INTERNATIONAL STANDARD

ISO/IEC 2382-37

Information technology — Vocabulary —

Part 37:
Biometrics

Technologies de l'information — Vocabulaire —

Partie 37: Biométrie

iTeh STANDARD PREVIEW
(standards.iteh.ai)

COPYRIGHT PROTECTED DOCUMENT

Contents

Page

iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO/IEC 2382-37:2017
https://standards.iteh.ai/catalog/standards/sist/e1b24e97-b539-4462-9cdf-
d3402242344e/iso-iec-2382-37-2017

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 and 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.

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 ISO documents 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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO 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).

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

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 World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

The committee responsible for this document is ISO/IEC JTC 1, *Information technology*, Subcommittee SC 37, *Biometrics*.

This second edition cancels and replaces the first edition (ISO/IEC 2382-37:2012). Minor changes have been made to some of the terms published in the 2012 edition and 41 new terms have been added.

Introduction

The main purpose of this document is to provide a systematic description of the concepts in the subject field of biometrics and to clarify the use of the terms in this subject field. The subject field of biometrics is broken down into subfields.

This document is addressed to biometrics standardizers and to users of these standards.

Terms defined in this document are to be understood in the subject field of biometrics. When terms exist in various subject fields, the current subject field may be indicated in angle brackets.

Words that are **bolded** are defined in this document. Words that are not **bolded** are to be understood in their natural language sense. The authority for natural language use of terms in this document is the Concise Oxford English Dictionary, Thumb Index Edition (tenth edition, revised, 2002).

EXAMPLE

candidate

<biometrics> *biometric reference identifier* (3.3.19) of a *biometric reference* (3.3.16) in the *biometric reference database* (3.3.17) determined to be similar to the *biometric probe* (3.3.14)

candidate

<politics> a person who applies for a job or is nominated for election

NOTE   When using terms defined with a qualifier (for example, "biometric xxx"), it is normal to include the qualifier on the first occurrence of the term in every paragraph, but to omit it on subsequent occurrences of that term within the same paragraph. In broader contexts, where the qualifier (in this case, 'biometric') is clearly understood, then the qualifier may be omitted completely.

The terms in this document are listed in a systematic order under a number of general headings.

The layout follows the directions given in ISO 10241-1. Thus, the elements of an entry appear in the following order:

— Entry number (mandatory);

— Preferred term(s) (mandatory);

— Admitted term(s) (mandatory);

— Deprecated term(s);

— Definition;

— Example(s);

— Note(s).

Information technology — Vocabulary —

Part 37:
Biometrics

1 Scope

This document establishes a systematic description of the concepts in the field of biometrics pertaining to recognition of human beings and reconciles variant terms in use in pre-existing biometric standards against the preferred terms, thereby clarifying the use of terms in this field.

Excluded from the scope of this document are concepts (represented by terms) from information technology, pattern recognition, biology, mathematics, etc. Biometrics uses such fields of knowledge as a basis.

In principle, mode specific terms are outside of scope of this document.

Words that are **bolded** are defined in this document. Words that are not bolded are understood in their natural language sense. The authority for natural language use of terms in this document is the Concise Oxford English Dictionary, Thumb Index Edition (tenth edition, revised, 2002). Words used in their natural language sense are considered out-of-scope for further definition in this document.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

3.1 General concept terms

3.1.1
biometric (adjective)
of or having to do with *biometrics* ([3.1.3](#))

EXAMPLE 1   Incorrect usage #1: ICAO resolved that face is the **biometric** most suited to the practicalities of travel documents.

EXAMPLE 2   Correct usage #1: ICAO resolved that face recognition is the *biometric mode* ([3.2.5](#)) most suited to the practicalities of travel documents.

EXAMPLE 3   Incorrect usage #2: The **biometric** recorded in my passport is a facial image.

EXAMPLE 4   Correct usage #2: The *biometric characteristic* ([3.1.2](#)) recorded in my passport is a facial image.

Note 1 to entry: The use of **biometric** as a noun, to mean for example, *biometric characteristic* ([3.1.2](#)), is deprecated.

Note 2 to entry: Since the late 19th century, the designations 'biometrics' and 'biometry' have been used with the general meaning of counting, measuring and statistical analysis of any kind of data in the biological sciences including the relevant medical sciences.

