

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

(10) **Patent No.:** **US 6,580,814 B1**
(45) **Date of Patent:** **Jun. 17, 2003**

(54) **SYSTEM AND METHOD FOR
 COMPRESSING BIOMETRIC MODELS**

6,073,101 A * 6/2000 Maes 704/275

FOREIGN PATENT DOCUMENTS

(75) Inventors: **Abraham P. Ittycheriah**, Danbury, CT (US); **Stephane H. Maes**, Danbury, CT (US)

JP 2-162400 * 6/1990
 JP 02-162400 * 6/1990

* cited by examiner

(73) Assignee: **International Business Machines Corporation**, Armonk, NY (US)

Primary Examiner—Samir Ahmed

(74) *Attorney, Agent, or Firm*—F. Chau & Associates, LLP

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(57) **ABSTRACT**

A system and method for building compressed biometric models and performing biometric identification using such models. The use of the compressed biometric models results in a significant decrease in the storage requirements for biometric models in conventional biometric systems. A given number of L reference biometric models are built. The L reference models are randomly divided into M subsets. During user enrollment, distance measurements between a temporary biometric model and each of the reference models in the M subsets are computed. The rank and distance parameters are used to build the compressed biometric models in accordance with the model: $I(M_j, R_j, D(M_j, R_j))$, where I represents the identity of the closest reference model in a corresponding subset M_j ; R_j refers to the ranking of the closeness of the reference model to the temporary biometric model as compared with the closeness of each of the other reference models in the corresponding subset M_j ; and D refers to the corresponding distance measure between the reference model and the temporary biometric model.

(21) Appl. No.: **09/126,894**

(22) Filed: **Jul. 31, 1998**

(51) **Int. Cl.**⁷ **G06K 9/00**

(52) **U.S. Cl.** **382/115; 340/5.52; 704/238**

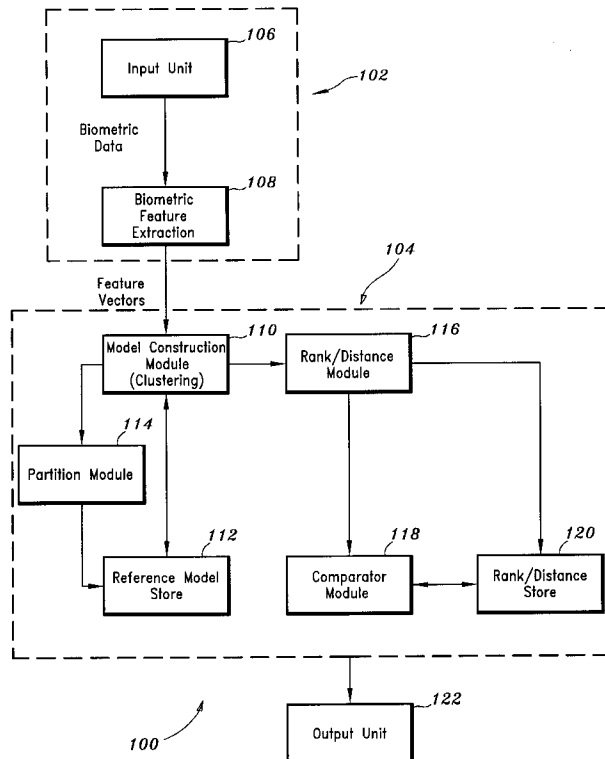
(58) **Field of Search** 382/115, 119, 382/120; 704/221, 222, 230, 231, 236, 237, 238, 239, 243, 245, 247, 250, 500, 246, 273; 235/380; 340/5.1-5.92, 5.8-5.86; 73/865.4

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,787,394 A * 7/1998 Bahl et al. 704/238
 5,799,088 A * 8/1998 Raiké 380/30
 5,812,739 A * 9/1998 Hirayama 704/238
 6,073,096 A * 6/2000 Gao et al. 704/245

