

PD ISO/IEC TR 29194:2015



BSI Standards Publication

Information Technology — Biometrics — Guide on designing accessible and inclusive biometric systems

bsi.

...making excellence a habit.™

National foreword

This Published Document is the UK implementation of ISO/IEC TR 29194:2015.

The UK participation in its preparation was entrusted to Technical Committee IST/44, Biometrics.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2015. Published by BSI Standards Limited 2015

ISBN 978 0 580 90154 6

ICS 13.180; 35.040

Compliance with a British Standard cannot confer immunity from legal obligations.

This Published Document was published under the authority of the Standards Policy and Strategy Committee on 31 May 2015.

Amendments issued since publication

| Date | Text affected |
|------|---------------|
|------|---------------|

**Information Technology — Biometrics
— Guide on designing accessible and
inclusive biometric systems**

*Technologies de l'information — Biométrie — Guide sur la conception
des systèmes biométriques accessibles et inclusifs*



COPYRIGHT PROTECTED DOCUMENT

© ISO/IEC 2015, Published in Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

Contents

Page

| | |
|---|-----------|
| Foreword | v |
| Introduction | vi |
| 1 Scope | 1 |
| 2 Accessible and inclusive design taxonomy | 1 |
| 3 Generic problems and recommendations | 2 |
| 3.1 Generic problems..... | 2 |
| 3.2 Recommendations..... | 2 |
| 3.3 Sources for addition guidance on accessibility..... | 3 |
| 4 (Inability to) Perceive visual information | 3 |
| 4.1 Examples of Problems..... | 3 |
| 4.1.1 People who are unable to perceive any visual information..... | 3 |
| 4.1.2 People who have difficulty in perceiving visual information..... | 3 |
| 4.2 Modality independent guidance..... | 3 |
| 4.3 Additional modality specific recommendations..... | 4 |
| 4.3.1 Finger..... | 4 |
| 4.3.2 Face..... | 4 |
| 4.3.3 Iris..... | 4 |
| 4.3.4 Signature..... | 4 |
| 4.3.5 Vascular and Hand Geometry..... | 4 |
| 4.3.6 Voice..... | 5 |
| 5 (Inability to) Perceive auditory information | 5 |
| 5.1 Examples of Problems..... | 5 |
| 5.1.1 People who are unable to perceive any auditory information..... | 5 |
| 5.1.2 People who have difficulty in perceiving auditory information..... | 5 |
| 5.2 Modality independent recommendations..... | 5 |
| 5.3 Additional modality specific recommendations..... | 6 |
| 5.3.1 Iris..... | 6 |
| 5.3.2 Signature..... | 6 |
| 5.3.3 Voice..... | 6 |
| 6 (Inability to) Perform motor actions | 6 |
| 6.1 Examples of Problems..... | 6 |
| 6.1.1 People who are unable to walk unaided..... | 6 |
| 6.1.2 People who are unable to stand..... | 6 |
| 6.1.3 People who are unable to pitch, or yaw, or rotate head, or keep stationary..... | 6 |
| 6.1.4 People who are unable to raise and/or rotate arms/hands..... | 6 |
| 6.1.5 People who are unable to present physical attribute within the specified field of the sensor..... | 7 |
| 6.2 Modality independent recommendations..... | 7 |
| 6.3 Additional modality specific recommendations..... | 7 |
| 6.3.1 Finger..... | 7 |
| 6.3.2 Signature, Vascular and Hand Geometry..... | 7 |
| 7 (Inability to) Present physiological attribute | 8 |
| 7.1 Examples of Problems..... | 8 |
| 7.1.1 Introduction..... | 8 |
| 7.1.2 Modality independent problems..... | 8 |
| 7.1.3 Related to hand(s)..... | 8 |
| 7.1.4 Related to finger(s) and/or palm(s)..... | 8 |
| 7.1.5 Related to face..... | 8 |
| 7.1.6 Related to eye(s)..... | 8 |
| 7.1.7 Related to voice..... | 8 |
| 7.2 Modality independent recommendations..... | 8 |
| 7.3 Additional modality specific recommendations..... | 9 |

