
**Information technology — Biometric
data interchange formats —**

**Part 5:
Face image data**

**AMENDMENT 2: XML encoding and
clarification of defects**

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

Partie 5: Données d'image de la face

AMENDEMENT 2: Codage XML et précisions concernant les défauts

Sample Document

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT), see the following URL: [Foreword — Supplementary information](#).

Amendment 2 to ISO/IEC 19794-5:2011 was prepared by ISO/IEC JTC 1, *Information Technology*, Subcommittee SC 37, *Biometrics*.

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Information technology — Biometric data interchange formats —

Part 5: Face image data

AMENDMENT 2: XML encoding and clarification of defects

Page 1, Conformance

Insert the following text as second paragraph:

An XML document conforms to this part of ISO/IEC 19794 if it satisfies the format requirements with respect to its structure, with respect to relations among its fields, and with respect to relations between its fields and the underlying input that are specified within Annex F of this part of ISO/IEC 19794.

Page 2, Normative references

Add the following URL as the last item in Clause 3:

XML Schema: <http://www.w3.org/XML/Schema.html>

Page v, ISO/IEC 19794-5:2011/Amd 1:2014, Introduction

Add the following paragraph after the last paragraph:

Additionally, this part of the ISO/IEC standard supports both binary and XML encoding, to support a spectrum of user requirement. With XML, this part will meet the requirements of modern IT architectures. With binary encoding this part will also be able to be used in bandwidth or storage constrained environments. Annex F specifies the schema that XML encoded face image records must conform to, and Annex G provides an example of a valid XML encoded face image record.

Page 6, ISO/IEC 19794-5:2011/Amd 1:2014, Annex A

Replace Table A.1 with the following (this new Table A.1 may extend over multiple pages):

Table A.1 — Normative requirements

Req. ID	Ref. in main body	Requirements summary	Level	Status	Subformat applicability				XML support	IUT support	Supported range	Test results
					B	F	T	P				
R-1	5.1	The ISO/IEC 19794-5:2011 BDIR format specified in this part of ISO/IEC 19794 is a format to store face representations within a biometric data record.	3C	0-1	Y	Y	Y	Y	Y			
R-2	5.1	Each BDIR shall pertain to a single subject.	3C	0-1	Y	Y	Y	Y	Y			
R-3	5.1	Each BDIR shall contain at least one or more 2D image and zero or more geometric representations (range images, 3D point maps, 3D vertex representations) of a human face.	3C	M	Y	Y	Y	Y	Y			
R-4	5.1	2D image data will be encoded using JPEG, JPEG2000 or PNG.	3C	0-1	Y	Y	Y	Y	Y			
R-5	5.1	With the exception of the Format Identifier and the Version Number for the standard, which are null-terminated ASCII character strings, all data is represented in binary format.	3C	0-1	Y	Y	Y	Y	N			
R-6	5.1	There are no record separators or field tags; fields are parsed by byte count.	3C	0-1	Y	Y	Y	Y	N			

Table A.1 (continued)

Req-ID	Ref. in main body	Requirements summary	Level	Status	Subformat applicability					XML support	IUT support	Supported range	Test results
					B	F	T	P					
R-7	5.1	<p>The organization of the record format is as follows.</p> <ul style="list-style-type: none"> — A fixed-length (17 byte) General Header containing information about the overall record, including the number of facial images represented and the overall record length in bytes. — A Representation block for each facial representation. This data consists of a Representation Header and the Representation Data. <p>The Representation Header consists of</p> <ul style="list-style-type: none"> — a fixed length (19 bytes) common elements defined in ISO/IEC 19794-1:2011, — multiple (including none) fixed length (5 byte) Quality blocks describing the quality of the representation, — a fixed length (17 byte) Facial Information block describing discernable characteristics of the subject such as gender, — multiple (including none) fixed length (8 byte) Landmark Point blocks describing Landmark Points in a facial image, — a fixed length (11 byte) Image Information block describing digital properties of the image such as Face Image Type and dimensions such as width and height. <p>The Representation Data consists of</p> <ul style="list-style-type: none"> — Image data consisting of a JPEG, JPEG2000 or PNG encoded data block, — for Face Image Types containing 3D information, a 3D Information block (95 byte) describing properties of this data, — for Face Image Types containing 3D information, the 3D Data block describing the 3D shape of the face. 	3C	0-1	Y	Y	Y	Y	N				
R-8	5.1	<p>Multiple 2D/3D representations of the same biometric data subject can be described in a single record. This is accomplished by including multiple representation blocks after the General Header block.</p>	3C	0-1	Y	Y	Y	Y	Y				
R-9	5.1	<p>Representation blocks containing 2D data can be stored together with Representation blocks also containing 3D data.</p>	3C	0-1	Y	Y	Y	Y	Y				

