INTERNATIONAL STANDARD

ISO/IEC 21472

First edition
2021-10

Information technology — Scenario evaluation methodology for user interaction influence in biometric system performance

Reference number
ISO/IEC 21472:2021(E)

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Published in Switzerland

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Foreword

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

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Introduction

This document describes a methodology for testing and reporting user interaction influence on the performance of biometric recognition systems. Specifically, it describes a methodology for testing and reporting that influence.

The performance of biometric systems can vary or can be influenced by user interaction influence factors. According to ISO/IEC 19795-1:2021, C.2, user physiology, user behaviour, sensors and hardware (all user interaction influence factors) are some factors that can influence the performance of a biometric system.

This methodology is a scenario test in which a set of test subjects interacts with a biometric system to execute transactions when one or more of the following factors is controlled:

— Factors related to the design, position or condition of the capture system.

— Factors depending on the users and their attributes.

— Factors depending on the user interaction with the biometric system.

Testing user interaction influence can be subjective and is not necessarily straightforward. Therefore, this document is intended to address the main conflicts that arise in such cases.

Within the context of this document, it is important to differentiate between “usability testing” and “user interaction influence in performance”. Usability testing relates to “the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use” (ISO/IEC 9241-11:2018). Usability testing involves the measurement of “how usable” a specific system or product is. Usability testing is addressed in documents including ISO/IEC TR 25060. On the other hand, "user interaction influence in performance" deals with measuring how the performance of a biometric system can differ from a reference evaluation, based on subjects using the system in operational or scenario conditions.

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Information technology — Scenario evaluation methodology for user interaction influence in biometric system performance

1 Scope

This document addresses:

— requirements for planning, executing and reporting the influence of user interaction on biometric system performance based on scenario test methodologies, considering three kinds of factors:

  a) factors related to the design, position or condition of the capture device,

  b) factors depending on users and user attributes,

  c) factors depending on the interaction of users with the biometric system;

— specifications for the definition, establishment and measurement of conditions needed for evaluation, including those relating to equipment;

— requirements for establishing a reference evaluation condition (REC) and target evaluation condition(s) (TEC) to compare the influence of user interaction factors;

— a specification of the biometric evaluation including requirements for test population, test protocols, data to record, test results; and

— procedures for carrying out the overall evaluation.

This document does not:

— determine which parameters ought to be analysed for a specific biometric modality. This is currently covered in ISO/IEC TR 19795-3;

— specify requirements for performing a vulnerability analysis modifying user interaction influence factors;

— include procedures for performing usability testing.

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 19795-1, *Information technology — Biometric performance testing and reporting — Part 1: Principles and framework*

ISO/IEC 19795-2, *Information technology — Biometric performance testing and reporting — Part 2: Testing methodologies for technology and scenario evaluation*

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

ISO/IEC 24779 (all parts), *Information technology — Cross-jurisdictional and societal aspects of implementation of biometric technologies — Pictograms, icons and symbols for use with biometric systems*

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3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 19795-1, 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
reference evaluation condition
REC
test condition reflecting established device factors, user factors or user interaction factors

Note 1 to entry: Results generated under these test conditions are compared against results generated under corresponding *target evaluation conditions* (3.2).

3.2
target evaluation condition
TEC
test condition reflecting new or alternative device factors, user factors or user interaction factors

Note 1 to entry: Results generated under these test conditions are compared against results generated under corresponding *reference evaluation conditions* (3.1).

3.3
user interaction influence in performance
measurement of how the performance of a biometric system can differ from a reference evaluation, based on subjects using the system in operational or scenario conditions

3.4
usability testing
testing relating to the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use

Note 1 to entry: See ISO/IEC 9241-11.

4 Conformance

To conform to this document, a user interaction influence performance evaluation shall implement the requirements contained herein, including one reference evaluation condition (REC) and at least one target evaluation condition (TEC).

5 Overview

5.1 General

Testing the influence of user interaction in the performance of a biometric system entails execution of one scenario evaluation under reference evaluation conditions (REC) and at least one evaluation under target evaluation conditions (TEC). These evaluations are identical except for changes to the user interaction influence factors being studied.

For each set of condition(s), test subjects interact with the biometric system as many times as required. The number of times the interaction is repeated shall be defined at the time of the evaluation design, considering parameters such as: available time for the evaluation, availability of test crew, effort to be applied for each test crew subject, cost, etc. Biometric system recognition outcomes and (optionally)

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