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Identification cards — Optical memory cards — Linear recording method —

Part 6: Use of biometrics on an optical memory card

Cartes d'identification — Cartes à mémoire optique — Méthode d'enregistrement linéaire —

Partie 6: Emploi de la biométrie sur une carte à mémoire optique

Reference number
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Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
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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 11694-6 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 17, *Cards and personal identification*.

ISO/IEC 11694 consists of the following parts, under the general title *Identification cards — Optical memory cards — Linear recording method*:

— *Part 1: Physical characteristics*

— *Part 2: Dimensions and location of the accessible optical area*

— *Part 3: Optical properties and characteristics*

— *Part 4: Logical data structures*

— *Part 5: Data format for information interchange for applications using ISO/IEC 11694-4, Annex B*

— *Part 6: Use of biometrics on an optical memory card*

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Introduction

This part of ISO/IEC 11694 is one of a series of standards defining the parameters for optical memory cards and the use of such cards for the storage and interchange of digital data.

This part of ISO/IEC 11694 is specific to optical memory cards using the linear recording method. Characteristics which apply to other specific recording methods are found in separate standards documents.

This part of ISO/IEC 11694 describes the use of biometric data on an optical memory card. It uses the logical structure defined in ISO/IEC 11694-5 to facilitate the interchange of biometric data written to optical memory cards using the linear recording method.

All numbers in this document are written in decimal notation unless otherwise specified.

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Identification cards — Optical memory cards — Linear recording method —

Part 6: Use of biometrics on an optical memory card

1 Scope

This part of ISO/IEC 11694 specifies the use of biometric data on optical memory cards using the logical data structure defined in ISO/IEC 11694-5.

2 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 11694-4, *Identification cards — Optical memory cards — Linear recording method — Part 4: Logical data structures*

ISO/IEC 11694-5, *Identification cards — Optical memory cards — Linear recording method — Part 5: Data format for information interchange for applications using ISO/IEC 11694-4, Annex B*

ISO/IEC 19785-1, *Information technology — Common Biometric Exchange Formats Framework — Part 1: Data element specification*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 11694-4, ISO/IEC 11694-5, ISO/IEC 19785-1 and the following apply.

3.1
biometric data
set of bytes that describes the physical properties of one or more parts of a living body

EXAMPLE The encoded template which mathematically describes a person's fingerprint. This template can be compared against the fingerprint of the person who is presenting the card.

3.2
CBEFF file
biometric data file (a set of bytes) that conforms to ISO/IEC 19785-1

3.3
encoded biometric data
biometric data that has been interpreted and encoded

3.4
raw biometric data
biometric data obtained directly from a biometric device

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4 Interchange of biometric data items

ISO/IEC 11694-5 allows for the interchange of all types of data on optical cards by specifying both the directory structure on the card and the method of identifying individual data items that are written to the card. Using the data format described in ISO/IEC 11694-5, biometric data is accessed in much the same manner as any other type of data on an optical memory card.

This being the case, this part of ISO/IEC 11694 specifies tags and structures which facilitate and which are specific to accessing biometric data items on a card.

Typically, an application that reads a given card looks on that card for tags that correspond to data items that the application knows how to use, based on the published tag document. ISO/IEC 11694-5 includes a set of defined tag ranges that assist a reading application in accessing useful biometric data on the card in the absence of the application's knowledge of a particular tag.

EXAMPLE The reader requires from the card, images of one or more of the cardholder's fingerprints. It queries the card for any data with tags in the range from 7000 through 7999. Tags in this range correspond to data items containing raw fingerprint images. If the card contains any such data, the reader can then read the corresponding data item from the card and use it to verify the identity of the cardholder.

The reader can use a process similar to that in the above example to read and use any type of biometric information that is associated with a tag which is not recognized by the reader.

