

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 12,131,745 B1
APPLICATION NO. : 18/754280
DATED : October 29, 2024
INVENTOR(S) : Pfeifenberger and Zhang

Page 1 of 1

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In the Claims

At Column 12, Line 28 in Claim 3. Delete the word “course” and replace it with the word “source.”

At Column 13, Line 27 in Claim 10. Delete the word “course” and replace it with the word “source.”

Signed and Sealed this
Twelfth Day of August, 2025



Coke Morgan Stewart
Acting Director of the United States Patent and Trademark Office



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
18/754,280	06/26/2024	Lukas PFEIFENBERGER	264248.000131	4411
11951	7590	08/12/2025		
Troutman Pepper Locke LLP (Rochester)			EXAMINER	
70 Linden Oaks			NEWAY, SAMUEL G	
Suite 210				
Rochester, NY 14625			ART UNIT	PAPER NUMBER
			2657	
			NOTIFICATION DATE	DELIVERY MODE
			08/12/2025	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):

Patents@troutman.com



UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NO.	ISSUE DATE	PATENT NO.
18/754,280	12-Aug-2025	12131745

Troutman Pepper Locke LLP (Rochester)
70 Linden Oaks
Rochester, NY 14625

ELECTRONIC CERTIFICATE OF CORRECTION NOTIFICATION

Your electronic certificate of correction is now available, and can be accessed via Patent Center at <https://patentcenter.uspto.gov>.

The electronic certificate of correction is the official certificate of correction under 35 U.S.C. 254 or 255. For more information, please visit <https://www.uspto.gov/electronicgrants>.



UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
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Patent No.: 12131745
Issue Date: 10/29/2024
Appl. No.: 18/754,280
Filed: 06/26/2024

PART (A) RESPONSE FOR CERTIFICATES OF CORRECTION

This is a decision on the Certificate of Correction request filed 17 July 2025.

The request for issuance of Certificate of Correction for the above-identified correction(s) under the provisions of 37 CFR 1.322 and/or 1.323 is hereby:

(Check one)

☒ Approved ☐ Approved in Part ☐ Denied

Comments: _____

PART (B) PETITION UNDER 37 CFR 1.324 OR 37 CFR 1.48

☐ This is a decision on the petition filed _____ to correct inventorship under 37 CFR 1.324.

☐ This is a decision on the request under 37 CFR 1.48, petition filed _____. In view of the fact that the patent has already issued, the request under 37 CFR 1.48 has been treated as a petition to correct inventorship under 37 CFR 1.324.

The petition is hereby: ☐ Granted ☐ Dismissed

Comment: _____

The patented filed is being forwarded to Certificate of Corrections Branch for issuance of a certificate naming only the actual inventor or inventors.

/DANIEL C WASHBURN/
Supervisory Patent Examiner, Art Unit 2657
Technology Center 2600
Phone: (571)272-5551

Certificates of Correction Branch email: CustomerServiceCoC@uspto.gov CoC Central Phone Number: (703) 756-1814



UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
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ELECTRONIC PAYMENT RECEIPT

APPLICATION #
18/754,280

RECEIPT DATE / TIME
07/17/2025 12:04:17 PM Z ET

ATTORNEY DOCKET #
264248.000131

Title of Invention

SYSTEM AND METHOD FOR AUTOMATIC ALIGNMENT OF PHONETIC CONTENT FOR REAL-TIME ACCENT CONVERSION

Application Information

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

PATENT # 12131745

CONFIRMATION # 4411

FILED BY Nicholas Gallo

PATENT CENTER # 71410173

AUTHORIZED BY Nicholas Gallo

CUSTOMER # 11951

FILING DATE 06/26/2024

CORRESPONDENCE ADDRESS -

FIRST NAMED INVENTOR Lukas PFEIFENBERGER

Payment Information

PAYMENT METHOD
DA / 500436

PAYMENT TRANSACTION ID
E20257GC04368604

PAYMENT AUTHORIZED BY
Nicholas Gallo

PRE-AUTHORIZED ACCOUNT
500436

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 1.21 (Miscellaneous fees and charges)

FEE CODE	DESCRIPTION	ITEM PRICE(\$)	QUANTITY	ITEM TOTAL(\$)
2811	CERTIFICATE OF CORRECTION	172.00	1	172.00
TOTAL AMOUNT:				\$172.00

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.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patentee : SANAS.AI, INC.)
Inventors : PFEIFENBERGER and ZHANG)
Patent No. : 12,131,745)
Issue Date : October 29, 2024)
Serial No. : 18/754,280)
Cnfrm. No. : 4411)
Filed : Sept. 9. 2021)
For : SYSTEM AND METHOD FOR AUTOMATIC)
ALIGNMENT OF PHONETIC CONTENT FOR)
REAL-TIME ACCENT CONVERSION)

**REQUEST FOR CERTIFICATE OF CORRECTION
PURSUANT TO 35 U.S.C. § 254 AND 37 C.F.R. § 1.322**

Commissioner for Patents
Office of Data Management
Attention: Certificates of Correction Branch
P.O. Box 1450
Alexandria, VA 22313-1450

Commissioner:

Pursuant to 35 U.S.C. § 254 and 37 C.F.R. § 1.322, Patentee hereby requests a certificate of correction (in the form attached) for the above-identified patent (the “’745 patent”) because of two minor typographical errors.

Pursuant to 35 U.S.C. § 255 and 37 C.F.R. § 1.323, Patentee hereby requests that the U.S. Patent and Trademark Office issue a certificate of correction (in the form attached) for the ’745 patent. A certificate of correction is requested because of a typographical error in dependent claims 3 and 10, as reflected below:

3. *The accent conversion system of claim 1, wherein the accent conversion neural network:*

is trained to learn a mapping between the first phonetic embedding vectors and the second phonetic embedding vectors using a labeled dataset comprising paired samples of ~~course~~ source accent phonetic embedding vectors and corresponding target accent phonetic embedding vectors; and

comprises an encoder layer configured to encode the first phonetic embedding vectors into a latent representation and a decoder layer configured to decode the latent representation to generate the second phonetic embedding vectors.

10. *The method of claim 8, wherein the machine learning model:*

-2-

is trained to learn a mapping between the set of phonetic embedding vectors and the set of transformed phonetic embedding vectors using a labeled dataset comprising paired samples of ~~course~~ source accent phonetic embedding vectors and corresponding target accent phonetic embedding vectors; and
comprises an encoder layer configured to encode the set of phonetic embedding vectors into a latent representation and a decoder layer configured to decode the latent representation to generate the set of transformed phonetic embedding vectors.

There is no antecedent basis in the detailed description of the '745 patent for the "course accent phonetic embedding vectors" term recited in the issued claims 3 and 10, which clearly should have been recited as "source accent phonetic embedding vectors" for which there is support in the detailed description. *See, e.g., '745 patent, 6:21-22, 7:54-59.*

This type of mistake is of a clerical or typographical nature and does not constitute new matter or require reexamination. Pursuant to 37 C.F.R. § 1.323, please charge the \$172.00 fee as set forth in 37 C.F.R. § 1.20(a) as well as any additional fees which may be required, or credit any overpayment, to Deposit Account No. 500436.

Respectfully submitted,

Dated: July 17, 2025

/Nicholas J. Gallo/
by: Nicholas J. Gallo
Reg. No. 60,758

Troutman Pepper Locke LLP
70 Linden Oaks, Suite 210
Rochester NY 14625
Telephone: (585) 270-2133
Facsimile: (800) 541-9525

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

Patent No. : 12,131,745
Serial No. : 18/754,280
Issued : Oct. 29, 2024
Inventors : PFEIFENBERGER and ZHANG

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

At column 12, line 28 there is a typographical error in claim 3. Delete the word “course” and replace it with the word “source.”

*3. The accent conversion system of claim 1, wherein the accent conversion neural network:
is trained to learn a mapping between the first phonetic embedding vectors and the second phonetic embedding vectors using a labeled dataset comprising paired samples of ~~course~~ source accent phonetic embedding vectors and corresponding target accent phonetic embedding vectors; and
comprises an encoder layer configured to encode the first phonetic embedding vectors into a latent representation and a decoder layer configured to decode the latent representation to generate the second phonetic embedding vectors.*

At column 13, line 27 there is a typographical error in claim 10. Delete the word “course” and replace it with the word “source.”

*10. The method of claim 8, wherein the machine learning model:
is trained to learn a mapping between the set of phonetic embedding vectors and the set of transformed phonetic embedding vectors using a labeled dataset comprising paired samples of ~~course~~ source accent phonetic embedding vectors and corresponding target accent phonetic embedding vectors; and
comprises an encoder layer configured to encode the set of phonetic embedding vectors into a latent representation and a decoder layer configured to decode the latent representation to generate the set of transformed phonetic embedding vectors.*

MAILING ADDRESS OF SENDER:

PATENT No. 12,131,745

Nicholas J. Gallo
Troutman Pepper Locke LLP
70 Linden Oaks, Suite 210
Rochester, NY 14625



UNITED STATES
PATENT AND TRADEMARK OFFICE

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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #
18/754,280

RECEIPT DATE / TIME
07/17/2025 12:04:17 PM Z ET

ATTORNEY DOCKET #
264248.000131

Title of Invention

SYSTEM AND METHOD FOR AUTOMATIC ALIGNMENT OF PHONETIC CONTENT FOR REAL-TIME ACCENT CONVERSION

Application Information

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

PATENT # 12131745

CONFIRMATION # 4411

FILED BY Nicholas Gallo

PATENT CENTER # 71410173

FILING DATE 06/26/2024

CUSTOMER # 11951

FIRST NAMED INVENTOR Lukas PFEIFENBERGER

CORRESPONDENCE ADDRESS -

AUTHORIZED BY Nicholas Gallo

Documents

TOTAL DOCUMENTS: 1

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
20250717_Request_Certificate_of_Correction_with_SAMPLE_Certificate_264248_000131.pdf	3	Request for Certificate of Correction	263 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
20250717_Request_Certificate_of_Correction_with_SAMPLE_Certificate_264248_000131.pdf	B5414A82A7D5038D45B424FC2625A6B8A0B2E16CF9B21D6236EE75DC176FA46E662E2165603E6117BDBB1062CD139AAF3A1D5F6E1CBC26EAD100DFA0591F8C78

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

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
18/754,280	06/26/2024	Lukas PFEIFENBERGER	264248.000131	4411
11951	7590	10/29/2024		
Troutman Pepper Hamilton Sanders LLP (Rochester)			EXAMINER	
70 Linden Oaks			NEWAY, SAMUEL G	
Suite 210				
Rochester, NY 14625			ART UNIT	PAPER NUMBER
			2657	
			NOTIFICATION DATE	DELIVERY MODE
			10/29/2024	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):

Patents@troutman.com

APPLICATION NO.	ISSUE DATE	PATENT NO.
18/754,280	29-Oct-2024	12131745

Troutman Pepper Hamilton Sanders LLP (Rochester)
70 Linden Oaks
Rochester, NY 14625

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>



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
18/754,280	06/26/2024	Lukas PFEIFENBERGER	264248.000131

CONFIRMATION NO. 4411

PUBLICATION NOTICE



OC000000079448533

11951

Troutman Pepper Hamilton Sanders LLP (Rochester)
70 Linden Oaks
Suite 210
Rochester, NY 14625

Date Mailed: 10/17/2024

Title:SYSTEM AND METHOD FOR AUTOMATIC ALIGNMENT OF PHONETIC CONTENT FOR REAL-TIME ACCENT CONVERSION

Publication No.US-2024-0347070-A1

Publication Date:10/17/2024

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. 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



APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
18/754,280	10/29/2024	12131745	264248.000131	4411

11951 7590 10/09/2024
Troutman Pepper Hamilton Sanders LLP (Rochester)
70 Linden Oaks
Suite 210
Rochester, NY 14625

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):

Lukas PFEIFENBERGER, Salzburg, AUSTRIA;

Shawn Zhang, Palo Alto, CA;

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

Sanas.ai Inc., Palo Alto, CA;

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit [SelectUSA.gov](https://selectusa.gov).



