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(ICS 35.240.15)

SINGAPORE STANDARD

Information technology — Biometric data interchange formats

– Part 4 : Finger image data

Singapore Standards Council

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Information technology — Biometric data interchange format

– Part 4 : Finger image data

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National Foreword

This Singapore Standard was prepared by the Technical Committee on Identification Technology under the purview of Information Technology Standards Committee.

This standard is an identical adoption of ISO/IEC 19794-4:2005, “Information technology — Biometric data interchange formats — Part 4 : Finger image data”, published by the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC).

Both ISO/IEC 19794-4:2005 and ISO/IEC 19794-4:2011 (confirmed in 2017) have been adopted as Singapore Standards, as the later and current version of the standard is not backward compatible with the previous version. Both versions are being used by industry. ISO has specified that the previous edition of the standard (i.e. the 2005 version) ‘exceptionally remains valid until 2033’.

NOTE 1 – Reference to International/Overseas Standards are replaced by applicable Singapore Standards or Technical References.

NOTE 2 – Where numerical values are expressed as decimals, the comma is read as a full point.

Attention is drawn to the possibility that some of the elements of this Singapore Standard may be the subject of patent rights. Enterprise Singapore shall not be held responsible for identifying any or all of such patent rights.

INTERNATIONAL STANDARD

ISO/IEC 19794-4

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Information technology — Biometric data interchange formats —

Part 4: Finger image data

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National Bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO/IEC 19794-4 was prepared by Joint Technical Committee ISO/IEC/JTC 1, *Information technology*, Subcommittee SC 37, *Biometrics*.

ISO/IEC 19794 consists of the following parts, under the general title *Information technology — Biometric data interchange formats*:

— *Part 1: Framework*

— *Part 2: Finger Minutiae Data*

— *Part 3: Finger Pattern Spectral Data*

— *Part 4: Finger Image Data*

— *Part 5: Face Image Data*

— *Part 6: Iris Image Data*

— *Part 7: Signature/Sign Behavioural Data*

— *Part 8: Finger Pattern Skeletal Data*

— *Part 9: Vascular Data*

— *Part 10: Hand Geometry Silhouette Data*

— *Part 11: Signature/sign processed dynamic Data*

— *Part 13: Voice Data*

— *Part 14: DNA Data*

This corrected version of ISO/IEC 19794-4:2005 incorporates the following corrections:

This corrected version contains the original content of ISO/IEC 19794-4:2005 and incorporates the Technical Corrigendum ISO/IEC 19794-4:2005/Cor 1:2011.

Introduction

In the forensic community, the capture and transmission of fingerprint images has been a common choice for the exchange of fingerprint information used by Automatic Fingerprint Identification Systems (AFIS) for the identification of individuals. However, little to no fingerprint information is being exchanged between equipment from different vendors in the biometric user verification and access community. This has been due in part to the lack of agreement between vendors on the amount and type of information to capture, the method of capture, and the information to be exchanged.

This part of the ISO/IEC 19794 standard is intended for those applications requiring the exchange of raw or processed fingerprint images that may not necessarily be limited by the amount of resources required for data storage or transmitting time. It can be used for the exchange of scanned fingerprints containing detailed image pixel information. This part of ISO/IEC 19794 can also be used to exchange processed fingerprint image data containing considerably fewer pixels per inch and/or a lesser number of greyscale levels. This is in contrast to other parts of ISO/IEC 19794 used for exchanging lists of fingerprint characteristics such as minutiae, patterns, or other variants. These formats require considerably less storage than a fingerprint image. However, by using any of the other parts of ISO/IEC 19794, information recorded in one standard format cannot be used by algorithms designed to operate with another type of information. In other words, minutiae data cannot be used by pattern matching algorithms and pattern data cannot be used by minutiae matching algorithms.

Although the minutiae, pattern, or other approaches produce different intermediate outputs, all must initially capture a reasonably high quality fingerprint image before reducing the size of the image (in bytes) or developing a list of characteristic data from the image. Use of the captured or processed image can provide interoperability among vendors relying on minutiae-based, pattern-based or other algorithms. As a result, data from the captured finger image offers the developer more freedom in choosing or combining matching algorithm technology. For example, an enrolment image may be stored on a contactless chip located on an identification document. This will allow future verification of the holder of the document with systems that rely on either minutiae based or pattern based algorithms. Establishment of an image-based representation of fingerprint information will not rely on pre-established definitions of minutiae, patterns or other types. It will provide implementers with the flexibility to accommodate images captured from dissimilar devices, varying image sizes, resolutions, and different grayscale depths. Use of the fingerprint image will allow each vendor to implement their own algorithms to determine whether two fingerprint records are from the same finger.

INTERNATIONAL STANDARD **ISO/IEC 19794-4:2005(E)**

Information technology — Biometric data interchange formats —

Part 4: Finger image data

1 Scope

This part of the ISO/IEC 19794 standard specifies a data record interchange format for storing, recording, and transmitting the information from one or more finger or palm image areas within an ISO/IEC 19785-1 CBEFF data structure. This can be used for the exchange and comparison of finger image data. It defines the content, format, and units of measurement for the exchange of finger image data that may be used in the verification or identification process of a subject. The information consists of a variety of mandatory and optional items, including scanning parameters, compressed or uncompressed images and vendor-specific information. This information is intended for interchange among organizations that rely on automated devices and systems for identification or verification purposes based on the information from finger image areas. Information compiled and formatted in accordance with this part of the ISO/IEC 19794 standard can be recorded on machine-readable media or may be transmitted by data communication facilities.

2 Conformance

Systems claiming conformance with this part of the ISO/IEC 19794 standard shall be capable of encoding and decoding finger image data and the associated parameter data used in the transmitting and/or receiving of fingerprint images as defined by this part of the ISO/IEC 19794 standard. At a minimum, conformance shall require the ability to capture, exchange, and compare interoperable fingerprint image information.

3 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IAFIS-IC-0110 (V3). *WSQ Gray-scale Fingerprint Image Compression Specification* 1997

ISO/IEC/CD 19785-3, *Common Biometric Exchange Formats Framework (CBEFF) — Part 1: Data Element Specification*

ISO/IEC IS 15444, *JPEG 2000, Information Technology — Digital Compression and Coding of Continuous-Tone Still Images — Part 1: Requirements and Guidelines*

MTR 04B0000022 (Mitre Technical Report), Margaret Lepley, Profile for 1000ppi Fingerprint Compression, Version 1.1, April 2004. Available at: http://www.mitre.org/work/tech_papers/tech_papers_04/lepley_fingerprint/lepley_fingerprint.pdf

4 Terms and definitions

For the purpose of this document, the following terms and definitions apply.