



US006963660B1

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

(10) **Patent No.:** **US 6,963,660 B1**
(45) **Date of Patent:** **Nov. 8, 2005**

(54) **FINGERPRINT COLLATING DEVICE AND FINGERPRINT COLLATING METHOD**

(75) Inventors: **Yoshihiro Tsukamura**, Kanagawa (JP); **Takeshi Funahashi**, Saitama (JP)

(73) Assignee: **Sony Corporation**, (JP)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 700 days.

(21) Appl. No.: **09/639,171**

(22) Filed: **Aug. 16, 2000**

(30) **Foreign Application Priority Data**

Aug. 18, 1999 (JP) P11-231683

(51) **Int. Cl.**⁷ **G06K 9/00; G06F 7/04**

(52) **U.S. Cl.** **382/124; 382/127; 340/5.53; 340/5.83; 348/161**

(58) **Field of Search** 382/115, 116, 117, 382/118, 119, 120, 121, 122, 123, 124, 125; 340/5.53, 5.83; 348/161

(56) **References Cited**

U.S. PATENT DOCUMENTS

- 3,533,823 A * 10/1970 Newkirk et al. 427/1
- 3,619,060 A * 11/1971 Johnson 356/71
- 4,650,978 A * 3/1987 Hudson et al. 235/380
- 5,180,901 A * 1/1993 Hiramatsu 235/380
- 5,493,621 A * 2/1996 Matsumura 382/125
- 5,618,232 A * 4/1997 Martin 463/25

- 5,664,126 A * 9/1997 Hirakawa et al. 345/751
- 5,719,950 A * 2/1998 Osten et al. 382/115
- 5,903,225 A * 5/1999 Schmitt et al. 340/5.25
- 6,195,447 B1 * 2/2001 Ross 382/125
- 6,241,288 B1 * 6/2001 Bergenek et al. 283/67
- 6,400,836 B2 * 6/2002 Senior 382/124
- 6,438,257 B1 * 8/2002 Morimura et al. 382/124
- 6,490,366 B1 * 12/2002 Haneda et al. 382/126
- 6,647,133 B1 * 11/2003 Morita et al. 382/124

