the distribution is position in a sentence. The y-axis is attention weight. The scores show which encoder hidden states are most closely related. The SoftMax scores specify which encoder hidden states are the most relevant for the decoder hidden state of the current time step.

**[00129]** The elements of the attention distribution are used as weights to calculate a weighted sum over the different encoder hidden states. The outcome of the weighted sum is called the attention output. The attention output is used to predict the output, often in combination (concatenation) with the decoder hidden states. Thus, both information about the inputs, as well as the already generated outputs, can be used to predict the next outputs.

**[00130]** By making it possible to focus on specific parts of the input in every decoder step, the attention mechanism solves the vanishing gradient problem. By using attention, information flows more directly to the decoder. It does not pass through many hidden states. Interpreting the attention step can give insights into the data. Attention can be thought of as a soft alignment. The words in the input sequence with a high attention score align with the current target word. Attention describes long-range dependencies better than RNN alone. This enables analysis of longer, more complex sentences.

**[00131]** The attention mechanism can be generalized as: given a set of vector values and a vector query, attention is a technique to compute a weighted sum of the vector values, dependent on the vector query. The vector values are the encoder hidden states, and the vector query is the decoder hidden state at the current time step.

**[00132]** The weighted sum can be considered a selective summary of the information present in the vector values. The vector query determines on which of the vector values to focus. Thus, a fixed-size representation of the vector values can be created, in dependence upon the vector query.

**[00133]** The attention scores can be calculated by the dot product, or by weighing the different



values (multiplicative attention).

## **Embeddings**

**[00134]** For most machine learning models, the input to the model needs to be numerical. The input to a translation model is a sentence, and words are not numerical. multiple methods exist for the conversion of words into numerical vectors. These numerical vectors are called the embeddings of the words. Embeddings can be used to convert any type of symbolic representation into a numerical one.

**[00135]** Embeddings can be created by using one-hot encoding. The one-hot vector representing the symbols has the same length as the total number of possible different symbols. Each position in the one-hot vector corresponds to a specific symbol. For example, when converting colors to a numerical vector, the length of the one-hot vector would be the total number of different colors present in the dataset. For each input, the location corresponding to the color of that value is one, whereas all the other locations are valued at zero. This works well for working with images. For NLP, this becomes problematic, because the number of words in a language is very large. This results in enormous models and the need for a lot of computational power. Furthermore, no specific information is captured with one-hot encoding. From the numerical representation, it is not clear that orange and red are more similar than orange and green. For this reason, other methods exist.

**[00136]** A second way of creating embeddings is by creating feature vectors. Every symbol has its specific vector representation, based on features. With colors, a vector of three elements could be used, where the elements represent the amount of yellow, red, and/or blue needed to create the color. Thus, all colors can be represented by only using a vector of three elements. Also, similar colors have similar representation vectors.

**[00137]** For NLP, embeddings based on context, as opposed to words, are small and can be trained. The reasoning behind this concept is that words with similar meanings occur in similar contexts. Different methods take the context of words into account. Some methods, like GloVe, base their context embedding on co-occurrence statistics from corpora (large texts) such as

Wikipedia. Words with similar co-occurrence statistics have similar word embeddings. Other methods use neural networks to train the embeddings. For example, they train their embeddings to predict the word based on the context (Common Bag of Words), and/or to predict the context based on the word (Skip-Gram). Training these contextual embeddings is time intensive. For this reason, pre-trained libraries exist. Other deep learning methods can be used to create embeddings. For example, the latent space of a variational autoencoder (VAE) can be used as the embedding of the input. Another method is to use 1D convolutions to create embeddings. This causes a sparse, high-dimensional input space to be converted to a denser, low-dimensional feature space.

### **Self-Attention: Queries (Q), Keys (K), Values (V)**

**[00138]** Transformer models are based on the principle of self-attention. Self-attention allows each element of the input sequence to look at all other elements in the input sequence and search for clues that can help it to create a more meaningful encoding. It is a way to look at which other sequence elements are relevant for the current element. The Transformer can grab context from both before and after the currently processed element.

**[00139]** When performing self-attention, three vectors need to be created for each element of the encoder input: the query vector (Q), the key vector (K), and the value vector (V). These vectors are created by performing matrix multiplications between the input embedding vectors using three unique weight matrices.

**[00140]** After this, self-attention scores are calculated. When calculating self-attention scores for a given element, the dot products between the query vector of this element and the key vectors of all other input elements are calculated. To make the model mathematically more stable, these self-attention scores are divided by the root of the size of the vectors. This has the effect of reducing the importance of the scalar thus emphasizing the importance of the direction of the vector. Just as before, these scores are normalized with a SoftMax layer. This attention distribution is then used to calculate a weighted sum of the value vectors, resulting in a vector  $z$  for every input element. In the attention principle explained above, the vector to calculate attention scores and to perform the weighted sum was the same, in self-attention two different

vectors are created and used. As the self-attention needs to be calculated for all elements (thus a query for every element), one formula can be created to calculate a Z matrix. The rows of this Z matrix are the z vectors for every sequence input element, giving the matrix a size length sequence dimension QKV.

**[00141]** Multi-headed attention is executed in the Transformer. FIG. 14 is a schematic representation 1400 of the calculation of self-attention showing one attention head. For every attention head, different weight matrices are trained to calculate Q, K, and V. Every attention head outputs a matrix Z. Different attention heads can capture different types of information. The different Z matrices of the different attention heads are concatenated. This matrix can become large when multiple attention heads are used. To reduce dimensionality, an extra weight matrix W is trained to condense the different attention heads into a matrix with the same size as one Z matrix. This way, the amount of data given to the next step does not enlarge every time self-attention is performed.

**[00142]** When performing self-attention, information about the order of the different elements within the sequence is lost. To address this problem, positional encodings are added to the embedding vectors. Every position has its unique positional encoding vector. These vectors follow a specific pattern, which the Transformer model can learn to recognize. This way, the model can consider distances between the different elements.

**[00143]** As discussed above, in the core of self-attention are three objects: queries (Q), keys (K), and values (V). Each of these objects has an inner semantic meaning of their purpose. One can think of these as analogous to databases. We have a user-defined query of what the user wants to know. Then we have the relations in the database, i.e., the values which are the weights. More advanced database management systems create some apt representation of its relations to retrieve values more efficiently from the relations. This can be achieved by using indexes, which represent information about what is stored in the database. In the context of attention, indexes can be thought of as keys. So instead of running the query against values directly, the query is first executed on the indexes to retrieve where the relevant values or weights are stored. Lastly, these weights are run against the original values to retrieve data that is most relevant to the initial query.

**[00144]** FIG. 15 is a depiction 1500 of several attention heads in a Transformer block. We can see that the outputs of queries and keys dot products in different attention heads are differently colored. This depicts the capability of the multi-head attention to focus on different aspects of the input and aggregate the obtained information by multiplying the input with different attention weights.

**[00145]** Examples of attention calculation include scaled dot-product attention and additive attention. There are several reasons why scaled dot-product attention is used in the Transformers. Firstly, the scaled dot-product attention is relatively fast to compute, since its main parts are matrix operations that can be run on modern hardware accelerators. Secondly, it performs similarly well for smaller dimensions of the K matrix,  $dk$ , as the additive attention. For larger  $dk$ , the scaled dot-product attention performs a bit worse because dot products can cause the vanishing gradient problem. This is compensated via the scaling factor, which is defined as  $\sqrt{dk}$ .

**[00146]** As discussed above, the attention function takes as input three objects: key, value, and query. In the context of Transformers, these objects are matrices of shapes  $(n, d)$ , where  $n$  is the number of elements in the input sequence and  $d$  is the hidden representation of each element (also called the hidden vector). Attention is then computed as:

**[00147]** Attention  $(Q, K, V) = \text{SoftMax} \left( \frac{QK^T}{\sqrt{dk}} \right) V$ , where  $Q, K, V$  are computed as:

**[00148]**  $X \cdot W_Q, X \cdot W_K, X \cdot W_V$

**[00149]**  $X$  is the input matrix and  $W_Q, W_K, W_V$  are learned weights to project the input matrix into the representations. The dot products appearing in the attention function are exploited for their geometrical interpretation where higher values of their results mean that the inputs are more similar, *i.e.*, pointing in the geometrical space in the same direction. Since the attention function now works with matrices, the dot product becomes matrix multiplication. The SoftMax function is used to normalize the attention weights into the value of 1 prior to being multiplied by the values matrix. The resulting matrix is used either as input into another layer of attention or becomes the output of the Transformer.

## Multi-Head Attention

[00150] Transformers become even more powerful when multi-head attention is used. Queries, keys, and values are computed the same way as above, though they are now projected into  $h$  different representations of smaller dimensions using a set of  $h$  learned weights. Each representation is passed into a different scaled dot-product attention block called a head. The head then computes its output using the same procedure as described above.

[00151] Formally, the multi-head attention is defined as:

[00152]  $\text{MultiHeadAttention}(Q, K, V) = [\text{head}_1, \dots, \text{head}_h]W_0$  where  $\text{head}_i = \text{Attention}(QW_i^Q, KW_i^K, VW_i^V)$

[00153] The outputs of all heads are concatenated together and projected again using the learned weights matrix  $W_0$  to match the dimensions expected by the next block of heads or the output of the Transformer. Using the multi-head attention instead of the simpler scaled dot-product attention enables Transformers to jointly attend to information from different representation subspaces at different positions.

[00154] FIG. 16 is an illustration 1600 that shows how one can use multiple workers to compute the multi-head attention in parallel, as the respective heads compute their outputs independently of one another. Parallel processing is one of the advantages of Transformers over RNNs.

[00155] Assuming the naive matrix multiplication algorithm which has a complexity of:

[00156]  $a \cdot b \cdot c$

[00157] For matrices of shape  $(a, b)$  and  $(c, d)$ , to obtain values  $Q, K, V$ , we need to compute the operations:

[00158]  $X \cdot W_Q, X \cdot W_K, X \cdot W_V$

[00159] The matrix  $X$  is of shape  $(n, d)$  where  $n$  is the number of patches and  $d$  is the hidden

vector dimension. The weights  $W_Q$ ,  $W_K$ ,  $W_V$  are all of shape  $(d, d)$ . Omitting the constant factor 3, the resulting complexity is:

$$\text{[00160]} \quad n \cdot d^2$$

**[00161]** We can proceed to the estimation of the complexity of the attention function itself, *i.e.*, of  $\text{SoftMax}\left(\frac{QK^T}{\sqrt{dk}}\right)V$ . The matrices  $Q$  and  $K$  are both of shape  $(n, d)$ . The transposition operation does not influence the asymptotic complexity of computing the dot product of matrices of shapes  $(n, d) \cdot (d, n)$ , therefore its complexity is:

$$\text{[00162]} \quad n^2 \cdot d$$

**[00163]** Scaling by a constant factor of  $\sqrt{dk}$ , where  $dk$  is the dimension of the keys vector, as well as applying the SoftMax function, both have the complexity of  $a \cdot b$  for a matrix of shape  $(a, b)$ , hence they do not influence the asymptotic complexity. Lastly the dot product  $\text{SoftMax}\left(\frac{QK^T}{\sqrt{dk}}\right) \cdot V$  is between matrices of shapes  $(n, n)$  and  $(n, d)$  and so its complexity is:

$$\text{[00164]} \quad n^2 \cdot d$$

**[00165]** The final asymptotic complexity of scaled dot-product attention is obtained by summing the complexities of computing  $Q$ ,  $K$ ,  $V$ , and of the following attention function:

$$\text{[00166]} \quad n \cdot d^2 + n^2 \cdot d.$$

**[00167]** The asymptotic complexity of multi-head attention is the same since the original input matrix  $X$  is projected into  $h$  matrices of shapes  $(n, \frac{d}{h})$ , where  $h$  is the number of heads. From the point of view of asymptotic complexity,  $h$  is constant, therefore we would arrive at the same estimate of asymptotic complexity using a similar approach as for the scaled dot-product attention.

**[00168]** Transformer models often have the encoder-decoder architecture, although this is not necessarily the case. The encoder is built out of different encoder layers which are all constructed in the same way. The positional encodings are added to the embedding vectors. Afterward, self-attention is performed.

### **Encoder Block of Transformer**

**[00169]** FIG. 17 is a portrayal 1700 of one encoder layer of a Transformer network. Every self-attention layer is surrounded by a residual connection, summing up the output and input of the self-attention. This sum is normalized, and the normalized vectors are fed to a feed-forward layer. Every  $z$  vector is fed separately to this feed-forward layer. The feed-forward layer is wrapped in a residual connection and the outcome is normalized too. Often, numerous encoder layers are piled to form the encoder. The output of the encoder is a fixed-size vector for every element of the input sequence.

**[00170]** Just like the encoder, the decoder is built from different decoder layers. In the decoder, a modified version of self-attention takes place. The query vector is only compared to the keys of previous output sequence elements. The elements further in the sequence are not known yet, as they still must be predicted. No information about these output elements may be used.

### **Encoder-Decoder Blocks of Transformer**

**[00171]** FIG. 18 shows a schematic overview 1800 of a Transformer model. Next to a self-attention layer, a layer of encoder-decoder attention is present in the decoder, in which the decoder can examine the last  $Z$  vectors of the encoder, providing fluent information transmission. The ultimate decoder layer is a feed-forward layer. All layers are packed in a residual connection. This allows the decoder to examine all previously predicted outputs and all encoded input vectors to predict the next output. Thus, information from the encoder is provided to the decoder, which could improve the predictive capacity. The output vectors of the last decoder layer need to be processed to form the output of the entire system. This is done by a combination of a feed-forward layer and a SoftMax function. The output corresponding to the highest probability is the predicted output value for a subject time step.

**[00172]** For some tasks other than translation, only an encoder is needed. This is true for both document classification and name entity recognition. In these cases, the encoded input vectors are the input of the feed-forward layer and the SoftMax layer. Transformer models have been extensively applied in different NLP fields, such as translation, document summarization, speech recognition, and named entity recognition. These models have applications in the field of biology as well for predicting protein structure and function and labeling DNA sequences.

### **Vision Transformer**

**[00173]** There are extensive applications of transformers in vision including popular recognition tasks (*e.g.*, image classification, object detection, action recognition, and segmentation), generative modeling, multi-modal tasks (*e.g.*, visual-question answering, visual reasoning, and visual grounding), video processing (*e.g.*, activity recognition, video forecasting), low-level vision (*e.g.*, image super-resolution, image enhancement, and colorization) and 3D analysis (*e.g.*, point cloud classification and segmentation).

**[00174]** FIG. 19 is a depiction 1900 of a Vision Transformer (ViT). FIG. 20 illustrates a processing flow 2000 of the Vision Transformer (ViT). Transformers were originally developed for NLP and worked with sequences of words. In image classification, we often have a single input image in which the pixels are in a sequence. To reduce the computation required, Vision Transformers (ViTs) cut the input image into a set of fixed-sized patches of pixels. The patches are often 16 x 16 pixels. They are treated much like words in NLP Transformers. ViTs are depicted in FIGs. 19 and 20. Unfortunately, important positional information is lost because image sets are position-invariant. This problem is solved by adding a learned positional encoding into the image patches.