3.1.2
biometric characteristic
DEPRECATED: biometric (noun)
biological and behavioural characteristic of an individual from which distinguishing, repeatable *biometric features* (3.3.11) can be extracted for the purpose of *biometric recognition* (3.1.3)

EXAMPLE   Examples of **biometric characteristics** are: Galton ridge structure, face topography, facial skin texture, hand topography, finger topography, iris structure, vein structure of the hand, ridge structure of the palm, retinal pattern, handwritten signature dynamics, etc.

3.1.3
biometric recognition
biometrics
automated recognition of individuals based on their biological and behavioural characteristics

Note 1 to entry: In the field of **biometrics** (as defined in this document), "Individual" is restricted in scope to refer only to humans.

Note 2 to entry: The general meaning of **biometrics** encompasses counting, measuring and statistical analysis of any kind of data in the biological sciences including the relevant medical sciences.

Note 3 to entry: **Biometric recognition** encompasses *biometric verification* (3.8.3) and *biometric identification* (3.8.2).

Note 4 to entry: Automated recognition implies that a machine based system is used for the recognition either for the full process or assisted by a human being.

Note 5 to entry: Behavioural and biological characteristics cannot be completely separated which is why the definition uses 'and' instead of 'and/or'. For example, a fingerprint image results from the biological characteristics of the finger ridge patterns and the behavioural act of presenting the finger.

Note 6 to entry: Use of 'authentication' as a synonym for "*biometric verification* (3.8.3) or *biometric identification* (3.8.2)" is deprecated; the term **biometric recognition** is preferred.

3.2   Biometric system terms

3.2.1
biometric capture subsystem
biometric capture devices (3.4.1) and any sub-processes required to execute a *biometric capture process* (3.5.2)

Note 1 to entry: In some systems, converting a signal from a *biometric characteristic* (3.1.2) to a *captured biometric sample* (3.3.25) may include multiple components such as a camera, photographic paper, printer, digital scanner, ink and paper.

Note 2 to entry: A **biometric capture subsystem** can consist of only a single *biometric capture device* (3.4.1).

3.2.2
biometric identification system
system that aims to perform *biometric identification* (3.8.2)

3.2.3
biometric system
system for the purpose of the *biometric recognition* (3.1.3) of individuals based on their behavioural and biological characteristics

Note 1 to entry: A **biometric system** will contain both *biometric* (3.1.1) and non-biometric components.

3.2.4
biometric verification system
system that aims to perform *biometric verification* (3.8.3)

3.2.5
mode
DEPRECATED: biometric (noun)
combination of a *biometric characteristic* (3.1.2) type, a sensor type and a processing method

Note 1 to entry: The processing algorithm may contain multiple methods, details of which may not be externally apparent. Thus a *biometric system* (3.2.3) is considered as using one processing method, until it is otherwise specified.

Note 2 to entry: Determining what constitutes a single type of sensor, processing method or *biometric characteristic* (3.1.2) will depend on convention. For example, current convention is that images of ridge patterns from both thumbs and fingers represent a single *biometric characteristic* (3.1.2) type, i.e. fingerprints. With respect to sensors, infrared and optical bandwidth sensors are considered different types, but optical bandwidth sensors are considered a single type despite imaging red, green and blue bandwidths.

3.2.6
multi-modal
multiple in at least 2 out of 3 constituents of a *mode* (3.2.5) in a single *biometric system* (3.2.3)

Note 1 to entry: Multiple implies difference in type.

3.2.7
system participation ratio
proportion of individuals eligible to use the system who do use the system

Note 1 to entry: Enrolled individuals are a subset of eligible individuals.

3.3 Terms for data in biometric systems

3.3.1
anonymized biometric data record
biometric data record (3.3.8) purposely disassociated from individual metadata

Note 1 to entry: The *biometric data* (3.3.6) within the *biometric data record* (3.3.8) ultimately remains attributable to an individual.

3.3.2
biometric application database
database of *biometric data* (3.3.6) and associated metadata developed from and supporting the operation of a *biometric* (3.1.1) application

Note 1 to entry: The metadata may include transaction history; authorizations (e.g. age) of *biometric data subject* (3.7.5); and archived *biometric data* (3.3.6).

Note 2 to entry: The term application includes the policies that govern the operation of the system and evidence of that operation.

3.3.3
biometric application decision
decision to perform an action at the application level based on the results of a *biometric* (3.1.1) process

Note 1 to entry: The application decision may include more than a *comparison* (3.5.7) process. For example, a *biometric capture process* (3.5.2) may show that there are no characteristics to capture and a decision can be made on this before any *biometric characteristics* (3.1.2) are compared.

