

First edition
2006-08-15

Information technology — Biometric data interchange formats —

Part 3: Finger pattern spectral data

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

Partie 3: Données spectrales de la forme du doigt

Reference number
ISO/IEC 19794-3:2006(E)



This is a preview of "ISO/IEC 19794-3:2006". [Click here to purchase the full version from the ANSI store.](#)

PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

© ISO/IEC 2005

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

This is a preview of "ISO/IEC 19794-3:2006". Click here to purchase the full version from the ANSI store.

Contents

Page

Foreword.....	v
Introduction	vi
1 Scope	1
2 Conformance	1
3 Normative references	1
4 Terms and definitions.....	1
5 Symbols and abbreviated terms	4
6 Data conventions	5
6.1 Byte and bit ordering	5
6.2 Coordinate system.....	5
6.3 Greyscale precision.....	6
6.4 Image polarity.....	6
6.5 Angle direction of rotation.....	6
6.6 Phase and propagation angles.....	6
7 Determination of finger pattern spectral data.....	6
7.1 Overview.....	6
7.2 Step 0) [Optional] Image pre-processing	6
7.3 Step 1) Cellular partitioning.....	6
7.4 Step 2) Spectral component selection.....	7
7.4.1 Quantized co-sinusoidal triplets	7
7.4.2 Discrete Fourier Transform	10
7.4.3 Gabor filters.....	12
7.5 Quality.....	13
8 Finger pattern spectral data record	14
8.1 Record header.....	14
8.1.1 Format identifier.....	14
8.1.2 Version number.....	15
8.1.3 Length of record	15
8.1.4 Number of single finger records	15
8.1.5 x (horizontal) resolution	15
8.1.6 y (vertical) resolution	15
8.1.7 Number of cells in x -direction	15
8.1.8 Number of cells in y -direction.....	15
8.1.9 Number of pixels in cells in x -direction	15
8.1.10 Number of pixels in cells in y -direction	15
8.1.11 Number of pixels between cell centres in x -direction.....	15
8.1.12 Number of pixels between cell centres in y -direction	16
8.1.13 Spectral component selection method.....	16
8.1.14 Type of window.....	16
8.1.15 Standard deviation.....	16
8.1.16 Number of frequencies.....	17
8.1.17 Frequencies	17
8.1.18 Number of orientations	17
8.1.19 Number of spectral components to be retained per cell	17
8.1.20 Bit-depth of propagation angle of co-sinusoidal function	18
8.1.21 Bit-depth of wavelength of co-sinusoidal function	18
8.1.22 Bit-depth of phase	18
8.1.23 Bit-depth of magnitude.....	18

This is a preview of "ISO/IEC 19794-3:2006". [Click here to purchase the full version from the ANSI store.](#)

8.1.24	Bit-depth of quality score	18
8.1.25	Cell quality group granularity	19
8.1.26	Reserved bytes	19
8.2	Single finger record	19
8.2.1	Header	19
8.2.2	Finger pattern spectral data block	20
8.2.3	Extended data block	23
8.3	Summary of finger pattern spectral data record.....	28
9	Finger pattern spectral data card format.....	31
Annex A (informative) Finger pattern spectral data record examples – quantized co-sinusoidal triplet spectral component selection method		
A.1	Example 1.....	33
A.2	Example 2.....	34
A.3	Size comparisons.....	36
Annex B (informative) Finger pattern spectral data record examples – Discrete Fourier Transform spectral component selection method		
B.1	Example 1.....	37
B.2	Example 2.....	38
Annex C (informative) Finger pattern spectral data record example – Gabor filter spectral component selection method		
		40
Bibliography		42

This is a preview of "ISO/IEC 19794-3:2006". [Click here to purchase the full version from the ANSI store.](#)

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 the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

ISO/IEC 19794-3 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 37, *Biometrics*.

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*

Introduction

In the interest of implementing interoperable personal biometric recognition systems, this part of ISO/IEC 19794 establishes a data interchange format for finger pattern spectral data. The goal of this part of ISO/IEC 19794 is to allow the exchange of local or global spectral data derived from a fingerprint image without the exchange of the entire image. This will allow more compact data representations.

This part of ISO/IEC 19794 allows for representation of spectral components, such as Discrete Fourier Transform and (single-scale) Gabor Filter components, extracted from global or stationary (not image dependent and not varying over the image) local overlapping or non-overlapping uniform-sized regions of the original intensity (non-color) image. Some or all of the extracted spectral components will be stored in the data format, depending upon the implementation. This part of ISO/IEC 19794 does not accommodate multi-scale (wavelet) decompositions.

There are fingerprint recognition algorithms that use spectral data directly for pattern matching. Spectral data-based recognition algorithms process "globally" local sections (cells) of biometric images, in contrast to morphological-based algorithms, which extract singularities in the morphological features. At the current time, there is no established mechanism for the interchange of finger pattern spectral information for use with spectral-based fingerprint matching algorithms.

By establishing a standard for spectral-based representation of fingerprints, we

- allow interoperability among fingerprint recognition vendors based on a small data record;
- support the proliferation of low-cost commercial fingerprint sensors with limited coverage, dynamic range, or resolution;
- define a data record that can be used to store biometric information on a variety of storage mediums (including, but not limited to, portable devices and smart cards);
- encourage the adoption of biometrics in applications where interoperability is required.

The International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC) draw attention to the fact that it is claimed that compliance with this document may involve the use of patents concerning the quantized co-sinusoidal triplets method of formatting the pattern spectral data. ISO and IEC take no position concerning the evidence, validity and scope of this patent right. The holder of this patent right has assured the ISO and IEC that he/she is willing to negotiate licenses under reasonable and non-discriminatory terms and conditions with applications throughout the world. In this respect, the statement of the holder of this patent right is registered with ISO and IEC. Information may be obtained from:

Bioscrypt Inc.
505 Cochrane Drive
Markham, Ontario, Canada
L3R 8E3

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights other than those identified above. ISO and IEC shall not be held responsible for identifying any or all such patent rights.