**[00175]** The computations of the ViT architecture can be summarized as follows. The first layer of a ViT extracts a fixed number of patches from an input image (FIG. 19). The patches are then projected to linear embeddings. A special class token vector is added to the sequence of embedding vectors to include all representative information of all tokens through the multi-layer encoding procedure. The class vector is unique to each image. Vectors containing positional information are combined with the embeddings and the class token. The sequence of embedding



vectors is passed into the Transformer blocks. The class token vector is extracted from the output of the last Transformer block and is passed into a multilayer perceptron (MLP) head whose output is the final classification. The perceptron takes the normalized input and places the output in categories. It classifies the images. FIG. 21 shows example software code 2100 that implements a Transformer block. This procedure directly translates into the Python Keras code shown in FIG. 21.

**[00176]** When the input image is split into patches, a fixed patch size is specified before instantiating a ViT. Given the quadratic complexity of attention, patch size has a large effect on the length of training and inference time. A single Transformer block comprises several layers. The first layer implements Layer Normalization, followed by the multi-head attention that is responsible for the performance of ViTs. In the depiction of a Transformer block in FIG. 19, we can see two arrows. These are residual skip connections. Including skip connection data can simplify the output and improve the results. The output of the multi-head attention is followed again by Layer Normalization. And finally, the output layer is an MLP (Multi-Layer Perceptron) with the GELU (Gaussian Error Linear Unit) activation function.

**[00177]** ViTs can be pretrained and fine-tuned. Pretraining is generally done on a large dataset. Fine-tuning is done on a domain specific dataset.

**[00178]** Domain-specific architectures, like convolutional neural networks (CNNs) or long short-term memory networks (LSTMs), have been derived from the usual architecture of MLPs and suffer from so-called inductive biases that predispose the networks towards a certain output. ViTs stepped in the opposite direction of CNNs and LSTMs and became more general architectures by eliminating inductive biases. A ViT can be seen as a generalization of MLPs because MLPs, after being trained, do not change their weights for different inputs. On the other hand, ViTs compute their attention weights at runtime based on the particular input.

[0001] What is claimed is:

**CLAIMS**

1. A multi-turn conversational system, comprising:  
a first large language model-based conversation interface configured to execute multiple turns of human-like conversation with a user, wherein the first large language model-based conversation interface is trained with over one thousand gradient update iterations; and  
a control logic, in communication with the first large language model-based conversation interface, and configured to generate one or more control signals based on evaluating multiple turns of upstream human-like conversation between the first large language model-based conversation interface and the user, wherein the control signals contribute in part to construction of multiple turns of downstream human-like conversation between the first large language model-based conversation interface and the user.
2. The multi-turn conversational system of claim 1, wherein the control logic comprises a trigger detection logic, a question insertion logic, and an answer classification logic.
3. The multi-turn conversational system of claim 2, wherein the trigger detection logic is a second large language model, and wherein the answer classification logic is a third large language model.
4. The multi-turn conversational system of claim 2, wherein the trigger detection logic is configured to evaluate the multiple turns of upstream human-like conversation and detect trigger exchanges in the multiple turns of upstream human-like conversation that require invoking the question insertion logic.
5. The multi-turn conversational system of claim 4, wherein the question insertion logic is configured to select one or more questions that correspond to the detected trigger exchanges,

and to cause the first large language model-based conversation interface to use the selected questions to construct the multiple turns of downstream human-like conversation.

6. The multi-turn conversational system of claim 5, wherein the selected questions are the control signals.

7. The multi-turn conversational system of claim 5, wherein the first large language model-based conversation interface is further configured to pose to the user the selected questions, to receive from the user answers to the selected questions, and to transmit the received answers to the answer classification logic.

8. The multi-turn conversational system of claim 7, wherein the answer classification logic is configured to analyze the received answers and classify the received answers to at least one answer category in a plurality of answer categories, and to generate the control signals based on the classification.

9. The multi-turn conversational system of claim 8, wherein the control signals, generated in response to the answer classification logic classifying the received answers to a first kickout category, cause the first large language model-based conversation interface to end the human-like conversation with the user.

10. The multi-turn conversational system of claim 1, wherein the first large language model-based conversation interface emulates a human healthcare professional, wherein the user is a human, and wherein the human-like conversation is a healthcare conversation.

11. The multi-turn conversational system of claim 10, wherein the trigger exchanges include symptom descriptors that identify one or more symptoms.

12. The multi-turn conversational system of claim 11, wherein the selected questions are medical condition queries that probe at least one symptom mentioned by the human and identified by at least one symptom descriptor associated with the detected trigger exchanges.

13. The multi-turn conversational system of claim 12, wherein the received answers identify one or more medical conditions associated with the symptom and experienced by the human.

14. The multi-turn conversational system of claim 13, wherein the answer classification logic is further configured to classify the received answers and generate the control signals based on severity of the identified medical conditions.

15. The multi-turn conversational system of claim 14, wherein the control signals, generated in response to the answer classification logic classifying the received answers to a second kickout category, cause the first large language model-based conversation interface to connect the user with a human healthcare professional.

16. The multi-turn conversational system of claim 15, wherein the control signals, generated in response to the answer classification logic classifying the received answers to a third kickout category, cause the first large language model-based conversation interface to schedule a healthcare appointment of the user with a human healthcare professional.

17. The multi-turn conversational system of claim 1, wherein the human-like conversation is text-based.

18. The multi-turn conversational system of claim 1, wherein the human-like conversation is audio-based.

19. A multi-turn conversational system, comprising:  
a conversation interface configured to execute multiple turns of human-like conversation with a user; and  
a control logic, in communication with the conversation interface, and configured to generate one or more control signals based on evaluating multiple turns of upstream human-like conversation between the conversation interface and the user.

20. The multi-turn conversational system of claim 19, wherein the control signals contribute in part to construction of multiple turns of downstream human-like conversation between the conversation interface and the user.

**LOW-LATENCY CONVERSATIONAL ARTIFICIAL INTELLIGENCE (AI)  
ARCHITECTURE WITH A PARALLELIZED IN-DEPTH ANALYSIS FEEDBACK  
LOOP**

**ABSTRACT OF THE DISCLOSURE**

In some aspects, a multi-turn conversational system includes: an artificial intelligence to provide a conversation interface configured to execute multiple turns of human-like conversation with a user and a control logic, in communication with the conversation interface, and configured to generate one or more control signals based on evaluating multiple turns of upstream human-like conversation between the conversation interface and the user. The control signals contribute in part to construction of multiple turns of downstream human-like conversation between the conversation interface and the user.

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Low-Latency Conversational Artificial Intelligence (Ai) Architecture With A Parallelized In-Depth Analysis Feedback Loop

### Application Information

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### Documents

**TOTAL DOCUMENTS: 7**

| DOCUMENT                                                         | PAGES | DESCRIPTION                               | SIZE<br>(KB) |
|------------------------------------------------------------------|-------|-------------------------------------------|--------------|
| 2024-02-27_ADS_HPAI1000USN01.pdf                                 | 11    | Application Data Sheet                    | 2224 KB      |
| Executed-Formals_HPAI1000USN01.pdf                               | 6     | Oath or Declaration filed                 | 431 KB       |
| 2024-02-27_Track-One-Non-Provisional_HPAI1000USN01-APP.TEXT.docx | 56    | Application body structured text document | 110 KB       |

Warning: Dynamic dates have been converted to static dates. Bookmarks were found and have been removed.

|                                       |   |                   |        |
|---------------------------------------|---|-------------------|--------|
| 2024-02-27_POA-82AB_HPAI1000USN01.pdf | 2 | Power of Attorney | 280 KB |
|---------------------------------------|---|-------------------|--------|

**OSSI Ex. 1018**

|                                                        |    |                                             |         |
|--------------------------------------------------------|----|---------------------------------------------|---------|
| 2024-02-27_Track-One-Non-Provisional_HPAI1000USN01.pdf | 56 | Auxiliary PDF of Application                | 786 KB  |
| 2024-02-27_Non-Provisional-Drawings_HPAI1000USN01.pdf  | 21 | Drawings-only black and white line drawings | 2576 KB |
| 2024-02-27_Trackone-Request-SB-434_HPAI1000USN01.pdf   | 2  | Track One Request                           | 137 KB  |

## Digest

| DOCUMENT                                                         | MESSAGE DIGEST(SHA-512)                                                                                                           |
|------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| 2024-02-27_ADS_HPAI1000USN01.pdf                                 | 4AAFB8923FCB29EB4DE914C7AEC9AB86F569B0180B2C5FA9A20689C9D88AD6FF298BF170E83790E44DD164F8BC2BC29DAC4D7542E50114157016F1220F1FC4F9  |
| Executed-Formals_HPAI1000USN01.pdf                               | 0D29ABD911DBBC48A8595ABF47BFC82EBBA88583A7C967C6CB5265A501D0904E5F17ED99D8040EA603CA032EA5AD4FCA07D85F8D5077833D68B8CBD97916AB5E  |
| 2024-02-27_Track-One-Non-Provisional_HPAI1000USN01-APP.TEXT.docx | E70CABF5DD20CB3A00ED830F8555C120B9860C5243C8DF63CEBC5F9DF4EB7E0ADAEBBC3D5EB99AE0EEB4072F40B273891FEF70A0FAA67D811C4ADCBE3DFB0A9C5 |
| 2024-02-27_POA-82AB_HPAI1000USN01.pdf                            | 0DD035AC0DE5E03C3654328535DBC20D238B93385C23BBB40B1F7259109DE53CD76705863F5FD5C1A03251CE2DF50ACD5F495866600767D5326FADFA938ABCE6  |
| 2024-02-27_Track-One-Non-Provisional_HPAI1000USN01.pdf           | 74AEDCF528E302F6847A5F22B5B03034C7AB8C3B07AB382A9F15809D39D41DB0C367D4A21131B15F3D38F88C78BFEAE16A643C387EF73FE1C8229D64CD36EBE2  |
| 2024-02-27_Non-Provisional-Drawings_HPAI1000USN01.pdf            | 1E20B7FDF45A3CE76E1B1FA8FF504125EFF8E32BD29D463907E2DF9F01A842750552DA4AC7DB3F516AFCF5EBD4D9E54108C4551EF1B803086BFFD9D9283F80F4  |
| 2024-02-27_Trackone-Request-SB-434_HPAI1000USN01.pdf             | FB1775D0BCFD0DF119438777CCB165A19025DB393C06070DA5F1F5098DD881B3D16D61EEFB265CFA9DB1F0D426CCC16A82470807E93567B17306D52560067C04  |

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**National Stage of an International Application under 35 U.S.C. 371**

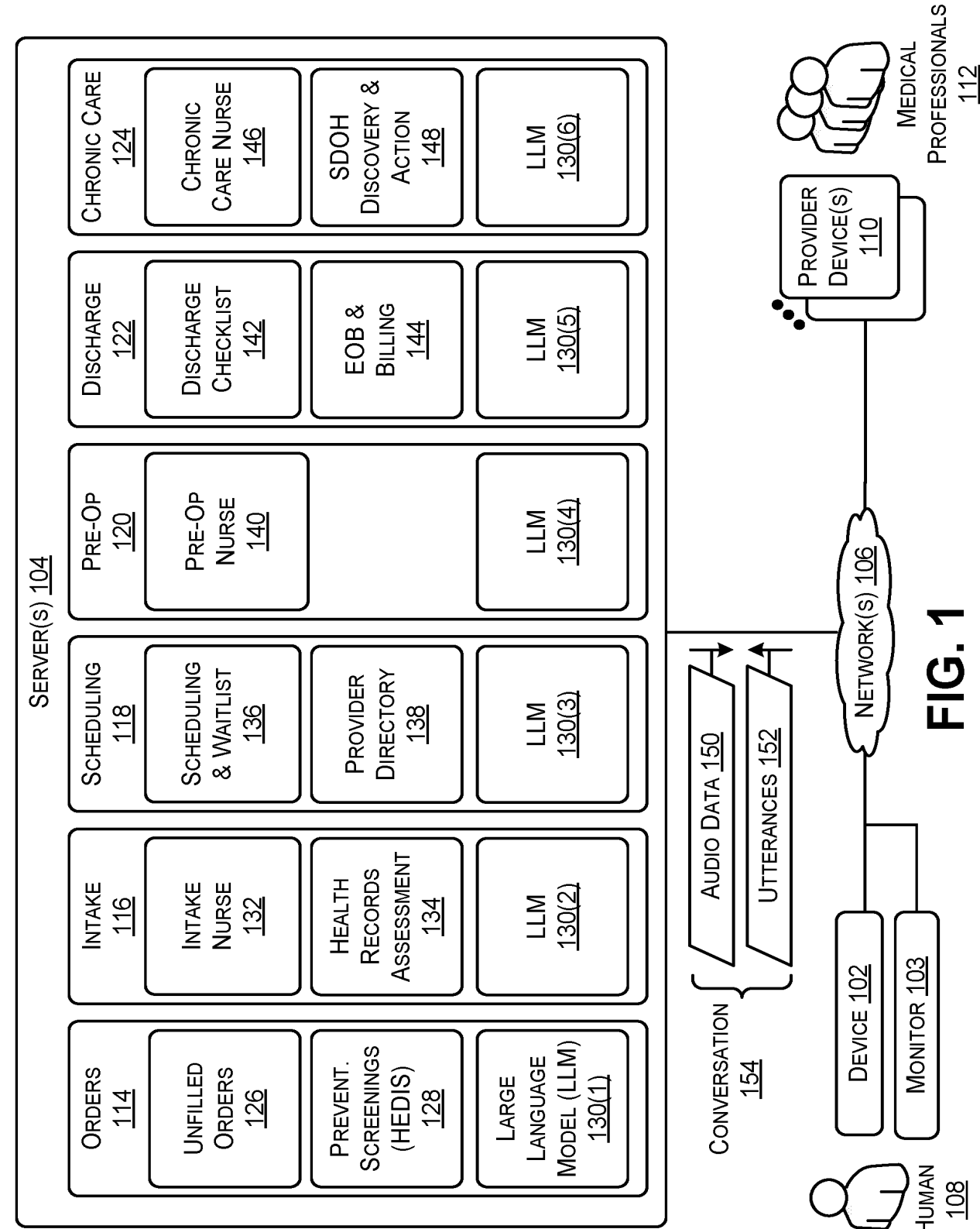
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If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

