

# PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

## PCT

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43*bis*.1)

To:

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Date of mailing ( <i>day/month/year</i> ) 25 October 2018 (25.10.2018)		<b>FOR FURTHER ACTION</b> See paragraph 2 below	
Applicant's or agent's file reference 5037PCT			
International application No. PCT/US 2018/036779	International filing date ( <i>day/month/year</i> ) 08 June 2018 (08.06.2018)	Priority date ( <i>day/month/year</i> ) 08 June 2017 (08.06.2017)	
International Patent Classification (IPC) or both national classification and IPC <b>G10L 25/63 (2013.01)</b> <b>G10L 25/30 (2013.01)</b> <b>G10L 21/0332 (2013.01)</b>			
Applicant NEWVOICEMEDIA US INC.			

1. This opinion contains indications relating to the following items:

- Box No. I Basis of the opinion
- Box No. II Priority
- Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- Box No. IV Lack of unity of invention
- Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement
- Box No. VI Certain documents cited
- Box No. VII Certain defects in the international application
- Box No. VIII Certain observations on the international application

**2. FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA/RU: Federal Institute of Industrial Property, Berezhkovskaya nab., 30-1, Moscow, G-59, GSP-3, Russia, 125993 Facsimile No: (8-495) 531-63-18, (8-499) 243-33-37	Date of completion of this opinion  22 October 2018 (22.10.2018)	Authorized officer  E. Druzhinina  Telephone No. (495) 531-65-15
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Box No. I Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of:
  - the international application in the language in which it was filed.
  - a translation of the international application into \_\_\_\_\_ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).
2.  This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(a))
3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing filed or furnished:
  - a.  forming part of the international application as filed:
    - in the form of an Annex C/ST.25 text file.
    - on paper or in the form of an image file.
  - b.  furnished together with the international application under PCT Rule 13*ter*.1(a) for the purposes of international search only in the form of an Annex C/ST.25 text file.
  - c.  furnished subsequent to the international filing date for the purposes of international search only:
    - in the form of an Annex C/ST.25 text file (Rule 13*ter*.1(a)).
    - on paper or in the form of an image file (Rule 13*ter*.1(b) and Administrative Instructions, Section 713).
4.  In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5. Additional comments:

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/US 2018/036779

**Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement**

Statement

Novelty (N)	Claims	1-5	YES
	Claims		NO
Inventive step (IS)	Claims		YES
	Claims	1-5	NO
Industrial applicability (IA)	Claims	1-5	YES
	Claims		NO

Citations and explanations:

D1: CN 106782602 A  
D2: US 7222075 B2  
D3: US 2016/0078859 A1

D1, as well as claims 1 and 5, discloses a system and a method for emotion-enhanced natural speech audio generation using dilated convolutional neural networks (abstract).

The known solution of D1 comprises:

an automated emotion engine comprising at least a plurality of programming instructions stored in a memory (claims, [0046]-[0050], [0073]) and operating on a processor of a network-connected computing device and configured to provide a plurality of input data ([0009]-[0010]), to, and receive a plurality of output data from, a dilated convolutional artificial neural network ([0011]-[0013], [0051]-[0052], [0069]);

wherein the automated emotion engine is configured to recognize a plurality of emotional states within the audio waveform ([0046]-[0048]).

The known method of D1 further comprises associating a plurality of text-based emotion content markers with at least a portion of the audio waveform, producing an emotion-enhanced audio waveform ([0048]-[0051]); and optionally providing the emotion-enhanced audio waveform to the dilated convolutional artificial neural network as an input data set for training ([0011]-[0013], [0048]-[0051]).

Inventions of the independent claims 1 and 5 differ from the known ones D1 with that the automated emotion engine is configured to receive at least a raw audio waveform from the dilated convolutional artificial neural network and to recognize a plurality of emotional states within the raw audio waveform.

Inventions of independent claims 1 and 5 meet the criterion of novelty.

Document D2 discloses solution for emotion-enhanced natural speech audio generation, wherein automated emotion engine is configured to receive a raw audio waveform and to recognize a plurality of emotional states within the raw audio waveform (col.3, lines 43-57, col.4, lines 42-67, col.5, line 50-col.6, line 65, col.7, lines 11-17, 39-43, col.8, lines 43-49, col.10, lines 23-25, line 45-col.11, line 22, col.12, lines 2-17).

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.  
Continuation of V:

Consequently, inventions of claims 1 and 5 meet the criterion of inventive step in view of documents D1 and D2 (Article 33(3) PCT).

Dependent claims 2-4 do not appear to contain any additional features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of inventive step, the reasons being as follows.

Features of claim 2 characterizing that the automated emotion engine is configured to produce an emotion-enhanced audio waveform by associating a plurality of emotion content markers, each comprising at least, a text label describing an emotional state, with at least, a portion of the audio waveform, are known from D1 ([0048]-[0051]).

Features of claim 3 characterizing that the automated emotion engine is configured to provide the emotion-enhanced audio waveform to the dilated convolutional artificial neural network as an input data set, are known from D1 ([0009]-[0013], [0046]-[0052]).

Features of claim 4 characterizing that at least one a portion of the emotion content markers are based on a text-to-speech script that was used in the generation of the raw audio waveform, are known from D3 (abstract, [0023]-[0041]).

The inventions of claims 1-5 meet the criterion of industrial applicability.