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Information technology — Biometric data interchange formats —

Part 8:
Finger pattern skeletal data

AMENDMENT 1: Conformance testing methodology

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

Partie 8: Données des structures du squelette de l'empreinte
AMENDEMENT 1: Méthodologie d'essai de conformité

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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.

Amendment 1 to ISO/IEC 19794-8:2011 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 37, *Biometrics*.

This corrected version of ISO/IEC 19794-8:2011/Amd.1:2014 corrects the Amendment number in the top right corner on the cover page.

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AMENDMENT 1: Conformance testing methodology

1. The following text is to be added to the "Introduction" clause of ISO/IEC 19794-8:

Annex A to document addresses the conformance testing to be used for interchange format defined in this part of ISO/IEC 19794. This Annex A is distinct from the ISO/IEC 29109-8, which addressed conformance testing only of the first, 2007, edition of the ISO/IEC 19794-8 standard.

2. The following text is to be added to the "Scope" clause of ISO/IEC 19794-8:

This part of ISO/IEC 19794 also specifies elements of conformance testing methodology, test assertions, and test procedures as applicable to this part of ISO/IEC 19794. Specifically, it establishes

— test assertions of the structure of the finger pattern skeletal data format as specified in Clauses 7 and 8 of this part of ISO/IEC 19794 (Type A Level 1 as defined in ISO/IEC 19794-1:2011 AMD 1),

— test assertions of internal consistency by checking the types of values that may be contained within each field (Type A Level 2 as defined in ISO/IEC 19794-1:2011 AMD 1),

— tests of semantic assertions (Type A Level 3 as defined in ISO/IEC 19794-1:2011 AMD 1).

The conformance testing methodology specified in this part of ISO/IEC 19794 does not establish

— tests of other characteristics of biometric products or other types of testing of biometric products (e.g. acceptance, performance, robustness, security),

— tests of conformance of systems that do not produce data records conforming to the requirements of this part of ISO/IEC 19794.

3. The following text is to be added to the "Conformance" clause of ISO/IEC 19794-8:

Biometric data interchange format conformance tests conform to this part of ISO/IEC 19794 if they satisfy all of the normative requirements set forth in clauses 6, 7, and 8. Specifically, they shall use the test methodology specified in ISO/IEC 19794-1:2011 AMD 1, and all Level 1, Level 2 and Level 3 tests shall use the assertions defined in Table A.1 of Clause A.2 in this part of ISO/IEC 19794.

Implementations of this part of ISO/IEC 19794 tested according to the specified methodology shall be able to claim conformance only to those biometric data record (BDB) requirements specified in this part of ISO/IEC 19794 that are tested by the test methods established by this methodology.

In consideration of the semantic specifics in different parts of 19794, all level 1, level 2, and level 3 tests shall use the assertions defined in Table A.2 of clause A.3 of this part of 19794 in conformity with the concept and rules set in 19794-1 Annex A.

4. Replace 3rd paragraph of Clause 6.2.3 "Constructing direction elements" with the following:

In order to minimize integration of digitalisation error, each starting point must be computed with relatively high accuracy, i.e. its resolution shall be at least 100 times finer than the spatial resolution of the minutiae.

5. Replace the normative annex in ISO/IEC 19794-8:2011 with the following one:

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896c2e0b6e03/iso-iec-19794-8-2011-amd-1-2014

Annex A
(normative)

Conformance Testing Methodology

A.1 Introduction

The testing methodology specified in ISO/IEC 19794-1:2011 AMD 1 shall apply. The content of the tables below is based on the conformance testing methodology outlined in ISO/IEC 19794-1:2011 AMD 1 and shall only be used in the context of that testing methodology.

A.2 Table of requirements in the base standard

The normative requirements of this part of ISO/IEC 19794 are listed in Table A.1. The supplier of the IUT should explain which optional components of the standard are supported and the testing laboratory should note the results of the test.

Table A.1 — Requirements of the Base Standard

Requirement Identifier	Reference in Base Standard	Requirement Summary	Level	Status	Sub-format / Format Type Applicability			IUT Support	Supported Range	Test Result
					R	N	C			
R-1	6.1.1	Minutiae are points located at the places in the fingerprint image where friction ridges end or split into two ridges. Each minutia point has a "type" associated with it. There are two major types of minutia: a "ridge ending" represented by the 2-bit value 01 and a "ridge bifurcation" or split point represented by 2-bit value 10.	1	M	Y	Y	Y		N/A	
R-2	6.1.2	The coordinate system used to express the position of the minutiae points of a fingerprint shall be a Cartesian coordinate system. For the skeletal pattern card format, the resolution of the x and y coordinates of the minutia shall be in metric units. The position of the minutia for a ridge ending shall be defined as the coordinates of the skeleton point with only one neighbour pixel belonging to the skeleton. The position of the minutia for a ridge bifurcation shall be defined as the point of forking of the skeleton of the ridge. The position of a virtual ending shall be defined like the position of a real ridge ending.	3C	O-1	Y	Y	Y		N/A	N/A