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200

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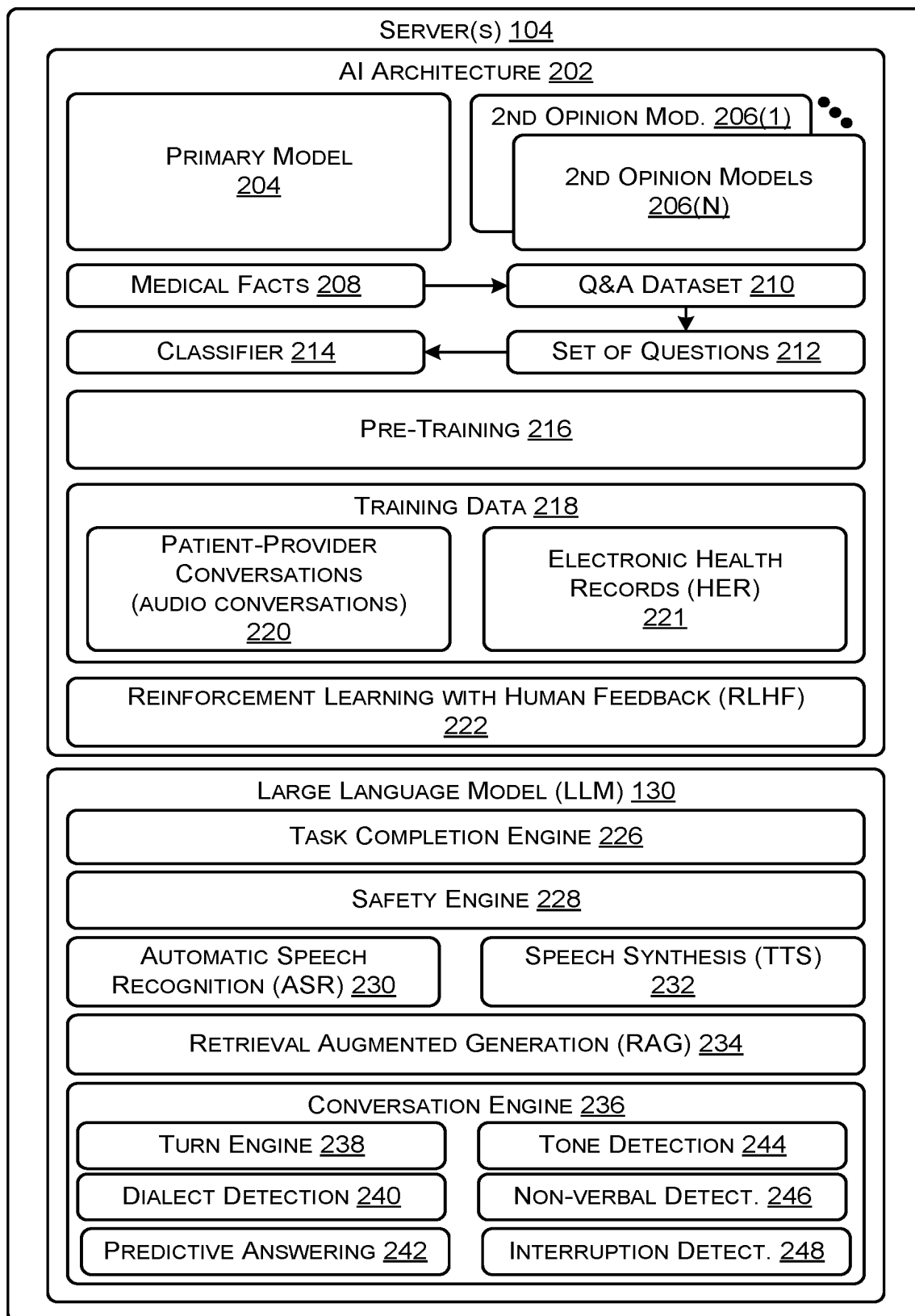
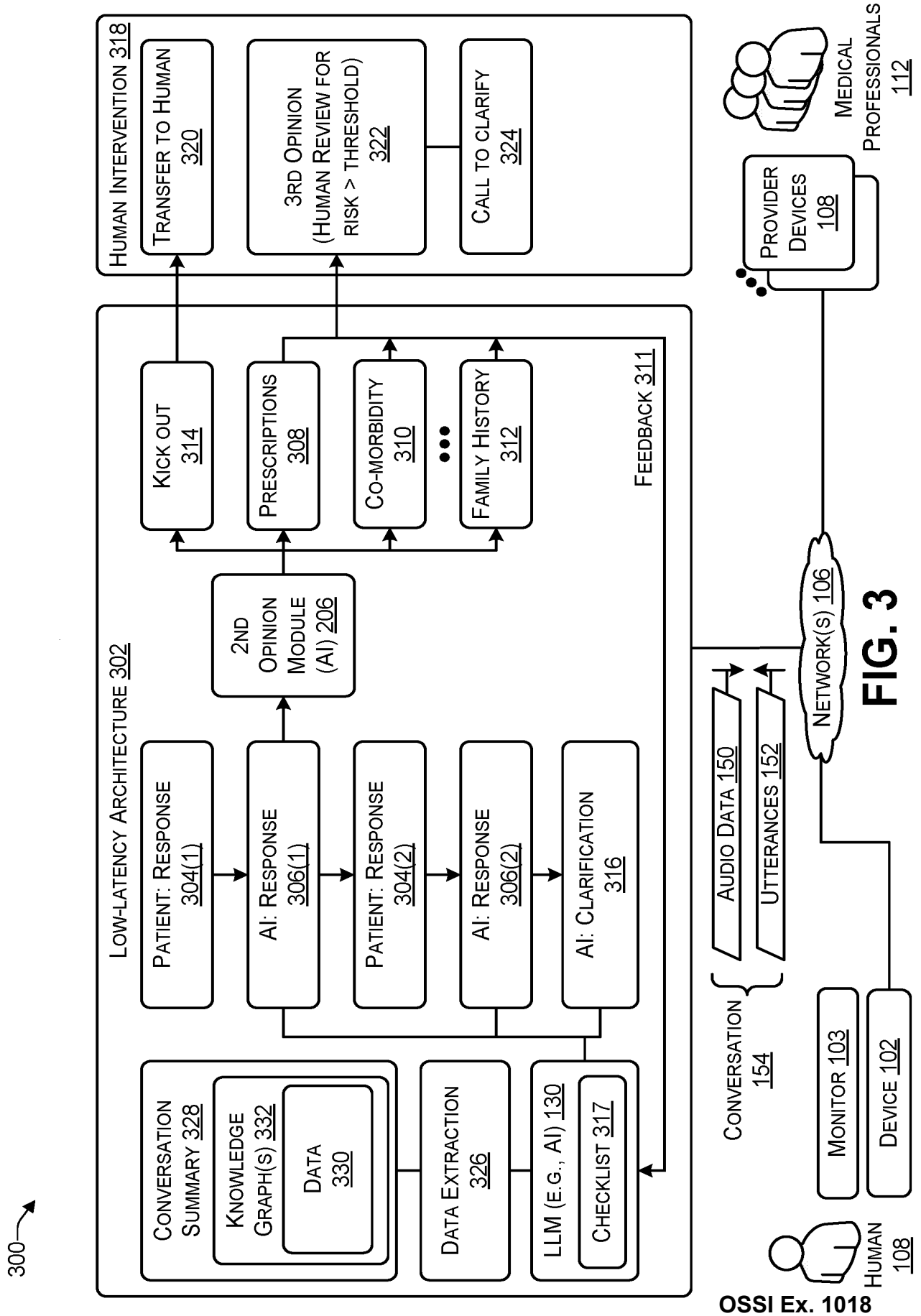


FIG. 2

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400 →

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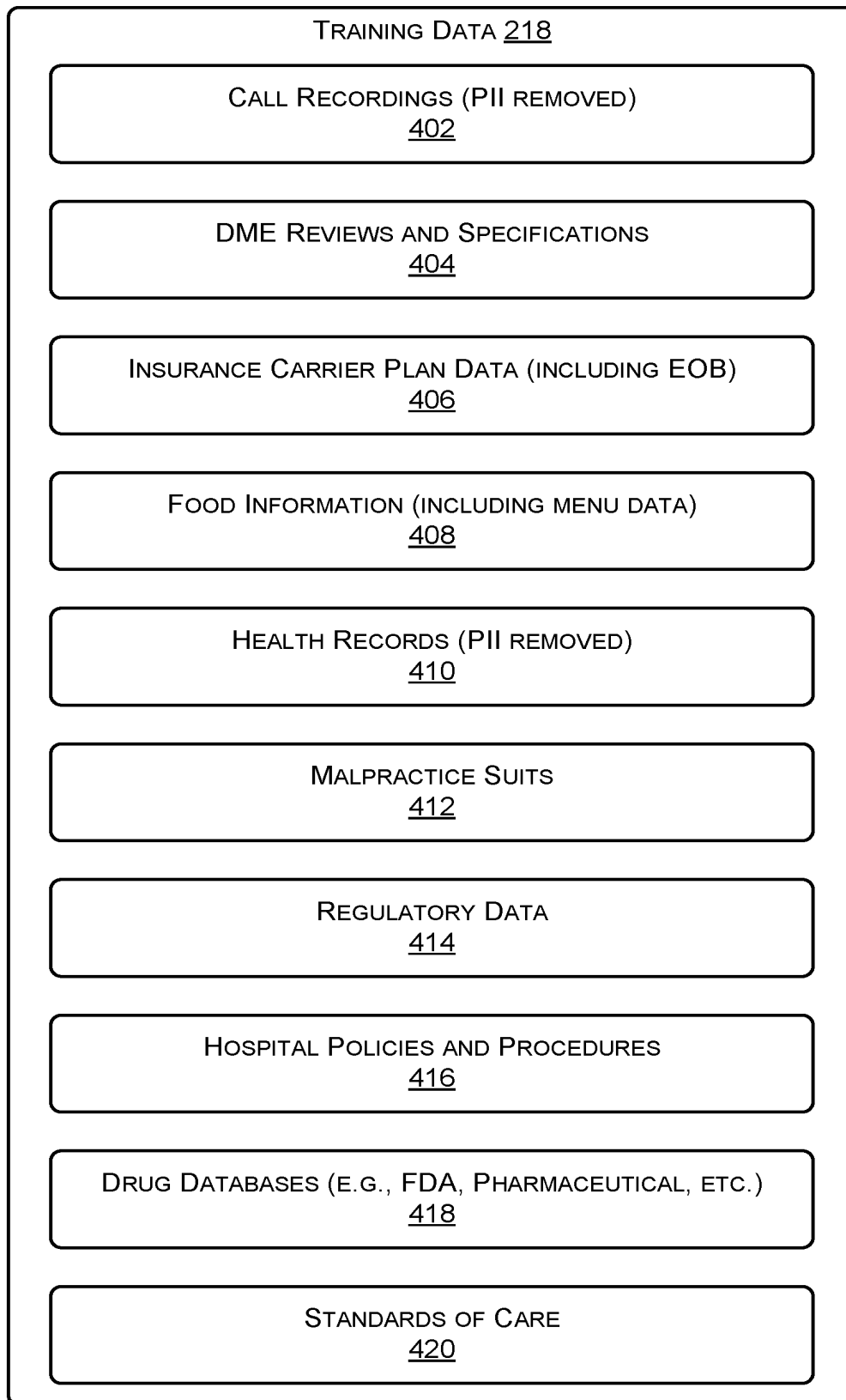


**FIG. 4**

500 ↘

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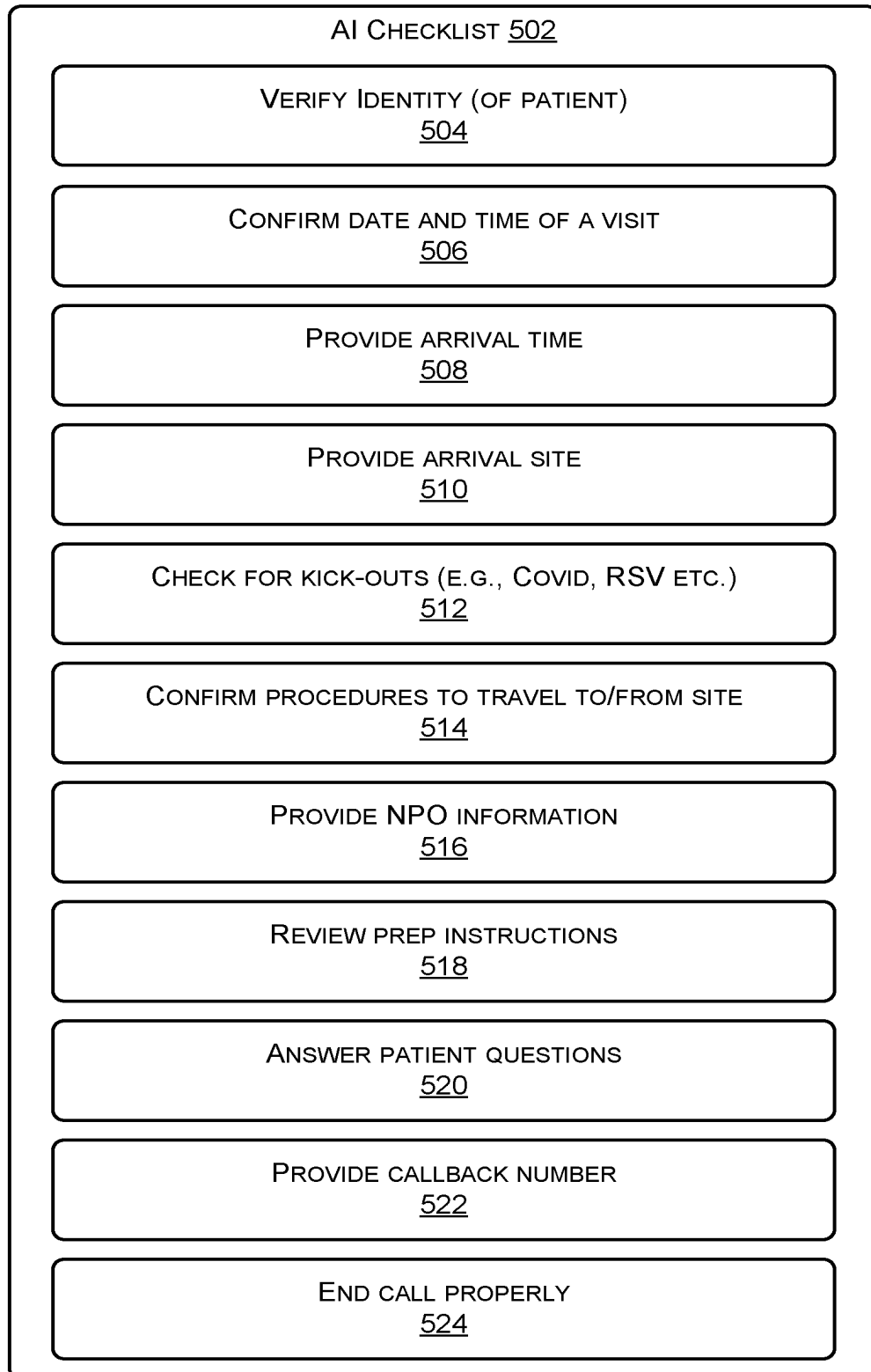


