SS ISO/IEC 19794-4.2:2021

ISO/IEC 19794-4:2011+C1:2012+A1:2013+A2:2015, IDT

(ICS 35.040)

SINGAPORE STANDARD

Information technology — Biometric data interchange formats

– Part 4 : Finger image data

Singapore Standards Council

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Published by Enterprise Singapore

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ISBN 978-981-5024-32-6

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 19794-4:2011, “Information technology — Biometric data interchange formats — Part 4 : Finger image data”, including its Technical Corrigendum 1 and Amendments 1 and 2, 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.

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INTERNATIONAL STANDARD

ISO/IEC 19794-4

Second edition
2011-12-15

Information technology — Biometric data interchange formats —

Part 4: Finger image data

Technologies de l'information — Formats d'échange de données biométriques —

Partie 4: Données d'image du doigt

Reference number
ISO/IEC 19794-4:2011(E)

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Published in Switzerland

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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 national 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 and IEC 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*.

This second edition cancels and replaces the first edition (ISO/IEC 19794-4:2005). It reflects the harmonization across the second generation of ISO/IEC 19794. Clause 8 has been technically revised and contains descriptions of the harmonized general and representation headers. Annex A is under development and will contain an amendment for conformance testing methodology for this part of ISO/IEC 19794. Annex B contains capture device certifications for capturing finger image data. Annex B has been technically revised. Annex D describes conditions for capturing finger image data, and Annex E contains the WSQ Gray-scale fingerprint image compression specification. The former Annex A “Image Quality Specification” has been removed.

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 time series data*

— *Part 8: Finger pattern skeletal data*

— *Part 9: Vascular image data*

— *Part 10: Hand geometry silhouette data*

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

— *Part 13: Voice data*

— *Part 14: DNA data*

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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.

ISO/IEC 19794 is a series of International Standards being developed by ISO/IEC JTC 1/SC 37 that supports interoperability and data interchange among biometric applications and systems. The series specifies requirements that solve the complexities of applying biometrics to a wide variety of personal recognition applications, whether such applications operate in an open systems environment or consist of a single, closed system. Additional information regarding the series is provided in ISO/IEC 19794-1.

This part of ISO/IEC 19794 is intended for those applications requiring the exchange of raw or processed fingerprint and palm 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 grayscale 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 records cannot be compared with pattern skeletal data comparison subsystems.

Although the minutiae, pattern, or other approaches produce different intermediate outputs, all shall 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 comparison algorithms. 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, spatial sampling rates, 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.

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INTERNATIONAL STANDARD **ISO/IEC 19794-4:2011(E)**

Information technology — Biometric data interchange formats —

Part 4: Finger image data

1 Scope

This part of ISO/IEC 19794 specifies a data record interchange format for storing, recording, and transmitting the information from one or more finger or palm image areas. 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 for enrolment, verification, or identification 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 ISO/IEC 19794 can be recorded on machine-readable media or may be transmitted by data communication facilities.

2 Conformance

A biometric data record conforms to this part of ISO/IEC 19794 if it satisfies all of the normative requirements related to:

a) its data structure, data values, and the relationships between its data elements, as specified throughout Clause 8 for the finger image record format of this part of ISO/IEC 19794;

b) the relationship between its data values and the input biometric data from which the biometric data record was generated, as specified throughout Clause 8 for the finger image record format of this part of ISO/IEC 19794.

A system that produces biometric data records is conformant to this part of ISO/IEC 19794 if all biometric data records that it outputs conform to this part of ISO/IEC 19794 (as defined above) as claimed in the Implementation Conformance Statement (ICS) associated with that system. A system does not need to be capable of producing biometric data records that cover all possible aspects of this part of ISO/IEC 19794, but only those that are claimed to be supported by the system in the ICS.

A system that uses biometric data records is conformant to this part of ISO/IEC 19794 if it can read, and use for the purpose intended by that system, all biometric data records that conform to this part of ISO/IEC 19794 (as defined above) as claimed in the ICS associated with that system. A system does not need to be capable of using biometric data records that cover all possible aspects of this part of ISO/IEC 19794, but only those that are claimed to be supported by the system in an ICS.

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