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ELECTRONIC PAYMENT RECEIPT

APPLICATION #
18/754,280

RECEIPT DATE / TIME
10/02/2024 09:29:44 AM Z ET

ATTORNEY DOCKET #
264248.000131

Title of Invention

SYSTEM AND METHOD FOR AUTOMATIC ALIGNMENT OF PHONETIC CONTENT FOR REAL-TIME ACCENT CONVERSION

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	4411	FILED BY	Mary Frances Heeks
PATENT CENTER #	67404892	AUTHORIZED BY	Nicholas Gallo
CUSTOMER #	11951	FILING DATE	06/26/2024
CORRESPONDENCE ADDRESS	-	FIRST NAMED INVENTOR	Lukas PFEIFENBERGER

Payment Information

PAYMENT METHOD DA / 500436	PAYMENT TRANSACTION ID E202402030466612	PAYMENT AUTHORIZED BY Mary Frances Heeks
-------------------------------	--	---

FEE CODE	DESCRIPTION	ITEM PRICE(\$)	QUANTITY	ITEM TOTAL(\$)
2501	UTILITY ISSUE FEE	480.00	1	480.00
TOTAL AMOUNT:				\$480.00

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/DP/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

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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)

11951 7590 09/25/2024
Troutman Pepper Hamilton Sanders LLP (Rochester)
70 Linden Oaks
Suite 210
Rochester, NY 14625

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
18/754,280	06/26/2024	Lukas PFEIFENBERGER	264248.000131	4411

TITLE OF INVENTION: SYSTEM AND METHOD FOR AUTOMATIC ALIGNMENT OF PHONETIC CONTENT FOR REAL-TIME ACCENT CONVERSION

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	12/26/2024

EXAMINER	ART UNIT	CLASS-SUBCLASS
NEWAY, SAMUEL G	2657	704-232000

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.

Troutman Pepper Hamilton
Sanders LLP

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)

SANAS.AI INC.

Palo Alto, CA

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. **500436**

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 **/Nicholas J. Gallo/**

Date **October 2, 2024**

Typed or printed name **Nicholas J. Gallo**

Registration No. **60,758**



UNITED STATES
PATENT AND TRADEMARK OFFICE

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

ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #
18/754,280

RECEIPT DATE / TIME
10/02/2024 09:29:44 AM Z ET

ATTORNEY DOCKET #
264248.000131

Title of Invention

SYSTEM AND METHOD FOR AUTOMATIC ALIGNMENT OF PHONETIC CONTENT FOR REAL-TIME ACCENT CONVERSION

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	4411	FILED BY	Mary Frances Heeks
PATENT CENTER #	67404892	FILING DATE	06/26/2024
CUSTOMER #	11951	FIRST NAMED INVENTOR	Lukas PFEIFENBERGER
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Nicholas Gallo

Documents

TOTAL DOCUMENTS: 1

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
20241002_Issue_Fee_Transmit_264248_000131.pdf	1	Issue Fee Payment (PTO-85B)	94 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
20241002_Issue_Fee_Transmit_264248_000131.pdf	1A1E4DA03F9815942C1D92CF9BD626B3280287CF183E90E3D31C366A18E3A9D2F610A92A6D1FA02BB7E0B0CE5C50E288A08906A4FD5C39DA0C3C5D5CE9F68AF6

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.

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.

**DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN
APPLICATION DATA SHEET (37 CFR 1.76)****Title of
Invention****SYSTEM AND METHOD FOR AUTOMATIC ALIGNMENT OF PHONETIC CONTENT
FOR REAL-TIME ACCENT CONVERSION**

As the below named inventor, I hereby declare that:

This declaration
is directed to:

The attached application, or



United States application or PCT international application number _____

filed on _____

The above-identified 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.**WARNING:**

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

LEGAL NAME OF INVENTORInventor: Lukas PFEIFENBERGERDate (Optional): 27/09/2027Signature: *Lukas Pfeifenger*

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

A Federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with an information collection subject to the requirements of the Paperwork Reduction Act of 1995, unless the information collection has a currently valid OMB Control Number. The OMB Control Number for this information collection is 0851-0032. Public burden for this form is estimated to average 1 minute per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the information collection. Send comments regarding this burden estimate or any other aspect of this information collection, including suggestions for reducing this burden to the Chief Administrative Officer, United States Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450 or email InformationCollection@uspto.gov. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS.** If filing this completed form by mail, send to: **Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing this form, call 1-800-PTO-6190 and select option 3.

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.

DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

**Title of
Invention**

SYSTEM AND METHOD FOR AUTOMATIC ALIGNMENT OF PHONETIC CONTENT FOR REAL-TIME ACCENT CONVERSION

As the below named inventor, I hereby declare that:

This declaration is directed to: ☒ The attached application, or

☐ United States application or PCT international application number _____
filed on _____.

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

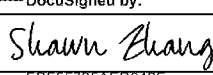
I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

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.

WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

LEGAL NAME OF INVENTOR

Inventor: Shawn ZHANG DocuSigned by: _____ Date (Optional) : 6/25/2024
Signature: 
EBF55735AED043F...

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

A Federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with an information collection subject to the requirements of the Paperwork Reduction Act of 1995, unless the information collection has a currently valid OMB Control Number. The OMB Control Number for this information collection is 0651-0032. Public burden for this form is estimated to average 1 minute per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the information collection. Send comments regarding this burden estimate or any other aspect of this information collection, including suggestions for reducing this burden to the Chief Administrative Officer, United States Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450 or email InformationCollection@uspto.gov. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS.** If filing this completed form by mail, send to: **Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.



UNITED STATES
PATENT AND TRADEMARK OFFICE

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

ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #
18/754,280

RECEIPT DATE / TIME
09/27/2024 12:25:17 PM Z ET

ATTORNEY DOCKET #
264248.000131

Title of Invention

SYSTEM AND METHOD FOR AUTOMATIC ALIGNMENT OF PHONETIC CONTENT FOR REAL-TIME ACCENT CONVERSION

Application Information

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

PATENT # -

CONFIRMATION # 4411

FILED BY Mary Frances Heeks

PATENT CENTER # 67351965

FILING DATE 06/26/2024

CUSTOMER # 11951

FIRST NAMED INVENTOR Lukas PFEIFENBERGER

CORRESPONDENCE ADDRESS -

AUTHORIZED BY Nicholas Gallo

Documents

TOTAL DOCUMENTS: 1

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
Signed_Declarations_264248_000131.pdf	2	Oath or Declaration filed	661 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
Signed_Declarations_264248_000131.pdf	7343ABF63274A4FB355EE5A12035B84C35E5D5352E158F6E67ABB4F6346FCABCA47DB1EAFF565D1D449A8CC4CF269920C64BE08A16FA3F44F36EE141D59F991F

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.



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

11951 7590 09/25/2024
Troutman Pepper Hamilton Sanders LLP (Rochester)
70 Linden Oaks
Suite 210
Rochester, NY 14625

EXAMINER	
NEWAY, SAMUEL G	
ART UNIT	PAPER NUMBER
2657	

DATE MAILED: 09/25/2024

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
18/754,280	06/26/2024	Lukas PFEIFENBERGER	264248.000131	4411

TITLE OF INVENTION: SYSTEM AND METHOD FOR AUTOMATIC ALIGNMENT OF PHONETIC CONTENT FOR REAL-TIME ACCENT CONVERSION

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	12/26/2024

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.

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.
11951 18/754,280	7590 09/25/2024	Troutman Pepper Hamilton Sanders LLP (Rochester) 70 Linden Oaks Suite 210 Rochester, NY 14625	Lukas PFEIFENBERGER	264248.000131 4411

TITLE OF INVENTION: SYSTEM AND METHOD FOR AUTOMATIC ALIGNMENT OF PHONETIC CONTENT FOR REAL-TIME ACCENT CONVERSION

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	12/26/2024

EXAMINER	ART UNIT	CLASS-SUBCLASS
NEWAY, SAMUEL G	2657	704-232000

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
18/754,280	06/26/2024	Lukas PFEIFENBERGER	264248.000131	4411
11951	7590	09/25/2024	EXAMINER	
Troutman Pepper Hamilton Sanders LLP (Rochester)			NEWAY, SAMUEL G	
70 Linden Oaks			ART UNIT	
Suite 210			PAPER NUMBER	
Rochester, NY 14625			2657	

DATE MAILED: 09/25/2024

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.

Notice of Allowability	Application No. 18/754,280	Applicant(s) PFEIFENBERGER et al.	
	Examiner SAMUEL G NEWAY	Art Unit 2657	AIA (FITF) Status 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 the application filed 26 June 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 or send an inquiry to 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. ☒ Notice of References Cited (PTO-892) 2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date ____. 3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material ____. 4. ☐ Interview Summary (PTO-413), Paper No./Mail Date ____.	5. ☐ Examiner's Amendment/Comment 6. ☒ Examiner's Statement of Reasons for Allowance 7. ☐ Other ____.
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/SAMUEL G NEWAY/
Primary Examiner, Art Unit 2657

DETAILED ACTION

1. This is responsive to the application filed 26 June 2024.
2. Claims 1-20 are pending and considered below.

Notice of Pre-AIA or AIA Status

3. The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Allowable Subject Matter

4. Claims 1-20 are allowed.
5. The following is an examiner's statement of reasons for allowance:

The closest prior art of record, Fan et al. (US PGPub 2023/0223006) discloses obtaining a set of phonetic embedding vectors for phonetic content representing a source accent and obtained from input audio data ("*The terminal inputs the first voice into a voice feature extraction model, and extracts a PPG feature of the first voice by using the voice feature extraction model*", [0084], see [0120] for accent); and applying a trained machine learning model to the set of phonetic embedding vectors to generate a set of transformed phonetic embedding vectors corresponding to phonetic characteristics of speech data in a target accent ("*The terminal inputs the style feature and the PPG feature into a voice fusion model for fusion, to obtain a second voice.*", [0096], see [0120] for accent).

Fan, alone or in combination with the prior art of record, does not disclose determining an alignment by maximizing a cosine distance between the set of phonetic

embedding vectors and the set of transformed phonetic embedding vectors; and aligning the speech data to the phonetic content based on the determined alignment to generate output audio data representing the target accent.

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

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Zhao et al. (US PGPub 2023/0335107) discloses a reference-free foreign accent conversion (FAC) computer system and methods for training models, utilizing a library of algorithms, to directly transform utterances from a foreign, non-native speaker (L2) or second language (L2) speaker to have the accent of a native (L1) speaker. The models in the reference-free FAC computer system are a speech-independent acoustic model to extract speaker independent speech embeddings from an L1 speaker utterance and/or the L2 speaker, a speech synthesizer to generate L1 speaker reference-based golden-speaker utterances and a pronunciation correction model to generate a L2 speaker reference-free golden speaker utterances.

Wang et al. (US PGPub 2021/0193160) discloses obtaining a to-be-converted voice, and extracting acoustic features of the to-be-converted voice; obtaining a source vector corresponding to the to-be-converted voice from a source vector pool, and selecting a target vector corresponding to the target voice from the target vector pool;

obtaining acoustic features of the target voice output by the voice conversion model by using the acoustic features of the to-be-converted voice, the source vector corresponding to the to-be-converted voice, and the target vector corresponding to the target voice as an input of the voice conversion model; and obtaining the target voice by converting the acoustic features of the target voice using a vocoder.

Aryal et al. ("Articulatory-based conversion of foreign accents with deep neural networks." Sixteenth Annual Conference of the International Speech Communication Association. 2015) discloses an articulatory-based method for real-time accent conversion using deep neural networks (DNN). The approach consists of two steps. First, a DNN articulatory synthesizer for the non-native speaker that estimates acoustics from contextualized articulatory gestures is trained. Then the DNN is driven with articulatory gestures from a reference native speaker –mapped to the nonnative articulatory space via a Procrustes transform.

Liu et al. ("End-to-end accent conversion without using native utterances." ICASSP 2020-2020 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP). IEEE, 2020) discloses an end-to-end framework, which is able to conduct AC (accent conversion) from non-native-accented utterances without using any native-accented utterances during online conversion. This is achieved by independently extracting linguistic and speaker representations from non-native accented speech and condition a speech synthesis model on these representations to generate native-accented speech.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to SAMUEL G NEWAY whose telephone number is

(571)270-1058. The examiner can normally be reached Monday-Friday 9:00am-5:00pm EST.

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, Daniel Washburn can be reached on 571-272-5551. 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.

/SAMUEL G NEWAY/
Primary Examiner, Art Unit 2657

Notice of References Cited	Application/Control No. 18/754,280		Applicant(s)/Patent Under Reexamination PFEIFENBERGER et al.	
	Examiner SAMUEL G NEWAY		Art Unit 2657	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date YYYY-MM-DD	Name	CPC Classification	US Classification
*	A	US-20220358903-A1	2022-11-10	Serebryakov; Maxim	G10L13/033	1/1
*	B	US-10176819-B2	2019-01-08	Sun; Lifa	G10L15/187	1/1
*	C	US-20230335107-A1	2023-10-19	Zhao; Guanlong	G10L15/16	1/1
*	D	US-20220122579-A1	2022-04-21	Biadisy; Fadi	G10L25/30	1/1
*	E	US-20230223006-A1	2023-07-13	FAN; Fan	H04M1/72403	704/231
*	F	US-20210193160-A1	2021-06-24	WANG; RUOTONG	G10L25/27	1/1
*	G	US-20040148161-A1	2004-07-29	Das, Sharmistha S.	G10L21/00	704/E21.001
*	H	US-20230352001-A1	2023-11-02	CARMIEL; Yishay	G10L13/10	1/1
*	I	US-10186251-B1	2019-01-22	Mohammadi; Seyed Hamidreza	G10L15/26	1/1
	J					
	K					
	L					
	M					

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date YYYY-MM-DD	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	Aryal et al. "Articulatory-based conversion of foreign accents with deep neural networks." Sixteenth Annual Conference of the International Speech Communication Association (Year: 2015)
	V	Liu et al., "End-to-end accent conversion without using native utterances." ICASSP 2020-2020 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP). IEEE (Year: 2020)
	W	
	X	

*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.

