

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44bis)

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| Applicant's or agent's file reference YGDG2016008 | FOR FURTHER ACTION | | See item 4 below |
| International application No. PCT/CN2016/109442 | International filing date (<i>day/month/year</i>) 12 December 2016 (12.12.2016) | Priority date (<i>day/month/year</i>) 02 December 2016 (02.12.2016) | |
| International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237 | | | |
| Applicant GUANGDONG SYGOLE INTELLIGENT TECHNOLOGY CO., LTD | | | |

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|---|-------------------------------------|---|---------------------|-------------------------------------|------------|----------|--------------------------|-------------|--|--------------------------|------------|----------------------------|-------------------------------------|-----------|---|--------------------------|------------|-------------------------|--------------------------|-------------|--|-------------------------------------|--------------|---|
| <p>1. This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 bis.1(a).</p> <p>2. This REPORT consists of a total of 7 sheets, including this cover sheet.</p> <p>In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.</p> | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>3. This report contains indications relating to the following items:</p> <table> <tr> <td><input checked="" type="checkbox"/></td> <td>Box No. I</td> <td>Basis of the report</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td>Box No. II</td> <td>Priority</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. III</td> <td>Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. IV</td> <td>Lack of unity of invention</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td>Box No. V</td> <td>Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. VI</td> <td>Certain documents cited</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. VII</td> <td>Certain defects in the international application</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td>Box No. VIII</td> <td>Certain observations on the international application</td> </tr> </table> <p>4. The International Bureau will communicate this report to designated Offices in accordance with Rules 44bis.3(c) and 93bis.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44bis .2).</p> | <input checked="" type="checkbox"/> | Box No. I | Basis of the report | <input checked="" type="checkbox"/> | Box No. II | Priority | <input type="checkbox"/> | Box No. III | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability | <input type="checkbox"/> | Box No. IV | Lack of unity of invention | <input checked="" type="checkbox"/> | Box No. V | Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement | <input type="checkbox"/> | Box No. VI | Certain documents cited | <input type="checkbox"/> | Box No. VII | Certain defects in the international application | <input checked="" type="checkbox"/> | Box No. VIII | Certain observations on the international application |
| <input checked="" type="checkbox"/> | Box No. I | Basis of the report | | | | | | | | | | | | | | | | | | | | | | |
| <input checked="" type="checkbox"/> | Box No. II | Priority | | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> | Box No. III | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability | | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> | Box No. IV | Lack of unity of invention | | | | | | | | | | | | | | | | | | | | | | |
| <input checked="" type="checkbox"/> | Box No. V | Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement | | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> | Box No. VI | Certain documents cited | | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> | Box No. VII | Certain defects in the international application | | | | | | | | | | | | | | | | | | | | | | |
| <input checked="" type="checkbox"/> | Box No. VIII | Certain observations on the international application | | | | | | | | | | | | | | | | | | | | | | |

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| | Date of issuance of this report 04 June 2019 (04.06.2019) |
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From the INTERNATIONAL SEARCHING AUTHORITY

To:

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

| | | |
|---|---|---|
| Applicant's or agent's file reference YGDG2016008 | | Date of mailing (day/month/year) 28 July 2017 |
| International application No. PCT/CN2016/109442 | | FOR FURTHER ACTION See paragraph 2 below |
| International filing date (day/month/year) 12 December 2016 | Priority date (day/month/year) 02 December 2016 | |
| International Patent Classification (IPC) or both national classification and IPC G01C 21/20(2006.01)i | | |
| Applicant GUANGDONG SYGOLE INTELLIGENT TECHNOLOGY 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 43bis.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 66.1bis(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/ | Date of completion of this opinion | Authorized officer |
| | | |

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Box No. I Basis of the 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. (means)
 - on paper
 - in electronic form
 - b. (time)
 - in the international application as filed
 - together with the international application in electronic form
 - subsequently to this Authority for the purposes of search
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:

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Box No. II **Priority**

1. The validity of the priority claim has not been considered because the International Searching Authority does not have in its possession a copy of the earlier application whose priority has been claimed or, where required, a translation of that earlier application. This opinion has nevertheless been established on the assumption that the relevant date (Rules 43*bis*.1 and 64.1) is the claimed priority date.
2. This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43*bis*.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.
3. Additional observations, if necessary:
 - [1] The priority of the present application has been verified to be valid.