Table A.1 (continued)

Req. ID	Ref. in main body	Requirements summary	Level	Status	Subformat applicability				XML support	IUT support	Supported range	Test results
					B	F	T	P				
R-10	5.2.1	Within the record format and all well-defined data blocks therein, all multibyte quantities are stored in Big-Endian format.	1	M	Y	Y	Y	Y	N			
R-11	5.2.2	All numeric values are fixed-length unsigned integer quantities, unless otherwise specified.	3C	0-1	Y	Y	Y	Y	Y			
R-12	5.2.3	The conversion of a numeric value to integer is given by rounding down if the fractional portion is less than 0,5 and rounding up if the fractional value is greater than or equal to 0,5.	3C	0-1	Y	Y	Y	Y	Y			
R-13	5.2.4	The following fields are mandatory, but the value of the field can indicate that the field is unspecified: Capture Device Technology Identifier, Capture Device Vendor Identifier, Capture Device Type Identifier, Gender, Eye Colour, Hair Colour, Subject Height, Property, Expression, Pose Angle, Pose Angle Uncertainty, Image Colour Space, 3D Capture Device Technology Identifier, 3D Capture Device Vendor Identifier, 3D Capture Device Type Identifier, 3D to 2D Image Temporal Synchronicity, 3D to 2D Texture Temporal Synchronicity, 3D Acquisition Time, 2D Texture Acquisition Time, Texture Map Type, and Texture Map Spectrum.	3C	0-1	Y	Y	Y	Y	N			
R-14	5.2.5	A field value labelled by the identifier "Unknown" shall be used to denote that the information encoded by the field cannot be determined by examination of the face image.	3C	0-1	Y	Y	Y	Y	Y			
R-15	5.3.1	The General Header block consists of seven fields: Format Identifier, Version Number, Length of Record, Number of Representations, Capture Device Vendor Identifier, Capture Device Type Identifier and the Temporal Semantics field as shown in Table 2.	3C	0-1	Y	Y	Y	Y	N			
R-16	5.3.2	The format identifier shall be recorded in four bytes.	1	M	Y	Y	Y	Y	N			
R-17	5.3.2	The format identifier shall consist of three characters "FAC" followed by a zero byte as a NULL string terminator.	1	M	Y	Y	Y	Y	N			
R-18	5.3.3	The number for the version of ISO/IEC 19794-5:2011 used for constructing the BDIR shall be placed in four bytes.	1	M	Y	Y	Y	Y	N			

Table A.1 (continued)

Req-ID	Ref. in main body	Requirements summary	Level	Status	Subformat applicability				XML support	IUT support	Supported range	Test results
					B	F	T	P				
R-19	5.3.3	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 version number and the third character will represent the minor revision number. The Version Number of ISO/IEC 19794-5:2011 shall be 3033300 _{HEX} : "030" – Version 3, Revision 0.	1	M	Y	Y	Y	N				
R-20	5.3.4	The length (in bytes) of the entire BDIR shall be recorded in four bytes.	1	M	Y	Y	Y	N				
R-21	5.3.4	This count shall be the total length of the BDIR including the general record header and one or more representation records.	2	M	Y	Y	Y	N				
R-22	5.3.5	The total number of representation records contained in the BDIR shall be recorded in two bytes.	1, 2	M	Y	Y	Y	N				
R-23	5.3.5	A minimum of one representation is required.	1	M	Y	Y	Y	Y				
R-24	5.3.6	Certification Flag The value shall be 00 _{HEX} .	1	M	Y	Y	Y	N				
R-25	5.3.7	Temporal Semantics This two byte (2 byte) field shall be assigned according to Table 3.	1	M	Y	Y	Y	N				
R-26	5.3.7	This supports storage of multiple representations: from a single session (e.g. from a photo shoot); from distinct sessions (e.g. from cash dispenser transactions); and from a temporal sequence (e.g. a video sequence of equally time-spaced representations).	3C	0-1	Y	Y	Y	N				
R-27	5.4.1	The Representation Header Structure The Representation Header is intended to describe discrete properties of the individual discernable from the image, one is included for each facial representation included in the record.	3C	0-1	Y	Y	Y	N				