29 Claims, 6 Drawing Sheets



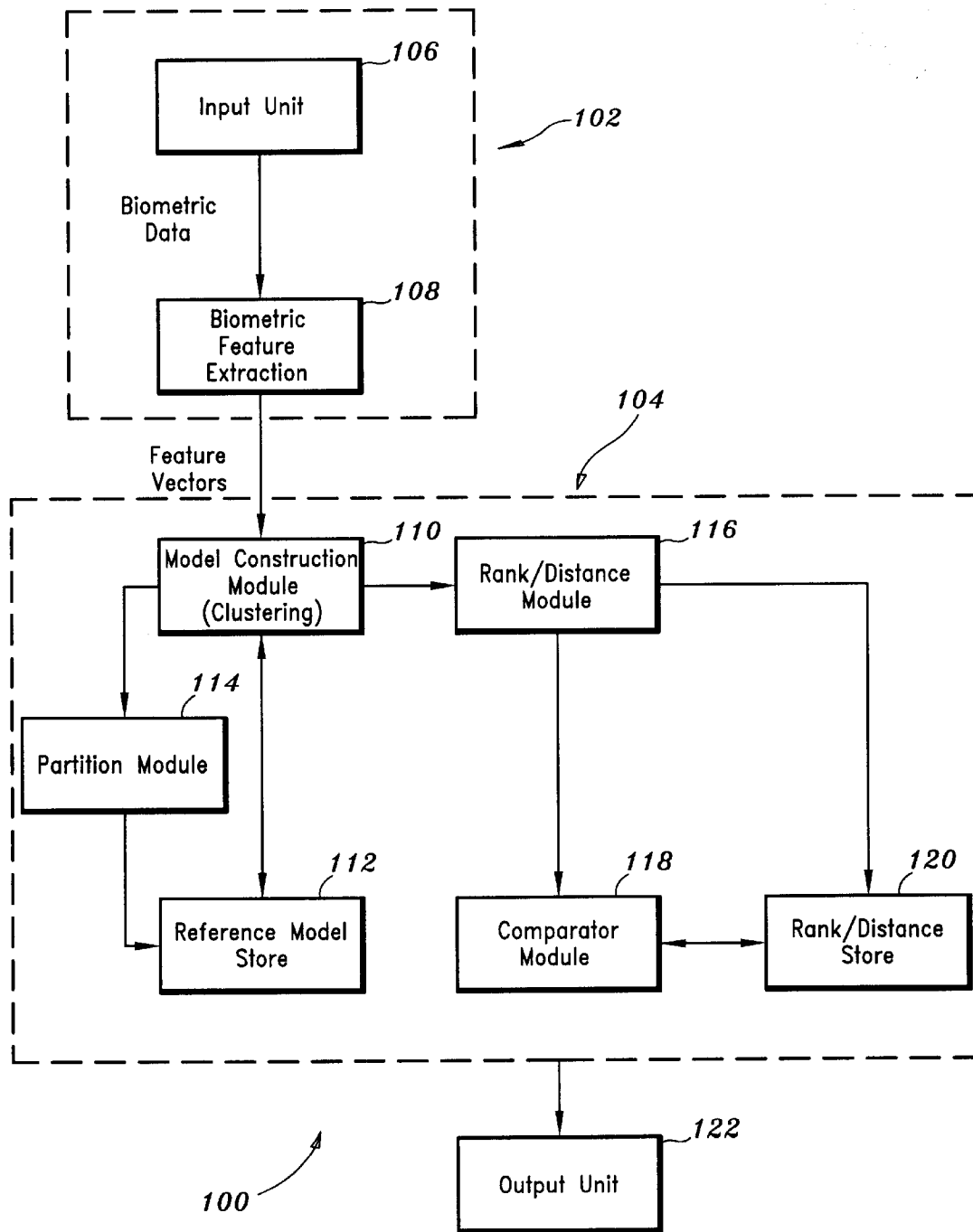


FIG. 1

