MEMS ULTRASONIC FINGERPRINT ID SYSTEM

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PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	10,430,631	10/01/2019	2013-165

BRIEF DESCRIPTION

Two-dimensional optical fingerprint analysis has been used for a variety of personal identification applications over the years. However, automated optical fingerprint scanning techniques have a number of limitations that block their use in broader applications. For example, automated optical fingerprint scanning techniques sense only the epidermal layer of a fingerprint. As a result, they are prone to errors created by finger contamination. The marketplace has reflected the limitations of optical fingerprint identification, as many optical fingerprint scanners have been removed from most later models due to these limitations. They lacked the necessary robustness to perform predictably in such everyday environments. Ultrasonic fingerprint scanners have been developed in an effort to minimize the limitations of currently available optical fingerprint scanning, and avoid some of the resulting errors. However, currently available ultrasonic fingerprint scanners devices are limited in their applications because of large size, the requirement of a physically moving scanning device, and cost.

UC researchers have developed a micro-machined ultrasonic transducer fingerprint identification system (MUT fingerprint ID system) to address these issues. MUT fingerprint ID system has advantages of a small size, robust solid-state construction, easy fabrication, easy integration with electronics, and fast electronic scanning. These features represent a game-changing advancement over currently available bulky, failure prone mechanical scanners. The system also has orders of magnitude lower cost per unit than current systems. Conventional fingerprint sensors used in consumer electronics applications are capacitive sensors and are extremely prone to errors due to wet, dry or oily fingers. Optical sensors are sensitive to dirt on fingers. Unlike both capacitive and optical sensors, which measure the fingerprint on the epidermis (skin surface), the ultrasonic sensor at the core of the MUT fingerprint ID system can detect the fingerprint on both the epidermis and dermis (subcutaneous) layers.

SUGGESTED USES

- consumer electronics (e.g. laptops and smartphones)
- personal identification applications
- security applications (e.g., banking)

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INVENTORS

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OTHER INFORMATION

KEYWORDS

Sensor, identification, fingerprint

CATEGORIZED AS

- **Optics and Photonics**
  - All Optics and Photonics
- **Communications**
  - Other
- **Computer**
  - Security
- **Security and Defense**
  - Other
- **Sensors & Instrumentation**
  - Other

RELATED CASES

2013-165-0

ADVANTAGES

- small size, easy fabrication, and easy integration with electronics
- insensitive to both contamination and moist conditions of fingers
- fast response time because of its electronic scanning feature
- able to electronically scan the focused acoustic beam over a large distance (from several mm to several cm) with small step size
- works in a live scan mode
- unique design which results in better directivity

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Precision Gyroscope Mode-Matching Insensitive To Rate Input

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