Requirement Identifier	Reference in Base Standard	Requirement Summary	Level	Status	Sub-format / Format Type Applicability			IUT Support	Supported Range	Test Result
					R	N	C			
R-3	6.1.3	The direction of the lines starting or ending at a point with more than three arms (trifurcation, etc.) shall be defined like the direction of a real ridge ending. The direction of a virtual ending shall be defined like the direction of a real ridge ending.	3C	O-1	Y	Y	Y		N/A	N/A
R-4	6.2.2	To keep the encoding size small a line shall start with a real minutia (type 01 or 10) if possible. No assumption shall be made about the order of the line encodings in the record. The skeleton shall be encoded only for image areas where the ridge lines are displayed with a sufficient quality. The reconstructed ridge lines shall describe the fingerprint image in ridge position and structure. The reconstructed skeleton line polygon element shall be inside the area of the ridge it is describing for most part of its length. The reconstructed skeleton line shall never be inside the area of any other ridge but the one it is describing. The reconstructed skeleton line shall preserve the topology of the ridges.	3C	O-1	Y	Y	Y		N/A	N/A
R-5	6.2.3	In order to minimize integration of digitalisation error, each starting point must be computed with relatively high accuracy, i.e. its resolution shall be at least 100 times finer than the spatial resolution of the minutiae.	3C	O-1	Y	Y	Y		N/A	N/A
R-6	6.2.3	If the direction change of the skeleton line cannot be described by a direction element, the line encoding shall be interrupted by a "virtual continuation" and a new line encoding shall begin with the same point without repeating the minutia data.	3C	O-1	Y	Y	Y		N/A	N/A
R-7	6.3.2	It is not usefull to list a neighourhood relation twice, any of the other indices shall be different i.e. Ai-1>Ai.	3A	M	Y	Y	Y			

Requirement Identifier	Reference in Base Standard	Requirement Summary	Level	Status	Sub-format / Format Type Applicability			IUT Support	Supported Range	Test Result
					R	N	C			
R-8	7.3, Table 1	There shall be one and only one record header for the finger pattern skeletal data record. The record header will contain information describing the identity and characteristics of the device that generated the data.	3A	M	Y	N	N			
R-9	7.3.1, Table 1	The finger pattern skeletal data record shall begin with a format identifier to be recorded in four bytes. For this part of ISO/IEC 19794, it shall consist of the three ASCII characters "FSK", followed by a zero byte as a NULL string terminator.	1	M	Y	N	N			
R-10	7.3.2, Table 1	The version number for the version of this part of ISO/IEC 19794 used in constructing the record shall be placed in four bytes.	1	M	Y	N	N			
R-11	7.3.2, Table 1	This version number shall consist of three ASCII numerals followed by a zero byte as a NULL string terminator. The first and second character will represent the major revision number and the third character will represent the minor revision number. Upon approval of this specification, the version number shall be "020" (an ASCII '0' followed by an ASCII '2' and an ASCII '0').	1	M	Y	N	N			
R-12	7.3.3, Table 1	The length of the entire BDIR shall be recorded in four bytes.	1	M	Y	N	N			
R-13	7.3.3, Table 1	This count shall be the total length of the BDIR including the general record header and one or more representation records.	1	M	Y	N	N			
R-14	7.3.4	The total number of representation records contained in the BDIR shall be recorded in two bytes. A minimum of one representation is required.	1	M	Y	N	N			
R-15	7.3.5	The one-byte certification flag shall indicate whether each Representation Header includes a certification block. A value of 00HEX shall indicate that no representation contains a certification block. A value of 01HEX shall indicate that all representations contain a certifica-tion block.	1	M	Y	N	N			

