

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
18 August 2005 (18.08.2005)

PCT

(10) International Publication Number  
WO 2005/076217 A3

- (51) International Patent Classification:  
G06T 7/00 (2006.01) G06T 5/00 (2006.01)  
H04N 1/62 (2006.01)
- (21) International Application Number:  
PCT/EP2005/001171
- (22) International Filing Date: 3 February 2005 (03.02.2005)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:  
10/773,092 4 February 2004 (04.02.2004) US
- (71) Applicant (for all designated States except US): FOTO-NATION VISION LIMITED [IE/IE]; Galway Business Park, Dangan, Galway (IE).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): DRIMBAREAN, Alexandru [RO/IE]; 60 Garraun Ard, Doughiska, Galway (IE). BIGIOL, Petronel [RO/IE]; 57 Sceilg Ard, Headford Road, County Galway (IE). POSOSIN, Alexei [MD/IE]; 28 Arus na Tra, Cois Cuain, Dr. Colohan Road, Galway (IE). STEINBERG, Eran [IL/US]; 137 Granville Way, San Francisco, CA 94127 (US). PRILUTSKY, Yury [US/US]; 1626 Shoal Drive, San Mateo, CA 94404 (US).

CORCORAN, Peter [IE/IE]; Cregg, Claregalway, Galway (IE).

(74) Agents: BOYCE, Conor et al.; F.R. Kelly & Co, 27 Clyde Road, Ballsbridge, Dublin 4 (IE).

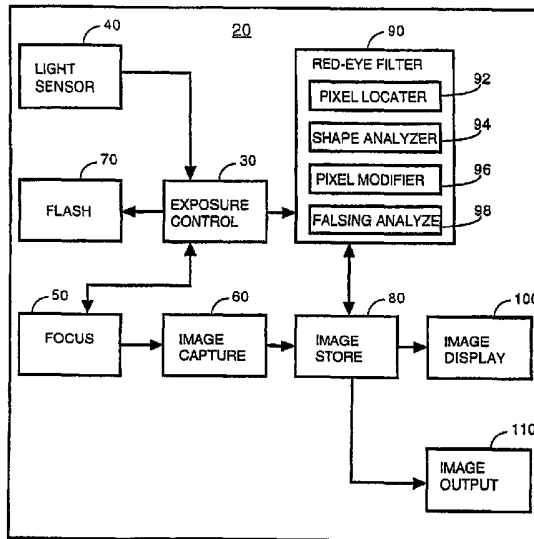
(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:  
— with international search report

[Continued on next page]

(54) Title: OPTIMIZED RED-EYE FILTER METHOD AND APPARATUS INVOLVING SUBSAMPLE REPRESENTATIONS OF SELECTED IMAGE REGIONS



(57) Abstract: A digital camera has an integral flash and stores and displays a digital image. Under certain conditions, a flash photograph taken with the camera may result in a red-eye phenomenon due to a reflection within an eye of a subject of the photograph. A digital apparatus has a red-eye filter which analyzes the stored image for the red-eye phenomenon and modifies the stored image to eliminate the red-eye phenomenon by changing the read area to black. The modification of the image is enabled when a photograph is taken under conditions indicative of the red-eye phenomenon. The modification is subject to anti-falsing analysis which further examines the area around the red-eye for indicia of the eye of the subject. The detection and correction can be optimized for performance and quality by operating on subsample versions of the image when appropriate.

WO 2005/076217 A3



- 
- (88) **Date of publication of the international search report:** *For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*  
20 April 2006
- (15) **Information about Correction:**  
**Previous Correction:**  
see PCT Gazette No. 41/2005 of 13 October 2005

INTERNATIONAL SEARCH REPORT

International Application No  
PCT/EP2005/001171

**A. CLASSIFICATION OF SUBJECT MATTER**  
G06T7/00 H04N1/62 G06T5/00

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)  
G06T H04N

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)  
EPO-Internal, WPI Data, PAJ

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2003/044070 A1 (FUERSICH MANFRED ET AL) 6 March 2003 (2003-03-06) * Fig. 1a, paragraphs '0025-0029, 0035, 0040-0046! *	1-49
X	US 6 278 491 B1 (WANG JOHN Y. A ET AL) 21 August 2001 (2001-08-21) * abstract, Figs. 1-6, cols. 4-7 *	1-49
X	US 2002/136450 A1 (CHEN TONG-XIAN ET AL) 26 September 2002 (2002-09-26) * Figs. 3,4, paragraphs '0036-0039, 0047!, claim 6 *	1-49

Further documents are listed in the continuation of box C.  Patent family members are listed in annex.

° Special categories of cited documents :

*A* document defining the general state of the art which is not considered to be of particular relevance	*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
*E* earlier document but published on or after the international filing date	*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
*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)	*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.
*O* document referring to an oral disclosure, use, exhibition or other means	*&* document member of the same patent family
*P* document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search <b>5 January 2006</b>	Date of mailing of the international search report <b>27/01/2006</b>
------------------------------------------------------------------------------------	-------------------------------------------------------------------------

Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Authorized officer <b>Borotschnig, H</b>
----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------

## INTERNATIONAL SEARCH REPORT

International Application No  
PCT/EP2005/001171

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>JOFFE S ED - INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS: "Red eye detection with machine learning"            PROCEEDINGS 2003 INTERNATIONAL CONFERENCE ON IMAGE PROCESSING. ICIP-2003. BARCELONA, SPAIN, SEPT. 14 - 17, 2003, INTERNATIONAL CONFERENCE ON IMAGE PROCESSING, NEW YORK, NY : IEEE, US,            vol. VOL. 2 OF 3,            14 September 2003 (2003-09-14), pages 871-874, XP010670596            ISBN: 0-7803-7750-8            * Fig. 2, sections 2, 3 *</p>	1-49
X	<p>US 5 432 863 A (BENATI ET AL)            11 July 1995 (1995-07-11)            * Figs. 2-4, col. 7 line 27-col. 8 line 57            *</p>	1,34
A	<p>US 6 407 777 B1 (DELUCA MICHAEL JOSEPH)            18 June 2002 (2002-06-18)            * Figs. 1-10 *</p>	1-49
A	<p>US 5 751 836 A (WILDES ET AL)            12 May 1998 (1998-05-12)            * Fig. 2b, col. 5 line 42-col. 9 line 52 *</p>	1-49

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No  
PCT/EP2005/001171

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2003044070	A1	06-03-2003	EP 1293933 A1 19-03-2003
			JP 2003109008 A 11-04-2003
US 6278491	B1	21-08-2001	JP 11284874 A 15-10-1999
US 2002136450	A1	26-09-2002	US 2005058340 A1 17-03-2005
			US 2005058342 A1 17-03-2005
			US 2005053279 A1 10-03-2005
US 5432863	A	11-07-1995	DE 69415886 D1 25-02-1999
			DE 69415886 T2 29-07-1999
			EP 0635972 A2 25-01-1995
			JP 3181472 B2 03-07-2001
			JP 7072537 A 17-03-1995
			US 5748764 A 05-05-1998
US 6407777	B1	18-06-2002	NONE
US 5751836	A	12-05-1998	AU 702883 B2 11-03-1999
			AU 3419895 A 27-03-1996
			BR 9508691 A 06-01-1998
			CA 2199040 A1 14-03-1996
			CN 1160446 A 24-09-1997
			EP 0793833 A1 10-09-1997
			HU 76950 A2 28-01-1998
			JP 10505180 T 19-05-1998
			WO 9607978 A1 14-03-1996
			US 5572596 A 05-11-1996