Issue Classification 	Application/Control No. 18/754,280	Applicant(s)/Patent Under Reexamination PFEIFENBERGER et al.
	Examiner SAMUEL G NEWAY	Art Unit 2657

CPC						
Symbol					Type	Version
G10L	/	21	/	007	F	2013-01-01
G06F	/	3	/	162	I	2013-01-01
G10L	/	15	/	063	I	2013-01-01
G10L	/	15	/	16	I	2013-01-01
G10L	/	15	/	02	I	2013-01-01
G10L	/	13	/	033	I	2013-01-01
G10L	/	13	/	00	I	2013-01-01
G10L	/	21	/	013	I	2013-01-01
G10L	/	15	/	26	I	2013-01-01
G10L	/	21	/	003	I	2013-01-01
G10L	/	21	/	01	A	2013-01-01
G10L	/	2021	/	0135	A	2013-01-01

CPC Combination Sets				
Symbol	Type	Set	Ranking	Version
/				

Use images from artifact folder? ☒ Yes ☐ No			
NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	20	
/SAMUEL G NEWAY/ Primary Examiner, Art Unit 2657	19 September 2024	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	3

Issue Classification 	Application/Control No. 18/754,280	Applicant(s)/Patent Under Reexamination PFEIFENBERGER et al.
	Examiner SAMUEL G NEWAY	Art Unit 2657

INTERNATIONAL CLASSIFICATION				
CLAIMED				
G10L21/007	/	21	/	007
G06F3/16	/	3	/	16
G10L15/06	/	15	/	06
G10L15/16	/	15	/	16
G10L15/02	/	15	/	02
G10L13/033	/	13	/	033
G10L13/00	/	13	/	00
G10L21/013	/	21	/	013
G10L15/26	/	15	/	26
G10L21/003	/	21	/	003
G10L21/01	/	21	/	01
NON-CLAIMED				
	/		/	

US ORIGINAL CLASSIFICATION	
CLASS	SUBCLASS

CROSS REFERENCES(S)						
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)					

Use images from artifact folder? ☒ Yes ☐ No			
NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	20	
/SAMUEL G NEWAY/ Primary Examiner, Art Unit 2657	19 September 2024	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	3

Issue Classification 	Application/Control No. 18/754,280	Applicant(s)/Patent Under Reexamination PFEIFENBERGER et al.
	Examiner SAMUEL G NEWAY	Art Unit 2657

☒ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47															
CLAIMS															
Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original

Use images from artifact folder? ☒ Yes ☐ No			
NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	20	
/SAMUEL G NEWAY/ Primary Examiner, Art Unit 2657	19 September 2024	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	3

Search Notes 	Application/Control No. 18/754,280	Applicant(s)/Patent Under Reexamination PFEIFENBERGER et al.
	Examiner SAMUEL G NEWAY	Art Unit 2657

CPC - Searched*		
Symbol	Date	Examiner
G10L15/02, G10L15/26, G10L13/00, G10L15/063, G10L2021/0135, G10L21/007, G10L21/003, G10L21/013, G10L21/01, G10L15/16, G10L13/033	09/17/2024	SN

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

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
G10L15/02, G10L15/26, G10L13/00, G10L15/063, G10L2021/0135, G10L21/007, G10L21/003, G10L21/013, G10L21/01, G10L15/16, G10L13/033 (limited with text query)	09/17/2024	SN
PE2E SEARCH: Text, Assignee and Inventor Search	09/17/2024	SN
Google Scholar: NPL and Patent Search (see attached search history)	09/17/2024	SN

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
G10L	15/02, 15/26, 13/00, 15/063, 2021/0135, 21/007, 21/003, 21/013, 21/01, 15/16, 13/033	09/19/2024	SN

/SAMUEL G NEWAY/ Primary Examiner, Art Unit 2657	
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<i>Search Notes</i> 	Application/Control No. 18/754,280	Applicant(s)/Patent Under Reexamination PFEIFENBERGER et al.
	Examiner SAMUEL G NEWAY	Art Unit 2657

/SAMUEL G NEWAY/ Primary Examiner, Art Unit 2657	
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Bibliographic Data

Application No: 18/754,280

Foreign Priority claimed: ☐ Yes ☒ No

35 USC 119 (a-d) conditions met: ☐ Yes ☐ No ☐ Met After Allowance

Verified and Acknowledged:

/SAMUEL G NEWAY/

SN

Examiner's Signature

Initials

Title:

SYSTEM AND METHOD FOR AUTOMATIC ALIGNMENT OF PHONETIC CONTENT FOR REAL-TIME ACCENT CONVERSION

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
06/26/2024	704	2657	
RULE			

APPLICANTS

Sanas.ai Inc., Palo Alto, CA, UNITED STATES

INVENTORS

Lukas PFEIFENBERGER,
Shawn Zhang,

CONTINUING DATA

This application has PRO of 63510487 06/27/2023

FOREIGN APPLICATIONS

IF REQUIRED, FOREIGN LICENSE GRANTED**

07/09/2024
** SMALL ENTITY **

STATE OR COUNTRY

ADDRESS

FILING FEE RECEIVED

\$2,408

Web Search History

date, time	web site	search string
9/16/2024 1:09:34 PM	Google Scholar	accent conversion neural networks "cosine distance"
9/16/2024 4:09:19 PM	Google Scholar	"accent conversion" neural networks
9/16/2024 5:43:10 PM	Google Scholar	Foreign accent conversion by synthesizing speech from phonetic posteriorgram
9/16/2024 5:44:49 PM	Google Scholar	"accent conversion" neural networks distance
9/16/2024 5:45:49 PM	Google Scholar	"accent conversion" neural networks "distance"
9/16/2024 5:58:53 PM	Google Scholar	"accent conversion" neural networks "cosine distance"
9/16/2024 6:06:06 PM	Google Scholar	real-time "accent conversion" neural networks
9/17/2024 9:45:25 AM	Google Scholar	"accent conversion" neural networks dtw
9/17/2024 9:46:07 AM	Google Scholar	"accent conversion" neural networks alignment
9/17/2024 9:47:06 AM	Google Scholar	"accent conversion" neural networks alignment distance
9/17/2024 9:48:57 AM	Google Scholar	"accent conversion" neural networks alignment "cosine distance"
9/17/2024 9:49:24 AM	Google Scholar	"accent conversion" neural networks alignment maximize "cosine distance"
9/18/2024 9:48:25 AM	Google Scholar	"accent conversion" neural networks cosine
9/18/2024 10:10:33 AM	Google Scholar	"real-time (accent OR voice OR pronunciation) conversion"
9/18/2024 10:14:15 AM	Google Scholar	"real-time (accent OR voice OR pronunciation) conversion" cosine
9/18/2024 10:31:43 AM	Google Scholar	Reduction of non-native accents through statistical parametric articulatory synthesis

date, time	web site	search string
9/19/2024 12:44:47 PM	Google Scholar	"differentiable alignment"
9/19/2024 12:52:22 PM	Google Scholar	"differentiable alignment" cosine
9/19/2024 4:52:09 PM	Google Scholar	Articulatory-based conversion of foreign accents with deep neural networks
9/19/2024 4:55:20 PM	Google Scholar	END-TO-END ACCENT CONVERSION WITHOUT USING NATIVE UTTERANCES

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L1	3	((("SANAS.AI") near3 ("INC"))).AS,AANM.	(US-PGPUB; USPAT)	OR	ON	ON	2024/09/16 06:00 PM
L2	604	(conver\$5) near2 accent	(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	2024/09/17 10:18 AM
L3	194	(conver\$5) near2 accent	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/09/17 10:18 AM
L4	72	L3 AND ((G10L15/02 OR G10L15/26 OR G10L13/00 OR G10L15/063 OR G10L2021/0135 OR G10L21/007 OR G10L21/003 OR G10L21/013 OR G10L21/01 OR G10L15/16 OR G10L13/033).cpc.)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/09/17 10:22 AM
L5	13	maximiz\$4 near2 cosine ADJ distance	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/09/17 03:17 PM
L6	47	(conver\$5 translat\$4 chang\$4 transform\$4 adapt\$5) near2 (accent voice pronunciation) SAME cosine NEAR (distance similarity dot ADJ product)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/09/17 03:21 PM
L7	101425	((G10L15/02 OR G10L15/26 OR G10L13/00 OR G10L15/063 OR G10L2021/0135 OR G10L21/007 OR	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/09/17 03:21 PM

L8	13	G10L21/003 OR G10L21/013 OR G10L21/01 OR G10L15/16 OR G10L13/033).cpc.) 7 AND 6	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/09/17 03:21 PM
L9	31556	cosine NEAR (distance similarity dot ADJ product)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/09/17 03:28 PM
L10	1204	7 AND 9	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/09/17 03:29 PM
L11	242	(maximiz\$4 minimiz\$4) near2 cosine NEAR (distance similarity dot ADJ product)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/09/17 03:30 PM
L12	3	7 AND 11	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/09/17 03:30 PM
L13	138080	(conver\$5 translat\$4 chang\$4 transform\$4 adapt\$5) near2 (accent voice pronunciation)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/09/17 03:38 PM
L14	2317	(conver\$5 translat\$4 chang\$4 transform\$4 adapt\$5) near2 (accent voice pronunciation) SAME neural	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/09/17 03:39 PM
L16	772	7 AND 14	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/09/17 03:39 PM
L17	7642	(conver\$5 translat\$4 chang\$4 transform\$4 adapt\$5) near2 (accent voice pronunciation) AND neural AND (distance similarity dot ADJ product)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/09/17 03:40 PM
L18	1712	7 AND 17	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/09/17 03:40 PM
L19	165	(conver\$5 translat\$4 chang\$4 transform\$4 adapt\$5) near2 (accent voice pronunciation) SAME neural SAME	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/09/17 03:40 PM

L20	28	(distance similarity dot ADJ product) 7 AND 19	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/09/17 03:41 PM
L21	1111	(conver\$5 translat\$4 chang\$4 transform\$4 adapt\$5) near2 (accent voice pronunciation) WITH neural	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/09/17 04:23 PM
L22	463	7 AND 21	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/09/17 04:23 PM
L23	763	(conver\$5) near2 (accent voice pronunciation) WITH neural	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/09/17 04:24 PM
L24	329	7 AND 23	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/09/17 04:24 PM
L25	714	(conver\$5) near2 (accent voice pronunciation) WITH neural ADJ (net network)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/09/17 04:25 PM
L26	302	7 AND 25	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2024/09/17 04:25 PM
L27	18	((("PFEIFENBERGER") near3 ("Lukas")) OR (("ZHANG") near3 ("Shawn"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2024/09/18 09:39 AM

PE2E SEARCH - Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
N1	33287	((G10L15/02 OR G10L15/26 OR G10L13/00 OR G10L15/063 OR G10L2021/0135 OR G10L21/007 OR G10L21/003 OR G10L21/013 OR G10L21/01 OR G10L15/16 OR G10L13/033).cpc.)	(US-PGPUB; USPAT)	OR	ON	ON	2024/09/19 04:23 PM
N2	19	(conver\$5 translat\$4 chang\$4 transform\$4	(US-PGPUB; USPAT)	OR	ON	ON	2024/09/19 04:24 PM

N3	211	adapt\$5) near2 (accent voice pronunciation) SAME cosine NEAR (distance similarity dot ADJ product) (maximiz\$4 minimiz\$4)	(US-PGPUB; USPAT)	OR	ON	ON	2024/09/19 04:24 PM
N4	98	near2 cosine NEAR (distance similarity dot ADJ product) (conver\$5 translat\$4 chang\$4 transform\$4 adapt\$5) near2 (accent voice pronunciation) SAME neural SAME (distance similarity dot ADJ product)	(US-PGPUB; USPAT)	OR	ON	ON	2024/09/19 04:24 PM
N5	339	(conver\$5) near2 (accent voice pronunciation) WITH neural	(US-PGPUB; USPAT)	OR	ON	ON	2024/09/19 04:24 PM
N6	9	1 AND 2	(US-PGPUB; USPAT)	OR	ON	ON	2024/09/19 04:59 PM
N7	3	1 AND 3	(US-PGPUB; USPAT)	OR	ON	ON	2024/09/19 05:07 PM
N8	22	1 AND 4	(US-PGPUB; USPAT)	OR	ON	ON	2024/09/19 05:07 PM
N9	220	1 AND 5	(US-PGPUB; USPAT)	OR	ON	ON	2024/09/19 05:12 PM



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.
18/754,280	06/26/2024	Lukas PFEIFENBERGER	264248.000131	4411
11951	7590	08/15/2024		
Troutman Pepper Hamilton Sanders LLP (Rochester)			EXAMINER	
70 Linden Oaks			CENTRAL, DOCKET	
Suite 210				
Rochester, NY 14625				
			ART UNIT	PAPER NUMBER
			OPAP	
			NOTIFICATION DATE	DELIVERY MODE
			08/15/2024	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):

Patents@troutman.com

<i>Decision Granting Request for Prioritized Examination (Track I)</i>	Application No. 18/754,280	Applicant(s) PFEIFENBERGER et al.	
	Examiner CHERYL P GIBSON BAYLOR	Art Unit OPET	AIA (FITF) Status Yes

1. THE REQUEST FILED 26 June 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 CHERYL GIBSON BAYLOR at (571)272-3213. In his/her absence, calls may be directed to Petition Help Desk at (571) 272-3282.