Table A.1 (continued)

Req. ID	Ref. in main body	Requirements summary	Level	Status	Subformat applicability				XML support	IUT support	Supported range	Test results
					B	F	T	P				
R-28	5.4.1	The Representation Header consists of the Representation Length, the Capture Date and Time, the Capture Device Technology Identifier, the Capture Device Vendor Identifier. These are followed by the Number of Quality Blocks field and the related number of Quality blocks. Finally the Representation Header contains the Facial Information block, the optional multiple Landmark Point blocks, and the Image Information block.	3C	0-1	Y	Y	Y	Y	N			
R-29	5.4.2	Representation Length The (4 byte) Representation Length field denotes the length in bytes of the representation including the representation header fields.	1, 2	M	Y	Y	Y	Y	N			
R-30	5.4.2	The minimum value of the Representation Length is 51 bytes, consisting of a minimum 47 bytes for the Representation Header plus the size of the Representation Data, i.e. minimum 4 bytes for the Length of Image Data Block field assuming 0 bytes for the variable data.	1	M	Y	Y	Y	Y	N			
R-31	5.4.3	Capture Date and Time The capture date and time field shall indicate when the capture of this representation started in Coordinated Universal Time (UTC).	3C	0-1	Y	Y	Y	Y	Y			
R-32	5.4.3	The capture date and time field shall consist of 9 bytes.	1	M	Y	Y	Y	Y	N			
R-33	5.4.3	Its value shall be encoded in the form given in ISO/IEC 19794-1.	1	M	Y	Y	Y	Y	N			
R-34	5.4.4	Capture Device Technology Identifier Capture device technology Identifier shall be encoded in one byte.	1	M	Y	Y	Y	Y	N			
R-35	5.4.4	This field shall indicate the class of device technology used to acquire the captured biometric sample.	3C	0-1	Y	Y	Y	Y	Y			
R-36	5.4.4	Many different types of capture devices work in the visible spectrum or in near infrared (NIR). To indicate that the capture device operates in NIR the highest bit in the Capture Device Technology Identifier field shall be set to 1.	3C	0-1	Y	Y	Y	Y	N			

Table A.1 (continued)

Req-ID	Ref. in main body	Requirements summary		Level	Status	Subformat applicability				XML support	IUT support	Supported range	Test results		
						B	F	T	P						
R-37	5.4.4	See the following table for the enumerated list of possible values.		1	M	Y	Y	Y	Y	Y ³⁾					
														Description	Value
														Unknown or Unspecified	00 _{HEX}
														Static photograph from an unknown source	01 _{HEX}
														Static photograph from a digital still-image camera	02 _{HEX}
														Static photograph from a scanner	03 _{HEX}
														Video frame(s) from an unknown source	04 _{HEX}
														Video frame(s) from an analogue video camera	05 _{HEX}
														Video frame(s) from a digital video camera	06 _{HEX}
														Reserved by SC37 for future use	07 _{HEX} to 7F _{HEX}
Vendor specific	80 _{HEX} to FF _{HEX}														
R-38	5.4.5	Capture Device Vendor Identifier The (2 byte) Capture Device Vendor Identifier shall identify the biometric organisation that owns the product that created the BDIR.		1	M	Y	Y	Y	Y ¹⁾						
R-39	5.4.5	The capture device algorithm vendor identifier shall be encoded in two bytes carrying a CBEFF biometric organization identifier (registered by IBIA or other approved registration authority).		3C	0-1	Y	Y	Y	N						
R-40	5.4.5	A value of all zeros shall indicate that the capture device vendor is unreported.		1	M	Y	Y	Y	N						
R-41	5.4.6	Capture Device Type Identifier The (2 byte) Capture Device Type Identifier shall identify the product type that created the BDIR.		1	M	Y	Y	Y	Y ¹⁾						
R-42	5.4.6	It shall be assigned by the registered product owner or other approved registration authority.		3C	M	Y	Y	Y	Y						
R-43	5.4.6	A value of all zeros shall indicate that the capture device type is unreported.		1	M	Y	Y	Y	N						

