
**Information technology — Biometric
performance testing and reporting —**

**Part 1:
Principles and framework**

*Technologies de l'information — Essais et rapports de performance
biométriques —*

Partie 1: Principes et canevas

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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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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*.

This second edition cancels and replaces the first edition (ISO/IEC 19795-1:2006), which has been technically revised.

The main changes compared to the previous edition are as follows:

- Terminology is updated to follow the biometrics vocabulary of ISO/IEC 2382-37:2017;
- Additional detail is provided on testing and reporting of transaction times and computational workload, and on graphical representation of results.

A list of all parts in the ISO 19795 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.

Introduction

This document is concerned solely with the scientific technical performance testing of biometric systems and devices. Technical performance testing seeks to determine error and throughput rates, with the goal of understanding and predicting the real-world error and throughput performance of biometric systems. The error rates include both false-positive and false-negative rates, as well as failure-to-enrol and failure-to-acquire rates across the test population. Throughput rates refer to the number of individuals processed per unit of time based both on computational speed and human-machine interaction. These measures are generally applicable to all biometric systems and devices. Technical performance tests that are modality-specific, for example, fingerprint scanner image quality, are not considered in this document.

The purpose of this document is to present the requirements and best scientific practices for conducting and reporting technical performance testing. It is acknowledged that technical performance testing is only one form of biometric testing. Other types of testing not considered in this document include:

- reliability, availability and maintainability;
- security, including vulnerability;
- conformance;
- safety;
- human factors, including user acceptance;
- cost/benefit;
- privacy regulation conformance.

Biometric technical performance testing can be of three types: technology, scenario and operational evaluation. Each type of test requires a different protocol and produces different types of results. Other parts of the ISO/IEC 19795 series provide specific advice and requirements for the development and use of such different test protocols. This document addresses specific philosophies and principles that can be applied over a broad range of test conditions.

Information technology — Biometric performance testing and reporting —

Part 1: Principles and framework

1 Scope

This document:

- establishes general principles for testing the performance of biometrics systems in terms of error rates and throughput rates for purposes including measurement of performance, prediction of performance, comparison of performance, and verifying conformance with specified performance requirements;
- specifies performance metrics for biometric systems;
- specifies requirements on the recording of test data and reporting of test results; and
- specifies requirements on test protocols in order to:
 - reduce bias due to inappropriate data collection or analytic procedures;
 - help achieve the best estimate of field performance for the expended effort;
 - improve understanding of the limits of applicability of the test results.

This document is applicable to empirical performance testing of biometric systems and algorithms through analysis of the comparison scores and decisions output by the system, without requiring detailed knowledge of the system's algorithms or of the underlying distribution of biometric characteristics in the population of interest.

Not within the scope of this document is the measurement of error and throughput rates for people deliberately trying to subvert the intended operation of the biometric system (e.g. by presentation attacks).

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 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 <http://www.electropedia.org/>