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Information technology — Guidance for biometric enrolment

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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).

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

This first edition of ISO/IEC 29196 cancels and replaces ISO/IEC TR 29196:2018, which has been technically revised.

The main changes are as follows:

— recommendations added throughout the document;

— Clause 3, some terms and references modified;

— information about enrolment updated to state of art;

— Annex A removed.

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

One of the most important contributions to a successful biometric recognition system is a consistent biometric enrolment service ("biometric capture process") that stores biometric data captured from individuals for biometric comparison purposes. Biometric data captured for subsequent verifications or identifications are compared with the biometric data collected at enrolment time. If the quality of the biometric samples captured for enrolment is not consistently maintained, the performance of the biometric recognition system is likely to be unreliable. For those who are enrolled in a verification system, a poor quality enrolment is an inconvenience if they are not recognized.

NOTE Quality has a specific meaning when applied to biometric systems, see ISO/IEC 29794-1: a high quality capture is one that results in biometric data that provides good comparison scores when compared with other high quality images from the same biometric feature.

Principles based on stakeholder requirements can guide the development of system policy to ensure that the quality of biometrics samples captured for enrolment are fit for purpose. Where biometric capture processing is outsourced to a third party, a shared understanding of quality is an extremely important basis for ensuring the relying party and the enrolment authority are aligned on what constitutes a biometric sample of acceptable quality.

Although the recommendations in this document are directed primarily to the parties responsible for the biometric capture process itself and for management of the enrolment service (noting that these two entities can be one and the same), they are also of value to the designers and developers of enrolment systems.

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Information technology — Guidance for biometric enrolment

1 Scope

This document gives guidance relating to successful, secure and usable implementation of biometric enrolment processes, while indicating risk factors that organizations which use biometric technologies can address during procurement, design, deployment and operation. Much of this document is generic to many types of applications, e.g. from national scale commercial and government applications, to closed systems for in-house operations, and to consumer applications. However, the intended application and its purpose often have influence on the necessary enrolment data quality and are taken into account when specifying an enrolment system and process.

This document specifies the differences in operation relating to specific types of application, e.g. where self-enrolment is more appropriate than attended enrolment. This document focuses on mandatory, attended enrolment at fixed locations. It ultimately consolidates information relating to better practices for the implementation of biometric enrolment capability in various business contexts including considerations of process, function (system), and technology, as well as legal/privacy and policy aspects.

This document provides guidance on collection and storage of biometric enrolment data and the impact on dependent processes of verification and identification. This document does not include material specific to forensic and law enforcement applications.

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 2382-37, *Information technology — Vocabulary — Part 37: Biometrics*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 2382-37 and the following apply.

ISO and IEC maintain terminology 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/

3.1
biometric capture service
process of capturing biometric data and submitting it to a back-end solution for either processing or biometric enrolment, or both

Note 1 to entry: Enrolment may happen directly or as a subsequent process of the backend solution.

3.2
biometric subject
individual seeking to be, or is enrolled in, a biometric enrolment database

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3.3
breeder document
document used to support applications for identity, residence and travel documents, such as birth, marriage and death certificate

3.4
enrolment authority
organisation (or other entity) with legal and contractual responsibilities for the completion of enrolment processes

3.5
enrolment officer
individual responsible for the operation of the biometric capture service and the enrolment in accordance with a system policy

Note 1 to entry: As an agent of the operator, the enrolment officer may be an employee or contracted by them.

Note 2 to entry: System policy can include requirements relating to legal, security, privacy, efficiency and effectiveness

Note 3 to entry: The enrolment officer can be responsible for the operation of the biometric enrolment service at one or more physical locations.

3.6
designer and developer
organization or individual responsible for the design, development, (and deployment, if applicable) of the biometric capture system

3.7
duty officer
trained individual acting on behalf of either the enrolment authority or operator.

Note 1 to entry: The duty officer is trained to provide advice and guidance to an enrolment officer in case of difficulty.

Note 2 to entry: The duty officer may be present in the vicinity of one or more enrolment stations, or available on line or by telephone.

Note 3 to entry: The duty officer may have a role in determining exception handling routines.

3.8
key performance indicator
KPI
metric quantifying one or more aspects of the successful operation of a process

3.9
operator
organization (or other entity) responsible for running the enrolment service on behalf of the enrolment authority

3.10
performance manager
individual responsible for assessing how well the biometric enrolment service satisfies the operational requirements of the enrolment authority

Note 1 to entry: This can include monitoring the quality of biometric samples captured and applying corrective measures where necessary, and reporting operating metrics to the enrolment authority as required.

3.11
personal assistant
individual accompanying the biometric subject at the enrolment session for one or more purposes

Note 1 to entry: Such purposes can include: translation of instructions from the enrolment officer into the native language of the subject; support for a disabled subject to enable the subject to undertake an enrolment successfully; to fulfil a legal requirement such as a parent present at the enrolment of a child.

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3.12
relying party
entity operating a biometrically-enabled application for which the enrolment process provides biometric references

3.13
service level agreement
SLA
agreement between a service provider and a customer defining a target level of service, mutual responsibilities of service provider and customer, together with other requirements for the delivery of a service

3.14
attendant
specialist support staff
trained attendant(s) present at the enrolment session on behalf of the enrolment authority or operator to assist with the enrolment of subjects with disabilities, or to fulfil service or legal requirements in respect of gender, cultural and religious sensitivities, or age of the subject

3.15
vendor
entity providing either the hardware or software biometric functionality, or both

4 Abbreviated terms

FMR false match rate

FNMR false non-match rate

FTAR failure to acquire rate

FTER failure to enrol rate

GUI graphical user interface

NFIQ NIST fingerprint image quality

OFIQ open source face image quality

5 Role of biometric capture processing in a biometric system

Given the variety of applications and technologies, it can seem difficult to draw any generalizations about biometric systems. All such systems, however, have many elements in common. Biometric samples are captured from a subject using a biometric capture device which contains one or more sensors. The sensor output is sent to a processor that extracts the distinctive but repeatable measures of the sample (the biometric features), discarding all other components. The resulting features can be stored in the biometric enrolment database as a biometric reference. In other cases, the sample itself (without feature extraction) can be stored as the reference. A subsequent probe biometric sample can be compared to a specific reference, to many references, or to all references already in the database to determine if there is a match. A decision regarding the biometric claim is made based upon the similarities or dissimilarities between the features of the biometric probe and those of the reference or references compared.

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