5 Biometric tag ranges

If a card issuer wishes to write to their cards, biometric data items that do not conform exactly to any of the standards listed in the next section, they shall request from the tag registration authority (as defined in ISO/IEC 11694-5) a new tag. The tag registration authority shall issue a tag in one of the following ranges, according to the type of biometric item:

Tag range	Description of biometric items
2000 – 2999	Any encoded (not raw) biometric data that comprises information specifically about the face or head of the subject. This specifically includes matching of face (visible light or thermal) and ear and excludes matching of eyes.
3000 – 3999	Any encoded (not raw) biometric data that comprises information specifically about the fingers of the subject. This includes fingerprints and attributes of individual fingers and excludes hand geometry.
4000 – 4999	Any encoded (not raw) biometric data that comprises information specifically about the eyes of the subject. This specifically includes retina and iris matching.
5000 – 5999	Any encoded (not raw) biometric data that comprises information specifically about the hands or feet of the subject. This specifically includes hand geometry, palm and foot prints, veins in the hand, and thermal hand image, and excludes fingerprints or individual finger traits, which are in another range.
6000 – 6999	Any raw (not encoded or processed) images of the subject. This includes the common image of the face (portrait).
7000 – 7999	Any raw (not encoded or processed) images of single digit fingerprints.
8000 – 8999	Any raw images or encoded data that comprises information about the pen-based signature of the subject.
12200 – 12299	Any encoded biometric data that comprises information on a molecular or cellular level. This specifically includes DNA and body odour matching.

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Tag range	Description of biometric items
12300 – 12399	Any encoded biometric data that comprises information about a behaviour. This specifically includes gait, keystroke, lip movement and voice and excludes the pen-based signature, which is in another range.
12400 – 12799	Any biometric data that does not fit into the above categories and conforms to ISO/IEC 19785-1, *Information technology — Common Biometric Exchange Formats Framework*
12800 – 12899	Any biometric data that does not fit into the above categories and does not conform to ISO/IEC 19785-1, *Information technology — Common Biometric Exchange Formats Framework*

A reading application that supports the verification or identification of the cardholder using certain biometric data items can use the above table as a guide, and look for tags in the range that matches its capabilities.

EXAMPLE A reading application is in a system that consists of a camera for obtaining the facial image of the cardholder and which contains software that can compare the cardholder's face against templates assigned to tags 2345, 2346, and certain CBEFF files. This application can start by querying the card for any data items with tags in the range from 2000 through 2999. If there are 2345 or 2346 data items, the application can read and use them right away. If there is an unrecognised data item with tag 2347, the application can look for the CBEFF header for that item and parse that header to see if the item can be used. Clause 7 describes how to find and read the CBEFF header without having to read the data item itself, if the card issuer supports it.

6 CBEFF files that meet other standards

Although the use of ISO/IEC 19785-1 (CBEFF) is not required by this part of ISO/IEC 11694, the use of existing biometric standards for the storage of biometrics on optical memory cards is strongly recommended.

This part of ISO/IEC 11694 includes specific support for CBEFF files.

The following standards, which all describe CBEFF files, are specific as to which biometric is described, so each has a tag within the tag range corresponding to the type of biometric. Exact implementations of these standards shall not require a tag document and shall be assigned the following tags within ISO/IEC 11694-5:

Tag	Data item meaning
3030	ISO/IEC 19794-2, *Information technology — Biometric data interchange formats — Part 2: Finger minutiae data*
3040	ISO/IEC 19794-3, *Information technology — Biometric data interchange formats — Part 3: Finger pattern spectral data*
7030	ISO/IEC 19794-4, *Information technology — Biometric data interchange formats — Part 4: Finger image data*
2001	ISO/IEC 19794-5, *Information technology — Biometric data interchange formats — Part 5: Face image data*
4010	ISO/IEC 19794-6, *Information technology — Biometric data interchange formats — Part 6: Iris image data*
8150	ISO/IEC 19794-7, *Information technology — Biometric data interchange formats — Part 7: Signature/sign time series data*
3070	ISO/IEC 19794-8, *Information technology — Biometric data interchange formats — Part 8: Finger pattern skeletal data*

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7 Finding other relevant CBEFF files

The purpose of ISO/IEC 11694-5 is to allow a reader familiar with the standard to read and parse data items corresponding to tags with which the reader is familiar. The reading application knows how to interpret and parse these items because it was developed using information in the 'tag document' for the tag that is later read from the card.

It is possible that a given tag document may allow for ambiguities that are resolved through the reading of a CBEFF (ISO/IEC 19785-1) header (SBH).

