



US006687410B1

(12) **United States Patent**
Brown(10) **Patent No.:** **US 6,687,410 B1**
(45) **Date of Patent:** **Feb. 3, 2004**(54) **METHOD AND APPARATUS FOR
COMPRESSION AND DECOMPRESSION OF
DATA**(75) Inventor: **Russell A. Brown**, Palo Alto, CA (US)(73) Assignee: **Sun Microsystems, Inc.**, Palo Alto, CA
(US)(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 0 days.(21) Appl. No.: **09/499,262**(22) Filed: **Feb. 7, 2000**(51) Int. Cl.⁷ **G06K 9/36**(52) U.S. Cl. **382/239**(58) Field of Search 382/232, 236,
382/238-240, 242, 248, 250; 358/432, 433;
348/384.1, 394.1-395.1, 400.1-404.1, 407.1-416.1,
420.1, 421.1, 425.2, 430.1, 431.1; 375/240.02-240.03,
240.11-240.16, 240.18-240.2, 240.22-240.25;
341/51, 63, 65, 67, 79, 107; 708/203, 300,
307-308, 313, 316-317, 400-405(56) **References Cited****U.S. PATENT DOCUMENTS**

4,809,067 A 2/1989 Kenichi et al.
 4,984,076 A * 1/1991 Watanabe et al. 358/133
 5,661,822 A * 8/1997 Knowles et al. 382/233
 5,721,791 A * 2/1998 Maeda et al. 382/253
 5,739,861 A * 4/1998 Music 348/391
 5,754,698 A * 5/1998 Suzuki et al. 382/232
 5,847,766 A 12/1998 Peak
 5,862,261 A 1/1999 Lee
 6,014,181 A * 1/2000 Sun 348/699
 6,023,295 A 2/2000 Pau

6,031,937 A * 2/2000 Graffagnino 382/236
 6,072,830 A * 6/2000 Proctor et al. 375/240
 6,101,276 A * 8/2000 Adiletta et al. 382/236
 6,233,017 B1 * 5/2001 Chaddha 348/412
 6,275,620 B2 * 8/2001 de Queiroz et al. 382/270
 6,281,942 B1 * 8/2001 Wang 348/607
 6,337,881 B1 * 1/2002 Chaddha 375/240.16

FOREIGN PATENT DOCUMENTS

WO WO 93 14600 7/1993

OTHER PUBLICATIONS

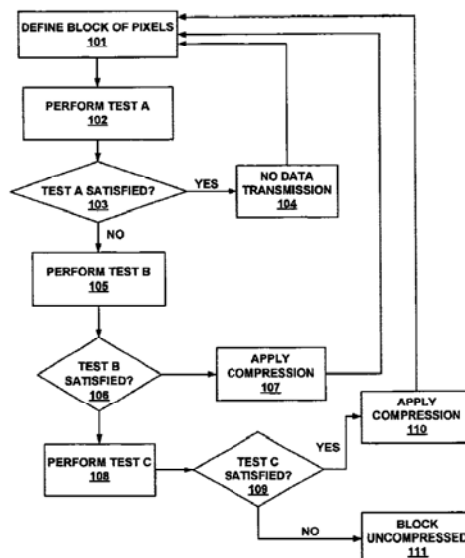
IBM Technical Disclosure Bulletin, IBM Corp., New York,
vol. 34 No. 1, Jun., 1999 (Jun. 1991), pp. 289-291,
XP000210220, ISSN: 0018-8689 p. 291, line 5-last line.

* cited by examiner

Primary Examiner—Jose L. Couso

(57) **ABSTRACT**

The present invention is a compression scheme for compressing audio and video data. An image is divided into blocks of pixels. In one test, if all of the pixels are approximately equal to the corresponding pixels in the previous block, then no data is sent for that block. In a second test, if all of the pixels in a block are approximately equal to a mean pixel value, then only one color value is transmitted. In a third test, if quantization of the pixels via companding results in an acceptable representation, the quantization is performed. The present invention uses quantization codes that are proportional to the logarithm of the magnitude of the range quantized, computation of a magnitude byte that permits rapid discovery of the number of bits used for quantization of a block, recursive packing and unpacking of quantized pixel data, and two-dimensional paths through the block.

