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Declarations under Rule 4.17:

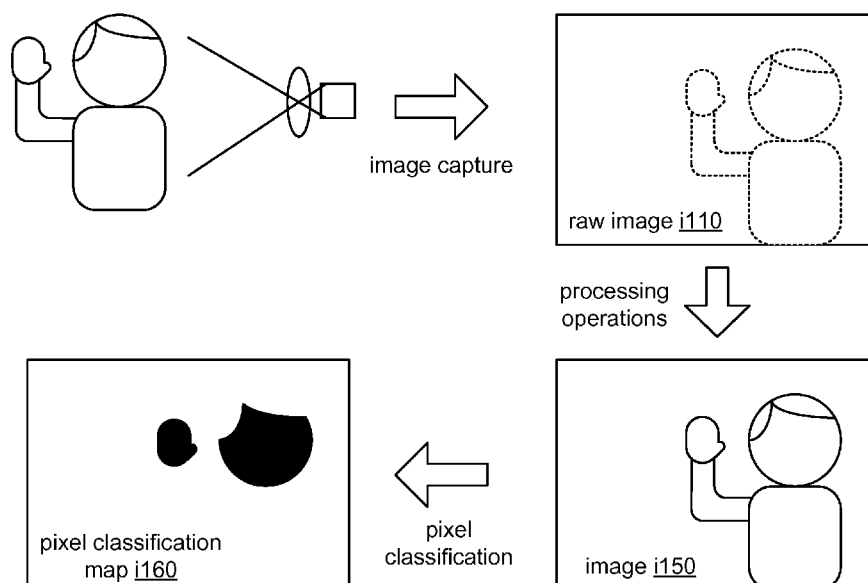
- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))

Published:

- with international search report (Art. 21(3))

[Continued on next page]

(54) Title: SYSTEMS, METHODS, AND APPARATUS FOR EXPOSURE CONTROL



(57) Abstract: Embodiments include methods of image processing in which pixels of an image are classified according to color. An exposure control operation is performed according to the pixel classifications. In one example, the pixels are classified according to a predetermined segmentation of a color space, based on predicted sensor responses. In another example, the pixels are classified according to a color selected from among at least two colors.



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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:**
7 April 2011

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2007/064332

A. CLASSIFICATION OF SUBJECT MATTER

INV. G06K9/34 H04N5/235 H04N9/04
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)

H04N G06K G03B 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 practical, search terms used)

EP0-Internal, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	MESSINA G; CASTORINA A; BATTIATO S; BOSCO A: "Image quality improvement by adaptive exposure correction techniques", PROCEEDINGS 2003 INTERNATIONAL CONFERENCE ON MULTIMEDIA AND EXPO (CAT.NO.03TH8698), vol. 1, 2003, pages I-549-I-552, XP002583871, ISBN: 0-7803-7965-9	1,2,4-6, 8-10, 12-14, 16-18, 20,22, 23,25,27
Y	the whole document ----- -/--	3,11,21, 26



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 document 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

8 February 2011

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14/02/2011

Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

International application No

PCT/US2007/064332

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	SANGER D ET AL: "METHOD FOR LIGHT SOURCE DISCRIMINATION AND FACIAL PATTERN DETECTION FROM NEGATIVE COLOR FILM", JOURNAL OF IMAGING SCIENCE AND TECHNOLOGY, SOCIETY OF IMAGING SCIENCE & TECHNOLOGY, SPRINGFIELD, VA, US, vol. 39, no. 2, 1 March 1995 (1995-03-01), pages 166-175, XP000197839, ISSN: 1062-3701	18,19, 21,23, 24,26,27
Y	the whole document	3,11,21, 26
A		1,2,4-7, 9,10, 12-16
X	----- EP 1 482 724 A1 (ST MICROELECTRONICS SA [FR]; ST MICROELECTRONICS SRL [IT]) 1 December 2004 (2004-12-01) paragraphs [0030] - [0036]	18,19, 21-24, 26,27
X,P	----- US 2006/088209 A1 (YU KEMAN [CN] ET AL) 27 April 2006 (2006-04-27) paragraphs [0036], [0037], [0043], [0061] paragraphs [0068], [0070] - [0073]; figure 3	18,20, 22,23, 25,27
X	----- US 6 249 317 B1 (HASHIMOTO NOBUO [JP] ET AL) 19 June 2001 (2001-06-19) column 5 - lines 32-36,2-23; figure 2	18, 20-23, 25-27
X	----- US 6 785 414 B1 (MCSTRAVICK III ARNOLD W [US] ET AL) 31 August 2004 (2004-08-31) column 8 - lines 34-40 column 8 - lines 49-57 column 12 - lines 35-49	1,4,8,9, 12, 16-18, 20,22, 23,25,27
X,P	----- WO 2007/022413 A2 (QUALCOMM INC [US]; QUAN SHUXUE [US]; CHIU CHINCHUAN ANDREW [US]; JIANG) 22 February 2007 (2007-02-22) paragraphs [0007], [0099], [0104], [0108]	1,2,8,9
A	----- US 6 707 940 B1 (QIAN RICHARD J [US]) 16 March 2004 (2004-03-16) the whole document	7,15
A	----- WO 2004/051573 A2 (KONINKL PHILIPS ELECTRONICS NV [NL]; PHILIPS CORP [US]; VAREKAMP CHRIS) 17 June 2004 (2004-06-17) the whole document	7,15

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2007/064332

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.:

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.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2007/064332

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 1482724	A1	01-12-2004	JP 2004357277 A	16-12-2004
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			KR 20050085355 A	29-08-2005
			US 2006104535 A1	18-05-2006

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. claims: 3, 11, 21, 26

distinguishing features: the segmentation defines a class of blocks with pixels of a specific colour space, and exposure control is based on the average luminance value of this class of blocks - these features solve the problem of avoiding taking too small areas into consideration for exposure control.

2. claims: 7, 15

distinguishing feature: exposure control is based on a denoised pixel classification map - this feature solves the problem of avoiding taking noisy areas into consideration for exposure control.

3. claims: 19, 24

distinguishing feature: selecting colour from the image - this feature solves the problem of avoiding building a segmented colour space offline
