INTERNATIONAL STANDARD

ISO/IEC 19794-2

Second edition
2011-12-15

Information technology — Biometric data interchange formats —

Part 2: Finger minutiae data

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

Partie 2: Données du point caractéristique du doigt

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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 19794-2 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 19794-2:2005). It reflects the harmonization across the second generation of ISO/IEC 19794. A new Clause 7 has been added to describe the finger minutiae format types; Clause 8 contains descriptions of the harmonized general and representation headers; and Clauses 8 and 9 have been technically revised. All annexes have been technically revised. Annex A is under development and will contain an amendment for conformance testing methodology for this part of ISO/IEC 19794. The former Annex B “Fingerprint Image Quality Specifications” has been removed. Annex E contains three examples of capture device certifications. Annex F provides descriptions of fingerprint minutiae location, direction, and type.

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*

Introduction

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 ISO/IEC 19794 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.

In the interest of implementing interoperable biometric recognition systems, this part of ISO/IEC 19794 establishes a data interchange format for minutiae. It is relevant for systems or components dealing with generating, processing, and storing minutiae data. Representation of fingerprint data using minutiae is a widely used technique in many application areas.

This part of ISO/IEC 19794 defines specifics of the extraction of key points (called *minutiae*) from fingerprint ridge patterns. These specifics include a description of the types of minutiae identified, the method used for the placement of minutiae on an image, a definition of the coordinate system used, and the methods used to calculate the angle associated with each minutia.

Information technology — Biometric data interchange formats —

Part 2: Finger minutiae data

1 Scope

This part of ISO/IEC 19794 specifies a concept and data formats for representation of fingerprints using the fundamental notion of minutiae. It is generic, in that it may be applied and used in a wide range of application areas where automated fingerprint recognition is involved. This part of ISO/IEC 19794 contains definitions of relevant terms, a description of how minutiae are to be determined, data formats for containing the data for both general use and for use with cards, and conformance information. Guidelines and values for comparing and decision parameters are provided.

NOTE Although ISO/IEC 19794-4 covers both finger and palm image data, this part of ISO/IEC 19794 only covers finger minutiae and is not applicable to palms.

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 minutiae record format and Clause 9 for the finger minutiae on-card biometric comparison 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 minutiae record format and Clause 9 for the finger minutiae on-card biometric comparison 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.

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.

ISO/IEC 19785-3:2007, *Information technology — Common Biometric Exchange Formats Framework — Part 3: Patron format specifications*

ISO/IEC 19794-1:2011, *Information technology — Biometric data interchange formats — Part 1: Framework*

ISO/IEC 7816-11:2004, *Identification cards — Integrated circuit cards — Part 11: Personal verification through biometric methods*

4 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 19794-1 and the following apply.

4.1
algorithm
sequence of instructions that tell a biometric system how to solve a particular problem

NOTE An algorithm will have a finite number of steps and is typically used by the biometric engine (i.e., the biometric system software) to compute whether a biometric sample and template are the same.

4.2
end user
person who interacts with a biometric system to enrol or have his/her identity checked

NOTE Compare with the definition of “user” in ISO/IEC 19794-1.

4.3
live-scan print
fingerprint image that is produced by scanning or imaging a live finger to generate an image of the friction ridges

4.4
population
set of end users for the application

4.5
ridge skeleton endpoint
minutia assigned to the location at which a ridge skeleton ends

NOTE A ridge skeleton endpoint is defined as the ending of the skeleton of a ridge.

4.6
template/reference template
data, which represents the biometric measurement of an enrollee, used by a biometric system for comparison against subsequently submitted biometric samples

NOTE This term is not restricted to mean only data used in any particular recognition method, such as template comparison.

4.7
valley bifurcation
point at which a valley splits into two valleys or, alternatively, where two separate valleys combine into one