**FIG. 5**

600 →

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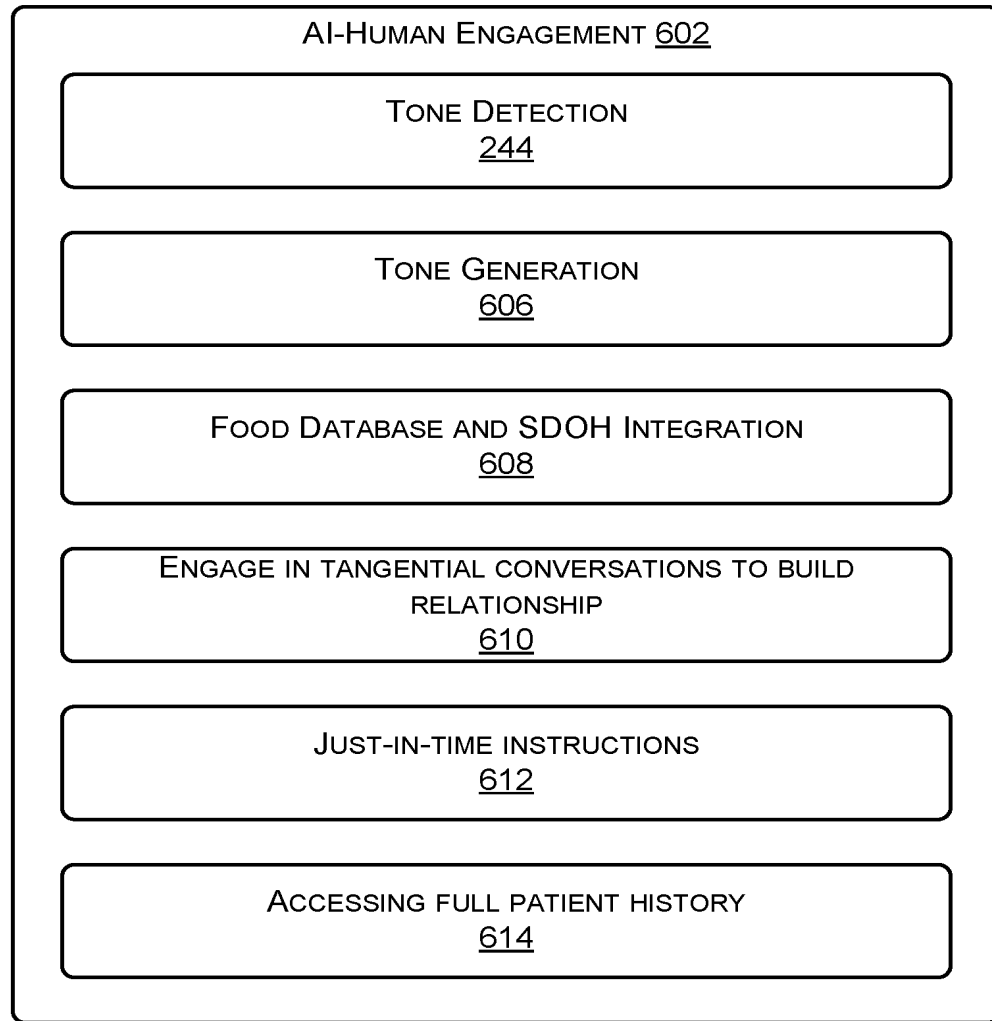


**FIG. 6**

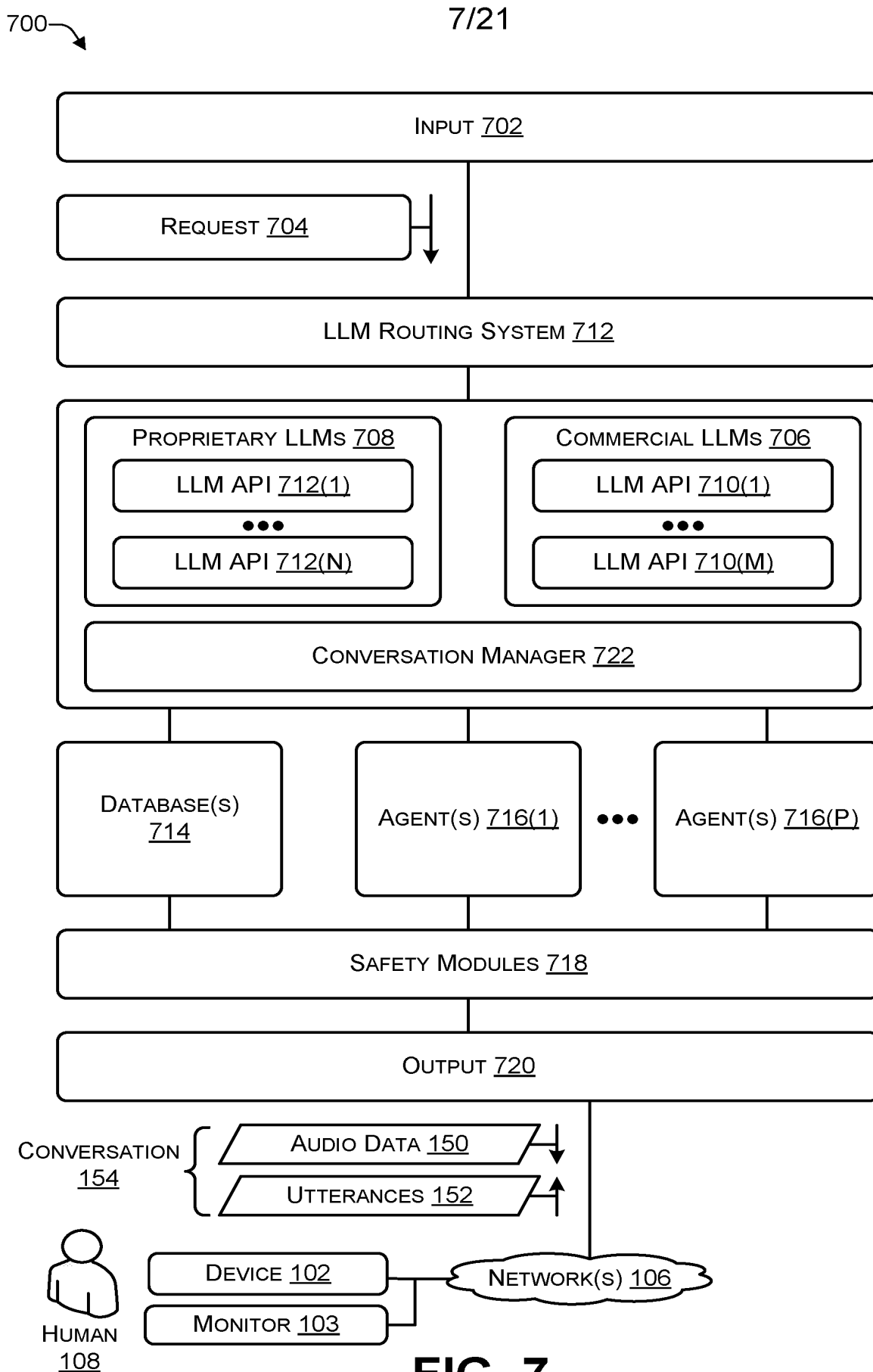


FIG. 7



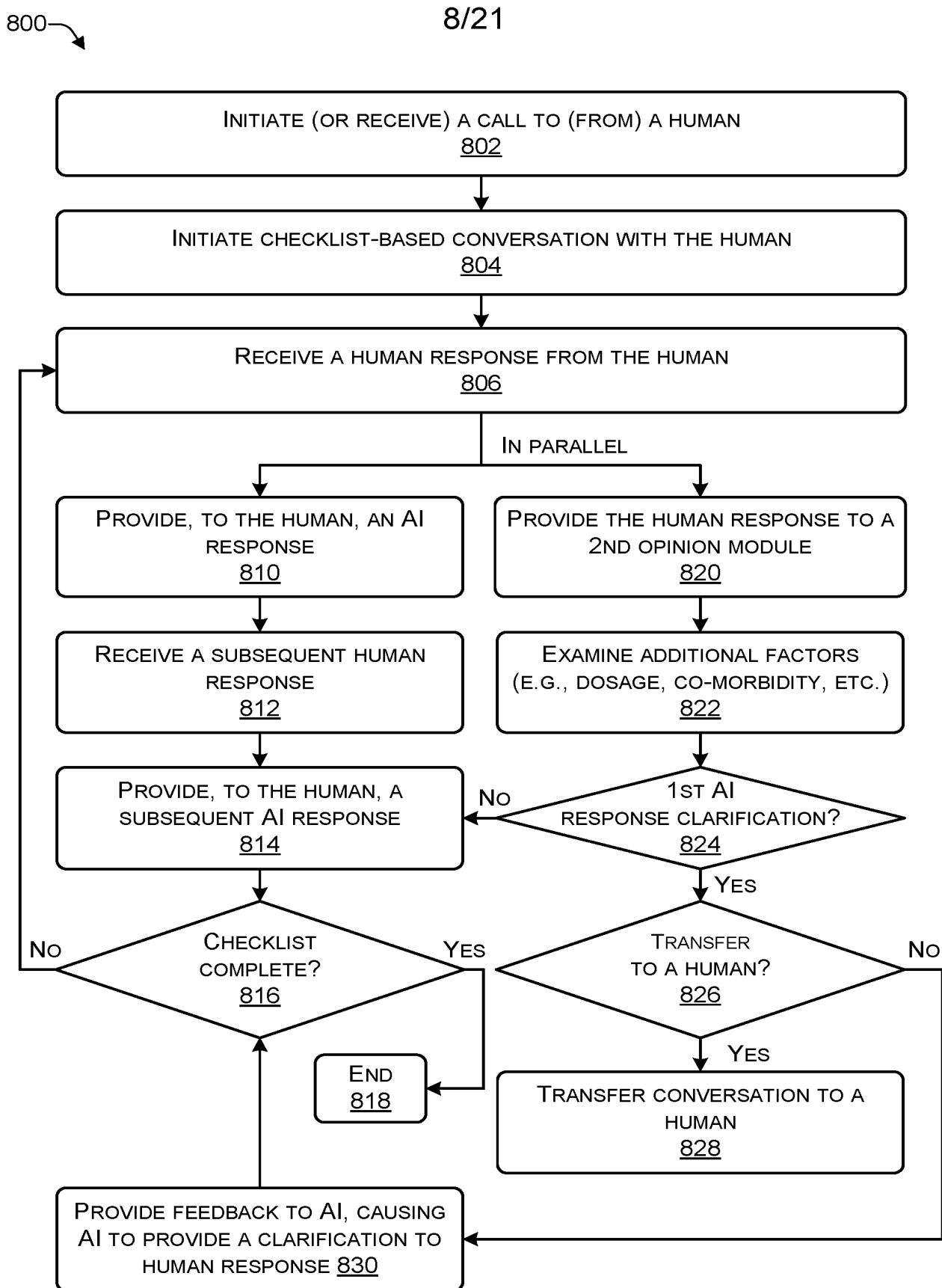


FIG. 8

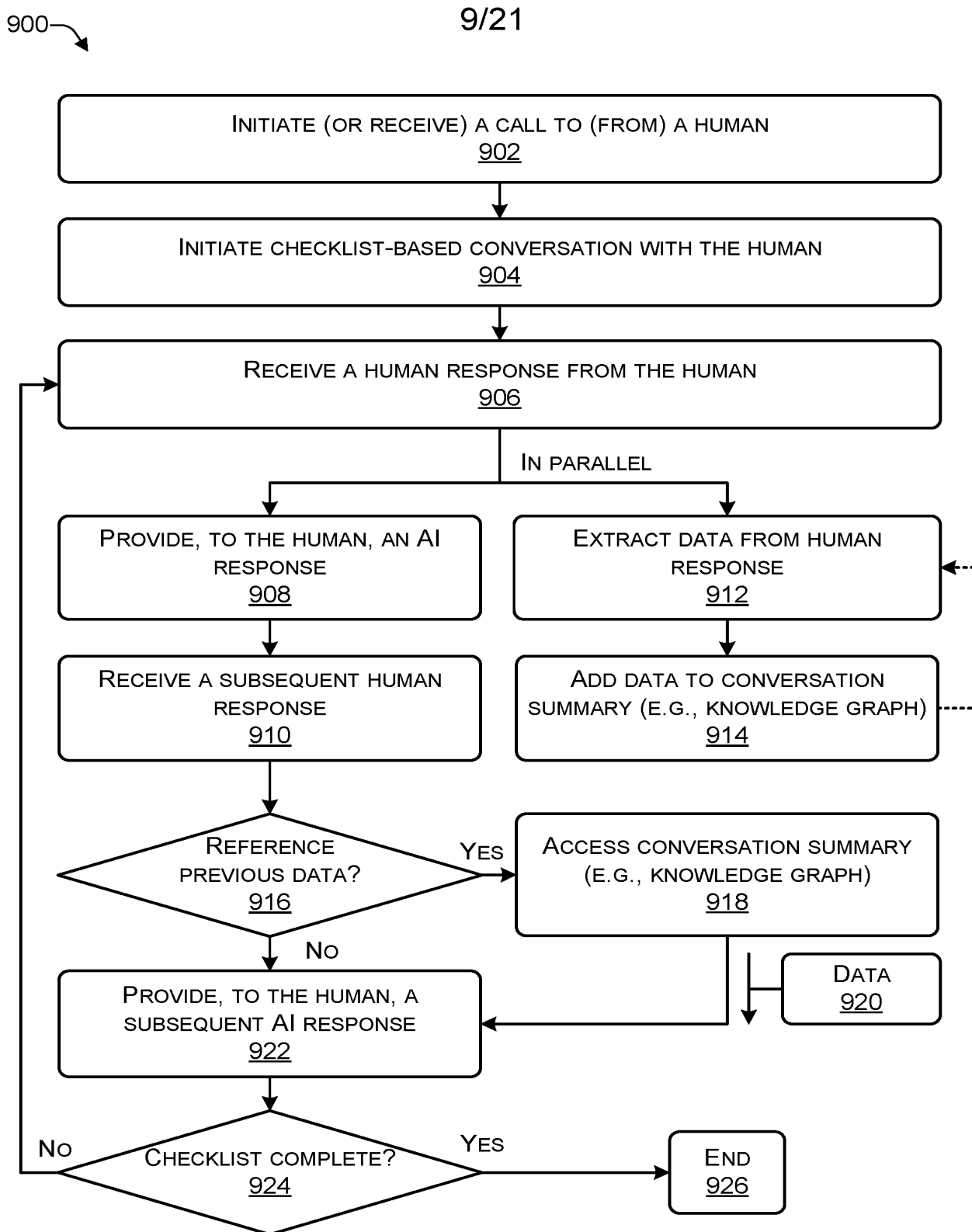
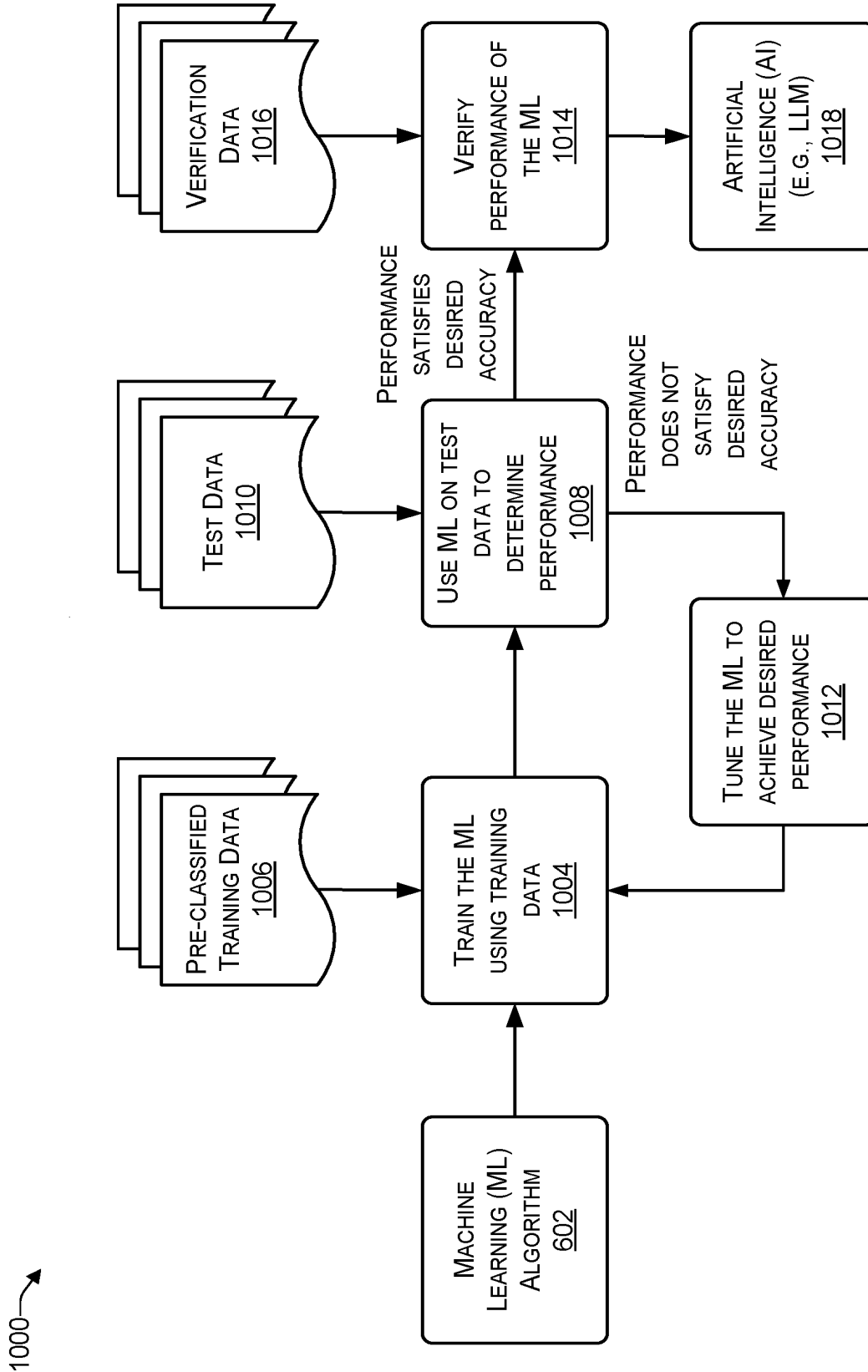
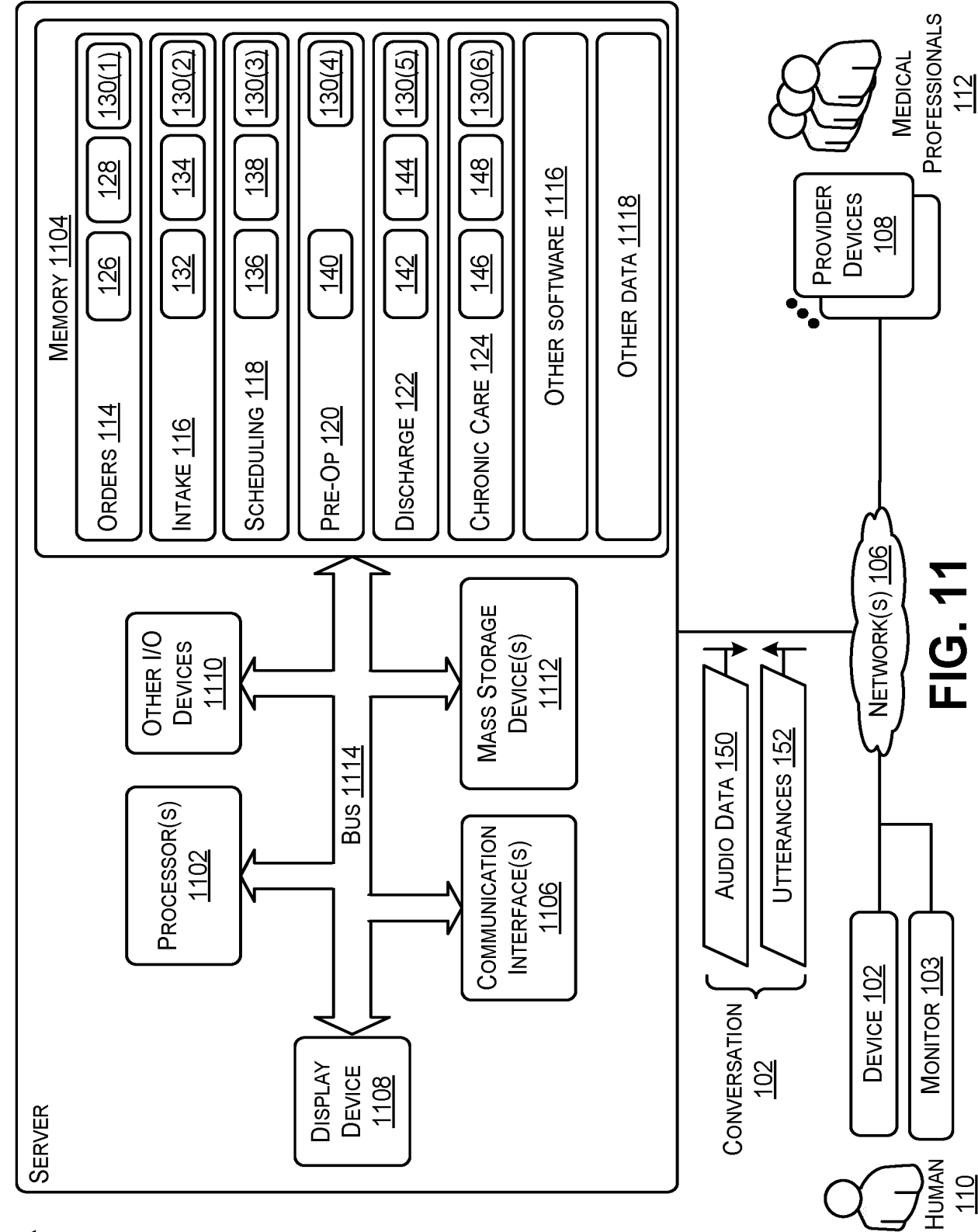


