



US008243171B2

(12) **United States Patent**  
**LeGall et al.**

(10) **Patent No.:** **US 8,243,171 B2**  
(45) **Date of Patent:** **\*Aug. 14, 2012**

(54) **HIGH RESOLUTION ZOOM: A NOVEL DIGITAL ZOOM FOR DIGITAL VIDEO CAMERA**

(75) Inventors: **Didier LeGall**, Los Altos, CA (US);  
**Leslie D. Kohn**, Fremont, CA (US);  
**Elliot N. Linzer**, Suffern, NY (US)

(73) Assignee: **Ambarella, Inc.**, Santa Clara, CA (US)

(\* ) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 112 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **12/956,232**

(22) Filed: **Nov. 30, 2010**

(65) **Prior Publication Data**

US 2011/0069206 A1 Mar. 24, 2011

**Related U.S. Application Data**

(63) Continuation of application No. 12/716,525, filed on Mar. 3, 2010, now Pat. No. 7,880,776, which is a continuation of application No. 11/010,032, filed on Dec. 10, 2004, now Pat. No. 7,688,364.

(51) **Int. Cl.**

**H04N 5/262** (2006.01)

**H04N 5/228** (2006.01)

(52) **U.S. Cl.** ..... **348/240.99**; 348/208.6; 348/240.1

(58) **Field of Classification Search** ..... 348/240.1, 348/240.2, 240.3, 240.99, 208.6

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

|                |         |                   |           |
|----------------|---------|-------------------|-----------|
| 5,420,632 A    | 5/1995  | Yamagiwa          | 348/240.3 |
| 5,882,625 A    | 3/1999  | MacDougall et al. | 423/700   |
| 6,654,506 B1   | 11/2003 | Luo et al.        | 382/282   |
| 6,654,507 B2   | 11/2003 | Luo               | 382/282   |
| 6,876,386 B1   | 4/2005  | Ito               | 348/240.1 |
| 6,982,755 B1   | 1/2006  | Kikuzawa          | 348/241   |
| 7,015,941 B2 * | 3/2006  | Malloy Desormeaux | 348/64    |
| 7,221,386 B2   | 5/2007  | Thacher et al.    | 348/14.02 |

(Continued)

FOREIGN PATENT DOCUMENTS

JP 06-203148 7/1994

(Continued)

OTHER PUBLICATIONS

Micron Technology, Inc., Boise, ID, "1/2-Inch 3-Megapixel CMOS Active-Pixel Digital Image Sensor" data sheet, Rev C, Sep. 2004. (MT9T001\_3100\_DS\_1.fm-Rev.C9/04EN 2003 Micron Technology, Inc. All rights reserved.).

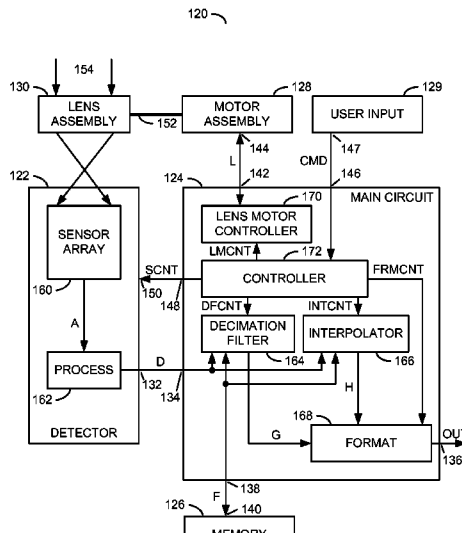
Primary Examiner — Hung Lam

(74) Attorney, Agent, or Firm — Christopher P. Maiorana, PC

(57) **ABSTRACT**

A camera system and a method for zooming the camera system is disclosed. The method generally includes the steps of (A) generating an electronic image by sensing an optical image received by the camera, the sensing including electronic cropping to a window size to establish an initial resolution for the electronic image, (B) generating a final image by decimating the electronic image by a decimation factor to a final resolution smaller than the initial resolution and (C) changing a zoom factor for the final image by adjusting both of the decimation factor and the window size.