14 Claims, 7 Drawing Sheets

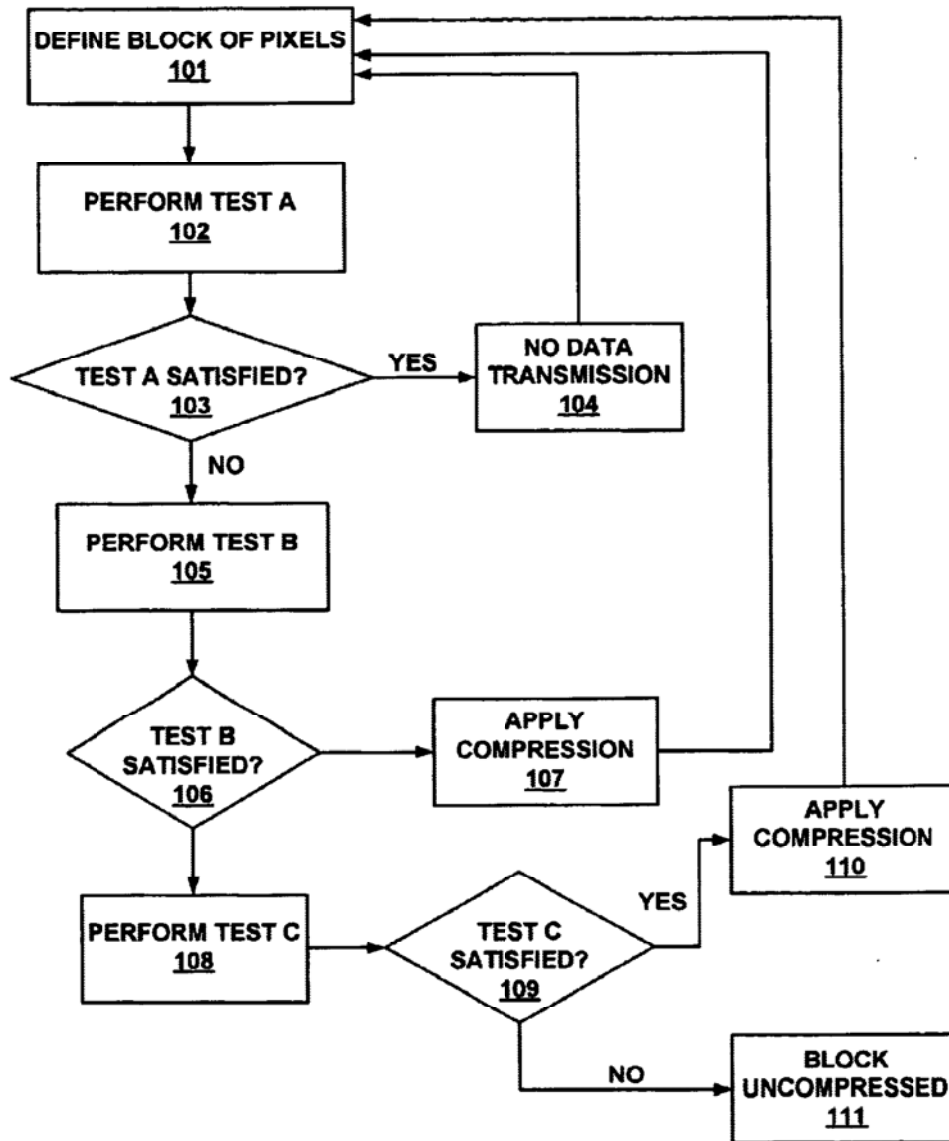
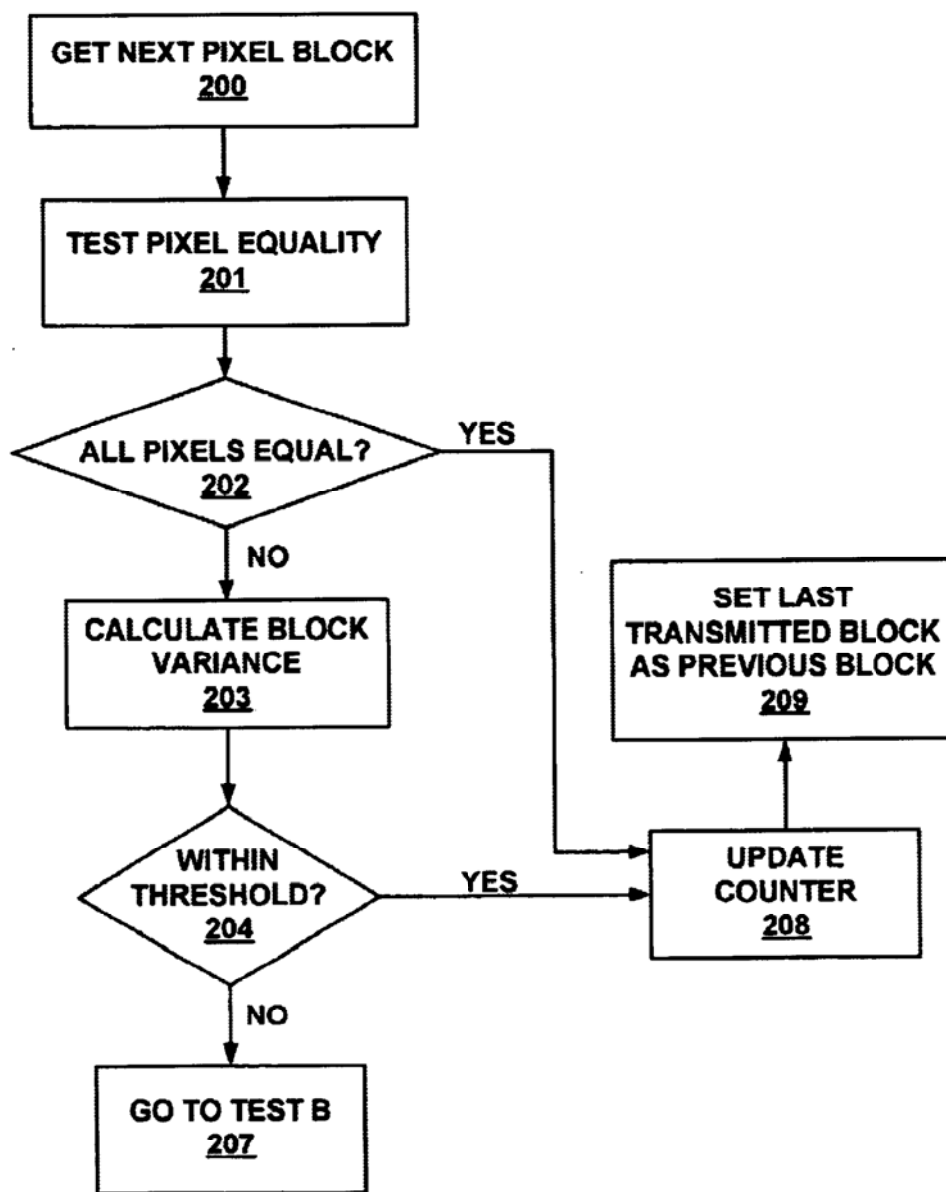
