

PATENT COOPERATION TREATY
PCT
INTERNATIONAL SEARCH REPORT
(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference SP100880WO	FOR FURTHER ACTION	
See Form PCT/ISA/220 as well as, where applicable, item 5 below.		
International application No. PCT/SG2020/050158	International filing date (<i>day/month/year</i>) 24/03/2020	(Earliest) Priority Date (<i>day/month/year</i>) 26/03/2019
Applicant AGENCY FOR SCIENCE, TECHNOLOGY AND RESEARCH		

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 purpose 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. 5

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/SG2020/050158

A. CLASSIFICATION OF SUBJECT MATTER**G06T 7/33 (2017.01)** G06K 9/62 (2006.01) G06K 9/46 (2006.01) G06F 16/532 (2019.01)

According to International Patent Classification (IPC)

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

G06T; G06K

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)

Database: FamPat

Search terms: feature, point, correspond, match, compare, recognize, map, identify, Zero-Mean Normalized Cross Correlation, ZNCC, visual, vocabulary, dictionary, word, 局部, 比较, 匹配, 对比, 映射, 相对, 对应, 零均值归一化, 类别, 名称, 种类, 标识, 物种 and other related terms

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	US 2012/0201469 A1 (LIVET N. ET AL.) 9 August 2012 Paragraphs [0008], [0009], [0070]-[0077], [0116]; Figures 3a, 3b	1-11, 13, 17, 19, 20 12, 14-16, 18
Y	US 2018/0089832 A1 (LIU H. ET AL.) 29 March 2018 Paragraphs [0031], [0032] [0041]-[0045]; Figures 1, 2, 5, 6	12, 14-16, 18
A	YUAN M. ET AL., Outlier Detection using Hierarchical Spatial Verification for Visual Place Recognition. <i>2018 15th International Conference on Control, Automation, Robotics and Vision (ICARCV)</i> , 21 November 2018, pages 1-6 [Retrieved on 2020-08-24] <DOI: 10.1109/ICARCV.2018.8581070>	
A	CN 104794703 A (INST ADVANCED TECHNOLOGY UNIV SCIENCE & TECHNOLOGY CHINA) 22 July 2015 Whole document of the machine translation	

 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

"D" document cited by the applicant in the international application

"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 24/08/2020 (day/month/year)	Date of mailing of the international search report 26/08/2020 (day/month/year)
Name and mailing address of the ISA/SG  Intellectual Property Office of Singapore 1 Paya Lebar Link, #11-03 PLQ 1, Paya Lebar Quarter Singapore 408533 Email: pct@ipos.gov.sg	Authorized officer Nae Win Aung (Mr) IPOS Customer Service Tel. No.: (+65) 6339 8616

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SG2020/050158

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 108986168 A (SHENZHEN GANDONG INTELLIGENT TECH CO LTD, UNIV PEKING SHENZHEN GRADUATE SCHOOL) 11 December 2018 Whole document of the machine translation	

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/SG2020/050158

Note: This Annex lists known patent family members relating to the patent documents cited in this International Search Report. This Authority is in no way liable for these particulars which are merely given for the purpose of information.

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2012/0201469 A1	09/08/2012	FR 2951565 A1 JP 2013508844 A WO 2011/048302 A1 KR 20120087952 A CN 102640185 A HK 1171851 A1 EP 2491532 A1	22/04/2011 07/03/2013 28/04/2011 07/08/2012 15/08/2012 29/04/2016 29/08/2012
US 2018/0089832 A1	29/03/2018	WO 2018/063608 A1	05/04/2018
CN 104794703 A	22/07/2015	NONE	
CN 108986168 A	11/12/2018	NONE	