Note 2 to entry: **Biometric application decisions** can be made on the basis of complex policies involving both *biometric* (3.1.3) and non-biometric data.

3.3.4
biometric candidate
biometric reference identifier (3.3.19) of a *biometric reference* (3.3.16) in the *biometric reference database* (3.3.17) determined to be sufficiently similar to the *biometric probe* (3.3.14) to warrant further analysis

3.3.5
biometric candidate list
set of zero, one or more *biometric candidates* ([3.3.4](#)) that may be intermediate or final

Note 1 to entry: Intermediate **biometric candidate lists** may be produced by systems that use multi-pass *biometric identification* ([3.8.2](#)).

Note 2 to entry: **Biometric candidate lists** may or may not be ordered.

3.3.6
biometric data
biometric sample ([3.3.21](#)) or aggregation of *biometric samples* ([3.3.21](#)) at any stage of processing, e.g. *biometric reference* ([3.3.16](#)), *biometric probe* ([3.3.14](#)), *biometric feature* ([3.3.11](#)) or *biometric property* ([3.3.15](#))

Note 1 to entry: **Biometric data** need not be attributable to a specific individual, e.g. Universal Background Models.

3.3.7
biometric database
database of *biometric data record(s)* ([3.3.8](#))

3.3.8
biometric data record
data record containing *biometric data* ([3.3.6](#))

Note 1 to entry: A **biometric data record** may include non-biometric data.

3.3.9
biometric enrolment database
database of *biometric enrolment data record(s)* ([3.3.10](#))

Note 1 to entry: A database of *biometric data* ([3.3.6](#)) not attributable to *biometric data subjects* ([3.7.5](#)) is a *biometric database* ([3.3.7](#)), but not a **biometric enrolment database**, e.g. a database utilised in the training of a Universal Background Model.

Note 2 to entry: The **biometric enrolment database** may or may not contain the *biometric reference database* ([3.3.17](#)). Separation of the databases may be required due to security, privacy, legislation, architecture, performance, etc.

Note 3 to entry: A single *biometric reference* ([3.3.16](#)) (e.g. a fingerprint on a storage card) may be considered as a **biometric enrolment database** in some transactions.

3.3.10
biometric enrolment data record
data record attributed to a *biometric data subject* ([3.7.5](#)), containing non-biometric data and associated with *biometric reference identifier(s)* ([3.3.19](#))

Note 1 to entry: Data can be updated after enrolment.

Note 2 to entry: The **biometric enrolment data record** will either contain *biometric reference data record(s)* ([3.3.18](#)) or pointer(s) to *biometric reference data record(s)* ([3.3.18](#)).

Note 3 to entry: The associated *biometric reference* ([3.3.16](#)) may be null (for example, *biometric enrolee* ([3.7.6](#)) lacks the *biometric characteristic* ([3.1.2](#)) or a *biometric capture process* ([3.5.2](#)) is pending).

3.3.11
biometric feature
numbers or labels extracted from *biometric samples* ([3.3.21](#)) and used for *comparison* ([3.5.7](#))

Note 1 to entry: **Biometric features** are the output of a completed *biometric feature extraction* ([3.5.4](#)).

Note 2 to entry: The use of this term should be consistent with its use by the pattern recognition and mathematics communities.

Note 3 to entry: A **biometric feature** set can also be considered a processed *biometric sample* (3.3.21).

Note 4 to entry: **Biometric features** may be extracted from an *intermediate biometric sample* (3.3.30).

Note 5 to entry: Filters applied to *biometric samples* (3.3.21) are not themselves **biometric features**, however the output of the filter applied to these samples may be. Therefore, for example, eigenfaces are not **biometric features.**

3.3.12
biometric identification decision
comparison decision (3.3.26) as to whether a *biometric reference(s)* (3.3.16) of a particular *biometric data subject* (3.7.5) is in a *biometric reference database* (3.3.17)

Note 1 to entry: Return of a *biometric candidate list* (3.3.5) is not considered a **biometric identification decision**.

Note 2 to entry: A positive *biometric identification* (3.8.2) process is inferred from the output of a *biometric reference identifier* (3.3.19).

3.3.13
biometric model
stored function generated from *biometric data (3.3.6)*

EXAMPLE   Examples of **biometric models** could be a Hidden Markov Model, Gaussian Mixture Model or an Artificial Neural Network.

Note 1 to entry: In most occasions, the **biometric model** is a stored function which is dependent on the *biometric data subject (3.7.5)*.

Note 2 to entry: The function may be determined through training.