Table A.1 (continued)

Req. ID	Ref. in main body	Requirements summary	Level	Status	Subformat applicability				XML support	IUT support	Supported range	Test results
					B	F	T	P				
R-44	5.4.6	If the capture device vendor identifier is 0000 _{HEX} , then also the capture device type identifier shall be 0000 _{HEX}	2	M	Y	Y	Y	Y	N			
R-45	5.4.7	Number of Quality Blocks This field is followed by the number of 5 byte Quality blocks reflected by its value.	2	M	Y	Y	Y	Y	N			
R-46	5.4.7	A value of zero (0) means that no attempt was made to assign a quality score. In this case, no Quality blocks are present.	2	M	Y	Y	Y	Y	N			
R-47	5.4.8	Quality Score The (1 byte) Quality Score, as defined in ISO/IEC 29794-1, shall be a quantitative expression of the predicted verification performance of the biometric sample.	1, 3C	M	Y	Y	Y	Y	Y ²⁾			
R-48	5.4.8	Valid values for Quality Score are integers between 0 and 100, where higher values indicate better quality.	1	M	Y	Y	Y	Y	Y			
R-49	5.4.8	A value of 255 is to handle a special case.	1	M	Y	Y	Y	Y	N			
R-50	5.4.8	An entry of 255 shall indicate a failed attempt to calculate a quality score.	3C	O-1	Y	Y	Y	Y	N			
R-51	5.4.9	Quality Algorithm Vendor Identifier 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 this two-byte field.	1	M	Y	Y	Y	Y	Y ²⁾			
R-52	5.4.9	This is registered with the IBIA or other approved registration authority.	3C	O-1	Y	Y	Y	Y	Y			
R-53	5.4.10	Quality Algorithm Identifier The (2 byte) Quality Algorithm Identifier specifies an integer product code assigned by the vendor of the quality algorithm.	1	M	Y	Y	Y	Y	Y ²⁾			
R-54	5.4.10	It indicates which of the vendor's algorithms (and version) was used in the calculation of the quality score and should be within the range 1 to 65 535.	1	M	Y	Y	Y	Y	Y			

Table A.1 (continued)

Req-ID	Ref. in main body	Requirements summary	Level	Status	Subformat applicability				XML support	IUT support	Supported range	Test results										
					B	F	T	P														
R-55	5.4.10	Table A.2 summarizes the quality field. All values are fixed-length unsigned integer quantities represented in Big-Endian format.	1, 3C	M	Y	Y	Y	Y	N ²⁾													
R-56	5.5.1	The Facial Information Block Structure The Facial Information Block consists of the Number of Landmark Points, the Gender, the Eye Colour, the Hair Colour, the Subject Height, the Property Mask, the Expression Mask, the Pose Angle, and the Pose Angle Uncertainty fields.	3C	O-1	Y	Y	Y	Y	N													
R-57	5.5.2	Number of Landmark Points The (2 byte) Number of Landmark Points field shall be the number of Landmark Point blocks that follow the Facial Information block.	1, 2	M	Y	Y	Y	Y	N													
R-58	5.5.3	Gender The (1 byte) Gender field shall represent the gender of the subject according to the following table.	1, 3C	M	Y	Y	Y	Y	Y ¹⁾³⁾													
		<table border="1"> <thead> <tr> <th>Description</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>Unspecified</td> <td>00_{HEX}</td> </tr> <tr> <td>Male</td> <td>01_{HEX}</td> </tr> <tr> <td>Female</td> <td>02_{HEX}</td> </tr> <tr> <td>Unknown</td> <td>FF_{HEX}</td> </tr> </tbody> </table>	Description	Value	Unspecified	00 _{HEX}	Male	01 _{HEX}	Female	02 _{HEX}	Unknown	FF _{HEX}										
Description	Value																					
Unspecified	00 _{HEX}																					
Male	01 _{HEX}																					
Female	02 _{HEX}																					
Unknown	FF _{HEX}																					