/CHERYL GIBSON BAYLOR/ Paralegal Specialist, OPET	
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United States Patent and Trademark Office

Office of the Chief Financial Officer

Document Code:WFEE

User :Gloria Arias

Sale Accounting Date:08/14/2024

Sale Item Reference Number
18754280

Effective Date
06/26/2024

Document Number	Fee Code	Fee Code Description	Amount Paid	Payment Method
I20248D940239520	2830	PROCESSING FEE, EXCEPT PROV. APPLS.	\$56.00	Deposit Account

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number
18/754,280

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 (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	64	N/A			
SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A	280	N/A			
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	320	N/A			
TOTAL CLAIMS (37 CFR 1.16(i))	20	minus 20 =	*	0	x	=	0	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	3	minus 3 =	*	0	x	=	0	
APPLICATION SIZE FEE (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	664		TOTAL	

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

APPLICATION AS AMENDED - PART II

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

AMENDMENT B	(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)	RATE(\$)	ADDITIONAL FEE(\$)				
Total (37 CFR 1.16(i))	*	Minus	**	=	x	=	x	=	OR	x	=
Independent (37 CFR 1.16(h))	*	Minus	***	=	x	=	x	=	OR	x	=
Application Size Fee (37 CFR 1.16(s))									OR		
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))									OR		
							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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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
18/754,280	06/26/2024	Lukas PFEIFENBERGER	264248.000131

CONFIRMATION NO. 4411

11951

Troutman Pepper Hamilton Sanders LLP (Rochester)
70 Linden Oaks
Suite 210
Rochester, NY 14625

INFORMAL NOTICE



OC000000074980662

Date Mailed: 07/10/2024

INFORMATIONAL NOTICE TO APPLICANT

Applicant is notified that the above-identified application contains the deficiencies noted below. No period for reply is set forth in this notice for correction of these deficiencies. However, if a deficiency relates to the inventor's oath or declaration, the applicant must file an oath or declaration in compliance with 37 CFR 1.63, or a substitute statement in compliance with 37 CFR 1.64, executed by or with respect to each actual inventor no later than the expiration of the time period set in the "Notice of Allowability" to avoid abandonment. See 37 CFR 1.53(f).

The item(s) indicated below are also required and should be submitted with any reply to this notice to avoid further processing delays.

- A properly executed inventor's oath or declaration has not been received for the following inventor(s):

Lukas PFEIFENBERGER

Shawn Zhang

An inventor's oath or declaration in compliance with 37 CFR 1.63 or 1.64 executed by or with respect to each inventor must be submitted no later than the date on which the issue fee is paid in response to a notice requiring such fee. See 37 CFR 1.53(f).

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/byemane-brehan/



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UNITED STATES DEPARTMENT OF COMMERCE
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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
18/754,280	06/26/2024		728	264248.000131	20	3

CONFIRMATION NO. 4411

FILING RECEIPT



0000000074980659

11951

Troutman Pepper Hamilton Sanders LLP (Rochester)
70 Linden Oaks
Suite 210
Rochester, NY 14625

Date Mailed: 07/10/2024

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.

Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please submit a written request for a corrected Filing Receipt, including a properly marked-up ADS showing the changes with strike-through for deletions and underlining for additions. If you received a "Notice to File Missing Parts" or other Notice requiring a response for this application, please submit any request for correction to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections provided that the request is grantable.

Inventor(s)

Lukas PFEIFENBERGER, Salzburg, AUSTRIA;
Shawn Zhang, Palo Alto, CA;

Applicant(s)

Sanas.ai Inc., Palo Alto, CA;

Power of Attorney: The patent practitioners associated with Customer Number 11951

Domestic Priority data as claimed by applicant

This appln claims benefit of 63/510,487 06/27/2023

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: 07/09/2024

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 18/754,280**

Projected Publication Date: 10/17/2024

Non-Publication Request: No

Early Publication Request: Yes

**** SMALL ENTITY ****

Title

SYSTEM AND METHOD FOR AUTOMATIC ALIGNMENT OF PHONETIC CONTENT FOR REAL-TIME ACCENT CONVERSION

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.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at <http://www.uspto.gov/web/offices/pac/doc/general/index.html>.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

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Title 37, Code of Federal Regulations, 5.11 & 5.15

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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



UNITED STATES
PATENT AND TRADEMARK OFFICE

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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #
18/754,280

RECEIPT DATE / TIME
06/26/2024 09:26:59 AM Z ET

ATTORNEY DOCKET #
264248.000131

Title of Invention

SYSTEM AND METHOD FOR AUTOMATIC ALIGNMENT OF PHONETIC CONTENT FOR REAL-TIME ACCENT CONVERSION

Application Information

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

PATENT # -

CONFIRMATION # 4411

FILED BY Nicholas Gallo

PATENT CENTER # 66121903

FILING DATE -

CUSTOMER # 11951

FIRST NAMED INVENTOR Lukas PFEIFENBERGER

CORRESPONDENCE ADDRESS -

AUTHORIZED BY Nicholas Gallo

Documents

TOTAL DOCUMENTS: 6

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
20240626_UTILITY_Application_264248_000131-APP.TEXT.docx	26	Application body structured text document	50 KB
Warning: Bookmarks were found and have been removed.			
20240625_UTILITY_Drawings_264248_000131.pdf	3	Drawings-only black and white line drawings	104 KB
20240626_UTILITY_Application_264248_000131.pdf	26	Auxiliary PDF of Application	187 KB
20240625_Track_One_Request_264248_000131.pdf	2	Track One Request	141 KB

20240626__ADS__264248__000 131.pdf	8	Application Data Sheet	109 KB
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Warning: This is not a USPTO supplied ADS fillable form. Data in the form cannot be automatically loaded to other USPTO systems.

20240626__POA__264248__000 131.pdf	2	Power of Attorney	282 KB
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Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
20240626__UTILITY__Application__264248__000131-APP.TEXT.docx	D28357FEA539654492AEEEC88DDDD57D7BA37D52940B2E408F970156E8B0C6810E7C632824FAA0ACB9596563DFD7EEEF3EADA84737F72F1FB9876422B8072A52
20240625__UTILITY__Drawings__264248__000131.pdf	D0EEDC0C0FBFD4151A3D3B152D50E7FF602194BB058BFCA591AB32A6793285474985C457AB80657EEBD0D79A232EB388B73ABF8FF7D26E02B9842DDC94B7C5FB
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20240626__POA__264248__000131.pdf	72FEC0355443FE739A16D39046FCABC0829CD7BC853C75C7CFA708E699982BC197C5F545EEBCCCEAB0B6F5B10ABBD735D23BE1C7A585E3756F48144B90DAF8AB

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.

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	To be Assigned
Filing Date	Concurrently Herewith
First Named Inventor	Lukas PFEIFENBERGER
Title	SYSTEM AND METHOD FOR AUTOMATIC ALIGNMENT OF PHONETIC CONTENT FOR REAL-TIME ACCENT CONVERSION
Art Unit	To be Assigned
Examiner Name	To be Assigned
Attorney Docket Number	264248.000131

SIGNATURE of Applicant or Patent Practitioner

Signature	/Nicholas J. Gallo/	Date (Optional)	2024-06-26
Name	Nicholas J. Gallo	Registration Number	60,758
Title (if Applicant is a juristic entity)	Attorney for Applicant		
Applicant Name (if Applicant is a juristic entity)	Sanas.ai Inc.		

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 1 forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.132, and 1.133. 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.**

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:

11951

OR

☐ I hereby appoint Practitioner(s) named in the attached list (form PTO/AIA/82C) 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 patent application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above. (Note: Complete form PTO/AIA/82C.)

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:

OR

☐ Firm or Individual Name

Address

City

State

Zip

Country

Telephone

Email

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

Sanas.ai Inc.

- ☐ 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

Date (Optional)

Name

Maxim Serebryakov

Title

Chief Executive Officer

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 1 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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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	264248.000131
		Application Number	
Title of Invention	SYSTEM AND METHOD FOR AUTOMATIC ALIGNMENT OF PHONETIC CONTENT FOR REAL-TIME ACCENT CONVERSION		
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. 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.			

Secrecy Order 37 CFR 5.2:

☐ 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:

Inventor 1 Remove				
Legal Name				
Prefix	Given Name	Middle Name	Family Name	Suffix
	Lukas		PFEIFENBERGER	
Residence Information (Select One) ☐ US Residency ☒ Non US Residency ☐ Active US Military Service				
City	Salzburg	Country of Residence ⁱ	AT	
Mailing Address of Inventor:				
Address 1		c/o Sanas.ai Inc.		
Address 2		437 Lytton Avenue, Suite 200		
City	Palo Alto	State/Province	CA	
Postal Code	94301	Country ⁱ	US	
Inventor 2 Remove				
Legal Name				
Prefix	Given Name	Middle Name	Family Name	Suffix
	Shawn		ZHANG	
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service				
City	Palo Alto	State/Province	CA	Country of Residence US
Mailing Address of Inventor:				
Address 1		c/o Sanas.ai Inc.		
Address 2		437 Lytton Avenue, Suite 200		
City		State/Province	CA	
Postal Code	94301	Country ⁱ	US	
All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the Add button. Add				

Correspondence Information:

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	264248.000131
		Application Number	
Title of Invention	SYSTEM AND METHOD FOR AUTOMATIC ALIGNMENT OF PHONETIC CONTENT FOR REAL-TIME ACCENT CONVERSION		

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ An Address is being provided for the correspondence information of this application.

Customer Number	11951		
Email Address		Add Email	Remove Email

Application Information:

Title of the Invention	SYSTEM AND METHOD FOR AUTOMATIC ALIGNMENT OF PHONETIC CONTENT FOR REAL-TIME ACCENT CONVERSION		
Attorney Docket Number	264248.000131	Small Entity Status Claimed	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	3	Suggested Figure for Publication (if any)	

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:

☒ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** 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 **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

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:	☒ Customer Number	☐ US Patent Practitioner	☐ Limited Recognition (37 CFR 11.9)
Customer Number	11951		

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	264248.000131
		Application Number	
Title of Invention	SYSTEM AND METHOD FOR AUTOMATIC ALIGNMENT OF PHONETIC CONTENT FOR REAL-TIME ACCENT CONVERSION		

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	Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
	Claims benefit of provisional	63510487	2023-06-27

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button.

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)¹ 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).

Application Number	Country ¹	Filing Date (YYYY-MM-DD)	Access Code ¹ (if applicable)

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button.

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

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.



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.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	264248.000131
		Application Number	
Title of Invention	SYSTEM AND METHOD FOR AUTOMATIC ALIGNMENT OF PHONETIC CONTENT FOR REAL-TIME ACCENT CONVERSION		

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.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	264248.000131
		Application Number	
Title of Invention	SYSTEM AND METHOD FOR AUTOMATIC ALIGNMENT OF PHONETIC CONTENT FOR REAL-TIME ACCENT CONVERSION		

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.

Applicant 1

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.

[Clear](#)

☒ Assignee
 ☐ Legal Representative under 35 U.S.C. 117
 ☐ Joint Inventor

☐ Person to whom the inventor is obligated to assign.
 ☐ 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:

If the Applicant is an Organization check here. ☒

Organization Name Sanas.ai Inc.

Mailing Address Information For Applicant:

Address 1	437 Lytton Avenue, Suite 200		
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.

Assignee Information including Non-Applicant Assignee Information:

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	264248.000131
		Application Number	
Title of Invention	SYSTEM AND METHOD FOR AUTOMATIC ALIGNMENT OF PHONETIC CONTENT FOR REAL-TIME ACCENT CONVERSION		

Assignee 1

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.