FOREIGN PATENT DOCUMENTS

- JP 2000-067236 3/2000
- JP 2001056858 A * 2/2001 G06T 7/00

* cited by examiner

Primary Examiner—Jingge Wu

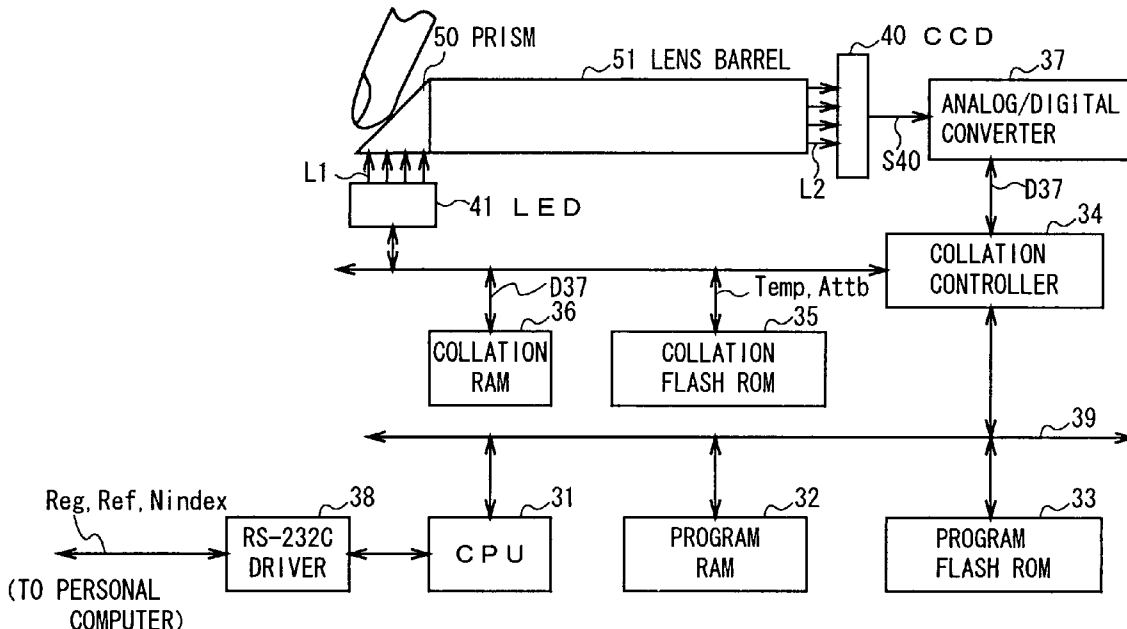
Assistant Examiner—Ryan J. Hesseltine

(74) *Attorney, Agent, or Firm*—Rader, Fishman & Grauer PLLC; Ronald P. Kananen

(57) **ABSTRACT**

A fingerprint collating device and a fingerprint collating method which can prevent an illicit use of fingerprint. The fingerprint collating device includes fingerprint reader for reading a user's fingerprint to create read fingerprint information, and to create read history information indicating that the read fingerprint information has been created, read history storage for storing the read history information, and collator for collating the read fingerprint information with the registered fingerprint information to effect personal authentication and output a result of authentication when the read history information is stored in the read history storage.