FIG. 9

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1200

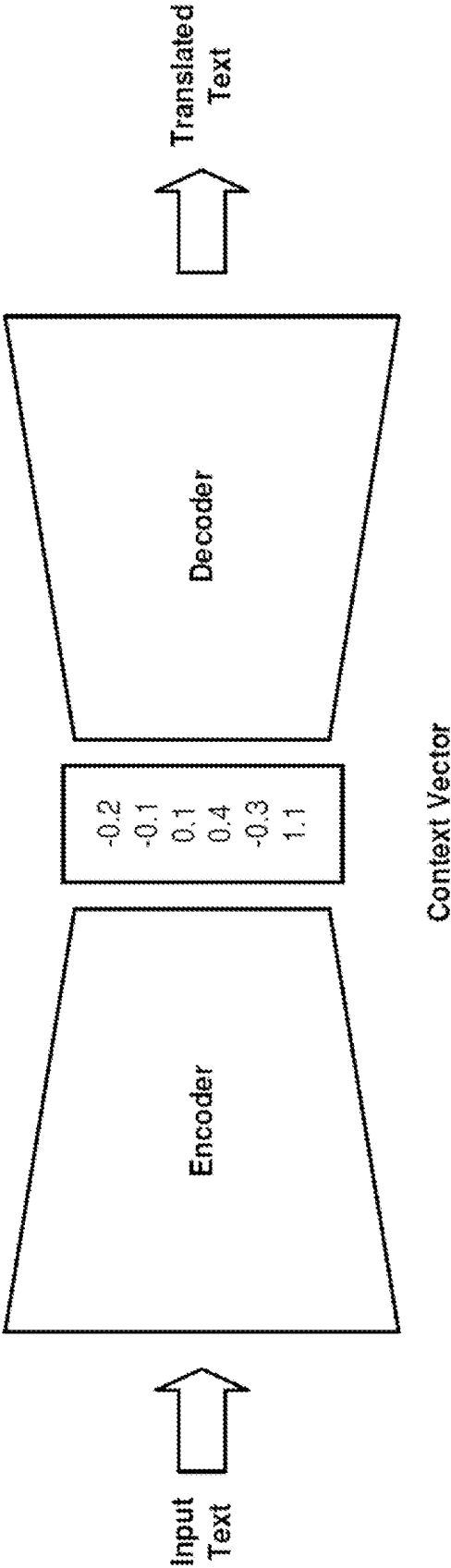


FIG. 12

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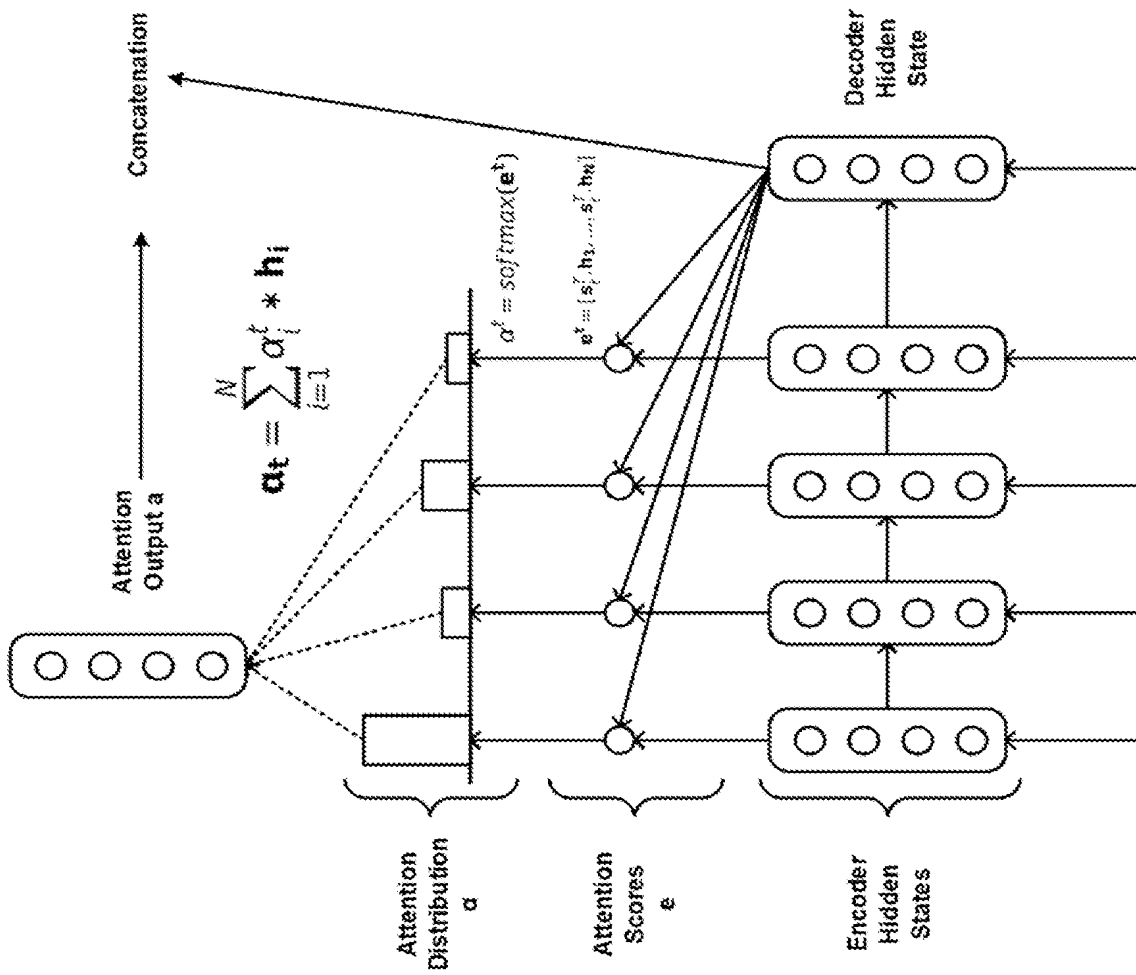


FIG. 13

1300

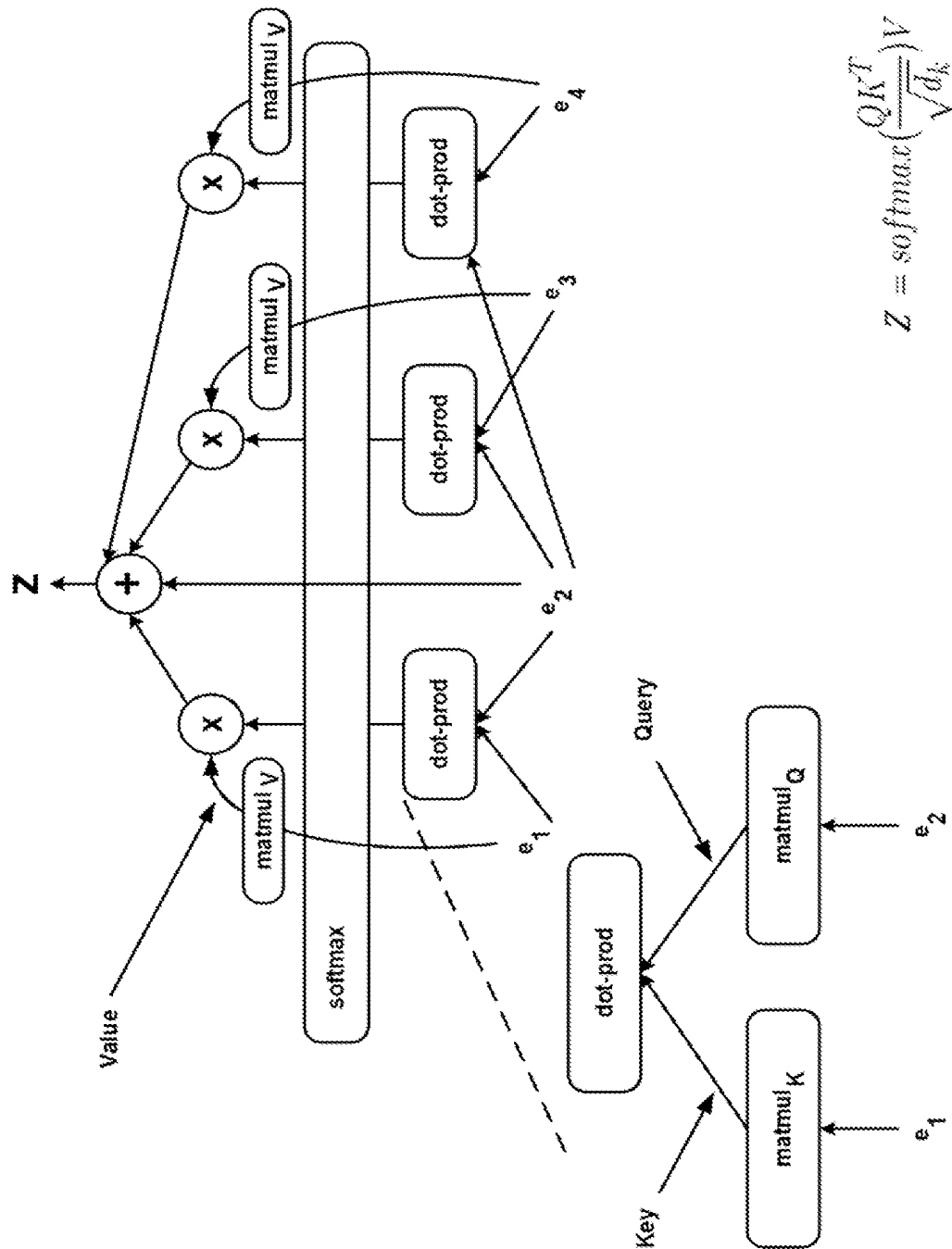


**FIG. 14**

$$\mathbf{Z} = \text{softmax}(\frac{\mathbf{Q}\mathbf{K}^T}{\sqrt{d_k}})\mathbf{V}$$