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| 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 | | | |
|---|--|--------|--------------------|-----------------|
| 1. Statement | Novelty (N) | Claims | 1-11 <hr/> None | YES <hr/> NO |
| | Inventive step (IS) | Claims | 10-11 <hr/> 1-9 | YES <hr/> NO |
| | Industrial applicability (IA) | Claims | 1-11 <hr/> None | YES <hr/> NO |
| 2. Citations and explanations : | | | | |
| [1] Reference is made to the following documents: | | | | |
| [2] D1: CN 205283825 U | | | | |
| [3] D2: CN 104390643 A | | | | |
| [4] The following opinion has been formed on the basis of the reasonable expectation contained in Box No. VIII. | | | | |
| [5] Novelty and Inventive Step | | | | |
| [6] D1 discloses a indoor positioning apparatus based on geomagnetism (description, paragraphs [0034]-[0040]), consisting of a geomagnetic induction terminal (equivalent to a measurement module), a geomagnetic positioning matching calculation server (equivalent to a navigation positioning module), and a geomagnetic map storage server (equivalent to a data storage module). The geomagnetic induction terminal consists of a geomagnetic sensor, a microprocessor, a wireless transmitter (equivalent to a wireless communication module), a display, a key (equivalent to a feedback interaction module), and the like; the geomagnetic induction terminal may be a smartphone on which an application having an interactive interface is installed. The geomagnetic map storage server consists of a CPU, an internal memory, a high-capacity memory, a keyboard, and the like; a removable hard drive may be used. The geomagnetic positioning matching calculation server consists of a primary CPU, a secondary CPU, a high-capacity memory, a storage device, a keyboard, and the like. The geomagnetic sensor is controlled by the microprocessor; after the microprocessor issues a startup acquisition command, the geomagnetic sensor senses the direction and strength of the magnetic force lines of the indoor geomagnetic field, and sends data to the geomagnetic positioning matching calculation server by means of the wireless transmitter. The geomagnetic positioning matching calculation server returns to the geomagnetic induction terminal the actual indoor position of the geomagnetic induction terminal of the matching calculation results. The geomagnetic induction terminal labels the actual location on a pre-stored indoor map, accomplishing indoor positioning. | | | | |
| [7] The differences between claim 1 and D1 are: claim 1 also comprises an indoor magnetic map building module and a central processing unit (CPU); each module communicates data with the central processing unit separately. Therefore claims 1-11 comply with PCT Article 33(2). | | | | |
| [8] With regard to the described differences, D2 discloses a method for achieving indoor positioning on the basis of multi-information fusion (description, paragraphs [0038]-[0090], and figures 1 and 2): comprising: a terminal uses a magnetic induction sensor to draw a map of the magnetic induction in a building (equivalent to an indoor magnetic-map building module), estimates a current spatial position according to obtained acceleration and other information, and, according to current and desired position information, activates a path planning algorithm to select a viable path. In addition, arranging a single central processing unit to communicate data with various function modules is a customary means. | | | | |
| [9] Therefore it would be obvious to a person skilled in the art to combine D1, D2, and common general knowledge to arrive at the subject matter of claim 1, and claim 1 does not comply with PCT Article 33(3). | | | | |
| [10] The additional features of claims 2-7 either are disclosed by D1 or D2 or are common general knowledge. Therefore said claims also do not comply with PCT Article 33(3). | | | | |

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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**

- [11] Claim 8 and its dependent claim 9 set forth a method implemented by the apparatus of claim 7. The parameters of the difference in air pressure between a building floor and ground level as well as magnetic induction strength, magnetic field gradient matrix, time series of three-directional acceleration and angular velocity, and distance from an obstacle serving as basic information for positioning navigation is common general knowledge. Performing linear segmented navigation using the fork of a roadway as a breakpoint also is a customary means. Therefore, on the basis of the opinion regarding claim 7, it can be known that claims 8 and 9 also do not comply with PCT Article 33(3).
- [12] The additional technical features of claims 10 and 11 are not disclosed by the prior art and are not common general knowledge. Therefore the technical solutions of claims 10 and 11 would not be obvious to a person skilled in the art, and said claims comply with PCT Article 33(3).
- [13] Industrial Applicability
- [14] Claims 1-11 comply with PCT Article 33(4).

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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:

- [1] Claim 8 sets forth “according to the multi-sensor fusion-based indoor navigation method of claim 7”. However, the subject matter of claim 7 is “...indoor navigation apparatus”. Therefore the title of the subject matter of claim 8 is caused to be unclear and thus not to comply with PCT Article 6.
- [2] On the basis of a reasonable expectation, the subject matter of claim 8 may be modified to read “an indoor navigation method implemented by the multi-sensor fusion-based indoor navigation apparatus of claim 7”.