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PCT Collaborative Search and Examination Pilot
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IA Number: CN2018095003
Applicant name: BAIDU.COM TIMES TECHNOLOGY (BEIJING)
CO., LTD. (+1)
International filing date: 09 July 2018

Main ISA: CN - State Intellectual Property Office of the
People's Republic of China
Main ISA provisional report
uploaded: 03 September 2018

Peer ISA: EP - European Patent Office (EPO)
Peer contribution uploaded: 28 September 2018

The following document(*) has been uploaded by the peer ISA for consideration by the main ISA:

- Peer contribution (12 pages)

Indications by the peer ISA concerning the further searching performed:

- The peer review covered all claims covered by the main ISA
- The peer examiner conducted a full prior art search of the claims covered

() Document containing a maximum of three different documents put together with a cover letter as first page.*

Date: 28 September 2018 16:19:27 CEST
ePCT user: John Berry
Authentication: OFFICE

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 18A52205	FOR FURTHER ACTION	see Form PCT/ISA/220 as well as, where applicable, item 5 below.
International application No. PCT/CN2018/095003	International filing date (<i>day/month/year</i>) 09 July 2018	(Earliest) Priority Date (<i>day/month/year</i>)
Applicant BAIDU.COM TIMES TECHNOLOGY (BEIJING) CO., LTD		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 4 sheets.

It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the **language**, the international search was carried out 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)).

b. This international search report has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43.6bis(a)).

c. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2. **Certain claims were found unsearchable** (see Box No. II).

3. **Unity of invention is lacking** (see Box No. III).

4. With regard to the **title**,

the text is approved as submitted by the applicant.

the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

the text is approved as submitted by the applicant.

the text has been established, according to Rule 38.2, by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the **drawings**,

a. the figure of the **drawings** to be published with the abstract is Figure No. 9

as suggested by the applicant.

as selected by this Authority, because the applicant failed to suggest a figure.

as selected by this Authority, because this figure better characterizes the invention.

b. none of the figures is to be published with the abstract.

INTERNATIONAL SEARCH REPORT

International application No
PCT/CN2018/095003

A. CLASSIFICATION OF SUBJECT MATTER

INV. B60W50/00 B60W30/00 G05D1/00 G08G1/00 G01C21/26
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
B60W G06N G05D G01C G05B G08G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 3 342 670 A1 (BAIDU USA LLC [US]) 4 July 2018 (2018-07-04) the whole document -----	1-21
A	US 8 374 765 B1 (RUBIN STUART H [US]) 12 February 2013 (2013-02-12) the whole document -----	1-21
A	US 2018/022361 A1 (RAO LEI [US] ET AL) 25 January 2018 (2018-01-25) the whole document -----	1-21
A	CN 103 777 631 A (BEIJING TRAFFIC CONTROL TECH) 7 May 2014 (2014-05-07) the whole document -----	1-21
	-/--	

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents:

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier application or patent but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- "&" document member of the same patent family

Date of the actual completion of the international search

Date of mailing of the international search report

28 September 2018

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
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Authorized officer

Tsitsilonis, Lucas

INTERNATIONAL SEARCH REPORT

International application No
PCT/CN2018/095003

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	KR 2014 0024547 A (KONG MIN HAN [KR]) 3 March 2014 (2014-03-03) abstract; claims; figures -----	1,12,17
A	CN 103 853 908 A (SHENYANG INST AUTOMATION) 11 June 2014 (2014-06-11) abstract; claims; figure 1 -----	1,12,17
A	US 2014/005877 A1 (XU JINGYANG [US] ET AL) 2 January 2014 (2014-01-02) abstract; claims; figures paragraphs [0010] - [0013], [0030] - [0048] -----	1,12,17

Peer contribution
Document 1 of 1
Page 3 of 12

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/CN2018/095003

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 3342670	A1	04-07-2018	-----
US 8374765	B1	12-02-2013	NONE
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US 2018022361	A1	25-01-2018	-----
CN 103777631	A	07-05-2014	NONE
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KR 20140024547	A	03-03-2014	NONE
-----	-----	-----	-----
CN 103853908	A	11-06-2014	NONE
-----	-----	-----	-----
US 2014005877	A1	02-01-2014	US 2014005877 A1 02-01-2014
-----	-----	-----	WO 2014003151 A2 03-01-2014
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Peer contribution
Document 1 of 1
Page 4 of 12