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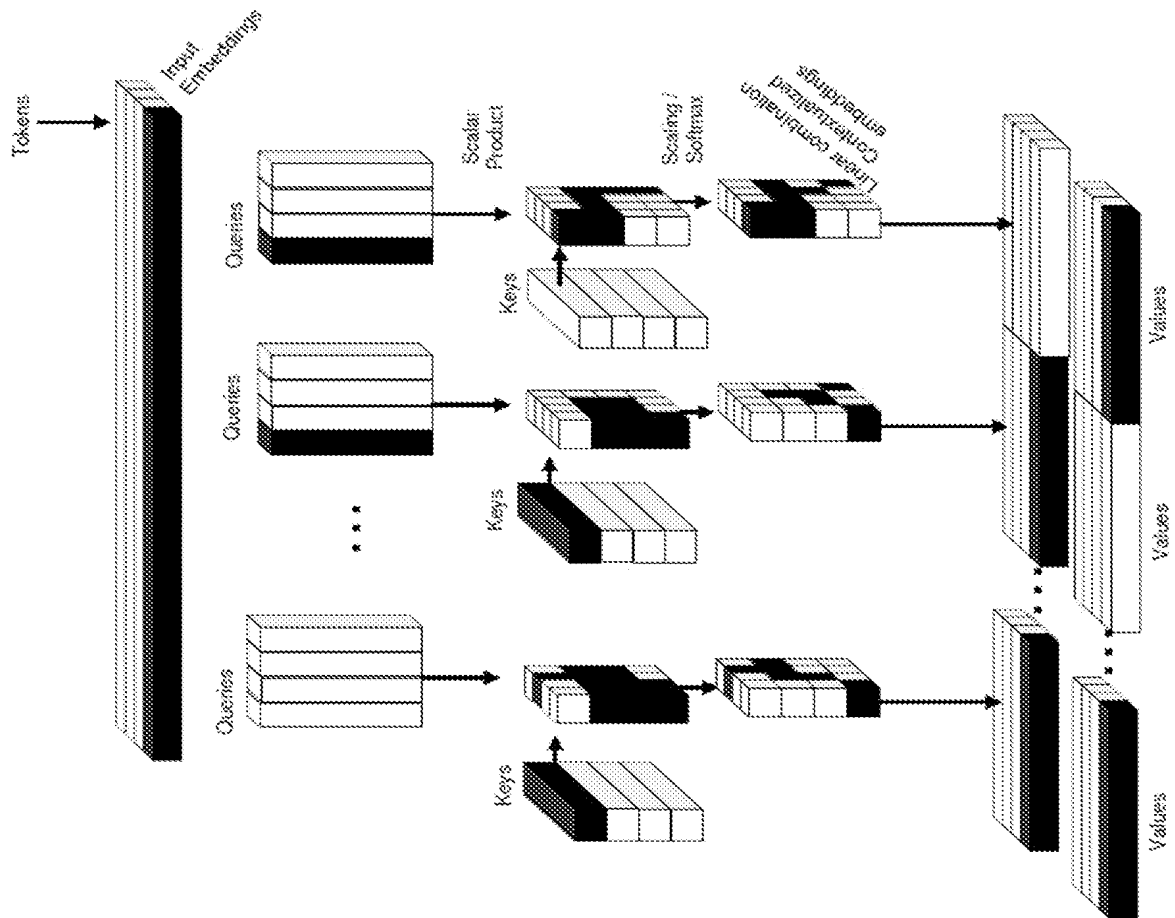


FIG. 15

1500



1600 →

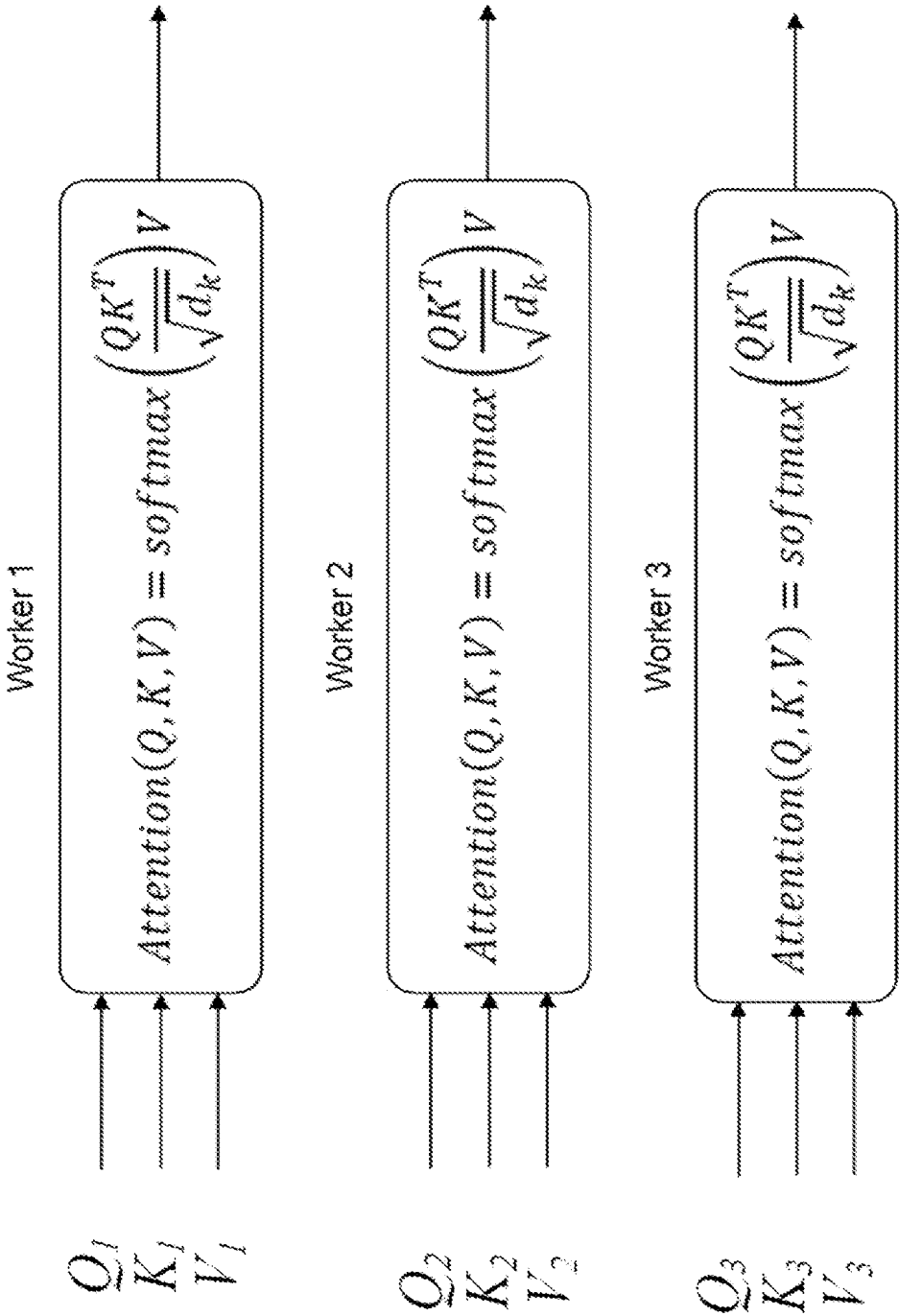


FIG. 16

1700

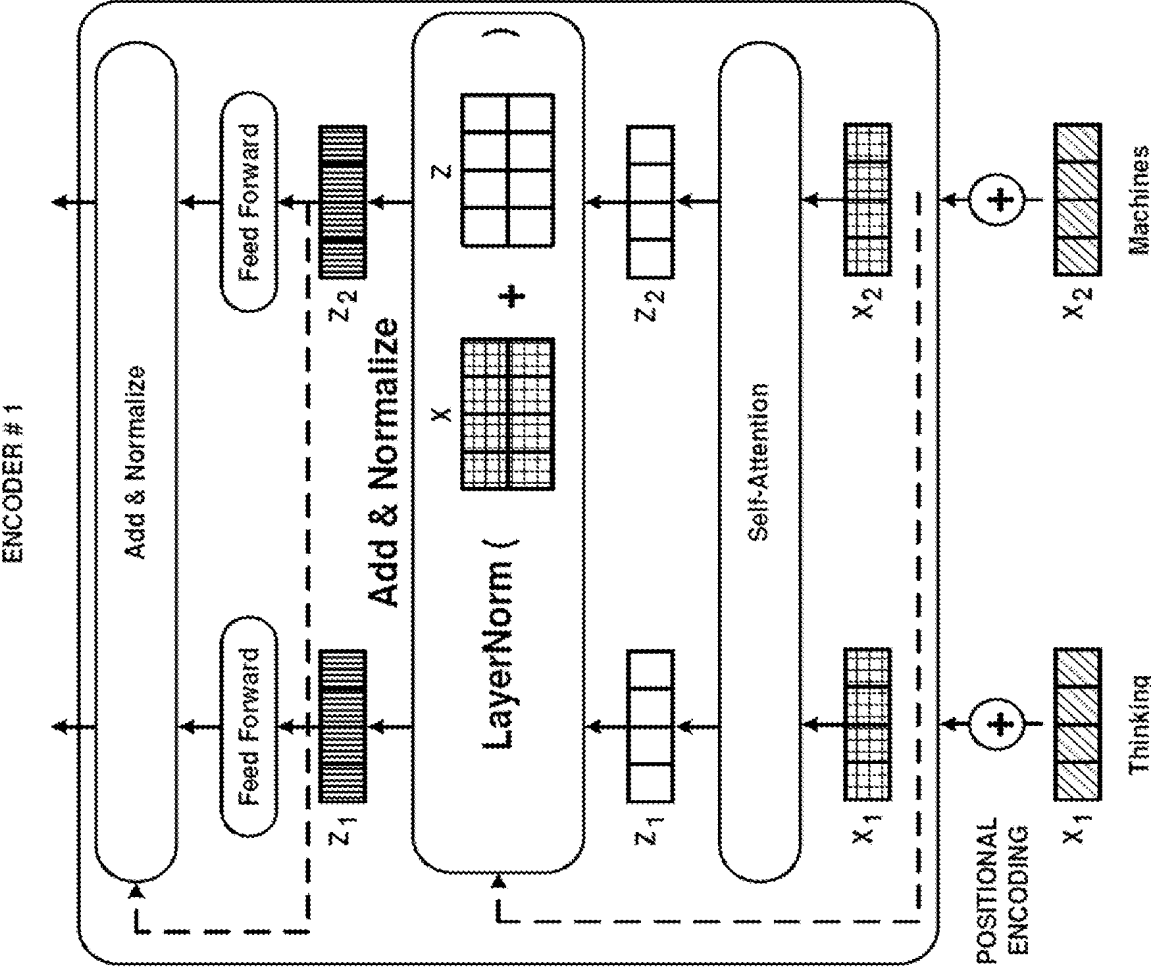


FIG. 17

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1800

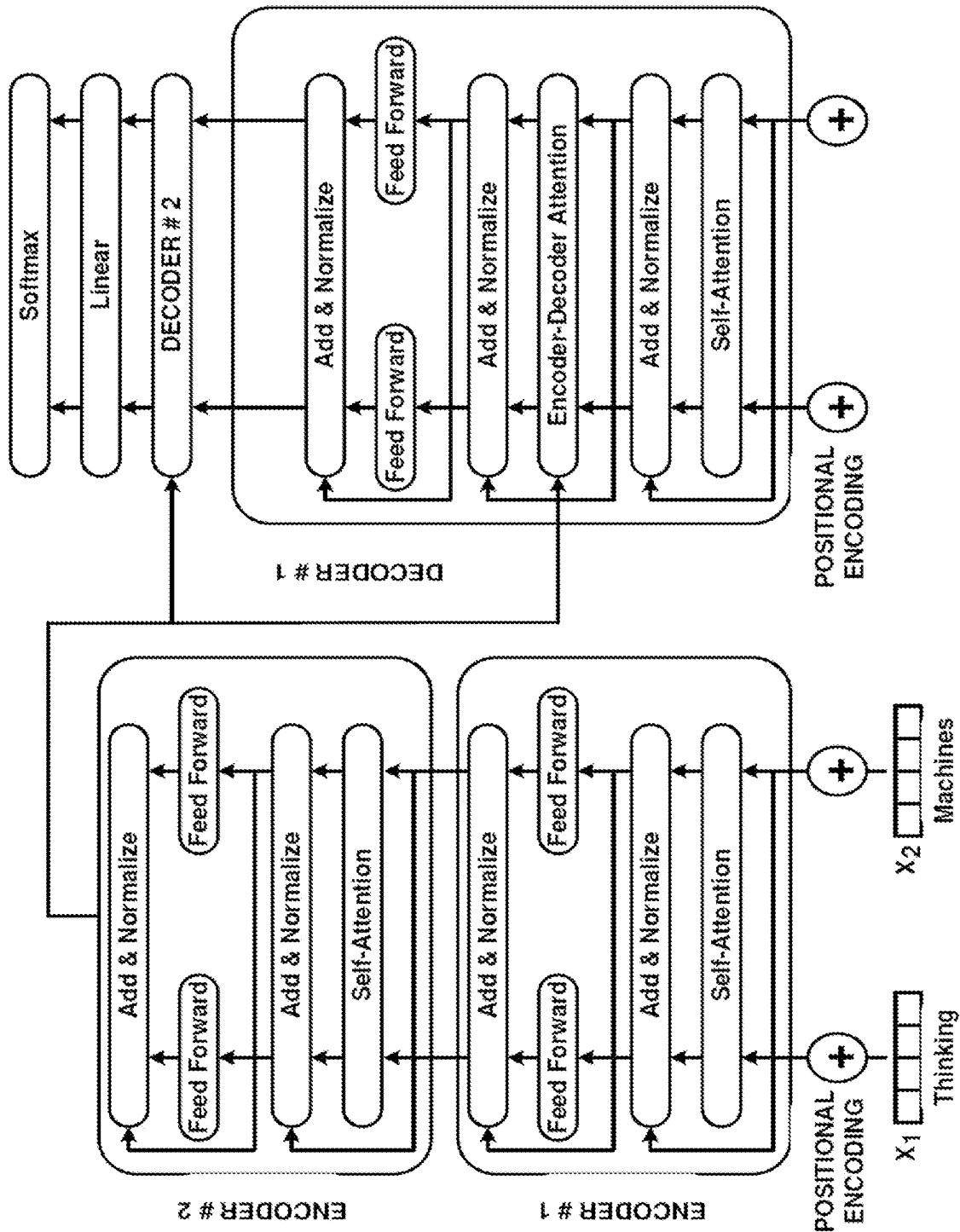
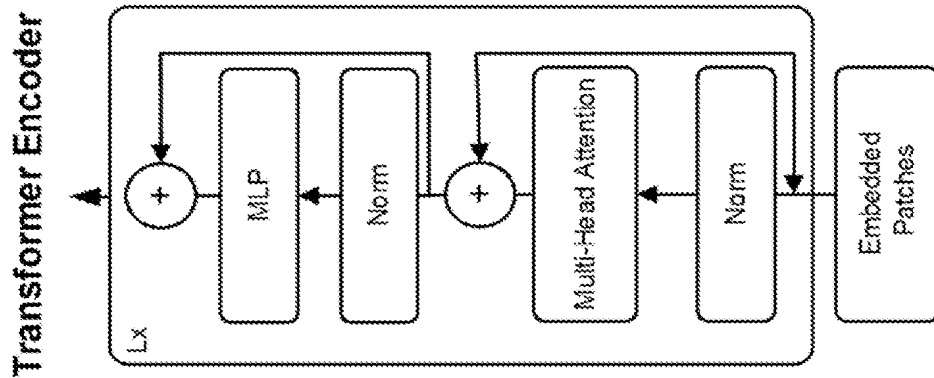