19 Claims, 3 Drawing Sheets



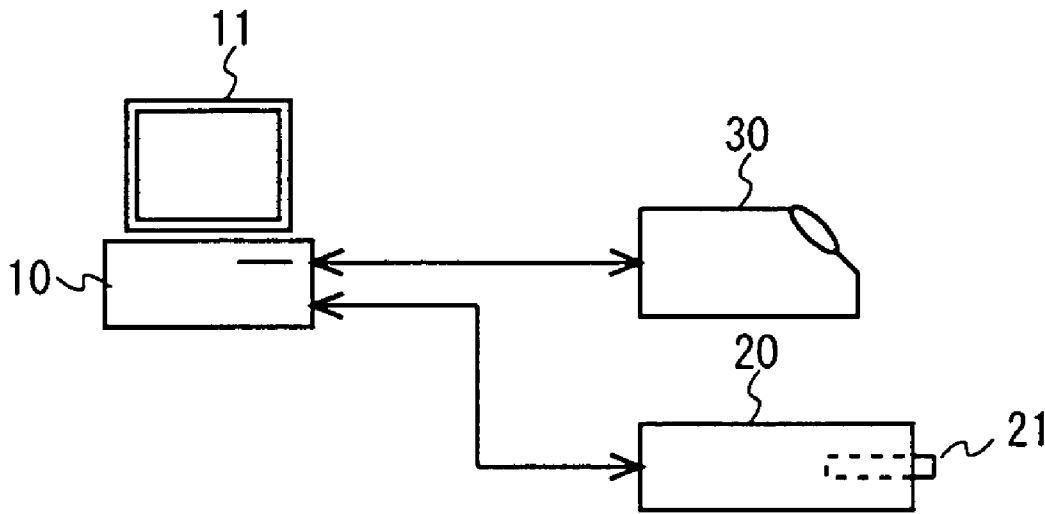


FIG. 1

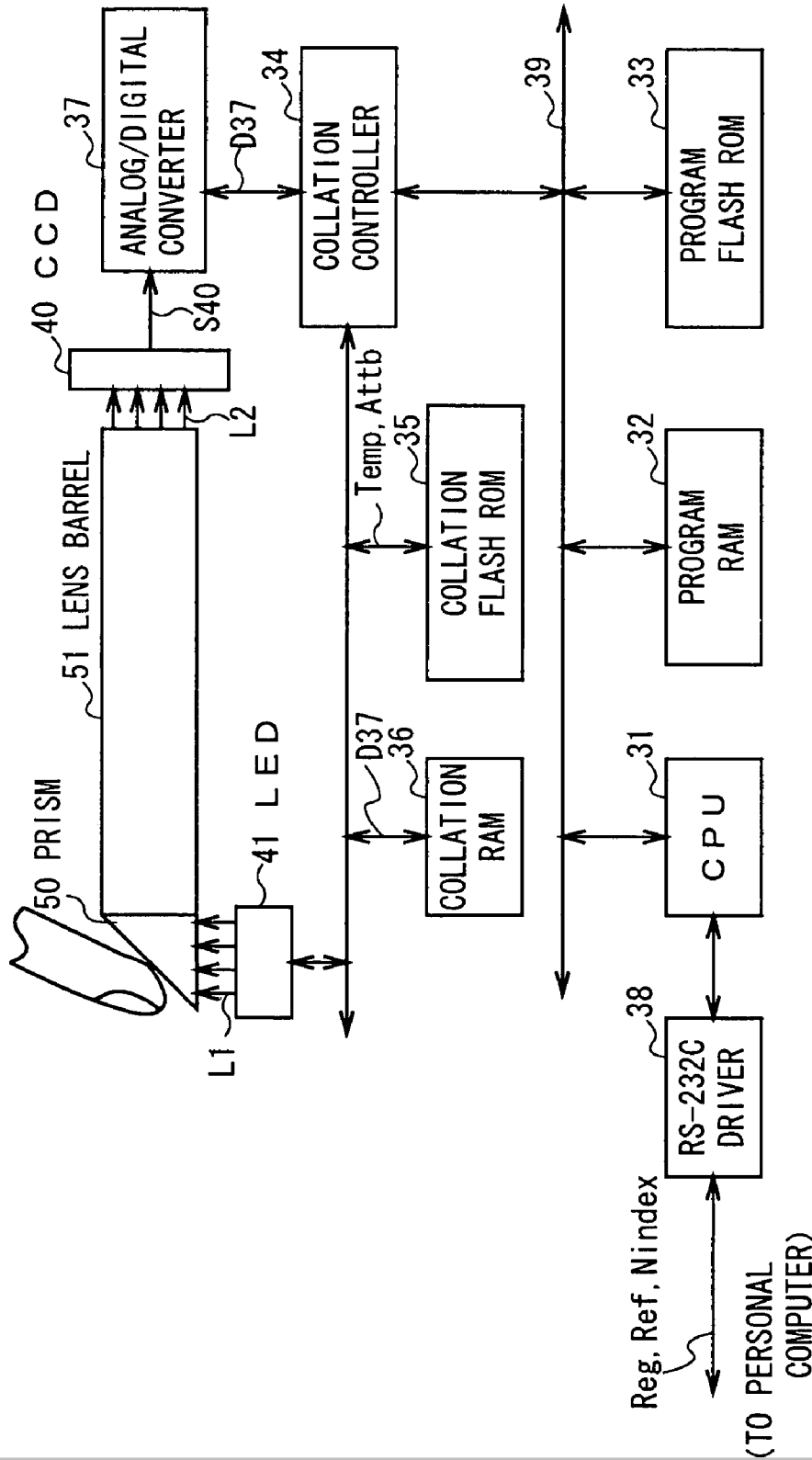


FIG. 2

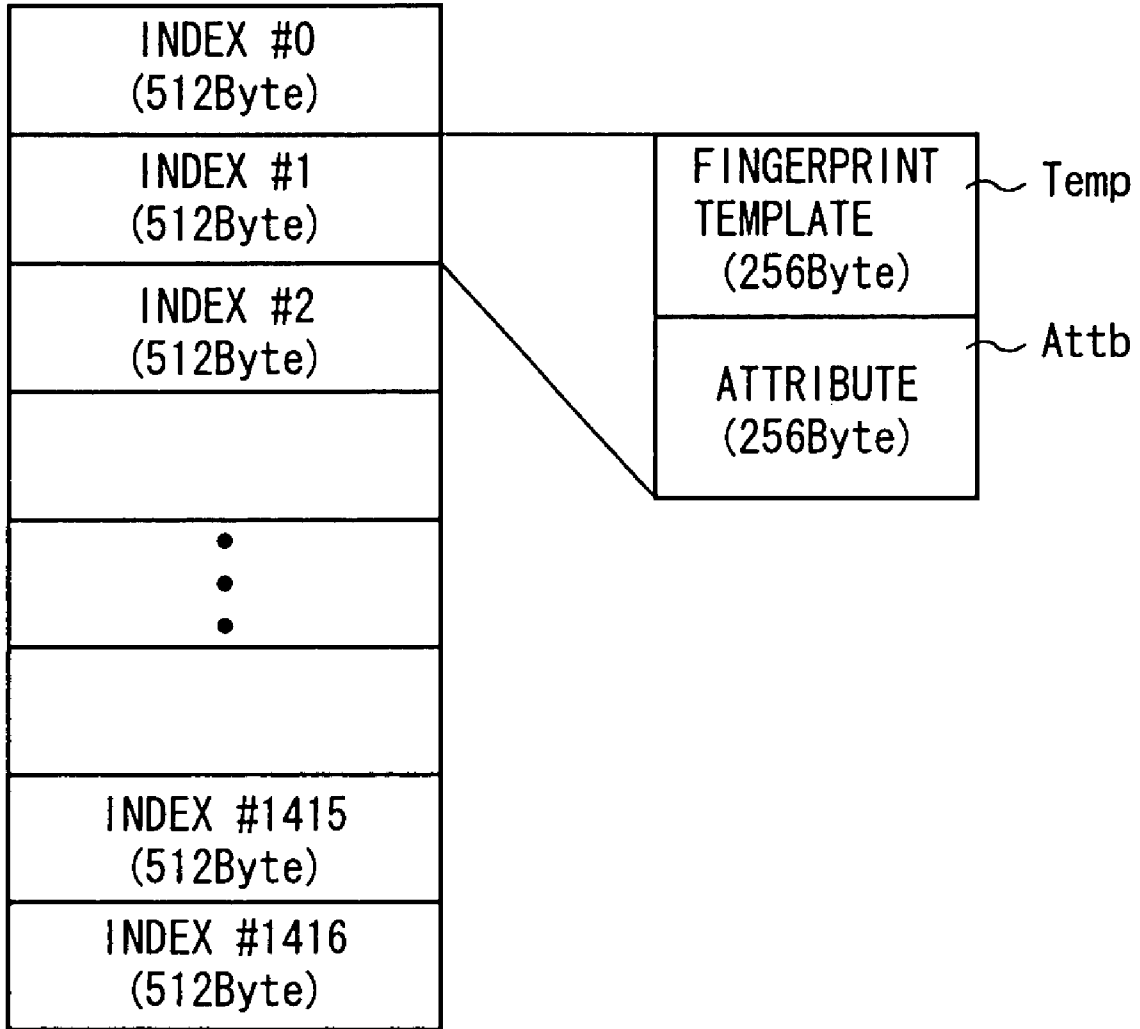


FIG. 3

1

FINGERPRINT COLLATING DEVICE AND FINGERPRINT COLLATING METHOD

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a fingerprint collating device and a fingerprint collating method, and more particularly, is suitably applied to a fingerprint collating device to effect personal authentication by using the fingerprint, for example.

2. Description of the Related Art

Conventionally, there is a fingerprint collating unit for effecting personal authentication by using the fingerprint. Such fingerprint collating unit uses an image pick-up element to photograph a user's fingerprint, and produce a fingerprint image. And the fingerprint collating unit collates the photographed fingerprint image with the registered fingerprint image for collation to effect personal authentication. The fingerprint is unchanged throughout one's life and different from person to person. Therefore, the fingerprint can securely assure the personal authentication.