Note 3 to entry: A **biometric model** may involve intermediate processing similar to *biometric feature extraction* (3.5.4).

3.3.14
biometric probe
biometric query
biometric sample (3.3.21) or *biometric feature* (3.3.11) set input to an algorithm for *biometric comparison* (3.5.7) to a *biometric reference(s)* (3.3.16)

Note 1 to entry: In some *comparisons* (3.5.7), a *biometric reference* (3.3.16) might be used as the subject of the comparison with other *biometric references* (3.3.16) or incoming *biometric samples* (3.3.21) used as the objects of the *comparisons* (3.5.7). For example, in a duplicate enrolment check, a *biometric reference* (3.3.16) will be used as the subject for *comparisons* (3.5.7) against all *other biometric references* (3.3.16) in the database.

Note 2 to entry: Typically in a biometric *comparison* (3.5.7) process, incoming *biometric samples* (3.3.21) serve as the subject of *comparisons* (3.5.7) against objects stored as *biometric references* (3.3.16) in a database.

3.3.15
biometric property
descriptive attributes of the *biometric data subject* (3.7.5) estimated or derived from the *biometric sample* (3.3.21) by automated means

EXAMPLE   Fingerprints can be classified by the **biometric properties** of ridge-flow, i.e. arch, whorl, and loop types. Estimates of age or gender from face recognition would also be **biometric properties**.

3.3.16
biometric reference
one or more stored *biometric samples* (3.3.21), *biometric templates* (3.3.22) or *biometric models* (3.3.13) attributed to a *biometric data subject* (3.7.5) and used as the object of *biometric comparison* (3.5.7)

EXAMPLE   Face image stored digitally on a passport, fingerprint minutiae template on a National ID card or Gaussian Mixture Model for speaker recognition, in a database.

Note 1 to entry: A **biometric reference** may be created with implicit or explicit use of auxiliary data, such as Universal Background Models.

Note 2 to entry: The subject/object labelling in a *comparison* ([3.5.7](#)) might be arbitrary. In some *comparisons* ([3.5.7](#)), a **biometric reference** might be used as the subject of the comparison with other **biometric references** or incoming samples and input to an algorithm for biometric comparison ([3.5.7](#)). For example, in a duplicate enrolment check a **biometric reference** will be used as the subject for comparison against all other **biometric references** in the database.

3.3.17
biometric reference database
database of *biometric reference data records* ([3.3.18](#))

Note 1 to entry: The **biometric reference database** may be a subset of the *biometric enrolment database* ([3.3.9](#)), or it may be a separate database. Separation of the databases may be required due to security, privacy, legislation, architecture, performance, etc.

3.3.18
biometric reference data record
indexed data record containing *biometric reference(s)* ([3.3.16](#))

Note 1 to entry: There may not be a one-to-one correspondence between **biometric reference data records** and *biometric data subjects* ([3.7.5](#)), e.g. a single *biometric data subject* ([3.7.5](#)) might have several reference data records and in some applications, a single **biometric reference data record** might be associated with multiple enrolments of a *biometric data subject* ([3.7.5](#)).

3.3.19
biometric reference identifier
pointer to a *biometric reference data record* ([3.3.18](#)) in the *biometric reference database* ([3.3.17](#))

3.3.20
biometric representation
biometric sample ([3.3.21](#)) or *biometric feature* ([3.3.11](#)) set

Note 1 to entry: This term is used in ISO/IEC 19794 biometric data interchange format standards for labelling a sub-record in a *biometric data record* ([3.3.8](#)).

3.3.21
biometric sample
analog or digital representation of *biometric characteristics* ([3.1.2](#)) prior to *biometric feature extraction* ([3.5.4](#))

EXAMPLE   A record containing the image of a finger is a **biometric sample.**

3.3.22
biometric template
reference biometric feature set
set of stored *biometric features* ([3.3.11](#)) comparable directly to probe *biometric features* ([3.3.11](#))

EXAMPLE   A record containing a set of finger minutiae is a **biometric template.**

Note 1 to entry: A *biometric reference* ([3.3.16](#)) consisting of an image, or other *captured biometric sample* ([3.3.25](#)), in its original, enhanced or compressed form, is not a **biometric template**.

Note 2 to entry: The *biometric features* ([3.3.11](#)) are not considered to be a **biometric template** unless they are stored for reference.

3.3.23
biometric verification decision
comparison decision ([3.3.26](#)) determining the validity of a *biometric claim* ([3.6.4](#)) in a *verification transaction* ([3.6.21](#))