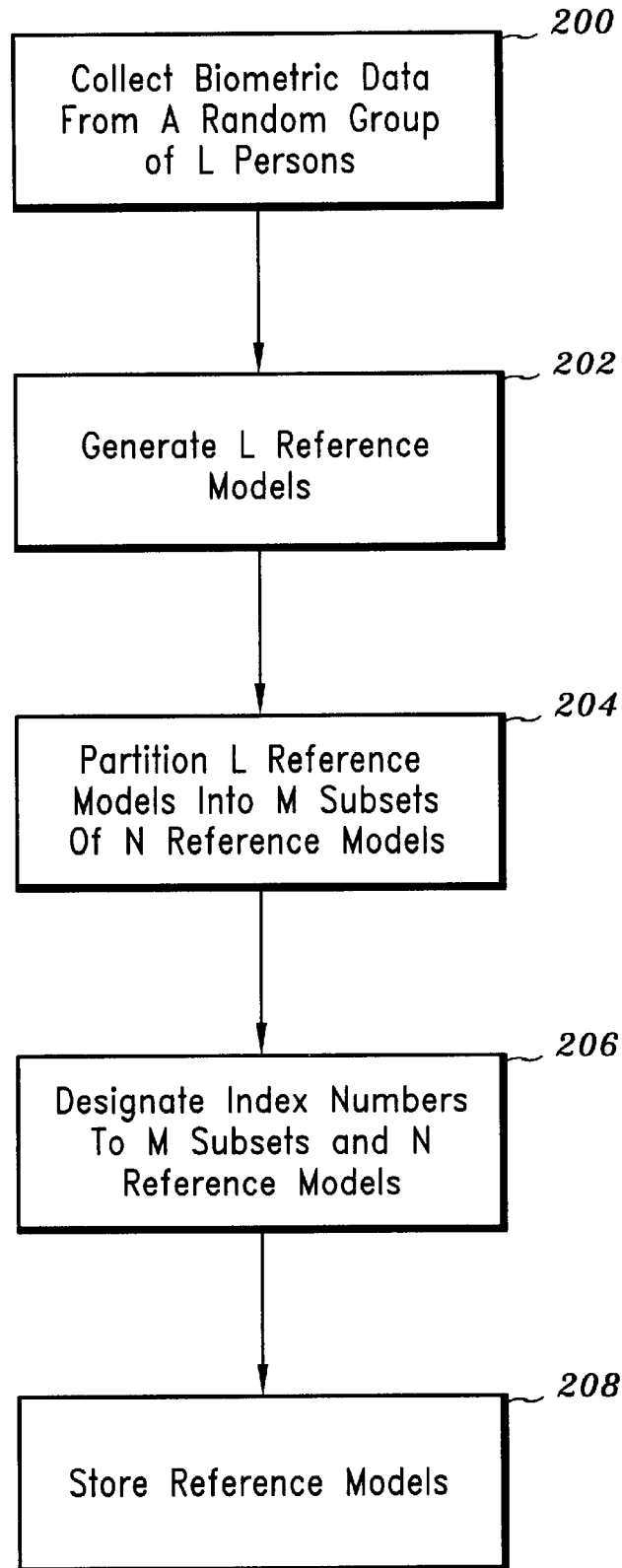


FIG. 2

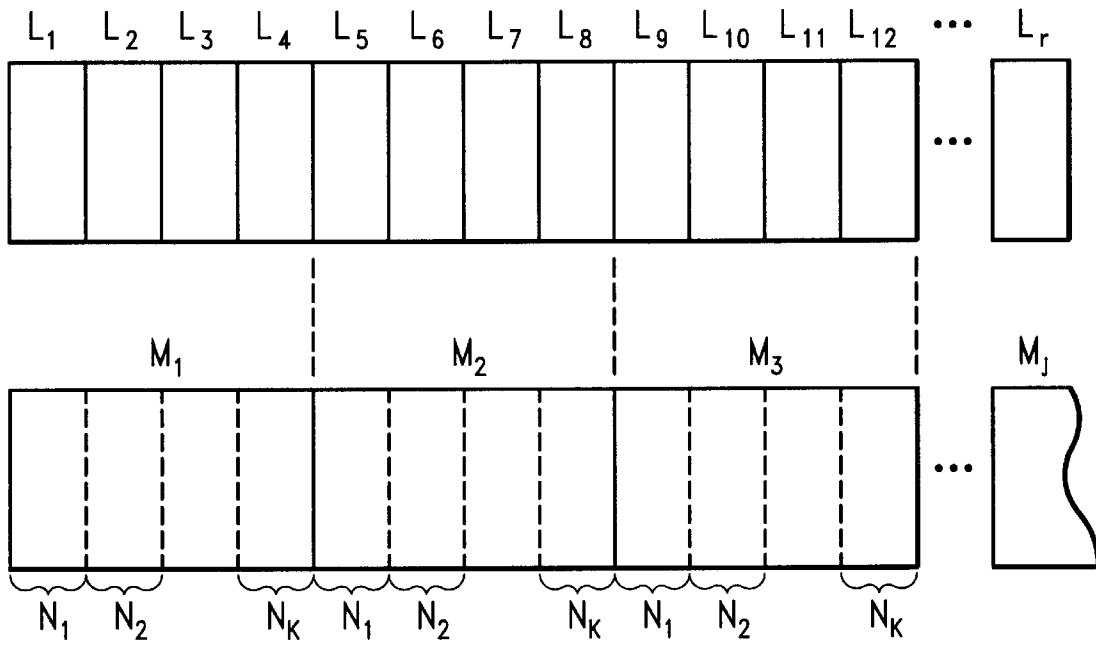


FIG. 3

