

PATENT COOPERATION TREATY


From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

To: KOLODKA, Joseph NEC Laboratories America, Inc. 4 Independence Way Suite 200 Princeton, New Jersey 08540 USA		Date of mailing (day/month/year) 28 November 2018 (28.11.2018)	
Applicant's or agent's file reference 17067PCT		FOR FURTHER ACTION See paragraph 2 below	
International application No. PCT/US2018/042218	International filing date (day/month/year) 16 July 2018 (16.07.2018)	Priority date(day/month/year) 05 September 2017 (05.09.2017)	
International Patent Classification (IPC) or both national classification and IPC G06F 17/30(2006.01)i, G06F 11/34(2006.01)i			
Applicant NEC LABORATORIES AMERICA, INC.			
<p>1. This opinion contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the opinion</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> 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</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input checked="" type="checkbox"/> Box No. VIII Certain observations on the international application</p> <p>2. FURTHER ACTION</p> <p>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 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.</p> <p>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.</p> <p>For further options, see Form PCT/ISA/220.</p>			

Name and mailing address of the ISA/KR International Application Division Korean Intellectual Property Office 189 Cheongsa-ro, Seo-gu, Daejeon, 35208, Republic of Korea Facsimile No. +82-42-481-8578	Date of completion of this opinion 27 November 2018 (27.11.2018)	Authorized officer NHO, Ji Myong Telephone No. +82-42-481-8528	
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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 43bis.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:
 - 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 13ter.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 13ter.1(a)).
 - on paper or in the form of an image file (Rule 13ter.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 forming part of the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5. Additional comments:

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

1. Statement

Novelty (N)	Claims	<u>1-20</u>	YES
	Claims	<u>NONE</u>	NO
Inventive step (IS)	Claims	<u>NONE</u>	YES
	Claims	<u>1-20</u>	NO
Industrial applicability (IA)	Claims	<u>1-20</u>	YES
	Claims	<u>NONE</u>	NO

2. Citations and explanations :

Reference is made to the following documents:

D1: US 2016-0292592 A1 (ORACLE INTERNATIONAL CORPORATION) 06 October 2016

D2: US 2017-0111245 A1 (INTERNATIONAL BUSINESS MACHINES CORPORATION) 20 April 2017

2.1 Novelty and Inventive Step (PCT Article 33(2) and (3))

2.1.1 Independent Claim 1

Claim 1 is an independent claim and relates to a computer-implemented method.

D1, which is considered to be the closest prior art to the subject matter of claim 1, discloses a method comprising:

identifying a log to analyze (see claim 1 in D1);

identifying certain tokens within the log (see paragraph [0190] in D1);

converting the log into a token vector (see paragraph [0202] in D1); and

performing a first similarity comparison between vector data and a first model of known log data to generate a first set of comparison results (see claim 1 in D1).

The subject matters of claim 1 differ from D1 in the features of: performing, by at least one processor, dimensionality reduction on a metric space to project the metric space into a lower dimensional sub-space; and in response to receiving a query associated with a query log message for reducing operational inefficiencies of one or more computer system components, employing, by the at least one processor, similarity distances to retrieve one or more similar log messages corresponding to the query log message for reducing the operational inefficiencies

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Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

Claims 11 and 19 are unclear because 'the database' has not been previously defined. Therefore, claims 11 and 19 do not meet the requirements of PCT Article 6.

(Note: Referring to paragraph [0037] in the description, the international search report and written opinion have been established on the assumption that the database in claims 11 and 19 refers to a database disclosed in paragraph [0037].)

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of the one or more computer system components. However, the different features are merely matters of design option in view of the combined features of D2, which is in the same technical field as D1, considering that a dimensionality reduction algorithm on event types is used to define clusters of new event types (see paragraph [0081] in D2) and D1 considering that a similarity comparison is then performed to classify a log and to generate classification results 1510 (see paragraph [0192] in D1).

It would not be particularly difficult for a person skilled in the art to combine D1 and D2, and it is regarded that the effect achieved from the combination of D1 and D2 can be easily foreseen by a person skilled in the art.

Accordingly, it would be obvious to a person skilled in the art to apply the feature of D2 to the method of D1 to arrive at the computer-implemented method of claim 1. Therefore, claim 1 is novel under PCT Article 33(2), but lacks an inventive step under PCT Article 33(3).

2.1.2 Dependent Claims 2-11

Claims 2-11 are directly or indirectly dependent on claim 1.

The additional features of **claims 2-4** are merely matters of design option in view of the feature of D1 (a second classifier, referred to herein as a “token classifier”, may operate based upon vectors generated by identification of certain tokens within the log, and some embodiments permit log data to be stored as metrics; see paragraphs [0140], [0190] in D1).

The additional features of **claims 5-6** are merely matters of design option in view of the feature of D2 (reducing a number of event types of the set of input traces to generate clusters of new event types, and calculating a similarity between each pair of event type based on a cosine similarity or a Euclidean distance-based similarity; see claims 1, 10, 13 in D2).

The additional feature of **claim 7** is merely a matter of design option in view of the feature of D2 (such as average cluster density, and average inter-or intra-cluster distance, embodiments of the disclosure evaluate process traces clustering using process-specific metrics; see paragraph [0089] in D2).

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The additional feature of **claim 8** is merely a matter of design option in view of the feature of D2 (calculating a similarity between each pair of event type nodes, and merging each event e_j into a cluster associated with one of the new dimensions that contains an event closest to e_j ; see claim 10 in D2).

The additional feature of **claim 9** is merely a matter of design option in view of the feature of D2 (Model-Regularized Trace Dimension Reduction; see paragraph [0073] in D2).

The additional feature of **claim 10** is known from the feature of D2 (presenting a visualization of the plurality of disjoint partitions to a user; see claim 6 in D2).

The additional feature of **claim 11** is merely a matter of design option in view of the feature of D1 (data may be accessed from a database 1432 that is maintained in a storage device 1431, which is accessed using a data interface 1433; see paragraph [0243] in D1).

Accordingly, claims 2-11 would have been obvious over D1 in view of D2. Therefore, claims 2-11 are novel under PCT Article 33(2), but lack an inventive step under PCT Article 33(3).

2.1.3 Independent Claim 12

Claim 12 is an independent claim and relates to a system. The features of claim 12 are substantially the same as those of claim 1 except for the category of invention and the features of a memory and a processor. However, the different features are known from the disclosure of D1 considering a memory and a processor (see paragraph [0239] in D1). Accordingly, the same reasoning as in claim 1 applies to claim 12. Therefore, claim 12 is novel under PCT Article 33(2), but lacks an inventive step under PCT Article 33(3) as being obvious over D1 in view of D2.

2.1.4 Dependent Claims 13-19

The features of **claims 13, 14-15, and 16-19** essentially correspond to those of claims 2, 5-6, and 8-11, respectively. Therefore, the same reasoning as in claims 2, 5-6, and 8-11 applies to claims 13, 14-15, and 16-19. Therefore, dependent claims 13-19 are novel under PCT Article 33(2), but lack an inventive step under PCT Article 33(3) as being obvious over D1 in view of D2.

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2.1.5 Independent Claim 20

Claim 20 is an independent claim and relates to a computer program product. Since the features of claim 20 are substantially the same as those of claim 1 except for the category of invention, the same reasoning as in claim 1 applies to claim 20. Therefore, claim 20 is novel under PCT Article 33(2), but lacks an inventive step under PCT Article 33(3) as being obvious over D1 in view of D2.

2.2 Industrial Applicability (PCT Article 33(4))

Claims 1-20 are industrially applicable under PCT Article 33(4).