(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
20 September 2001 (20.09.2001)

PCT

(10) International Publication Number
WO 01/69530 A2

(51) International Patent Classification[7]: G06T 5/00

(21) International Application Number: PCT/US01/05776

(22) International Filing Date: 23 February 2001 (23.02.2001)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
09/525,204 14 March 2000 (14.03.2000) US

(71) Applicant: **INTEL CORPORATION** [US/US]; 2200 Mission College Boulevard, Santa Clara, CA 95052 (US).

(72) Inventors: **LIENHART, Rainer, w.**; 2727 Forbes Avenue, Santa Clara, CA 95051 (US). **WERNICKE, Axel**; 701 Curtner Avenue, San Jose, CA 95125 (US).

(74) Agents: **ALDOUS, Alan**; Intel Corporation, 2200 Mission College Boulevard, Santa Clara, CA 95052 et al. (US).

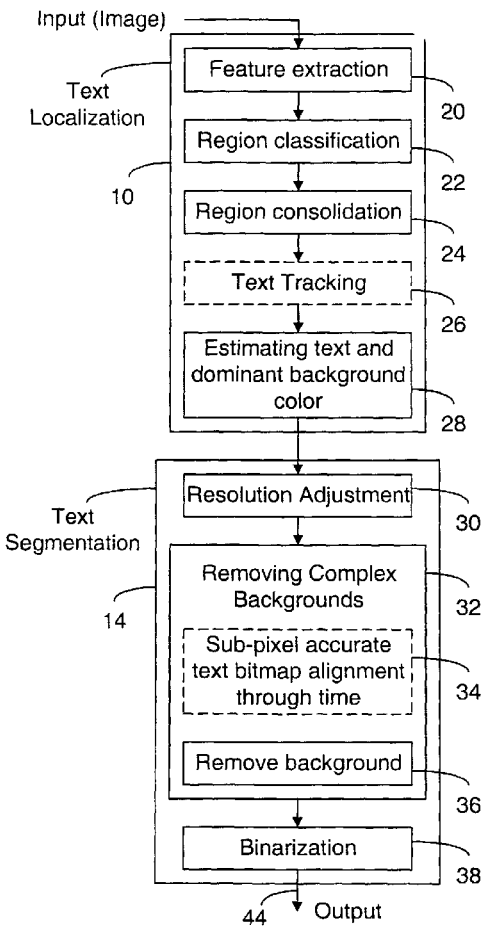
(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW.

(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

[Continued on next page]

WO 01/69530 A2

(54) Title: ESTIMATING TEXT COLOR AND SEGMENTATION OF IMAGES



(57) Abstract: In some embodiments, the invention includes receiving a digital image including text and background. The method includes vector quantizing the digital image such that the digital image is divided into certain colors, and creating a text color histogram from a portion of the text and a first portion of the background. The method also includes creating at least one background color histogram from a second portion of the background, and creating a difference color histogram from a difference between the text color histogram and the at least one background color histogram, and wherein an estimated color of the text is derived from the difference color histogram. In other embodiments, the invention includes receiving a text object including bounding boxes of multiple frames of a video signal. The method further includes estimating a color of text of the bounding boxes and aligning blocks representing the bounding boxes through a best displacement search in which only pixels having a color within a threshold of an estimated color are considered. Some embodiments of the invention also include receiving digital images in text bounding boxes and in preparation for a segmentation process, adjusting sizes of the digital images to a fixed height.

Published:
— *without international search report and to be republished upon receipt of that 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.