EXAMPLE The tag document for a given tag allows for the data item to contain one of two types of biometric data. The reading system in this example can only make use of one of these types. The reading application would like to know which of the types is in the data item before it takes the time to read the data item.

It is also possible for an application to search for a useful CBEFF file whose tag was not assigned until after this particular application was deployed to the field.

EXAMPLE A reader application has been set up to make use of any CBEFF file that contains the biometric data that it expects, for example Fingerprint Format A. A card issuer creates a new card that contains a Fingerprint Format A file. This data item is issued a different tag from the one that our reader application originally used. In this case, we would like this older reader application to be able to determine that there is a Fingerprint Format A file on the card, and to be able to access that file.

The solution to the cases highlighted in the above two examples is to define a data item that will contain a copy of the SBH for any CBEFF files on the card.

The tag 12900 shall be reserved for such a data item. A card issuer can optionally write this data item in order to facilitate the retrieval of a relevant CBEFF file in such cases.

This data item shall consist of one or more header entries. Each header entry shall consist of a 2-byte tag (as defined in ISO/IEC 11694-5) which identifies the data item containing the CBEFF file, followed by a 2-byte Patron Format Identifier (as defined in ISO/IEC 19785-1) which specifies the format of the SBH, followed by the 2-byte length of the SBH, followed by the SBH itself. The SBH shall exactly match the Patron file format specified by the Patron Format Identifier in conjunction with the relevant annex of ISO/IEC 19785-1. Immediately following the SBH in this data item shall be the tag value that represents the beginning of the next header entry (describing another CBEFF file on the card). This list of header entries shall be terminated by a tag value of zero. The rest of the terminating header entry need not exist in the data item.

Even in such cases where the SBH portion of a CBEFF file is contained within the CBEFF header item, the corresponding data item (referenced by the tag in the header entry) shall contain the entire CBEFF file, including the SBH portion.

EXAMPLE The following table contains an example of a CBEFF header item (tag = 12900) that references two CBEFF files:

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Offset (bytes)	Length (bytes)	Example	Entry: Field	Description
0	2	2010	1: T	Tag for the data item (e.g. a face template)
2	2	2	1: P	CBEFF Patron Format Identifier (minimum simple byte-oriented patron format in this case)
4	2	4	1: L	Length of the header to follow
6	4	(See ISO/IEC 19785 -1)	1: H	Standard Biometric Header (SBH) for this data item. If the application finds this CBEFF file useful, the data item itself can be obtained by reading the data item with the tag specified in this entry (in this case 2010).
10	2	3200	2: T	Tag for the data item (e.g. an iris template)
12	2	6	2: P	CBEFF Patron Format Identifier (bioAPI in this case)
14	2	23	2: L	Length of the header to follow
16	23	(See ISO/IEC 19785 -1)	2: H	Standard Biometric Header (SBH) for this data item. If the application finds this CBEFF file useful, the data item itself can be obtained by reading the data item with the tag specified in this entry (in this case 3200).
39	2	0	End	NULL Tag marks end of header list

In the above cases, the reading application will first look for the tags corresponding to data items it can use based on its being developed with the use of their respective tag documents. If it does not find such items, but it can make use of other CBEFF files, it will then look for tag 12900. If that data item is on the card, it will read and parse it, looking for one or more CBEFF headers that correspond to files it can use. If such a header is found, the application will then read the data item that corresponds to the tag that is found within the entry containing that header, and it then has the relevant CBEFF file.

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[1] ISO/IEC 19794-2, *Information technology — Biometric data interchange formats — Part 2: Finger minutiae data*

[2] ISO/IEC 19794-3, *Information technology — Biometric data interchange formats — Part 3: Finger pattern spectral data*[1)]

[3] ISO/IEC 19794-4, *Information technology — Biometric data interchange formats — Part 4: Finger image data*

[4] ISO/IEC 19794-5, *Information technology — Biometric data interchange formats — Part 5: Face image data*

[5] ISO/IEC 19794-6, *Information technology — Biometric data interchange formats — Part 6: Iris image data*

[6] ISO/IEC 19794-7, *Information technology — Biometric data interchange formats — Part 7: Signature/sign time series data*[1)]

[7] ISO/IEC 19794-8, *Information technology — Biometric data interchange formats — Part 8: Finger pattern skeletal data*[1)]

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