Table A.1 (continued)

Req. ID	Ref. in main body	Requirements summary	Level	Status	Subformat applicability				XML support	IUT support	Supported range	Test results																					
					B	F	T	P																									
R-59	5.5.4	<p>Eye Colour</p> <p>The (1 byte) Eye Colour field shall represent the colour of irises of the eyes according to the following table.</p> <table border="1"> <thead> <tr> <th>Descript</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>Unspecified</td> <td>00_{HEX}</td> </tr> <tr> <td>Black</td> <td>01_{HEX}</td> </tr> <tr> <td>Blue</td> <td>02_{HEX}</td> </tr> <tr> <td>Brown</td> <td>03_{HEX}</td> </tr> <tr> <td>Gray</td> <td>04_{HEX}</td> </tr> <tr> <td>Green</td> <td>05_{HEX}</td> </tr> <tr> <td>Multi-Coloured</td> <td>06_{HEX}</td> </tr> <tr> <td>Pink</td> <td>07_{HEX}</td> </tr> <tr> <td>Reserved by SC 37 for future use</td> <td>08_{HEX} to FE_{HEX}</td> </tr> <tr> <td>Other or Unknown (e.g. cannot be determined from image, monochrome image)</td> <td>FF_{HEX}</td> </tr> </tbody> </table>	Descript	Value	Unspecified	00 _{HEX}	Black	01 _{HEX}	Blue	02 _{HEX}	Brown	03 _{HEX}	Gray	04 _{HEX}	Green	05 _{HEX}	Multi-Coloured	06 _{HEX}	Pink	07 _{HEX}	Reserved by SC 37 for future use	08 _{HEX} to FE _{HEX}	Other or Unknown (e.g. cannot be determined from image, monochrome image)	FF _{HEX}	1, 3C	M	Y	Y	Y	Y	Y(1)3)		
Descript	Value																																
Unspecified	00 _{HEX}																																
Black	01 _{HEX}																																
Blue	02 _{HEX}																																
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Other or Unknown (e.g. cannot be determined from image, monochrome image)	FF _{HEX}																																
R-60	5.5.4	If the eyes are different colours, then the right eye colour is to be encoded.	3C	O-1	Y	Y	Y	Y	Y																								

Table A.1 (continued)

Req-ID	Ref. in main body	Requirements summary	Level	Status	Subformat applicability				XML support	IUT support	Supported range	Test results		
					B	F	T	P						
R-61	5.5.5	Hair Colour The (1 byte) Hair Colour field shall represent the colour of the hair according to the following table.	1, 3C	M	Y	Y	Y	Y	Y ⁽¹⁾³⁾					
													Description	Value
													Unspecified	00 _{HEX}
													Bald	01 _{HEX}
													Black	02 _{HEX}
													Blonde	03 _{HEX}
													Brown	04 _{HEX}
													Gray	05 _{HEX}
													White	06 _{HEX}
													Red	07 _{HEX}
													Reserved by SC 37 for future use	08 _{HEX} to FE _{HEX}
													Unknown or Other	FF _{HEX}
													R-62	5.5.6
Description	Value													
Unspecified	00 _{HEX}													
Subject Height in cm	01 _{HEX} to FF _{HEX}													
R-63	5.5.7	Property Mask The (3 byte) Property Mask is a bit mask of 3 bytes and each bit of the mask position listed in Table 10 shall be set to 1 if the corresponding property is present, and set to 0 if absent.	1	M	Y	Y	Y	Y	N					