FIG. 18

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-----

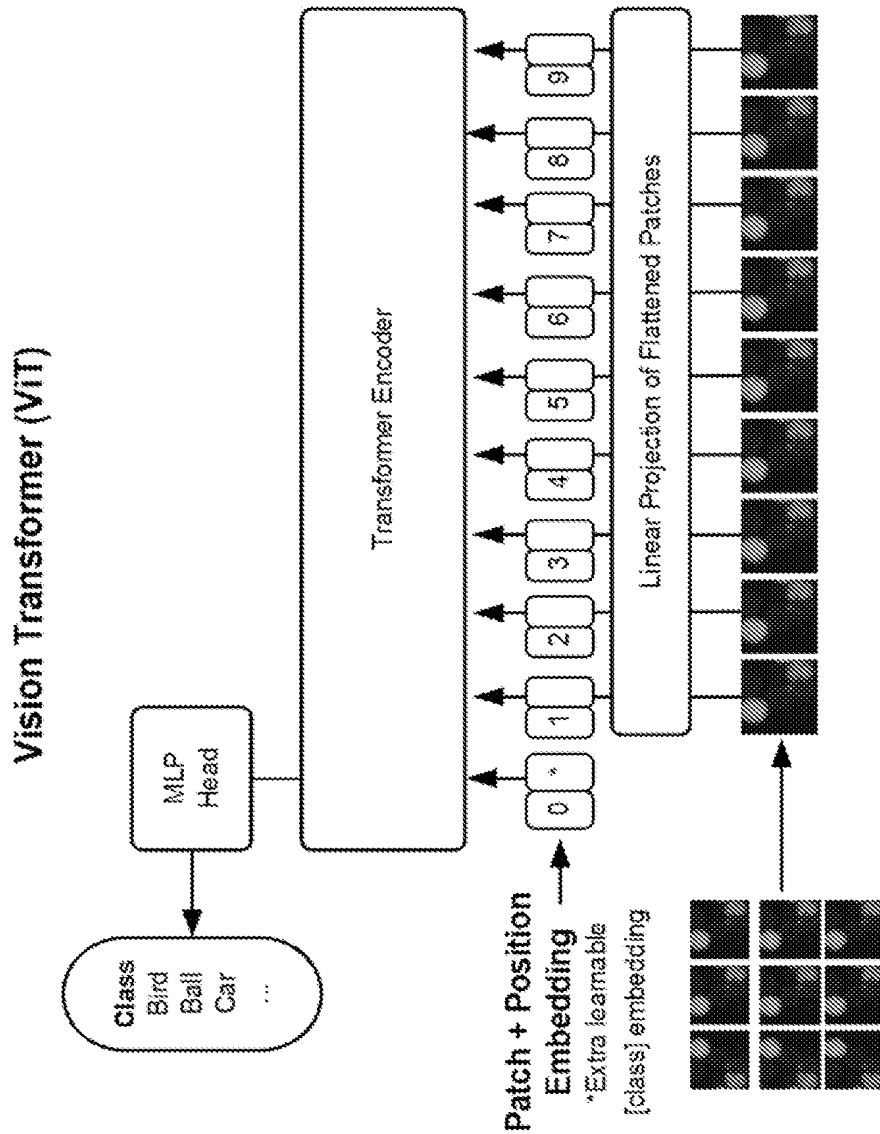


FIG. 19

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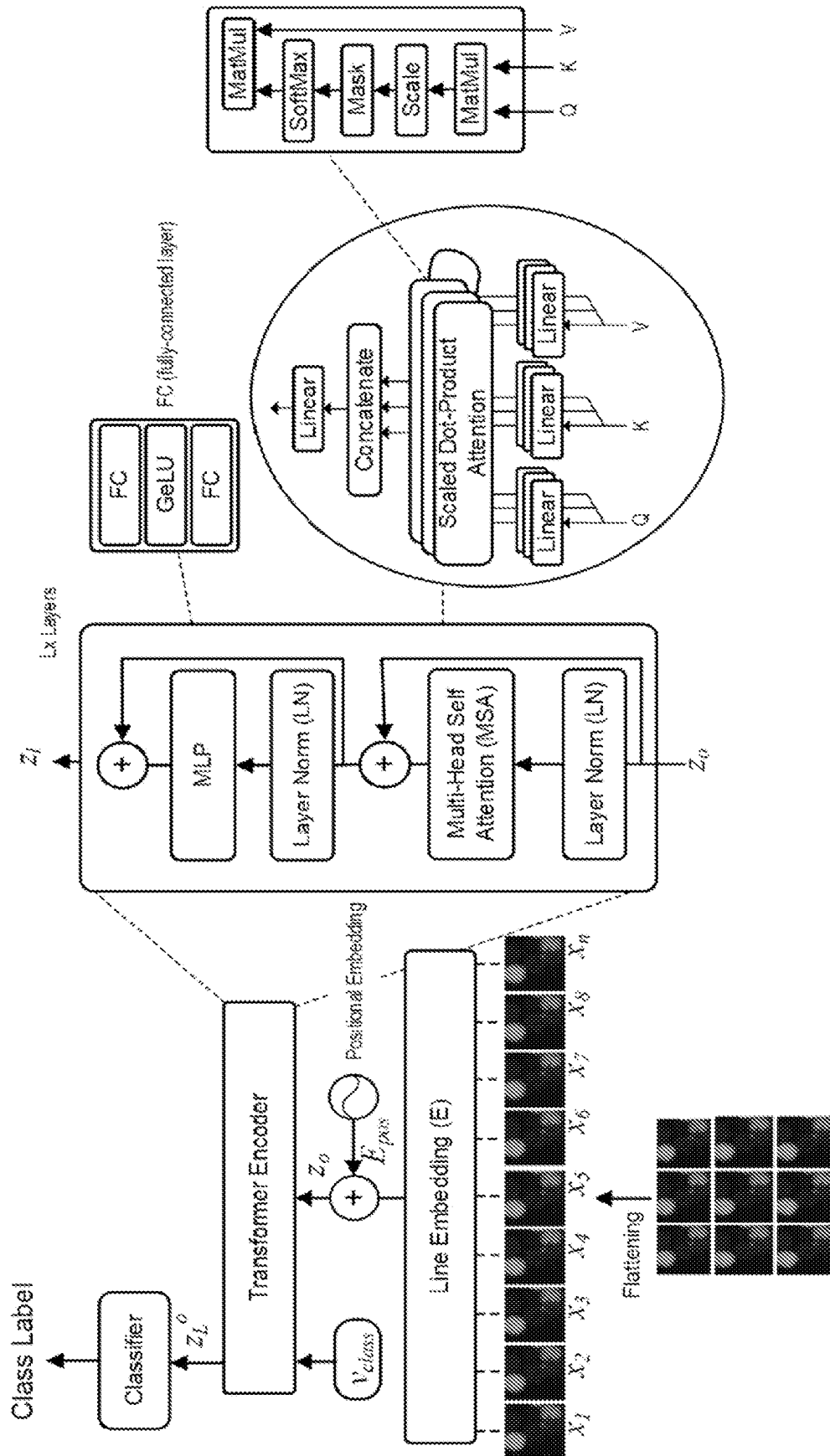


FIG. 20

2000

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2100 →

```
batch_size = tf.shape(x)[0]
x = self.rescale(x)
patches = self.extract_patches(x)
x = self.patch_proj(patches)

class_emb = tf.broadcast_to(
    self.class_emb, [batch_size, 1, self.d_model]
)
x = tf.concat([class_emb, x], axis=1)
x = x + self.pos_emb

for layer in self.enc_layers:
    x = layer(x, training)

return self.mlp_head(x[:, 0])
```

**FIG. 21**

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## ELECTRONIC PAYMENT RECEIPT

APPLICATION #  
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**HPAI1000USN01**

### Title of Invention

Low-Latency Conversational Artificial Intelligence (Ai) Architecture With A Parallelized In-Depth Analysis Feedback Loop

### Application Information

APPLICATION TYPE    Utility - Nonprovisional Application  
under 35 USC 111(a)

PATENT #    -

CONFIRMATION #    7098

FILED BY    Shahzina Khan

PATENT CENTER #    64502058

AUTHORIZED BY    Shiv Naimpally

CUSTOMER #    189741

FILING DATE    -

CORRESPONDENCE  
ADDRESS    -FIRST NAMED  
INVENTOR    Munjal SHAH

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E20242SL43026307PAYMENT AUTHORIZED BY  
Shahzina KhanPRE-AUTHORIZED ACCOUNT  
604861

PRE-AUTHORIZED CATEGORY  
37 CFR 1.16 (National application filing, search, and examination fees); 37 CFR 1.17 (Patent application and reexamination processing fees); 37 CFR 1.19 (Document supply fees); 37 CFR 1.20 (Post Issuance fees); 37 CFR 1.21 (Miscellaneous fees and charges)

| FEE CODE | DESCRIPTION                                | ITEM PRICE(\$) | QUANTITY | ITEM TOTAL(\$) |
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| 2817     | REQUEST FOR PRIORITIZED EXAMINATION        | 1680.00        | 1        | 1680.00        |
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| 4011     | BASIC FILING FEE- UTILITY                  | 64.00          | 1        | 64.00          |
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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                          |                        |               |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|------------------------|---------------|
| <b>Application Data Sheet 37 CFR 1.76</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                          | Attorney Docket Number | HPAI1000USN01 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                          | Application Number     |               |
| Title of Invention                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Low-Latency Conversational Artificial Intelligence (Ai) Architecture With A Parallelized In-Depth Analysis Feedback Loop |                        |               |
| <p>The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.</p> <p>This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.</p> |                                                                                                                          |                        |               |

**Secrecy Order 37 CFR 5.2:**

|                          |                                                                                                                                                                                                                                       |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.) |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**Inventor Information:**

|                                                                                                                                                                                 |                   |                       |                    |                             |                        |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-----------------------|--------------------|-----------------------------|------------------------|--|
| <b>Inventor 1</b>                                                                                                                                                               |                   |                       |                    |                             | <a href="#">Remove</a> |  |
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|                                                                                                                                                                                 | Munjal            |                       | SHAH               |                             |                        |  |
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| <b>City</b>                                                                                                                                                                     | Palo Alto         | <b>State/Province</b> | CA                 | <b>Country of Residence</b> | US                     |  |
| <b>Mailing Address of Inventor:</b>                                                                                                                                             |                   |                       |                    |                             |                        |  |
| <b>Address 1</b>                                                                                                                                                                |                   | C/o 167 Hamilton Ave. |                    |                             |                        |  |
| <b>Address 2</b>                                                                                                                                                                |                   |                       |                    |                             |                        |  |
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| <b>Postal Code</b>                                                                                                                                                              | 94301             | <b>Country</b>        | US                 |                             |                        |  |
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|                                                                                                                                                                                 | Vishal            |                       | PARIKH             |                             |                        |  |
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| <b>Address 1</b>                                                                                                                                                                |                   | C/o 167 Hamilton Ave. |                    |                             |                        |  |
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|                                                                                                                                                                                 | Meenesh           |                       | BHIMANI            |                             |                        |  |
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|                                           |  | Application Number                                                                                                       |  |               |  |
| Title of Invention                        |  | Low-Latency Conversational Artificial Intelligence (Ai) Architecture With A Parallelized In-Depth Analysis Feedback Loop |  |               |  |

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| Inventor 5                                                                                                                                                               |                       |                |                |                      | <a href="#" style="border: 1px solid black; padding: 2px;">Remove</a> |
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|                                                                                                                                                                          | Alex                  |                |                | MILLER               |                                                                       |
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| Inventor 6                                                                                                                                                               |                       |                |                |                      | <a href="#" style="border: 1px solid black; padding: 2px;">Remove</a> |
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|                                                                                                                                                                          | Saad                  |                |                | GODIL                |                                                                       |
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| <b>Application Data Sheet 37 CFR 1.76</b> |                                                                                                                          | Attorney Docket Number | HPAI1000USN01 |
|                                           |                                                                                                                          | Application Number     |               |
| Title of Invention                        | Low-Latency Conversational Artificial Intelligence (Ai) Architecture With A Parallelized In-Depth Analysis Feedback Loop |                        |               |

**Mailing Address of Inventor:**

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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------|------------------------|
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| Inventor 7                                                                                                                                                               |                       |                        | <a href="#">Remove</a> |
| Legal Name                                                                                                                                                               |                       |                        |                        |
| Prefix                                                                                                                                                                   | Given Name            | Middle Name            | Family Name            |
|                                                                                                                                                                          | Debajyoti             |                        | DATTA                  |
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| City                                                                                                                                                                     | Palo Alto             | State/Province         | CA                     |
|                                                                                                                                                                          |                       | Country of Residence i | US                     |

**Mailing Address of Inventor:**

|                                                                                                                                                                          |                       |                        |                        |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------|------------------------|
| Address 1                                                                                                                                                                | C/o 167 Hamilton Ave. |                        |                        |
| Address 2                                                                                                                                                                |                       |                        |                        |
| City                                                                                                                                                                     | Palo Alto             | State/Province         | CA                     |
| Postal Code                                                                                                                                                              | 94301                 | Country i              | US                     |
| Inventor 8                                                                                                                                                               |                       |                        | <a href="#">Remove</a> |
| Legal Name                                                                                                                                                               |                       |                        |                        |
| Prefix                                                                                                                                                                   | Given Name            | Middle Name            | Family Name            |
|                                                                                                                                                                          | Paul                  |                        | GAMBLE                 |
| Residence Information (Select One) <input checked="" type="radio"/> US Residency <input type="radio"/> Non US Residency <input type="radio"/> Active US Military Service |                       |                        |                        |
| City                                                                                                                                                                     | Palo Alto             | State/Province         | CA                     |
|                                                                                                                                                                          |                       | Country of Residence i | US                     |

**Mailing Address of Inventor:**

|                                                                                                                                                                          |                       |                        |                        |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------|------------------------|
| Address 1                                                                                                                                                                | C/o 167 Hamilton Ave. |                        |                        |
| Address 2                                                                                                                                                                |                       |                        |                        |
| City                                                                                                                                                                     | Palo Alto             | State/Province         | CA                     |
| Postal Code                                                                                                                                                              | 94301                 | Country i              | US                     |
| Inventor 9                                                                                                                                                               |                       |                        | <a href="#">Remove</a> |
| Legal Name                                                                                                                                                               |                       |                        |                        |
| Prefix                                                                                                                                                                   | Given Name            | Middle Name            | Family Name            |
|                                                                                                                                                                          | Rae                   |                        | LASKO                  |
| Residence Information (Select One) <input checked="" type="radio"/> US Residency <input type="radio"/> Non US Residency <input type="radio"/> Active US Military Service |                       |                        |                        |
| City                                                                                                                                                                     | Palo Alto             | State/Province         | CA                     |
|                                                                                                                                                                          |                       | Country of Residence i | US                     |