PATENT COOPERATION TREATY

From the
 INTERNATIONAL SEARCHING AUTHORITY

PCT

WRITTEN OPINION OF THE
 INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43*bis*.1)

To:

Date of mailing
 (day/month/year)

Applicant's or agent's file reference
 18A52205

FOR FURTHER ACTION
 See paragraph 2 below

International application No.
 PCT/CN2018/095003

International filing date (day/month/year)
 09 July 2018

Priority date (day/month/year)

International Patent Classification (IPC) or both national classification and IPC
 INV. B60W50/00 B60W30/00 G05D1/00 G08G1/00 G01C21/26

Applicant
 BAIDU.COM TIMES TECHNOLOGY (BEIJING) CO., LTD

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/EP
 European Patent Office
 D-80298 Munich
 Tel. +49 89 2399-0
 Fax: +49 89 2399-4465

Date of completion of this opinion

Authorized officer
 L Tsitsilonis
 Telephone No.

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))
- 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:

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

1. Statement

Novelty (N) Yes: Claims 1-21
No: Claims

Inventive step (IS) Yes: Claims 1-21
No: Claims

Peer contribution Document 1 of 1 Industrial applicability (IA) Yes: Claims 1-21
Page 7 of 12 No: Claims

2. Citations and explanations

see separate sheet

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Reference is made to the following documents:

- D1 EP 3 342 670 A1 (BAIDU USA LLC [US]) 4 July 2018 (2018-07-04)
- D2 US 8 374 765 B1 (RUBIN STUART H [US]) 12 February 2013 (2013-02-12)
- D3 US 2018/022361 A1 (RAO LEI [US] ET AL) 25 January 2018 (2018-01-25)
- D4 CN 103 777 631 A (BEIJING TRAFFIC CONTROL TECH) 7 May 2014 (2014-05-07)
- D5 KR 2014 0024547 A (KONG MIN HAN [KR]) 3 March 2014 (2014-03-03)
- D6 CN 103 853 908 A (SHENYANG INST AUTOMATION) 11 June 2014 (2014-06-11)
- D7 US 2014/005877 A1 (XU JINGYANG [US] ET AL) 2 January 2014 (2014-01-02)

2. Independent claim 1

2.1 D1 is regarded as being the prior art closest to the subject-matter of claim 1, and discloses (see figures 4-8; paragraphs 12, 44-49; claims) a computer-implemented method to control an autonomous driving vehicle (ADV), the method comprising:

- receiving a first control command ("*past target speed*") and a speed measurement ("*current vehicle speed*") of the ADV;
- determining an expected acceleration the ADV (through the depression of the throttle/ accelerator pedal) based on the speed measurement and the first control command;
- ~~receiving an acceleration measurement of the ADV;~~
- determining a feedback error based on the ~~acceleration measurement and the expected acceleration~~ the target speed and the actual speed;

- updating a portion of the calibration table based on the determined feedback error (by calculating a cost value); and
- generating a second control command to control the ADV based on the calibration table having the updated portion to control the ADV autonomously according to the second control command.

2.2 The subject-matter of claim 1 differs from this known computer-implemented method in that the method comprises

- receiving an acceleration measurement of the ADV; and
- determining a feedback error based on the acceleration measurement and the expected acceleration.

The subject matter of claim 1 is therefore new (Article 33(2) PCT).

2.3 Motion planning and control are critical operations in autonomous driving. Conventional motion planning operations require that same motion planning and control is applied to an autonomous vehicle irrespective of its loading (e.g. number of passengers) at any time. The problem to be solved by the present invention may be regarded as improving the speed control accuracy by using a more efficient self-calibration method.

2.4 The solution to this problem proposed in claim 1 of the present application is considered as involving an inventive step (Article 33(3) PCT) for the following reasons:

D2 discloses (see figure 1) a computer-implemented method to control a vehicle, the method comprising:

- receiving a first control command and a speed ("tachometer") measurement of the vehicle;
- determining an expected acceleration the vehicle (through the depression of the accelerator pedal) based on the speed measurement and the first control command (see figure 1);
- updating a portion of the calibration table ; and
- generating a second control command to control the vehicle based on the calibration table having the updated portion to control the vehicle according to the second control command.