**20 Claims, 8 Drawing Sheets**



# US 8,243,171 B2

Page 2

## U.S. PATENT DOCUMENTS

|              |      |        |                         |           |
|--------------|------|--------|-------------------------|-----------|
| 7,227,573    | B2   | 6/2007 | Stavely .....           | 348/240.2 |
| 7,401,007    | B1 * | 7/2008 | Su .....                | 702/189   |
| 7,417,670    | B1   | 8/2008 | Linzer et al. ....      | 348/222.1 |
| 7,477,297    | B2   | 1/2009 | Pollard .....           | 348/240.1 |
| 2002/0126208 | A1 * | 9/2002 | Misue et al. ....       | 348/211   |
| 2004/0189830 | A1   | 9/2004 | Pollard .....           | 348/240.1 |
| 2005/0046710 | A1   | 3/2005 | Miyazaki .....          | 348/239   |
| 2005/0052646 | A1   | 3/2005 | Wohlstadter et al. .... | 356/311   |

|              |    |        |                     |            |
|--------------|----|--------|---------------------|------------|
| 2005/0078205 | A1 | 4/2005 | Hynecek .....       | 348/294    |
| 2005/0083556 | A1 | 4/2005 | Carlson .....       | 358/474    |
| 2005/0093982 | A1 | 5/2005 | Kuroki .....        | 348/207.99 |
| 2006/0077269 | A1 | 4/2006 | Kindt et al. ....   | 348/294    |
| 2009/0028413 | A1 | 1/2009 | Goodwin et al. .... | 382/133    |