Requirement Identifier	Reference in Base Standard	Requirement Summary	Level	Status	Sub-format / Format Type Applicability			IUT Support	Supported Range	Test Result
					R	N	C			
R-16	7.4.1	A finger pattern skeletal representation header shall start each area of finger data providing information for that finger. There shall be one finger pattern skeletal representation header for each finger contained in the finger pattern skeletal data record. The finger pattern skeletal representation header will occupy at least 31 bytes as described below. Note that it is permissible for more than one single finger record to represent the same finger, with (presumably) different data.	1	M	Y	Y	Y			
R17	7.4.1.1	The representation-length field denotes the length in bytes of the representation including the representation header fields	1	M	Y	Y	Y			
R-18	7.4.1.2	The capture date and time field shall indicate when the capture of this representation started in Coordinated Universal Time (UTC). The capture date and time field shall consist of 9 bytes. Its value shall be encoded in the form given in ISO/IEC 19794-1.This field shall indicate the date and time the representation was captured. This field is not intended encode the time the record was instantiated.	1	M	Y	Y	Y			
R-19	7.4.1.3	The capture device technology ID shall be encoded in one byte. This field shall indicate the class of capture device technology used to acquire the captured biometric sample.	1	M	Y	Y	Y			
R-20	7.4.1.3	A value of 00HEX indicates unknown or unspecified technology. See Table 2 for the list of possible values.	1	M	Y	Y	Y			
R-21	7.4.1.4	The capture device vendor identifier shall be recorded in two bytes. It shall identify the biometric organisation that owns the product that created the BDB and shall be registered with the IBIA or other approved registration authority.	1	M	Y	Y	Y			
R-22	7.4.1.4	A value of all zeros shall indicate that the capture device vendor is unreported.	1	M	Y	Y	Y			

Requirement Identifier	Reference in Base Standard	Requirement Summary	Level	Status	Sub-format / Format Type Applicability			IUT Support	Supported Range	Test Result
					R	N	C			
R-23	7.4.1.5	This capture device type identifier shall be recorded in two bytes. It shall identify the product type that created the BDB and shall be assigned by the registered BDB product owner or other approved registration authority. A value of all zeros shall indicate that the capture device type is unreported.	1	M	Y	Y	Y			
R-24	7.4.1.6.1	The quality information of the overall finger minutiae data shall be recorded in five bytes.	1	M	Y	Y	Y			
R-25	7.4.1.6.2	The first byte is mandatory and shall contain the number of blocks of quality information of the overall finger pattern skeletal data.	1	M	Y	Y	Y			
R-26	7.4.1.6.2	Subsequent 5-byte blocks shall contain the specific quality/vendor/algorithm information for each quality/vendor/algorithm evaluation.	1	M	Y	Y	Y			
R-27	7.4.1.6.2	A value of zero (0) means that no attempt was made to assign a quality score. In this case, no Quality Blocks are present.	1	M	Y	Y	Y			
R-28	7.4.1.6.3	Quality score, as defined in ISO/IEC 29794-1, shall be a quantitative expression of the predicted verification performance of the biometric sample. Valid values for Quality Score are integers between 0 and 100, where higher values indicate better quality.	1	M	Y	Y	Y			
R-29	7.4.1.6.3	A value of 255 is to handle a special case. An entry of 255 shall indicate a failed attempt to calculate a quality score. Multiple quality scores calculated by the same algorithm (same vendor identifier and Quality Algorithm identifier) shall not be present in a single representation.	1	M	Y	Y	Y			
R-30	7.4.1.6.4	To enable the recipient of the quality score to differentiate between quality scores generated by different algorithms, the provider of quality scores shall be uniquely identified by the next two bytes. This Vendor identifier shall be registered with the International Biometrics Industry Association (IBIA).	1	M	Y	Y	Y			

Requirement Identifier	Reference in Base Standard	Requirement Summary	Level	Status	Sub-format / Format Type Applicability			IUT Support	Supported Range	Test Result
					R	N	C			
R-31	7.4.1.6.5	The remaining two bytes shall specify an integer product code assigned by the vendor of the Quality Algorithm ID. It indicates which of the vendor's algorithms (and version) was used in the calculation of the quality score and must be within the range of 1 to 65535.	1	M	Y	Y	Y			
R-32	7.4.1.7.1	This multi-byte block contains information to indicate the compliant certification procedures that were used to test the biometric capture equipment used. If the device certification block flag in the general header has a value of 00 HEX, no capture device certification information shall be present in any of the representation header records for that finger pattern skeletal record.	1	M	Y	Y	Y			
R-33	7.4.1.7.2	The first byte is mandatory and shall contain the number of successful certifications for the capture device. This byte is followed by 3-byte sub-blocks containing certification information. A value of 00 HEX in this first byte shall indicate that this capture device has not been certified and no certification information sub-blocks follow.	1	M	Y	Y	Y			
R-34	7.4.1.7.3	Certification authority identifier shall be encoded in two bytes. Certification Authority is the agency that certifies a device according to a particular capture device quality specification. Certification authority identifier shall be registered by the IBIA or other approved registration authority.	1	O	Y	Y	Y			
R-35	7.4.1.7.4	This last byte of the sub-block shall identify a certification scheme used to certify the capture device. A list of current certification scheme identifiers is contained in Table 3.	1	O	Y	Y	Y			