In short, D2 discloses a controlled vehicle acceleration method using a **user-responsive feedback** in order to assign different weights to a look-up table, so that the vehicle can accelerate smoothly under different driving conditions as specified in column 4, lines 5-37 of D2.

Each of the documents D3 to D7, when examined individually, seem to show relevant speed and/or acceleration adaptable policies for ADV's, whereby said policies are based on weighted matrices or look-up tables.

None of the retrieved prior art documents disclose all the steps of the method of the invention as claimed. Furthermore, there is no hint in the retrieved prior art documentation that would prompt the skilled person towards the proposed solution to the aforementioned problem. Since the claimed solution cannot be considered as an obvious solution for the skilled person, the skilled person would have needed to apply inventive skills in order to arrive to the claimed invention., and as a result the subject matter of claim 1 is considered to be not only new, but also inventive over the retrieved prior art.

3. Dependent claims 2-11

Claims 2-14 are dependent on claim 1 and as such also meet the requirements of the PCT with respect to novelty and inventive step.

4. Dependent claims 12-21

Claim 12 refers to a non-transitory machine-readable medium and claim 17 to a data processing system. Each of the claims 12 and 17 contains essentially all technical features of claim 1. Based on a similar argumentation as for claim 1, also the subject matter of claims 12 and 17 is new and inventive over the prior art.

Claims 13-16 and 18-21 are dependent on claims 12 and 17 and as such also meet the requirements of the PCT with respect to novelty and inventive step.

5. Industrial Applicability

The subject matter of claims 1-21 fulfils the criteria of Article 33(4) PCT since it finds application in the field of Automotive Engineering and in particular the field of navigation and control autonomous driving vehicles.

Re Item VII

Certain defects in the international application

(a) At least independent claim 1 is not in the two-part form in accordance with Rule 6.3(b) PCT, which in the present case would be appropriate, with those features known in combination from the prior art being placed in the preamble (Rule 6.3(b)(i) PCT) and the remaining features being included in the characterising part (Rule 6.3(b)(ii) PCT).

(b) The technical features of all claims are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).

(c) A document reflecting the prior art described on page 1 of the description, is not identified in the relevant section of the application (Rule 5.1(a)(ii) PCT).

Re Item VIII

Certain observations on the international application

The application does not meet the requirements of Article 6 PCT, because claim 1 is not clear because the calibration table is not clearly defined.

In claim 1, reference is made for the first time to a calibration table by stating "... *updating a portion of the calibration table ...*". But the calibration table was not previously defined. Thus the aforementioned expression is taken to mean "... *updating a portion of a calibration table ...*".

Information on Search Strategy - Pilot phase (see OJ 2015, A86)

The type of information contained in this sheet may change during the pilot for improving the usefulness of this new service.

Application Number

PCT/CN2018/095003

TITLE: A SPEED CONTROL COMMAND AUTO-CALIBRATION SYSTEM FOR AUTONOMOUS VEHICLES

APPLICANT: BAIDU.COM TIMES TECHNOLOGY (BEIJING) CO., LTD

IPC CLASSIFICATION: B60W50/00, B60W30/00, G05D1/00, G08G1/00, G01C21/26

EXAMINER: Tsitsilonis, Lucas

CONSULTED DATABASES: WPI

CLASSIFICATION SYMBOLS DEFINING EXTENT OF THE SEARCH:

IPC:

CPC: B60W2050/0026, B60W2050/0075/LOW, B60W2050/0014, B60W2050/0062, B60W2050/0088, B60W2050/0083/LOW, B60W30/08/LOW, B60W30/10/LOW, B60W30/14/LOW, B60W30/18/LOW, B60W40/12, B60W40/13/LOW, G05D1/0088, G05D1/0027, G05D1/021/LOW, G01C21/26, G06N5/00/LOW, G05B13/00, G08G1/00/LOW

FI/F-TERMS:

KEYWORDS OR OTHER ELEMENTS FEATURING THE INVENTION: