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Information technology — Extensible biometric data interchange formats —

Part 9: Vascular 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.

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 or www.iec.ch/members_experts/refdocs).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents) or the IEC list of patent declarations received (see patents.iec.ch).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html. In the IEC, see www.iec.ch/understanding-standards.

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

A list of all parts in the ISO/IEC 39794 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html and www.iec.ch/national-committees.

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Introduction

Biometric data interchange formats enable the interoperability of different biometric systems. The first generation of biometric data interchange formats was published between 2005 and 2007 in the first edition of the ISO/IEC 19794 series. From 2011 onwards, the second generation of biometric data interchange formats was published in the form of second editions of the established parts and first editions of a number of new parts of the ISO/IEC 19794 series. In the second generation of biometric data interchange formats, new useful data elements such as data elements related to biometric sample quality have been added, the header data structures have been harmonized across all parts of the ISO/IEC 19794 series, and XML encoding has been added in addition to the binary encoding.

In anticipation of the future need for additional data elements and to avoid future compatibility issues, ISO/IEC JTC 1/SC 37 has developed the ISO/IEC 39794 series as a third generation of biometric data interchange formats, defining extensible biometric data interchange formats capable of including future extensions in a defined manner. Extensible specifications in ASN.1 (Abstract Syntax Notation One) and the distinguished encoding rules of ASN.1 form the basis for encoding biometric data in binary tag-length-value formats. XML Schema Definitions form the basis for encoding biometric data in XML (eXtensible Markup Language).

This third generation of vascular image data interchange formats complements ISO/IEC 19794-9:2007 and ISO/IEC 19794-9:2011.

This document is intended for those applications requiring the exchange of raw or processed vascular images (for example, palm images) that are sometimes not necessarily limited in the amount of resources available for data storage or transmitting time. It can be used for the exchange of scanned vascular images containing detailed image pixel information.

Use of the captured or processed image allows interoperability among biometric systems relying on pattern-based or other algorithms. Thus, data from the captured hand image offers the developer more freedom in choosing or combining comparison algorithms. For example, an enrolment image can be stored on a contactless chip located on an identification document. This allows future verification of the holder of the document with systems that rely on pattern-based algorithms. Establishment of an image-based representation of vascular information will not rely on pre-established definitions of 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 grey-scale depths. Use of the vascular image will allow each vendor to implement their own algorithms to determine whether two vascular records are from the same hand.

This document supports both binary and XML encoding, to support a spectrum of user requirements. With XML, this document meets the requirements of modern IT architectures. With binary encoding, this document is also able to be used in bandwidth or storage-constrained environments.

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Information technology — Extensible biometric data interchange formats —

Part 9: Vascular image data

1 Scope

This document specifies

— generic extensible data interchange formats for the representation of vascular image data: a tagged binary data format based on an extensible specification in ASN.1 and a textual data format based on an XML schema definition that are both capable of holding the same information,

— examples of data record contents,

— application specific requirements, recommendations, and best practices in data acquisition, and

— conformance test assertions and conformance test procedures applicable to this document.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 39794-1, *Information technology — Extensible biometric data interchange formats — Part 1: Framework*

ISO/IEC 14495-1, *Information technology — Lossless and near-lossless compression of continuous-tone still images: Baseline — Part 1:*

ISO/IEC 15444-1, *Information technology — JPEG 2000 image coding system — Part 1: Core coding system*

ISO/IEC 15948, *Information technology — Computer graphics and image processing — Portable Network Graphics (PNG): Functional specification*

ISO/IEC 8824-1, *Information technology – Abstract Syntax Notation One (ASN.1) – Part 1: Specification of basic notation*

ISO/IEC 8825-1, *Information technology – ASN.1 encoding rules – Part 1: Specification of Basic Encoding Rules (BER), Canonical Encoding Rules (CER), and Distinguished Encoding Rules (DER)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 39794-1 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

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3.1
centroid
centre of gravity

Note 1 to entry: In this document, this term is used to define a unique location within a silhouette image that can be assumed as the origin of a coordinate system.

3.2
dorsal
back side of a finger or a hand

3.3
ventral
palm side of a finger or a hand

3.4
vascular biometric image
captured raw or processed image that represents physical characteristics or traits of vascular pattern used to recognize the identity or verify the claimed identity of an individual

4 Symbols and abbreviated terms

ICS	implementation conformance statement
JPEG	joint photographic experts group
MIR	midrange infrared
NIR	near infrared
nm	nanometre
PGM	portable gray map
PNG	portable network graphics
ppcm	pixels per centimetre
RGB	red, green, blue color model
VIR	vascular biometric image record

5 Conformance

A biometric data block (BDB) conforms to this document if it satisfies all of the requirements related to:

— its data structure, data values and the relationships between its data elements as specified throughout Clauses 6, 7, 8 and Annex A, and

— the relationship between its data values and the input biometric data from which the biometric data record was generated as specified throughout Clauses 6, 7, 8 and Annex A.

A system that produces biometric data records conforms to this document if all biometric data records that it outputs conform to this document (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 document, 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 document if it can read, and use for the purpose intended by that system, all biometric data records that conform to this document (as defined

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