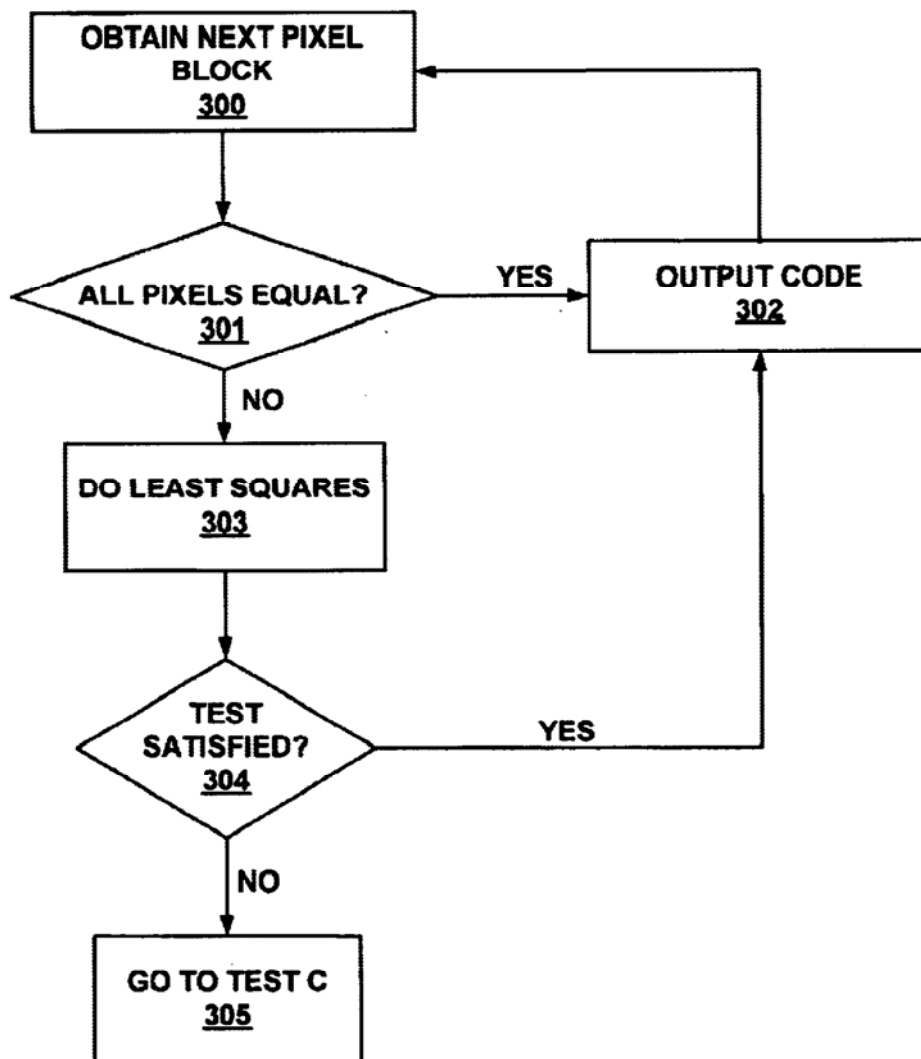
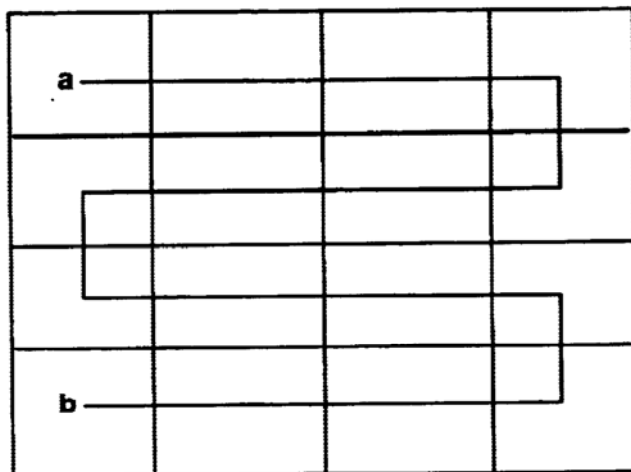


FIGURE 1

**FIGURE 2**

**FIGURE 3**

**FIGURE 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.