If the Assignee or Non-Applicant Assignee is an Organization check here. ☐

Prefix	Given Name	Middle Name	Family Name	Suffix

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1				
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Signature:

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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	/Nicholas J. Gallo/		Date (YYYY-MM-DD)	2024-06-26	
First Name	Nicholas J.	Last Name	Gallo	Registration Number	60,758

Additional Signature may be generated within this form by selecting the Add button.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	264248.000131
		Application Number	
Title of Invention	SYSTEM AND METHOD FOR AUTOMATIC ALIGNMENT OF PHONETIC CONTENT FOR REAL-TIME ACCENT CONVERSION		

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.**

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

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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.
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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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ELECTRONIC PAYMENT RECEIPT

APPLICATION #
18/754,280

RECEIPT DATE / TIME
06/26/2024 09:26:59 AM Z ET

ATTORNEY DOCKET #
264248.000131

Title of Invention

SYSTEM AND METHOD FOR AUTOMATIC ALIGNMENT OF PHONETIC CONTENT FOR REAL-TIME ACCENT CONVERSION

Application Information

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

PATENT # -

CONFIRMATION # 4411

FILED BY Nicholas Gallo

PATENT CENTER # 66121903

AUTHORIZED BY Nicholas Gallo

CUSTOMER # 11951

FILING DATE -

CORRESPONDENCE
ADDRESS -

FIRST NAMED
INVENTOR Lukas PFEIFENBERGER

Payment Information

PAYMENT METHOD
DA / 500436

PAYMENT TRANSACTION ID
E20246P029056236

PAYMENT AUTHORIZED BY
Nicholas Gallo

PRE-AUTHORIZED ACCOUNT
500436

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 1.21 (Miscellaneous fees and charges)

FEE CODE	DESCRIPTION	ITEM PRICE(\$)	QUANTITY	ITEM TOTAL(\$)
2817	REQUEST FOR PRIORITIZED EXAMINATION	1680.00	1	1680.00
2111	UTILITY PATENT APPL. SEARCH FEE	280.00	1	280.00
4011	BASIC FILING FEE- UTILITY	64.00	1	64.00
2051	SURCHARGE- LATE FILING FEE, SEARCH FEE, EXAMINATION FEE, INVENTOR'S OATH OR	64.00	1	64.00

DECLARATION, OR APPLICATION
FILED WITHOUT AT LEAST ONE
CLAIM OR BY REFERENCE

2311	EXAMINATION OF ORIGINAL PATENT APPLICATION	320.00	1	320.00
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TOTAL AMOUNT:	\$2,408.00
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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.

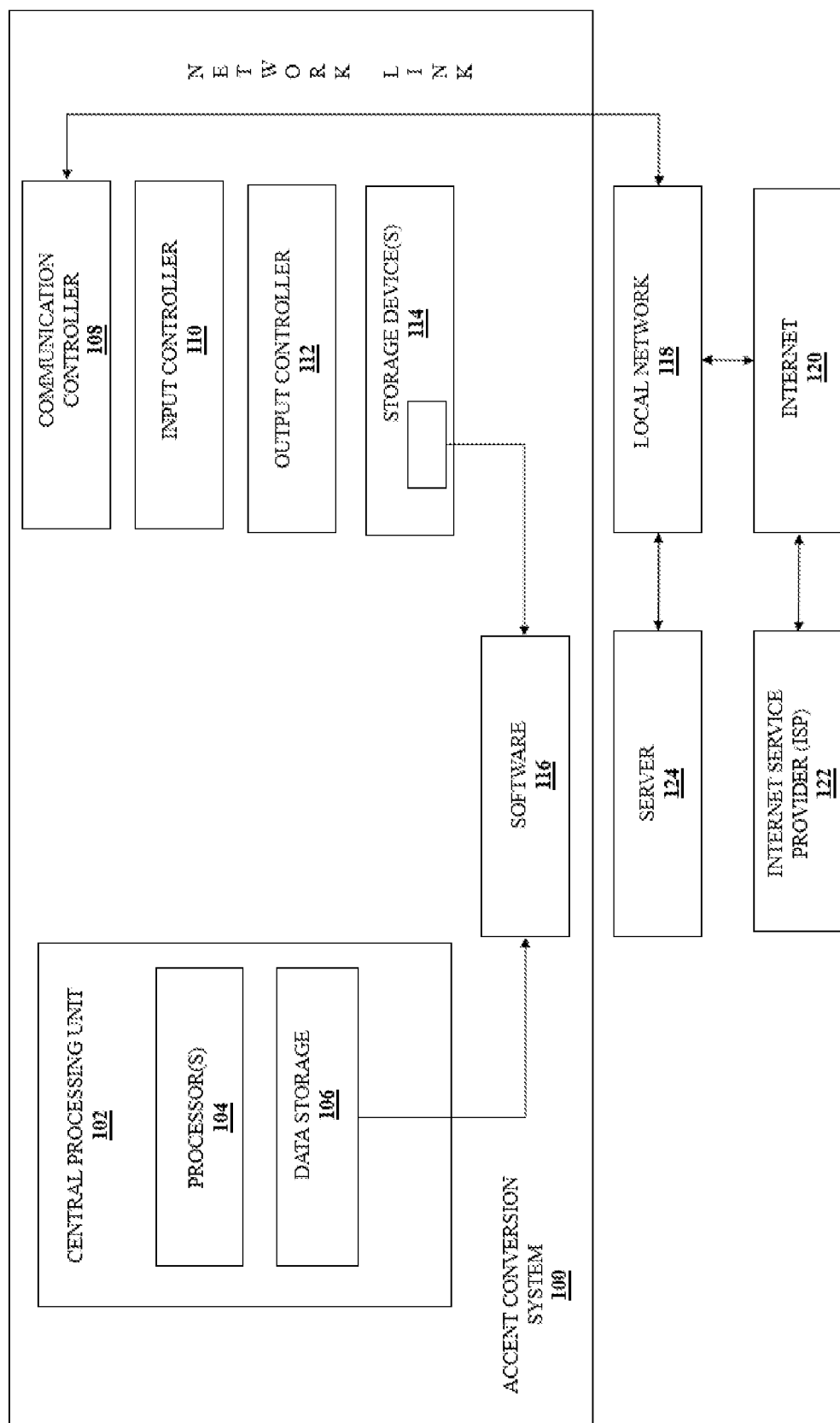


FIG. 1

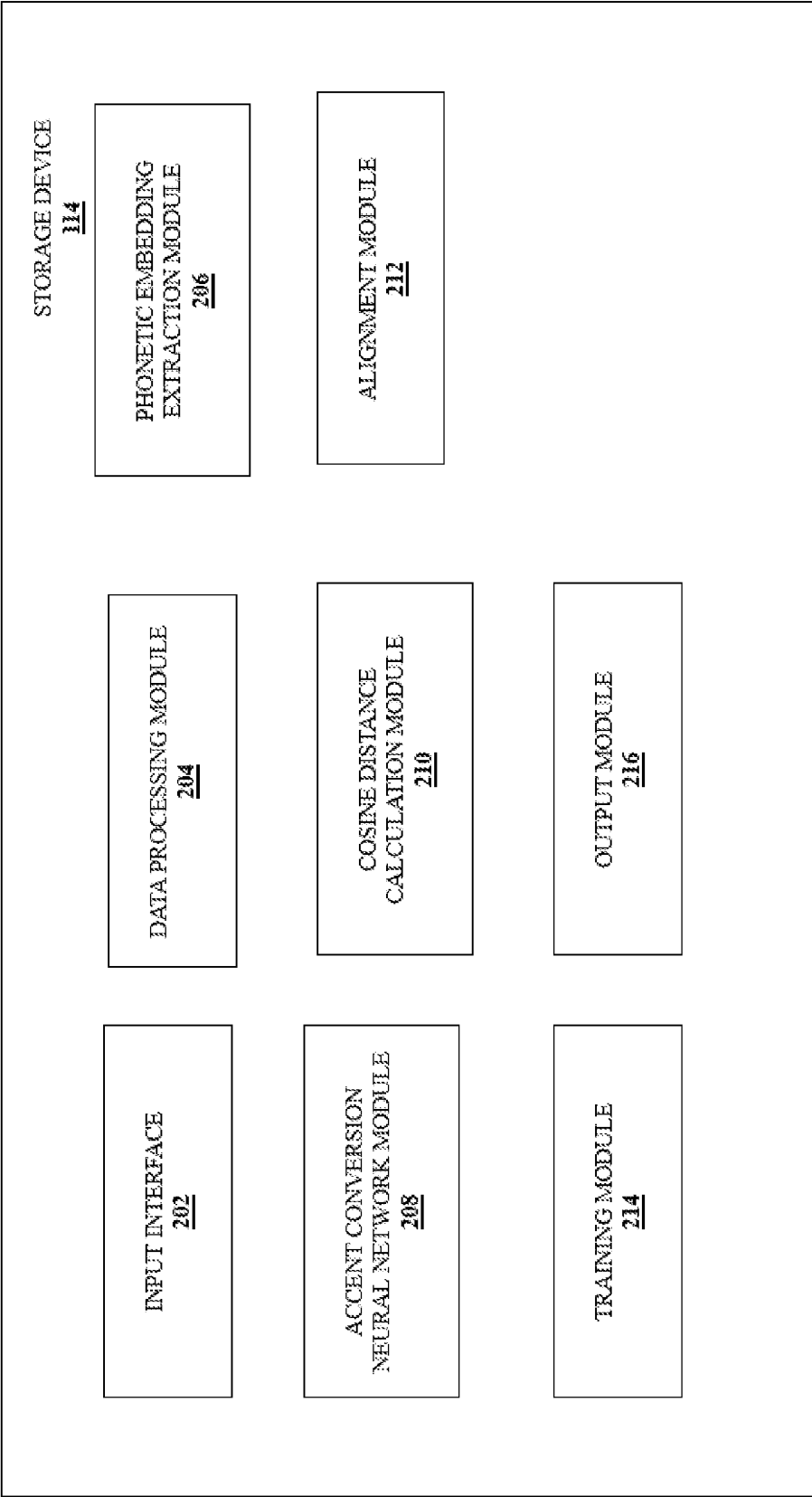


FIG. 2

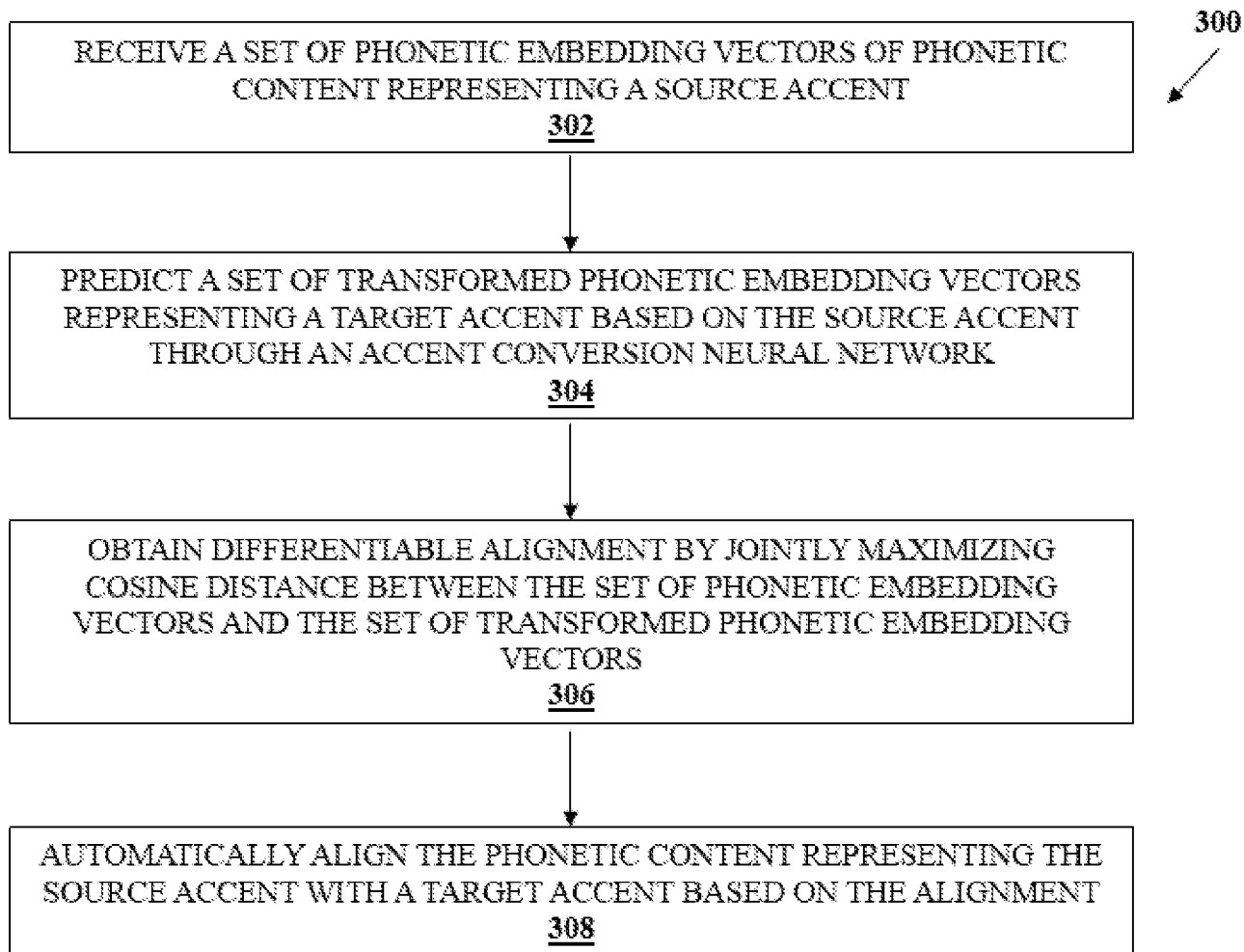


FIG. 3

TITLE: **SYSTEM AND METHOD FOR AUTOMATIC
ALIGNMENT OF PHONETIC CONTENT FOR
REAL-TIME ACCENT CONVERSION**

INVENTORS: **LUKAS PFEIFENBERGER and SHAWN ZHANG**

DOCKET NO.: **264248.000131**

SYSTEM AND METHOD FOR AUTOMATIC ALIGNMENT OF PHONETIC CONTENT FOR REAL-TIME ACCENT CONVERSION

[0001] This application claims priority to U.S. Provisional Patent Application Serial No. 63/510,487, filed June 27, 2023, which is hereby incorporated herein by reference in its entirety.

