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Published:

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- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

(88) Date of publication of the international search report:

2 April 2015

(54) Title: LEARNING SYSTEMS AND METHODS

(57) Abstract: A sequence of images depicting an object is captured, e.g., by a camera at a point-of-sale terminal in a retail store. The object is identified, such as by a barcode or watermark that is detected from one or more of the images. Once the object's identity is known, such information is used in training a classifier (e.g., a machine learning system) to recognize the object from others of the captured images, including images that may be degraded by blur, inferior lighting, etc. In another arrangement, such degraded images are processed to identify feature points useful in fingerprint-based identification of the object. Feature points extracted from such degraded imagery aid in fingerprint-based recognition of objects under real life circumstances, as contrasted with feature points extracted from pristine imagery (e.g., digital files containing label artwork for such objects). A great variety of other features and arrangements - some involving designing classifiers so as to combat classifier copying - are also detailed.



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INTERNATIONAL SEARCH REPORT

International application No PCT/US2014/049435

A. CLASSIFICATION OF SUBJECT MATTER INV. G06K9/00 G06F21/16 G06K9/32 G06T1/00 G06K9/62 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) G06K G06F G06T				
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				
C. DOCUMENTS CONSIDERED TO BE RELEVANT				
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.		
X	WO 2013/085985 A1 (GOOGLE INC [US]) 13 June 2013 (2013-06-13)	1-3,5-7		
Y	paragraph [0050] - paragraphs [0060], [0076]; figure 9 -----	4		
A	Olivier Chappelle ET AL: "Semi-Supervised Learning" In: "Semi-Supervised Learning", 22 September 2006 (2006-09-22), The MIT Press, XP055148615, ISBN: 978-0-26-203358-9 page 1 - page 4 -----	1-7		
Y	WO 2013/033442 A1 (DIGIMARC CORP [US]; DAVIS BRUCE L [US]; LORD JOHN D [US]; BAI YANG [US]) 7 March 2013 (2013-03-07) page 1, line 15 - line 20 page 10, line 23 - line 26 -----	4		
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.				
* Special categories of cited documents : <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none; vertical-align: top;"> "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 </td> <td style="width: 50%; border: none; vertical-align: top;"> "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 </td> </tr> </table>			"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
"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			
29 October 2014	28/01/2015			
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Wunderlich, Doreen			

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2014/049435

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.

3. As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-7

Remark on Protest

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-7

providing training images and label data to a learning system

2. claims: 8-12

generating reference data based on image feature extraction

3. claim: 13

providing reference images and metadata for use in supervised learning system;

4. claims: 14-17, 29, 30

training a learning system using marked images

5. claims: 18-22

determining if program instructions performing classification are copied by using images having specific characteristic

6. claims: 23-25

determining if program instructions performing classification are copied based on the classification result

7. claims: 26, 27

determining if an identifier sent with an input signal for classification is valid or not

8. claim: 28

email spam filter system

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2014/049435

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2013085985 A1	13-06-2013	AU 2012347985 A1 CA 2850959 A1 US 2013188886 A1 WO 2013085985 A1	17-04-2014 13-06-2013 25-07-2013 13-06-2013
WO 2013033442 A1	07-03-2013	EP 2751748 A1 JP 2014531636 A WO 2013033442 A1	09-07-2014 27-11-2014 07-03-2013