**OSSI Ex. 1018**

|                                           |                                                                                                                          |                        |               |
|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|------------------------|---------------|
| <b>Application Data Sheet 37 CFR 1.76</b> |                                                                                                                          | Attorney Docket Number | HPAI1000USN01 |
|                                           |                                                                                                                          | Application Number     |               |
| Title of Invention                        | Low-Latency Conversational Artificial Intelligence (Ai) Architecture With A Parallelized In-Depth Analysis Feedback Loop |                        |               |

**Mailing Address of Inventor:**

|                                                                                                                                             |                       |                      |    |
|---------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|----------------------|----|
| Address 1                                                                                                                                   | C/o 167 Hamilton Ave. |                      |    |
| Address 2                                                                                                                                   |                       |                      |    |
| City                                                                                                                                        | Palo Alto             | State/Province       | CA |
| Postal Code                                                                                                                                 | 94301                 | Country <sup>i</sup> | US |
| All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the <b>Add</b> button. |                       |                      |    |

**Correspondence Information:**

|                                                                                                                                       |                             |                                          |                                             |
|---------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|------------------------------------------|---------------------------------------------|
| Enter either Customer Number or complete the Correspondence Information section below.<br>For further information see 37 CFR 1.33(a). |                             |                                          |                                             |
| <input type="checkbox"/> An Address is being provided for the correspondence Information of this application.                         |                             |                                          |                                             |
| Customer Number                                                                                                                       | 189741                      |                                          |                                             |
| Email Address                                                                                                                         | docket@flagshipipatents.com | <input type="button" value="Add Email"/> | <input type="button" value="Remove Email"/> |

**Application Information:**

|                                         |                                                                                                                          |                                           |                                     |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|-------------------------------------|
| Title of the Invention                  | Low-Latency Conversational Artificial Intelligence (Ai) Architecture With A Parallelized In-Depth Analysis Feedback Loop |                                           |                                     |
| Attorney Docket Number                  | HPAI1000USN01                                                                                                            | Small Entity Status Claimed               | <input checked="" type="checkbox"/> |
| Application Type                        | Nonprovisional                                                                                                           |                                           |                                     |
| Subject Matter                          | Utility                                                                                                                  |                                           |                                     |
| Total Number of Drawing Sheets (if any) | 21                                                                                                                       | Suggested Figure for Publication (if any) | 3                                   |

**Filing By Reference:**

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

|                                                        |                          |                                            |
|--------------------------------------------------------|--------------------------|--------------------------------------------|
| Application number of the previously filed application | Filing date (YYYY-MM-DD) | Intellectual Property Authority or Country |
|                                                        |                          |                                            |

**Publication Information:**

|                                                                                                                                                                                                                                                                                                                                                                                                                        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> Request Early Publication (Fee required at time of Request 37 CFR 1.219)                                                                                                                                                                                                                                                                                                                      |
| <input type="checkbox"/> <b>Request Not to Publish.</b> I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application <b>has not and will not</b> be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing. |

|                                           |                                                                                                                          |                        |               |
|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|------------------------|---------------|
| <b>Application Data Sheet 37 CFR 1.76</b> |                                                                                                                          | Attorney Docket Number | HPAI1000USN01 |
|                                           |                                                                                                                          | Application Number     |               |
| Title of Invention                        | Low-Latency Conversational Artificial Intelligence (Ai) Architecture With A Parallelized In-Depth Analysis Feedback Loop |                        |               |

## Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

|                                                                                                                               |             |                                                         |             |                                                         |               |
|-------------------------------------------------------------------------------------------------------------------------------|-------------|---------------------------------------------------------|-------------|---------------------------------------------------------|---------------|
| Please Select One:                                                                                                            |             |                                                         |             |                                                         |               |
| <input type="radio"/> Customer Number                                                                                         |             | <input checked="" type="radio"/> US Patent Practitioner |             | <input type="radio"/> Limited Recognition (37 CFR 11.9) |               |
| Prefix                                                                                                                        | Given Name  | Middle Name                                             | Family Name | Suffix                                                  | <b>Remove</b> |
|                                                                                                                               | Shivshanker |                                                         | NAIMPALLY   |                                                         |               |
| Registration Number                                                                                                           | 66142       |                                                         |             |                                                         |               |
| Additional Representative Information blocks may be generated within this form by selecting the <b>Add</b> button. <b>Add</b> |             |                                                         |             |                                                         |               |

## Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78. When referring to the current application, please leave the "Application Number" field blank.

|                                                                                                                                  |                               |                          |                                    |
|----------------------------------------------------------------------------------------------------------------------------------|-------------------------------|--------------------------|------------------------------------|
| Prior Application Status                                                                                                         | Pending                       | <b>Remove</b>            |                                    |
| Application Number                                                                                                               | Continuity Type               | Prior Application Number | Filing or 371(c) Date (YYYY-MM-DD) |
|                                                                                                                                  | Claims benefit of provisional | 63611762                 | 2023-12-18                         |
| Prior Application Status                                                                                                         | Pending                       | <b>Remove</b>            |                                    |
| Application Number                                                                                                               | Continuity Type               | Prior Application Number | Filing or 371(c) Date (YYYY-MM-DD) |
|                                                                                                                                  | Claims benefit of provisional | 63466712                 | 2023-05-15                         |
| Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the <b>Add</b> button. <b>Add</b> |                               |                          |                                    |

## Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)<sup>i</sup> the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

|                                           |                                                                                                                          |                        |               |
|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|------------------------|---------------|
| <b>Application Data Sheet 37 CFR 1.76</b> |                                                                                                                          | Attorney Docket Number | HPAI1000USN01 |
|                                           |                                                                                                                          | Application Number     |               |
| Title of Invention                        | Low-Latency Conversational Artificial Intelligence (Ai) Architecture With A Parallelized In-Depth Analysis Feedback Loop |                        |               |

|                                                                                                        |                      |                          |                                                            |
|--------------------------------------------------------------------------------------------------------|----------------------|--------------------------|------------------------------------------------------------|
| Application Number                                                                                     | Country <sup>i</sup> | Filing Date (YYYY-MM-DD) | <div>Remove</div> Access Code <sup>i</sup> (if applicable) |
|                                                                                                        |                      |                          |                                                            |
| Additional Foreign Priority Data may be generated within this form by selecting the <b>Add</b> button. |                      |                          | <div>Add</div>                                             |

## Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.<br>NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA. |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                           |                                                                                                                          |                        |               |
|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|------------------------|---------------|
| <b>Application Data Sheet 37 CFR 1.76</b> |                                                                                                                          | Attorney Docket Number | HPAI1000USN01 |
|                                           |                                                                                                                          | Application Number     |               |
| Title of Invention                        | Low-Latency Conversational Artificial Intelligence (Ai) Architecture With A Parallelized In-Depth Analysis Feedback Loop |                        |               |

## Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

**NOTE:** This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

### 1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

**A. Priority Document Exchange (PDX)** - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

**B. Search Results from U.S. Application to EPO** - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

### 2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

**NOTE:** Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

|                                           |                                                                                                                          |                        |               |
|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|------------------------|---------------|
| <b>Application Data Sheet 37 CFR 1.76</b> |                                                                                                                          | Attorney Docket Number | HPAI1000USN01 |
|                                           |                                                                                                                          | Application Number     |               |
| Title of Invention                        | Low-Latency Conversational Artificial Intelligence (AI) Architecture With A Parallelized In-Depth Analysis Feedback Loop |                        |               |

## Applicant Information:

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                |                                                                        |               |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|------------------------------------------------------------------------|---------------|
| Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                |                                                                        |               |
| <b>Applicant 1</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                |                                                                        | <b>Remove</b> |
| <p>If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.</p> |                                                                |                                                                        |               |
| <b>Clear</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                |                                                                        |               |
| <input checked="" type="radio"/> Assignee                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <input type="radio"/> Legal Representative under 35 U.S.C. 117 | <input type="radio"/> Joint Inventor                                   |               |
| <input type="radio"/> Person to whom the inventor is obligated to assign.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                | <input type="radio"/> Person who shows sufficient proprietary interest |               |
| If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                |                                                                        |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                |                                                                        |               |
| Name of the Deceased or Legally Incapacitated Inventor: <input type="text"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                |                                                                        |               |
| If the Applicant is an Organization check here. <input checked="" type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                |                                                                        |               |
| Organization Name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | HealthGPT, Inc. DBA Hippocratic AI                             |                                                                        |               |
| <b>Mailing Address Information For Applicant:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                |                                                                        |               |
| Address 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 167 Hamilton Ave.                                              |                                                                        |               |
| Address 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                |                                                                        |               |
| City                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Palo Alto                                                      | State/Province                                                         | CA            |
| Country                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | US                                                             | Postal Code                                                            | 94301         |
| Phone Number                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                | Fax Number                                                             |               |
| Email Address                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                |                                                                        |               |
| Additional Applicant Data may be generated within this form by selecting the Add button. <b>Add</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                |                                                                        |               |

## Assignee Information including Non-Applicant Assignee Information:

|                                                                                                                                                                                     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office. |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



|                                           |                                                                                                                          |                        |               |
|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|------------------------|---------------|
| <b>Application Data Sheet 37 CFR 1.76</b> |                                                                                                                          | Attorney Docket Number | HPAI1000USN01 |
|                                           |                                                                                                                          | Application Number     |               |
| Title of Invention                        | Low-Latency Conversational Artificial Intelligence (Ai) Architecture With A Parallelized In-Depth Analysis Feedback Loop |                        |               |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                    |                |       |  |  |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|----------------|-------|--|--|--|
| <b>Assignee 1</b>                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                    |                |       |  |  |  |
| Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication. |                                    |                |       |  |  |  |
| <div>Remove</div>                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                    |                |       |  |  |  |
| If the Assignee or Non-Applicant Assignee is an Organization check here. <div>X</div>                                                                                                                                                                                                                                                                                                                                                                  |                                    |                |       |  |  |  |
| Organization Name                                                                                                                                                                                                                                                                                                                                                                                                                                      | HealthGPT, Inc. DBA Hippocratic AI |                |       |  |  |  |
| <b>Mailing Address Information For Assignee including Non-Applicant Assignee:</b>                                                                                                                                                                                                                                                                                                                                                                      |                                    |                |       |  |  |  |
| Address 1                                                                                                                                                                                                                                                                                                                                                                                                                                              | 167 Hamilton Ave.                  |                |       |  |  |  |
| Address 2                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                    |                |       |  |  |  |
| City                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Palo Alto                          | State/Province | CA    |  |  |  |
| Country <sup>i</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                   | US                                 | Postal Code    | 94301 |  |  |  |
| Phone Number                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                    | Fax Number     |       |  |  |  |
| Email Address                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                    |                |       |  |  |  |
| Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button. <div>Add</div>                                                                                                                                                                                                                                                                                                                       |                                    |                |       |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                    |                |       |  |  |  |

**Signature:**

Remove

**NOTE:** This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). However, if this Application Data Sheet is submitted with the **INITIAL** filing of the application **and** either box A or B is **not** checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

|                                                                                                    |                           |           |                   |                     |       |
|----------------------------------------------------------------------------------------------------|---------------------------|-----------|-------------------|---------------------|-------|
| Signature                                                                                          | /Shivshanker S Naimpally/ |           | Date (YYYY-MM-DD) | 2024-02-27          |       |
| First Name                                                                                         | Shiv                      | Last Name | NAIMPALLY         | Registration Number | 66142 |
| Additional Signature may be generated within this form by selecting the Add button. <div>Add</div> |                           |           |                   |                     |       |

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

|                                           |                                                                                                                          |                        |               |
|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|------------------------|---------------|
| <b>Application Data Sheet 37 CFR 1.76</b> |                                                                                                                          | Attorney Docket Number | HPAI1000USN01 |
|                                           |                                                                                                                          | Application Number     |               |
| Title of Invention                        | Low-Latency Conversational Artificial Intelligence (Ai) Architecture With A Parallelized In-Depth Analysis Feedback Loop |                        |               |

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

# Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

- 1 The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
- 2 A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
- 3 A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
- 4 A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
- 5 A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
- 6 A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
- 7 A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
- 8 A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
- 9 A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

**CERTIFICATION AND REQUEST FOR PRIORITIZED EXAMINATION  
UNDER 37 CFR 1.102(e) (Page 1 of 1)**

|                       |                                                                                                                          |                                               |  |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|--|
| First Named Inventor: | Munjal SHAH                                                                                                              | Nonprovisional Application Number (if known): |  |
| Title of Invention:   | Low-Latency Conversational Artificial Intelligence (AI) Architecture With A Parallelized In-Depth Analysis Feedback Loop |                                               |  |

**APPLICANT HEREBY CERTIFIES THE FOLLOWING AND REQUESTS PRIORITIZED EXAMINATION FOR THE ABOVE-IDENTIFIED APPLICATION.**

1. The processing fee set forth in 37 CFR 1.17(i)(1) and the prioritized examination fee set forth in 37 CFR 1.17(c) have been filed with the request. The publication fee requirement is met because that fee, set forth in 37 CFR 1.18(d), is currently \$0. The basic filing fee, search fee, and examination fee are filed with the request or have been already been paid. I understand that any required excess claims fees or application size fee must be paid for the application.
2. I understand that the application may not contain, or be amended to contain, more than four independent claims, more than thirty total claims, or any multiple dependent claims, and that any request for an extension of time will cause an outstanding Track I request to be dismissed.
3. The applicable box is checked below:
  - I. ☒ **Original Application (Track One) - Prioritized Examination under § 1.102(e)(1)**
    - i. (a) The application is an original nonprovisional utility application filed under 35 U.S.C. 111(a). This certification and request is being filed with the utility application via EFS-Web.  
---OR---  
(b) The application is an original nonprovisional plant application filed under 35 U.S.C. 111(a). This certification and request is being filed with the plant application in paper.
    - ii. An executed inventor's oath or declaration under 37 CFR 1.63 or 37 CFR 1.64 for each inventor, or the application data sheet meeting the conditions specified in 37 CFR 1.53(f)(3)(i) is filed with the application.
  - II. ☐ **Request for Continued Examination - Prioritized Examination under § 1.102(e)(2)**
    - i. A request for continued examination has been filed with, or prior to, this form.
    - ii. If the application is a utility application, this certification and request is being filed via EFS-Web.
    - iii. The application is an original nonprovisional utility application filed under 35 U.S.C. 111(a), or is a national stage entry under 35 U.S.C. 371.
    - iv. This certification and request is being filed prior to the mailing of a first Office action responsive to the request for continued examination.
    - v. No prior request for continued examination has been granted prioritized examination status under 37 CFR 1.102(e)(2).

|                       |                          |                                     |            |
|-----------------------|--------------------------|-------------------------------------|------------|
| Signature             | /Shivshanker S Naimpally | Date                                | 2024-02-27 |
| Name<br>(Print/Typed) | Shivshanker S. NAIMPALLY | Practitioner<br>Registration Number | 66142      |

**Note:** This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. Submit multiple forms if more than one signature is required.\*

☒ \*Total of 1 forms are submitted.

## Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
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## **SCORE Placeholder Sheet for IFW Content**

Application Number: 18592441

Document Date: 02/29/2024

The presence of this form in the IFW record indicates that the following document type was received in electronic format on the date identified above. This content is stored in the SCORE database.

Since this was an electronic submission, there is no physical artifact folder, no artifact folder is recorded in PALM, and no paper documents or physical media exist. The TIFF images in the IFW record were created from the original documents that are stored in SCORE.

- Drawing

At the time of document entry (noted above):

- USPTO employees may access SCORE content via DAV or via the SCORE web page.
- External customers may access SCORE content via PAIR using the Supplemental Content tab.