FIELD

[0002] This technology generally relates to audio analysis and, more particularly, to methods and systems for automatic alignment of phonetic content for real-time accent conversion.

BACKGROUND

[0003] Real-time accent conversion relates to the process of transforming speech from one accent to another accent in real-time. For instance, a speaker with an Indian accent could have their speech automatically converted into an American accent while they are speaking. This transformation process involves aligning phonetically dissimilar audio of two accents, which can be challenging due to the unique pronunciation styles of each speaker and associated accent.

[0004] One approach to aligning two audio sequences uses a dynamic time warping (DTW) algorithm. DTW finds optimal temporal alignment of two sequences by stretching or compressing them in time. However, DTW has limitations, such as being non-differentiable and not providing gradient information. As a result, training an accent conversion model of an accent conversion system using DTW requires two separate steps. The first step involves using DTW to align the audio of the two accents and the second step involves training the accent conversion model using the aligned data. This approach can limit the overall performance of the accent conversion system since the accent conversion model can only learn from the aligned data and not from the original audio.

[0005] Non-differentiability also is a significant issue that makes it difficult to train an accent conversion model effectively using DTW, thereby limiting its performance in real-world scenarios. Specifically, the non-differentiability of DTW makes it challenging to optimize current accent conversion systems using gradient-based methods, which are widely used in deep learning models. This limitation can lead to inaccuracies and errors in the accent conversion process and resulting poor-quality audio signals.

[0006] Non-monotonicity and instability are other significant issues that lead to alignment errors and negatively impact the accuracy of current accent conversion systems. Non-monotonicity refers to the fact that some alignment algorithms, including DTW, do not always guarantee that the alignment will be strictly increasing in time. This may lead to alignment errors and result in inaccurate accent conversions. Instability refers to the fact that the alignment algorithm may produce different results when the input signals are slightly perturbed, leading to inconsistencies in the accent conversion process.

[0007] Other deficiencies of existing accent conversion methods is that they do not handle complex accents that deviate significantly from the data used to train the accent conversion model. In such cases, current accent conversion systems may produce inaccurate or inconsistent results. Additionally, existing accent conversion methods are not able to capture the nuances and variations of different accents accurately, which may affect the naturalness and intelligibility of the converted speech. Furthermore, existing accent conversion methods require a significant amount of training data, which may be a challenge to collect and annotate, limiting the scalability of current systems and making it challenging for current systems to adapt to new accents or languages.

[0008] These and other limitations make it challenging to develop and deploy effective real-time accent conversion models and systems to accurately convert accented speech in different audio signals. Accordingly, current accent conversion

systems have limited performance, accuracy, and effectiveness for real-time accent conversion.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] The disclosed technology is illustrated by way of example and not limitation in the accompanying figures, in which like references indicate similar elements:

[0010] FIG. 1 is a block diagram of an exemplary network environment that includes an accent conversion system;

[0011] FIG. 2 is a block diagram of an exemplary storage device of the accent conversion system of FIG. 1; and

[0012] FIG. 3 is a flowchart of an exemplary method for automatic alignment of phonetic content for real-time accent conversion.

DETAILED DESCRIPTION

[0013] Examples described below may be used to provide a method, a device (e.g., non-transitory computer readable medium), an apparatus, and/or a system for automatic alignment of phonetic content for real-time accent conversion. Although the technology has been described with reference to specific examples, various modifications may be made to these examples without departing from the broader spirit and scope of the various embodiments of the technology described and illustrated by way of the examples herein.

[0014] With this technology, a set of phonetic embedding vectors that represent a source accent is received and a set of transformed phonetic embedding vectors that represent a target accent is predicted using a machine learning model (e.g., an accent conversion neural network). The disclosed technology achieves alignment by maximizing the cosine distance between the two sets of phonetic embedding vectors.

Based on this alignment, the phonetic content of the source accent is automatically aligned with the target accent.

[0015] Accordingly, this technology enables an accent conversion neural network, for example, to accurately transform the phonetic characteristics of the source accent to closely match the target accent, allowing for efficient and seamless accent conversion in real-time applications. The technology enables efficient and real-time accent conversion, thereby facilitating the processing of speech data in various practical applications such as voice assistants, language learning tools, and speech recognition systems.

[0016] In some examples, the disclosed technology may include several components such as audio input, pre-trained phonetic embedding vectors, a neural network model, a gradient-based optimization algorithm, loss functions, training data, and/or a user interface, each of which is described and illustrated in detail below. The technology may include obtaining audio recordings of two different accents and using pre-trained phonetic embedding vectors to quantify the similarity between those accents. An accent conversion neural network machine learning model may then be employed to predict the set of phonetic embedding vectors representing the target accent.

[0017] To achieve alignment, a gradient-based optimization algorithm may be utilized to automatically derive an alignment between the two sets of phonetic embedding vectors. The alignment may ensure stability and monotonicity by incorporating various loss functions such as Loss1, Loss2, and Loss3. The gradient-based optimization algorithm may efficiently calculate the alignment by taking advantage of the mathematical properties of the phonetic embedding vectors, which may have a unit norm. The similarity between any two phonetic embedding vectors may be expressed using the cosine distance, which may range between -1 and 1. The user interface may provide real-time feedback on the converted speech, enabling users to adjust settings for optimal performance. Thus, the disclosed technology overcomes

limitations in existing solutions and provides gradients for more efficient and effective training of the accent conversion system 100.

[0018] Referring now to FIG. 1, a block diagram of an exemplary network environment that includes an accent conversion system 100 is illustrated. The accent conversion system 100 in this example is configured for automatic alignment of phonetic content for real-time accent conversion and includes processor(s) 104, which are designed to process instructions (e.g., computer readable instructions (i.e., code)) stored on the storage device(s) 114 (e.g., a non-transitory computer readable medium) of the accent conversion system 100. By processing the stored instructions, the processor(s) 104 may perform one or more of the steps and/or functions disclosed herein, such as with reference to FIG. 3 for example.

[0019] The storage device(s) 114 may be optical storage device(s), magnetic storage device(s), solid-state storage device(s) (e.g., solid-state disks (SSDs)) or non-transitory storage device(s), another type of memory, and/or a combination thereof, for example, although other types of storage device(s) can also be used. The storage device(s) 114 may contain software 116, which is a set of instructions (i.e., program code). Alternatively, instructions may be stored in one or more remote storage devices, for example storage devices (e.g., hosted by a server 124) accessed over a local network 118 or the Internet 120 via an Internet Service Provider (ISP) 122.

[0020] The accent conversion system 100 also includes an operating system and microinstruction code in some examples, one or both of which can be hosted by the storage device(s) 114. The various processes and functions described herein may either be part of the microinstruction code and/or program code (or a combination thereof), which is executed via the operating system. The accent conversion system 100 also may have data storage 106, which along with the processor(s) 104 form a central processing unit (CPU) 102, an input controller 110, an output controller 112, and/or a communication controller 108. A bus (not shown) may operatively couple components of the accent conversion system 100, including processor(s) 104, data storage 106,

storage device(s) 114, input controller 110, output controller 112, and/or any other devices (e.g., a network controller or a sound controller).

[0021] Output controller 112 may be operatively coupled (e.g., via a wired or wireless connection) to a display device (e.g., a monitor, television, mobile device screen, touch-display, etc.) in such a fashion that output controller 112 can transform the display on the display device (e.g., in response to the execution of module(s)). Input controller 110 may be operatively coupled (e.g., via a wired or wireless connection) to an input device (e.g., mouse, keyboard, touchpad scroll-ball, touch-display, etc.) in such a fashion that input can be received from a user of the accent conversion system 100.

[0022] The communication controller 108 is coupled to a bus (not shown) in some examples and provides a two-way coupling through a network link to the Internet 120 that is connected to a local network 118 and operated by an ISP 122, which provides data communication services to the Internet. The network link typically provides data communication through one or more networks to other data devices. For example, a network link may provide a connection through local network 118 to a host computer and/or to data equipment operated by the ISP 122. A server 124 may transmit requested code for an application through the Internet 120, ISP 122, local network 118 and/or communication controller 108.

[0023] The accent conversion system 100 is illustrated in FIG. 1 with all components as separate devices for ease of identification only. One or more of the components of the accent conversion system 100 in other examples may be separate devices (e.g., a personal computer connected by wires to a monitor and mouse), may be integrated in a single device (e.g., a mobile device with a touch-display, such as a smartphone or a tablet), or any combination of devices (e.g., a computing device operatively coupled to a touch-screen display device, a plurality of computing devices attached to a single display device and input device, etc.). The accent conversion system 100 also may be one or more servers, for example a farm of networked or

distributed servers, a clustered server environment, or a cloud network of computing devices. Other network topologies can also be used in other examples.

[0024] Referring now to FIG 2, a block diagram of an exemplary one of the storage device(s) 114 of the accent conversion system 100 is illustrated. The storage device(s) 114 may include an input interface 202, a data processing module 204, a phonetic embedding extraction module 206, an accent conversion neural network module 208, a cosine distance calculation module 210, an alignment module 212, a training module 214, and/or an output module 216, although other types and/or number of modules can also be used in other examples.

[0025] The input interface 202 may serve as an interface through which the accent conversion system 100 receives input data and may allow for the input of the phonetic content representing a source accent, which may be necessary for the accent alignment and conversion process. The phonetic content may be in the form of speech and/or audio data or any other representation that captures the phonetic characteristics of the source accent.

[0026] The input interface 202 may include various components or functionalities to facilitate the input process and may include hardware components like microphones or audio interfaces for capturing real-time speech data. Alternatively, input interface 202 may include a software interface that allows for the input of pre-recorded speech data or textual representations of the phonetic content, and other types of input interfaces can also be used in other examples.

[0027] Accordingly, the input interface 202 may facilitate the receipt by the accent conversion system 100 of the necessary data to initiate the accent alignment and conversion process described and illustrated herein. The input interface 202 may be the initial point of interaction between a user (e.g., a user computing device) or external systems and the accent conversion system 100. The input data provided through the input interface 202 may serve as the foundation for subsequent processing and analysis within the accent conversion system 100, as described and illustrated in detail below.

[0028] The data processing module 204 may handle the input data received from the input interface 202. The data processing module 204 may employ techniques such as signal processing, statistical analysis, or machine learning algorithms to extract meaningful information from the input data. This information may include phonetic features, linguistic characteristics, and/or other relevant parameters that contribute to the alignment and conversion process. The data processing module 204 may involve data integration from multiple sources or data fusion techniques to combine different types of input data, enabling a more comprehensive analysis and alignment. The processed data from the data processing module 204 may be then passed on to subsequent modules within the accent conversion system 100, such as the phonetic embedding extraction module 206 or the accent conversion neural network module 208, for example, for further analysis and transformation.

[0029] The phonetic embedding extraction module 206 may extract phonetic embedding vectors from the phonetic content representing the source accent. The phonetic embedding extraction module 206 may capture and represent the phonetic characteristics of the input speech or audio data in a numerical format. The phonetic embedding vectors may encode essential information about phonemes, speech sounds, or other relevant phonetic units present in the input speech or audio data representing the source accent.