| | | |
|--|--|-----------|
| 7.3.1 | Signature..... | 9 |
| 8 | (Inability to) Understand and apply the instructions..... | 9 |
| 8.1 | Examples of Problems | 9 |
| 8.1.1 | People with cognitive or learning difficulties | 9 |
| 8.1.2 | Where interaction and/or responses from system are counter to intuition or familiarity..... | 9 |
| 8.2 | Modality independent recommendations..... | 9 |
| 8.3 | Additional modality specific recommendations..... | 10 |
| 8.3.1 | Signature..... | 10 |
| 9 | (Inability to) Follow guidance due to cultural discrepancies..... | 10 |
| 9.1 | Examples of Problems | 10 |
| 9.1.1 | People with language differences..... | 10 |
| 9.2 | Modality independent recommendations..... | 10 |
| 9.3 | Additional modality specific recommendations..... | 10 |
| 9.3.1 | Finger and Hand Geometry..... | 10 |
| 9.3.2 | Face and Iris..... | 10 |
| 9.3.3 | Signature..... | 11 |
| 9.3.4 | Voice..... | 11 |
| Annex A (informative) Description of impairments..... | | 12 |
| Bibliography..... | | 17 |

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.

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).

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. 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 WTO principles in the Technical Barriers to Trade (TBT), see the following URL: [Foreword — Supplementary information](#).

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

Introduction

This Technical Report provides support for the further development of ISO/IEC biometrics international standards in the context of cross-jurisdictional and societal applications of biometrics, including standardization of both existing and future technologies.

ISO/IEC/TR 24714-1:2008 lays down the principle that inclusive designs of biometric systems are ones that as many subjects within the target population as is reasonably possible can use the systems effectively and with minimum discomfort. This Technical Report offers guidance in the dialogue between writers of system specifications for biometric systems and the developers of biometric systems, in reaching a common understanding of the target population and agreement of what is reasonably possible. This Technical Report aims to aid the procurement process of biometric systems, provide a means of acceptance of inclusive design, and ultimately improve accessibility of biometric systems.

Central to a common understanding of target populations is an agreed taxonomy. This Technical Report establishes taxonomy based upon a person's inability to perform a function. This enables a writer of a system specification for a biometric system to specify those categories that must be handled by the primary biometric system and those categories that would be required to use the exception handling process. Conversely the taxonomy enables biometric system suppliers to specify which parts of the population they have accommodated for in their designs.

Agreed quantification of the target population and how accessibility and inclusivity is to be achieved enables acceptance testing to be devised.

Information Technology — Biometrics — Guide on designing accessible and inclusive biometric systems

1 Scope

Procurements of biometric systems often stipulate requirements for the systems to be inclusive and make provision for exception handling.

This Technical Report provides guidance for biometric system design and procurement to handle the range of accessibility and usability issues. This report will build upon the generic guidance in ISO/IEC/TR 24714-1, *Information technology — Biometrics — Jurisdictional and societal considerations for commercial applications – Part 1: General guidance*.

The biometric modalities addressed in this technical report include those described in the ISO/IEC 19794, (All parts), *Information Technology — Biometric data interchange formats*:

- Finger
- Face
- Iris
- Signature
- Vascular
- Hand-geometry
- Voice

2 Accessible and inclusive design taxonomy

The taxonomy used by this Technical Report reflects that described in ISO/IEC/TR 29138-1. This Technical Report provides examples of good practice for particular biometric modalities against the taxonomy, resulting in guidelines for inclusive design for the widest range of the population. The Technical Report can also help in selecting suitable biometric modality solutions when designing solutions with a particular population from the taxonomy descriptions.

There is a basic principle of designing biometric systems in a way that they can be used effectively and with minimum discomfort by the whole target population. There is also the need of reaching a common understanding of the target population and an agreement of what is reasonably possible. This brings the requirement of designing biometric systems following the best possible guidance to create systems that are accessible. Accessibility problems of biometrics systems are not limited to disabled people. Other groups may be affected due to occupational constraints, medical procedures and religious/cultural issues.

A person may not be aware of any issues of them using a biometric system until at the point of use.

Biometric systems are not familiar to all, and even then may not be regularly used. Therefore inclusive design must be based upon a lack of familiarity.

Considering all these scenarios, the following taxonomy can be considered. Each of the categories and subcategories in this taxonomy will be detailed in subsequent clauses of this Technical Report.

- (Inability to) Perceive visual information
 - People who are unable to perceive any visual information.