## FOREIGN PATENT DOCUMENTS

|    |             |        |
|----|-------------|--------|
| JP | 2000-184259 | 6/2000 |
|----|-------------|--------|

\* cited by examiner

80

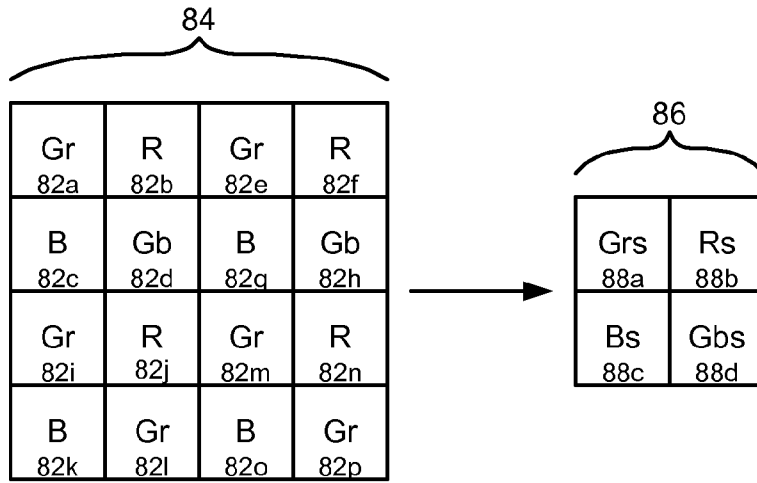


FIG. 1

90

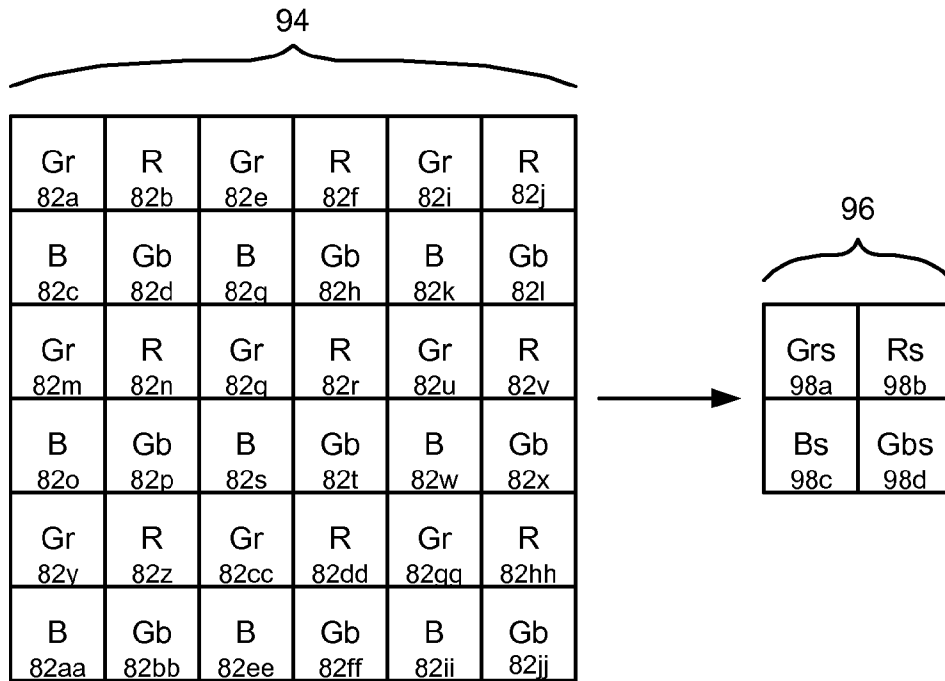


FIG. 2

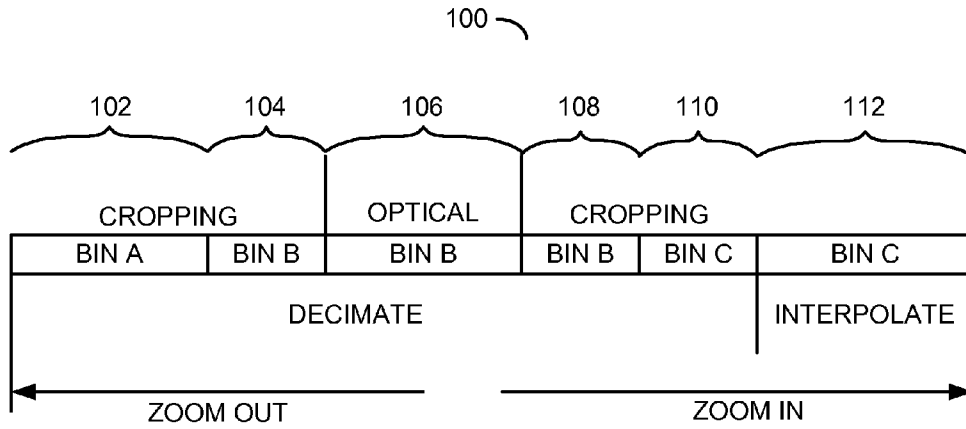


FIG. 3

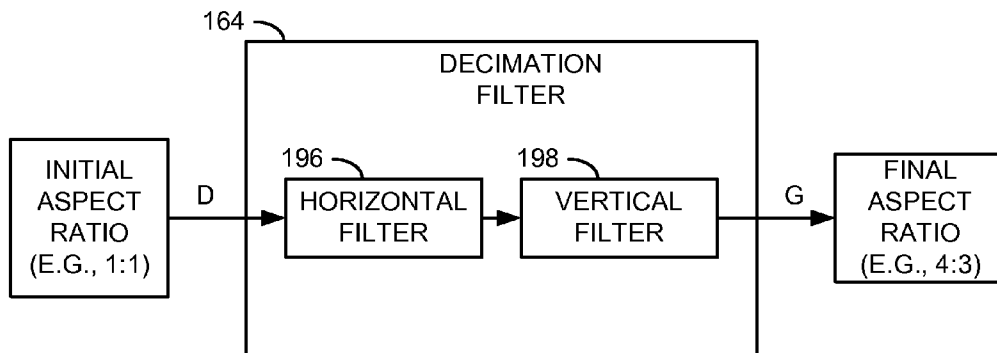


FIG. 6

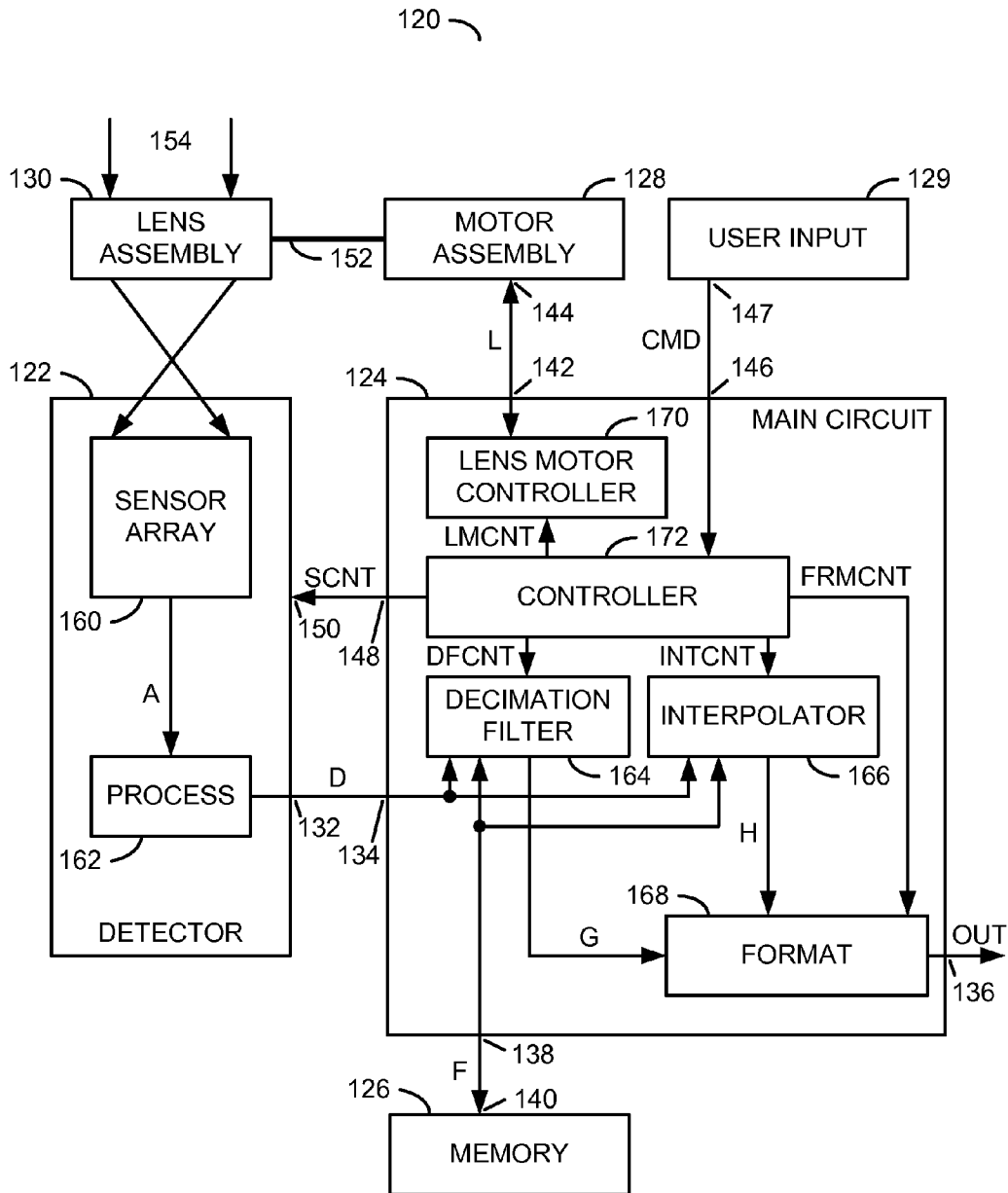


FIG. 4

# Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

## Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

## Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

## Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

## API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

## LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

## FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

## E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.