[0030] The phonetic embedding extraction module 206 may utilize various techniques, such as deep learning models, feature extraction algorithms, or linguistic analysis methods, to convert the acoustic or linguistic properties of the input speech or audio data into meaningful phonetic embedding vectors. These phonetic embedding vectors are typically high-dimensional numerical representations that capture the distinguishing phonetic features and patterns in the input speech or audio data representing the source accent.

[0031] To extract the phonetic embedding vectors, the phonetic embedding extraction module 206 may analyze different aspects of the input speech data, such as spectral features, pitch, formant frequencies, or other acoustic properties. The phonetic

embedding extraction module 206 may also consider linguistic information, such as phoneme sequences or linguistic features derived from the input speech data.

[0032] The extraction process performed by the phonetic embedding extraction module 206 may involve mapping the input speech data into a latent space where phonetic similarities and differences are captured. This latent space representation may enable the subsequent alignment and conversion step(s) to compare and manipulate the phonetic content effectively, as explained in more detail below.

[0033] The extracted phonetic embedding vectors from the phonetic embedding extraction module 206 may serve as a compact and informative representation of the phonetic content in the input speech data associated with the source accent. These vectors may then be utilized by subsequent modules, such as the accent conversion neural network module 208 or the cosine distance calculation module 210, to perform alignment, conversion, and/or distance computations.

[0034] In particular, the accent conversion neural network module 208, may predict the transformed phonetic embedding vectors that represent the target accent based on the source accent. The accent conversion neural network module 208 may utilize machine learning models including deep learning techniques, specifically neural networks, to learn the mapping between the phonetic embedding vectors of the input speech data in the source accent and the corresponding transformed phonetic embedding vectors that embody the phonetic characteristics of speech data in the target accent. The accent conversion neural network module 208 may leverage the power of neural networks to capture complex patterns and relationships within the phonetic data.

[0035] The accent conversion neural network module 208 can include multiple layers, including an encoder layer and a decoder layer. The encoder layer may take the phonetic embedding vectors associated with the source accent as input and encode them into a latent representation, effectively capturing the unique phonetic features of the input speech data representing the source accent. The decoder layer may then decode

this latent representation to generate the transformed phonetic embedding vectors that represent the target accent.

[0036] During the training phase, the accent conversion neural network module 208 may learn to predict the transformed phonetic vectors by adjusting the internal parameters based on a labeled dataset. This dataset may include paired samples of source accent phonetic embedding vectors and corresponding target accent phonetic embedding vectors. By iteratively adjusting the network parameters, the accent conversion neural network module 208 may optimize its predictions to minimize the difference between the predicted transformed vectors and the target accent vectors.

[0037] In some examples of the real-time accent conversion process described and illustrated by way of the examples herein, the accent conversion neural network module 208 may take the phonetic embedding vectors of the source accent as input and pass them through the accent conversion neural network. The internal computations of the neural network and learned transformations may enable the accent conversion neural network module 208 to generate the transformed phonetic embedding vectors that represent the target accent. The transformed phonetic embedding vectors may capture the phonetic characteristics and nuances of the target accent, allowing for a seamless conversion from the source accent to the target accent. Deep learning capabilities of the accent conversion neural network module 208 may make it capable of capturing subtle accent-specific details, resulting in accurate and effective accent conversion.

[0038] The cosine distance calculation module 210 in some examples is configured to calculate the cosine distance between the set of phonetic embedding vectors and the set of transformed phonetic embedding vectors. The cosine distance may measure similarity between two vectors that considers both their direction and magnitude. By jointly maximizing the cosine distance between the phonetic embedding vectors and the transformed phonetic embedding vectors, the cosine distance calculation module 210 may facilitate the alignment process described herein.

[0039] The cosine distance calculation module 210 is configured to normalize both sets of phonetic embedding vectors to have a unit norm. Normalization may involve scaling the phonetic embedding vectors to have a magnitude or length of one, while preserving their relative directions. This normalization may ensure that the phonetic embedding vectors are on a consistent scale and eliminate the influence of their magnitudes in the cosine distance calculation.

[0040] Once the phonetic embedding vectors are normalized, the cosine distance calculation module 210 may compute the dot product of the normalized phonetic embedding vectors. The dot product may measure the similarity of the phonetic embedding vectors based on their directions. By taking the dot product of the normalized phonetic embedding vectors, the cosine distance calculation module 210 may calculate the cosine distance between them, which provides a measure of alignment between the phonetic embedding vectors and the transformed phonetic embedding vectors. Maximizing the cosine distance may jointly align the phonetic embedding vectors in a way that minimizes their dissimilarity and maximizes their similarity.

[0041] The computed cosine distance may also serve as a feedback signal for the alignment module 212, enabling it to optimize and refine the alignment process. By maximizing the cosine distance, the alignment module 212 may achieve an improved alignment, enabling accurate and effective accent conversion. Accordingly, the alignment module 212 in some examples aligns the phonetic content of the input speech data associated with the source accent with the target accent based on the alignment obtained through the cosine distance maximization.

[0042] Once the cosine distance between the phonetic embedding vectors and the transformed phonetic embedding vectors is calculated, the alignment module 212 may utilize this information to perform an alignment process. The alignment module 212 may automatically align the phonetic content of the input speech data representing the source accent with the target accent to closely match each other. The alignment module 212 may operate at a frame-level granularity in some examples, aligning

individual frames of the input speech data associated with the source accent with corresponding frames of the target accent. The fine-grained alignment may allow for relatively precise matching of the phonetic content between accents, capturing temporal characteristics of speech.

[0043] To achieve alignment, the alignment module 212 may employ various techniques such as time-warping functions. These functions may enable the temporal alignment of the phonetic content by stretching or compressing the frames of the speech data representing the source accent to match the corresponding frames of output speech data representing the target accent. The temporal alignment may ensure that the phonetic content is properly synchronized between the accents.

[0044] By performing automatic alignment, the alignment module 212 may facilitate transformation of the phonetic characteristics of the input speech data in the source accent to closely match those of the target accent. This alignment process may ensure that important phonetic features are preserved while adapting the phonetic content to the desired target accent. Thus, the alignment module 212 allows for seamless and efficient conversion of accents during speech processing and may ensure that the converted speech maintains the natural flow and rhythm while accurately reflecting the desired target accent.

[0045] The training module 214 is configured to train the accent conversion neural network by iteratively adjusting one or more phonetic parameters based on the alignment achieved through maximizing the cosine distance. During the training process, the training module 214 may use a dataset comprising paired samples of source accent phonetic embedding vectors and target accent phonetic embedding vectors. These paired samples may serve as the training data for the accent conversion neural network.

[0046] The training module 214 may employ a gradient-based optimization algorithm to optimize the joint maximization of the cosine distance. The gradient-based optimization algorithm may iteratively update the phonetic parameters of the

accent conversion neural network based on the calculated gradients of a loss function, aiming to minimize the discrepancy between the predicted transformed phonetic embedding vectors and the target accent vectors.

[0047] By adjusting the phonetic parameters, the training module 214 may ensure that the accent conversion neural network learns to generate accurate and meaningful transformations of phonetic embedding vectors from the source accent to the target accent. The training process may allow the accent conversion neural network to capture the underlying patterns and relationships between the accents, enabling it to perform accurate accent conversion.

[0048] The training module 214 may fine-tune the ability of the accent conversion neural network to align and convert accents effectively. By continually updating the network parameters, the training module 214 may improve the accent conversion neural network performance and enhance its capability to produce high-quality transformed phonetic embedding vectors that closely match the target accent.

[0049] The training phase may be performed before deploying the accent conversion system 100 for real-time accent conversion and may involve multiple iterations and the adjustment of various phonetic parameters to achieve optimal performance. The training module 214 may enable the accent conversion neural network to learn and improve its accent conversion capabilities, leading to more accurate and reliable results in real-time accent conversion scenarios.

[0050] Once the alignment module 212 aligns the phonetic content of the source accent with the target accent, the aligned phonetic content may be passed to the output module 216 for further processing. The output module 216 in some examples is configured to generate speech output data that closely resembles the target accent while preserving the original linguistic content. The output module 216 may incorporate techniques such as prosody modeling, intonation adjustment, and/or accent-specific acoustic modeling for high quality, natural sounding, accurate and fluent speech production in the target accent.

[0051] The output module 216 may offer options for adjusting the speech characteristics, such as speech rate, pitch, or gender, to further customize the converted speech output based on user preferences or application requirements, for example. The output module 216 may deliver a seamless and intelligible speech output to reflect the desired target accent. By leveraging advanced speech synthesis techniques and models, the output module 216 may provide an accurate representation of the converted accent, allowing users to hear the converted speech output with the intended target accent in real-time or on-demand.

[0052] Referring now to FIG. 3, a flowchart of an exemplary method 300 for automatic alignment of phonetic content for real-time accent conversion is illustrated. In some examples, the method 300 may be implemented as a software application (e.g., software 116 executed by the central processing unit 102) or a module within a larger speech processing system. The software application or module may receive input audio data, perform automatic alignment, accent conversion, and provide the converted speech output in real-time, as explained in detail below

[0053] In step 302 in this example, the accent conversion system 100 receives a set of phonetic embedding vectors of phonetic content representing a source accent. The phonetic content is associated with speech in the source accent as represented within audio data from which the phonetic embedding vectors are generated. The phonetic content representing the source accent can be associated with audio data captured (e.g., via a microphone) or obtained by the accent conversion system 100. Audio embeddings capture audio data, including speech, as numerical vectors, incorporating acoustic features and temporal patterns in the audio, for example. Thus, the phonetic embedding vectors in some examples capture important features related to pronunciation, intonation, and other phonetic aspects of the speech in the source accent.

[0054] In some examples, additional phonetic embedding vectors can be used that represent emotions or styles, for example. In this examples, the method 300 may align and convert not only accents but also emotional or stylistic aspects of the source

speech, enabling more versatile and expressive accent conversion applications. The phonetic embedding vectors can be generated by a machine learning model (also referred to as an embedding model) trained to generate the phonetic embedding vectors from input audio data (e.g., audio data encapsulating the phonetic content representing the source accent).

[0055] In step 304, the accent conversion system 100 predicts a set of transformed phonetic embedding vectors representing a target accent based on the source accent through a trained accent conversion neural network. The target accent can be selected by a user and/or a stored default accent in some examples. Accordingly, the accent conversion neural network may be trained to predict a set of transformed phonetic embedding vectors that represent the target accent, based on input from the source accent. The accent conversion neural network may be trained by iteratively adjusting one or more parameters, utilizing the alignment achieved through maximizing the cosine distance between the source and target phonetic embedding vectors, which is described and illustrated in detail herein.

[0056] In some examples, the accent conversion system 100 trains the accent conversion neural network using a large dataset of aligned phonetic content pairs from multiple source and target accents, which allows the accent conversion neural network to learn a more generalized mapping between different accents, enhancing its accent conversion capabilities. Optionally, the accent conversion system 100 can subsequently preprocess the source and target phonetic embedding vectors (also referred to herein as the set of phonetic embedding vectors and the set of transformed phonetic embedding vectors, respectively) by applying dimensionality reduction techniques, such as Principal Component Analysis (PCA) or t-SNE (t-Distributed Stochastic Neighbor Embedding) to reduce the computational complexity and enhance the alignment accuracy.

[0057] In step 306, the accent conversion system 100 obtains differentiable alignment by jointly maximizing cosine distance between the set of phonetic embedding vectors and the set of transformed phonetic embedding vectors. To ensure

accurate alignment, the accent conversion system 100 employs a joint maximization of the cosine distance between the set of phonetic embedding vectors and the set of transformed phonetic embedding vectors, which allows for alignment and enables a smooth and seamless transition between source and target accents. In one example, the joint maximization of the cosine distance between the set of phonetic embedding vectors and the set of transformed phonetic embedding vectors may be performed using a gradient-based optimization algorithm.

[0058] Optionally, the phonetic embedding vectors and the predicted set of transformed phonetic embedding vectors can be normalized to have a unit norm, which ensures that the phonetic embedding vectors are scaled to a standardized length, specifically a magnitude of one, using mathematical calculations, such as dividing each component of each of the phonetic embedding vectors by its Euclidean norm or another appropriate norm. Normalization may involve scaling the phonetic embedding vectors to have a unit norm, followed by computing a dot product of the normalized phonetic embedding vectors, for example.

[0059] The normalization may create a consistent scale for the phonetic embedding vectors, allowing for effective comparisons and calculations based on their direction or relative positions rather than their magnitudes. In other words, by normalizing the phonetic embedding vectors to a unit norm, their magnitudes are equalized, and the focus may be shifted towards their orientations or relationships.