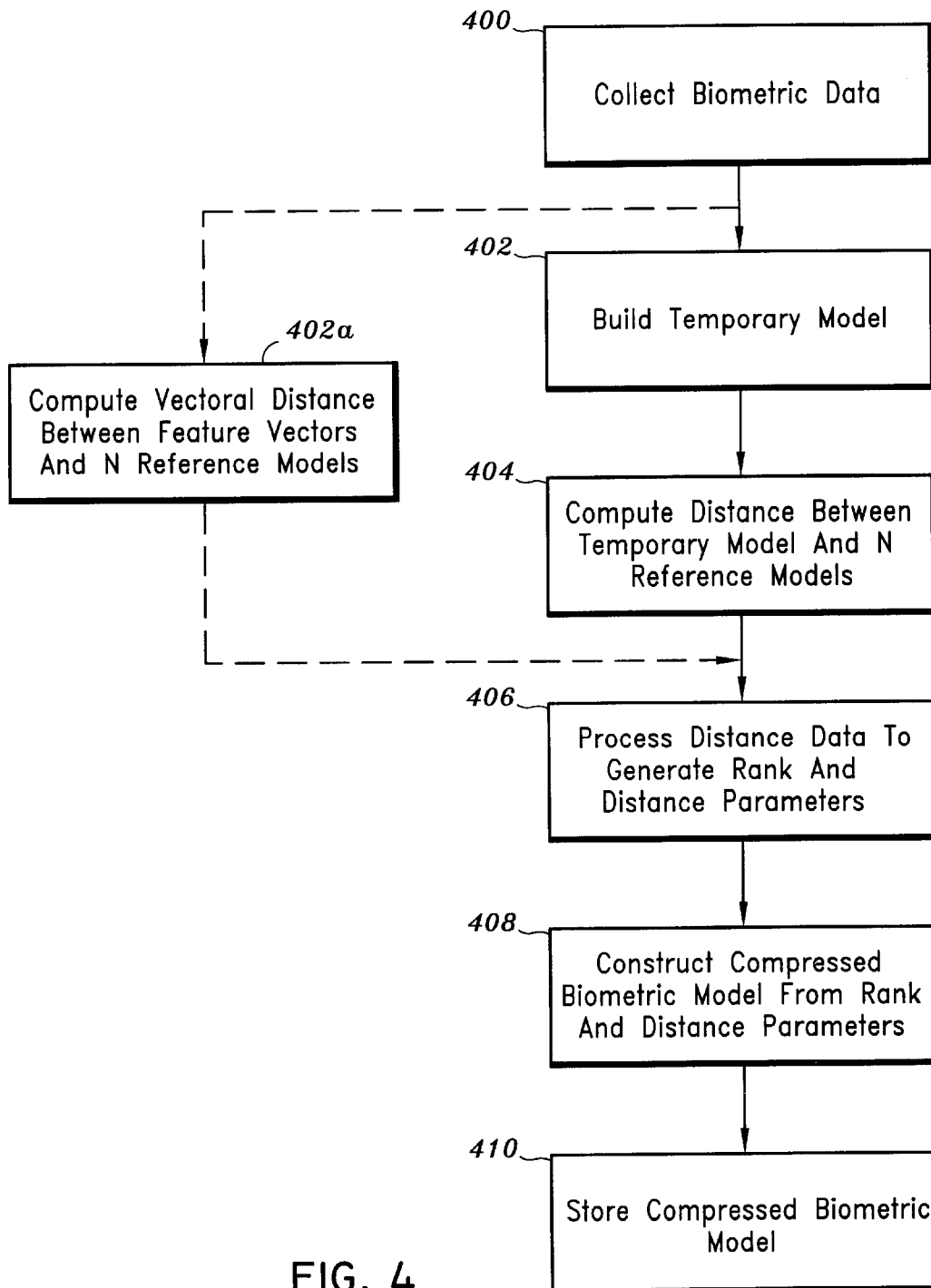


FIG. 4

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.