However, the third party may pick up the other's fingerprint from a cup or the like, for example, to falsify a fingerprint image, and enter the falsified fingerprint image into the fingerprint collating unit for the fingerprint collation. The third party may abuse the falsified fingerprint for personal authentication.

SUMMARY OF THE INVENTION

In view of the foregoing, an object of this invention is to provide a fingerprint collating device and a fingerprint collating method which can prevent an illicit use of the other's fingerprint.

The foregoing object and other objects of the invention have been achieved by the provision of a fingerprint collating device for collating a user's fingerprint the registered fingerprint information to effect personal authentication, comprising fingerprint reader for reading the user's fingerprint to create read fingerprint information, and to create read history information indicating that the read fingerprint information has been created, read history storage for storing the read history information, and collator for collating the read fingerprint information with the registered fingerprint information to effect personal authentication and output a result of authentication when the read history information is stored in the read history storage.

The read history information indicating that the read fingerprint information has been created is stored in the read history storage, and the read fingerprint information is collated with the registered fingerprint information to effect personal authentication when the read history information is stored in the read history storage. Therefore, even if the read fingerprint information is improperly entered from the outside, the personal authentication is not effected, leading to prevention of an illicit use.

The nature, principle and utility of the invention will become more apparent from the following detailed description when read in conjunction with the accompanying draw-

2

BRIEF DESCRIPTION OF THE DRAWINGS

In the accompanying drawings:

FIG. 1 is a block diagram showing the configuration of a fingerprint collation system according to the present invention;

FIG. 2 is a block diagram showing the configuration of a fingerprint collating unit; and

FIG. 3 is a diagram showing a stored state of fingerprint data.

DETAILED DESCRIPTION OF THE EMBODIMENT

Preferred embodiments of this invention will be described with reference to the accompanying drawings:

(1) Overall Configuration of a Fingerprint Collation System

In FIG. 1, reference numeral 1 denotes a fingerprint collation system of the invention as a whole, in which a card reader 20 for reading or writing data from or to an Integrated Circuit (IC) card 21 and a fingerprint collating unit 30 as a fingerprint collating device are connected to a personal computer 10. The personal computer 10 is connected to the card reader 20, as well as the fingerprint collating unit 30, via an RS-232C serial interface.

The fingerprint collating unit 30 accepts a user's fingerprint, and collates the fingerprint with either a fingerprint template (reference fingerprint data for the person for authentication) registered in the fingerprint collating unit 30 or a fingerprint template registered in the IC card 21, a result of fingerprint collation being output to the personal computer 10.

The fingerprint collating unit 30 has a plurality of fingerprint templates registered, each fingerprint template being identified by an index number N index. Also, the IC card 21 has a fingerprint template of an owner of the IC card 21 registered.

(2) Fingerprint Registration Process

When the fingerprint of a person for authentication is registered in the fingerprint collating unit 30, the personal computer 10 sends a fingerprint registration instruction Reg and an index number N index specified by the user to the fingerprint collating unit 30 in response to the fingerprint registration operation of the user.

FIG. 2 is a diagram of the fingerprint collating unit 30 as a whole. A CPU 31, a program Random Access Memory (RAM) 32, a program flash Read Only Memory (ROM) 33, and a collation controller 34 are connected to a main bus 39. The CPU 31 reads a control program from the program flash ROM 33 and executes the control program in the program RAM 32 to control the whole of the fingerprint collating unit 30.

That is, the CPU 31 receives the fingerprint registration instruction Reg and the index number N index sent from the personal computer 10 via a RS232C driver 38. And the CPU 31 controls the collation controller 34 in accordance with the fingerprint registration instruction Reg to start reading the fingerprint.

The collation controller 34 turns on an LED 41 under the control of the CPU 31 to apply an illuminating light L1 onto the bottom face of a prism 50. Then, the user puts one's finger with fingerprint face to be registered on the slant of the prism 50 firmly.

The prism 50 reflects the illuminating light L1 on the

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.