[0060] Thus, a unit norm for the phonetic embedding vectors and the predicted set of transformed phonetic embedding vectors may be used for calculating the cosine distance. The cosine distance is a measure of the angle between two vectors and may be used to quantify their similarity or dissimilarity. The cosine distance calculation may be more accurate and reliable by normalizing the phonetic embedding vectors to have a unit norm, leading to relatively precise alignment. According, in some examples, the accent conversion system 100 calculates the cosine distance between the normalized phonetic embedding vectors and the predicted set of transformed phonetic

embedding vectors to facilitate the alignment process and allow for efficient comparison between the source and target accents.

[0061] In step 308, the accent conversion system 100 automatically aligns the phonetic content of the source accent with the target accent based on the differentiable alignment obtained in step 306 to generate output audio data with phonetic content representing the target accent. The alignment of step 308 advantageously guarantees a relatively precise matching of the phonetic characteristics of the speech in the source and target accents, resulting in a highly accurate and natural-sounding accent conversion.

[0062] In some examples, the accent conversion system 100 incorporates a language model or a phonetic dictionary to improve the alignment accuracy. The language model or dictionary may provide additional context and phonetic information, enabling better alignment of the phonetic content between the source and target accents. In yet other examples, the accent conversion system 100 may incorporate a feedback loop mechanism that enables iterative refinement of the alignment and accent conversion by continuously comparing the converted phonetic content with the target accent and adjusting the accent conversion neural network parameters accordingly. Thus, the alignment of step 308 may enable end-to-end training of the accent conversion neural network.

[0063] Optionally, the accent conversion system 100 may utilize a speaker adaptation module that adapts the accent conversion method 300 based on the specific characteristics of the speaker's voice (i.e., the speaker associated with the speech content of the input audio data from which the set of phonetic embedding vectors of phonetic content is generated), thereby improving the accuracy and naturalness of the converted speech for individual speakers. In some examples of this technology, the alignment of step 308 is about twenty times faster than alignment achieved using dynamic time warping (DTW).

[0064] With this technology, an alignment between a set of phonetic embedding vectors representing a source accent and a set of transformed phonetic embedding vectors representing a target accent is advantageously derived for real-time accent conversion. The technology disclosed herein may be differentiable, may provide gradient, and may allow for more efficient and effective training of a real-time accent conversion system 100.

[0065] This technology has numerous practical applications, such as accent modification in speech synthesis, language learning tools, and cross-accent speech recognition. Moreover, the real-time capability of this technology ensures efficient and seamless accent conversion during speech processing, which enables users to communicate more effectively across different accents. The disclosed technology can be applied to non-native speakers learning a new accent in some implementations. By aligning the phonetic content of the learner's native accent with the target accent, this technology may facilitate accent acquisition and help learners improve their pronunciation and intonation.

[0066] In yet other applications, this technology can be used with voice assistants and virtual agents. By automatically aligning and converting accents in real-time, these voice assistant and virtual agent systems may provide a more personalized and natural user experience, which enables effective communication between the user and the voice assistant or virtual agent, regardless of the user's accent. The voice assistants and virtual agents may adapt to different accents, enhancing their ability to understand and respond to users' queries and requests.

[0067] This technology may also be applicable to multilingual communication systems, such as call centers or language translation services. Specifically, the disclosed technology enables seamless accent conversion by aligning and converting the accents of both the caller and the recipient, which facilitates smooth communication and overcomes potential barriers caused by diverse accents and thereby improves the overall quality and efficiency of multilingual interactions.

[0068] Moreover, this technology is applicable to the media and entertainment industries as it may be utilized to modify the accents of actors or voice-over artists to match specific roles or characters. By automatically aligning and converting accents, this technology enhances the authenticity and consistency of accents portrayed in movies, television shows, and other forms of media, which may improve the overall quality and realism of the content and enhance the viewer's experience.

[0069] Further, the automatic alignment of phonetic content described and illustrated by way of the examples herein may also benefit speech recognition and natural language processing (NLP) systems. By converting diverse accents into a common reference accent, this technology may improve the accuracy and performance of such systems, which may enable better understanding and interpretation of spoken input, enhance speech recognition, transcription, and language understanding capabilities, and be particularly useful in applications such as voice dictation, transcription services, and language understanding platforms.

[0070] Having thus described the basic concept of the invention, it will be rather apparent to those skilled in the art that the foregoing detailed disclosure is intended to be presented by way of example only and is not limiting. Various alterations, improvements, and modifications will occur and are intended for those skilled in the art, though not expressly stated herein. These alterations, improvements, and modifications are intended to be suggested hereby, and are within the spirit and scope of the invention. Additionally, the recited order of processing elements or sequences, or the use of numbers, letters, or other designations, therefore, is not intended to limit the claimed processes to any order.

CLAIMS

What is claimed is:

1. An accent conversion system, comprising an audio interface, memory having instructions stored thereon, and one or more processors coupled to the memory and configured to execute the instructions to:

obtain input audio data via the audio interface;

generate from the input audio data first phonetic embedding vectors for phonetic content representing a source accent;

apply a trained accent conversion neural network to the first phonetic embedding vectors to generate second phonetic embedding vectors corresponding to first phonetic characteristics of speech data in a target accent;

determine a differentiable alignment by jointly maximizing a cosine distance between the first phonetic embedding vectors and the second phonetic embedding vectors; and

align the speech data to the phonetic content based on the differentiable alignment to generate and provide output audio data corresponding to the aligned speech data and representing the target accent.

2. The accent conversion system of claim 1, wherein the first phonetic embedding vectors represent second phonetic characteristics of input speech in the input audio data in a numerical format and encode one or more of phonetic features, patterns, phonemes, pronunciation, intonation, speech sounds, or phonetic units present in the input speech.

3. The accent conversion system of claim 1, wherein the accent conversion neural network:

is trained to learn a mapping between the first phonetic embedding vectors and the second phonetic embedding vectors using a labeled dataset comprising paired samples of source accent phonetic embedding vectors and corresponding target accent phonetic embedding vectors; and

comprises an encoder layer configured to encode the first phonetic embedding vectors into a latent representation and a decoder layer configured to decode the latent representation to generate the second phonetic embedding vectors.

4. The accent conversion system of claim 1, wherein the one or more processors are further configured to execute the instructions to, in order to determine the cosine distance:

normalize the first and second phonetic embedding vectors by scaling the first and second phonetic embedding vectors to have a magnitude of one and preserving a relative direction of the first and second phonetic embedding vectors; and

generate a dot product of the normalized first and second phonetic embedding vectors.

5. The accent conversion system of claim 1, wherein the one or more processors are further configured to execute the instructions to, in order to generate the output audio data, one or more of align first frames of the speech data with corresponding second frames of the phonetic content, apply one or more of prosody modeling, intonation adjustment, or accent-specific acoustic modeling techniques, or adjust a speech rate, pitch, or gender, wherein the output audio data preserves linguistic content of the input audio data.

6. The accent conversion system of claim 1, wherein the one or more processors are further configured to execute the instructions to apply a gradient-based optimization algorithm to optimize the joint maximization of the cosine distance.

7. The accent conversion system of claim 1, wherein the one or more processors are further configured to execute the instructions to apply one or more dimensionality reduction techniques to preprocess the first and second phonetic embedding vectors.

8. A method for automatic alignment of phonetic content for real-time accent conversion, the method implemented by an accent conversion system and comprising:

obtaining a set of phonetic embedding vectors for phonetic content representing a source accent and obtained from input audio data;

applying a trained machine learning model to the set of phonetic embedding vectors to generate a set of transformed phonetic embedding vectors corresponding to phonetic characteristics of speech data in a target accent;

determining an alignment by maximizing a cosine distance between the set of phonetic embedding vectors and the set of transformed phonetic embedding vectors; and

aligning the speech data to the phonetic content based on the determined alignment to generate output audio data representing the target accent.

9. The method of claim 8, wherein the first phonetic embedding vectors represent second phonetic characteristics of input speech in the input audio data in a numerical format and encode one or more of phonetic features, patterns, phonemes, pronunciation, intonation, speech sounds, or phonetic units present in the input speech.

10. The method of claim 8, wherein the machine learning model:
is trained to learn a mapping between the set of phonetic embedding vectors and the set of transformed phonetic embedding vectors using a labeled dataset comprising paired samples of course accent phonetic embedding vectors and corresponding target accent phonetic embedding vectors; and

comprises an encoder layer configured to encode the set of phonetic embedding vectors into a latent representation and a decoder layer configured to decode the latent representation to generate the set of transformed phonetic embedding vectors.

11. The method of claim 8, further comprising, in order to determine the cosine distance:

normalizing the set of phonetic embedding vectors and the set of transformed phonetic embedding vectors by scaling the set of phonetic embedding vectors and the set of transformed phonetic embedding vectors to have a same

magnitude and preserving a relative direction of the set of phonetic embedding vectors and the set of transformed phonetic embedding vectors; and

generate a dot product of the normalized the set of phonetic embedding vectors and the set of transformed phonetic embedding vectors.

12. The method of claim 8, further comprising, in order to generate the output audio data, one or more of aligning first frames of the speech data with corresponding second frames of the phonetic content, applying one or more of prosody modeling, intonation adjustment, or accent-specific acoustic modeling techniques, or adjusting a speech rate, pitch, or gender, wherein the output audio data preserves linguistic content of the input audio data.

13. The method of claim 8, further comprising applying a gradient-based optimization algorithm to optimize the joint maximization of the cosine distance.

14. The method of claim 8, further comprising applying one or more dimensionality reduction techniques to preprocess the set of phonetic embedding vectors and the set of transformed phonetic embedding vectors.

15. A non-transitory computer-readable medium comprising instructions that, when executed by at least one processor, cause the at least one processor to:

obtain first phonetic embedding vectors for phonetic content representing a source accent and determined from obtained input audio data;

apply a trained neural network to the first phonetic embedding vectors to generate second phonetic embedding vectors corresponding to phonetic characteristics of speech data in a target accent;

determine an alignment by maximizing a cosine distance between the first phonetic embedding vectors and the second phonetic embedding vectors; and

align the speech data to the phonetic content based on the determined alignment to generate output audio data representing the target accent.

16. The non-transitory computer-readable medium of claim 15, wherein the first phonetic embedding vectors represent second phonetic characteristics of

input speech in the input audio data in a numerical format and encode one or more of phonetic features, patterns, phonemes, pronunciation, intonation, speech sounds, or phonetic units present in the input speech.

17. The non-transitory computer-readable medium of claim 15, wherein the instructions, when executed by the at least one processor further causes the at least one processor to, in order to determine the cosine distance:

normalize the first and second phonetic embedding vectors by scaling the first and second phonetic embedding vectors to have a magnitude of one and preserving a relative direction of the first and second phonetic embedding vectors; and

generate a dot product of the normalized first and second phonetic embedding vectors.

18. The non-transitory computer-readable medium of claim 15, wherein the instructions, when executed by the at least one processor further causes the at least one processor to, in order to generate the output audio data, one or more of align first frames of the speech data with corresponding second frames of the phonetic content, apply one or more of prosody modeling, intonation adjustment, or accent-specific acoustic modeling techniques, or adjust a speech rate, pitch, or gender, wherein the output audio data preserves linguistic content of the input audio data.

19. The non-transitory computer-readable medium of claim 15, wherein the instructions, when executed by the at least one processor further causes the at least one processor to apply a gradient-based optimization algorithm to optimize the joint maximization of the cosine distance.

20. The non-transitory computer-readable medium of claim 15, wherein the instructions, when executed by the at least one processor further causes the at least one processor to apply one or more dimensionality reduction techniques to preprocess the first and second phonetic embedding vectors.

ABSTRACT

The disclosed technology relates to methods, accent conversion systems, and non-transitory computer readable media for real-time accent conversion. In some examples, a set of phonetic embedding vectors is obtained for phonetic content representing a source accent and obtained from input audio data. A trained machine learning model is applied to the set of phonetic embedding vectors to generate a set of transformed phonetic embedding vectors corresponding to phonetic characteristics of speech data in a target accent. An alignment is determined by maximizing a cosine distance between the set of phonetic embedding vectors and the set of transformed phonetic embedding vectors. The speech data is then aligned to the phonetic content based on the determined alignment to generate output audio data representing the target accent. The disclosed technology transforms phonetic characteristics of a source accent to match the target accent more closely for efficient and seamless accent conversion in real-time applications.

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

First Named Inventor:	Lukas Pfeifenberger	Nonprovisional Application Number (if known):	
Title of Invention:	SYSTEM AND METHOD FOR AUTOMATIC ALIGNMENT OF PHONETIC CONTENT FOR REAL-TIME ACCENT CONVERSION		

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	/Nicholas J. Gallo/	Date	2024-06-25
Name (Print/Typed)	Nicholas J. Gallo	Practitioner Registration Number	60,758

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.

Placeholder Sheet for Supplemental Content

Application Number: 18754280

Document Date: 06/26/2024

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