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(71) Applicant: MIMOS BERHAD [MY/MY]; Technology
Park Malaysia, 57000 Kuala Lumpur (MY).

(72) Inventors: AHMAD, Hafez Bin Nawi; c/o MIMOS Berhad, Technology Park Malaysia, 57000, Kuala Lumpur, Malaysia (MY). SMRUTI, Santosh Palai; c/o MIMOS Berhad, Technology Park Malaysia, 57000, Kuala Lumpur, Malaysia (MY). DEVI, Prasad; c/o MIMOS Berhad, Technology Park Malaysia, 57000, Kuala Lumpur, Malaysia (MY).

(74) Agent: YAP, Kah Hong; Pyprus Sdn Bhd., Suite 8-02, 8th Floor, Plaza First Nationwide 161, Jalan Tun H.S. Lee 50000, Kuala Lumpur (MY).

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Declarations under Rule 4.17:

— of inventorship (Rule 4.17(iv))

Published:

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[Continued on next page]

(54) Title: SYSTEM AND METHOD FOR MULTIPLE LICENSE PLATES IDENTIFICATION

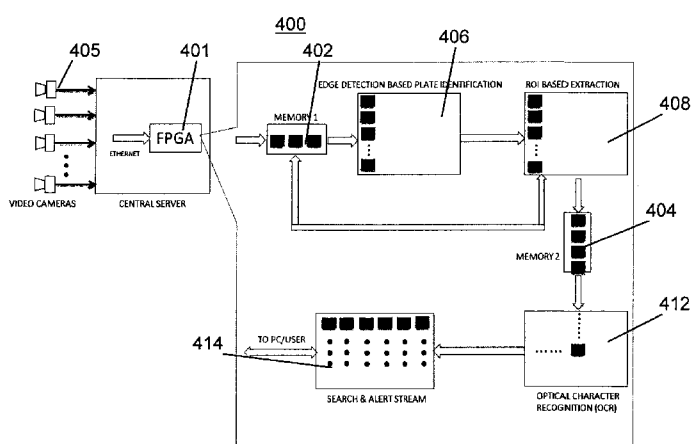


FIG. 4

(57) Abstract: The present invention provides a license plates recognition system (400) for detecting and extracting multiple license plates. The system (400) acquires video sequences of the moving vehicles and processes the same to extract license plate registration number for matching. The system (400) utilizes FPGA having an edge detector (406) and a ROI based extractor (408) for determining the possible license plates and its position (or coordinate) thereof. The edge detections and ROI based extractions are carried out to process multiple images in parallel. The extracted license plate images are then processed by an OCR (412) to extract the registration numbers therein, and a search and alert module (414) is provided for searching and matching (510) the license plate of interest. A method of processing the images to extract license plate is also provided.



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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:**
23 April 2015

INTERNATIONAL SEARCH REPORT

International application No
PCT/MY2014/000142

A. CLASSIFICATION OF SUBJECT MATTER
INV. G06K9/00 G06F17/50 G06K9/32
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

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.
X	XIAOJUN ZHAI ET AL: "Improved number plate character segmentation algorithm and its efficient FPGA implementation", JOURNAL OF REAL-TIME IMAGE PROCESSING, 10 June 2012 (2012-06-10), XP055144553, ISSN: 1861-8200, DOI: 10.1007/s11554-012-0258-5 page 1, column 2, line 1 - line 14 page 2, column 2, line 35 - line 49 page 9, column 1, line 16 - line 19 ----- -/--	1,3,6,8



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

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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

Martinez, Francis

INTERNATIONAL SEARCH REPORT

International application No

PCT/MY2014/000142

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	ZHAI X ET AL: "Real-time license plate localisation on FPGA", COMPUTER VISION AND PATTERN RECOGNITION WORKSHOPS (CVPRW), 2011 IEEE COMPUTER SOCIETY CONFERENCE ON, IEEE, 20 June 2011 (2011-06-20), pages 14-19, XP031926509, DOI: 10.1109/CVPRW.2011.5981739 ISBN: 978-1-4577-0529-8 figures 1-14 page 14, column 1, line 1 - line 10 page 15, section 3 - page 19, section 5 -----	1,3,6,8
X	CANER H ET AL: "Efficient Embedded Neural-Network-Based License Plate Recognition System", IEEE TRANSACTIONS ON VEHICULAR TECHNOLOGY, IEEE SERVICE CENTER, PISCATAWAY, NJ, US, vol. 57, no. 5, 1 September 2008 (2008-09-01), pages 2675-2683, XP011224515, ISSN: 0018-9545, DOI: 10.1109/TVT.2008.915524 figures 13, 11, 16, 18, 19 page 2675, column 1, line 1 - line 10 page 2676, section II - page 2682, section III -----	1,3,6,8
X	SHAN DU ET AL: "Automatic License Plate Recognition (ALPR): A State-of-the-Art Review", IEEE TRANSACTIONS ON CIRCUITS AND SYSTEMS FOR VIDEO TECHNOLOGY, IEEE SERVICE CENTER, PISCATAWAY, NJ, US, vol. 23, no. 2, 1 February 2013 (2013-02-01), pages 311-325, XP011492786, ISSN: 1051-8215, DOI: 10.1109/TCSVT.2012.2203741 page 312, section II.A pages 316, section III - page 319, section V.B -----	2,4,7,9
A	C-N E ANAGNOSTOPOULOS ET AL: "License Plate Recognition From Still Images and Video Sequences: A Survey", IEEE TRANSACTIONS ON INTELLIGENT TRANSPORTATION SYSTEMS, IEEE, PISCATAWAY, NJ, USA, vol. 9, no. 3, 1 September 2008 (2008-09-01), pages 377-391, XP011347122, ISSN: 1524-9050, DOI: 10.1109/TITS.2008.922938 the whole document -----	1-4,6-9

INTERNATIONAL SEARCH REPORT

International application No.
PCT/MY2014/000142

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.:

1-4, 6-9

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: 1-4, 6-9

License plate detection and recognition

1.1. claims: 1, 3, 6, 8

Selection of license plate candidates

1.2. claims: 2, 7

Image filtering

1.3. claims: 4, 9

License plate format recognition

2. claims: 5, 10

User input based vehicle identification and alerting
