~~Date: 2023-04~~

ISO/IEC ~~DIS~~ PRF 4944~~:2023(E)~~

ISO/IEC ~~TC JTC1~~ JTC 1/SC 35~~/WG 9~~

Secretariat: AFNOR

Date: 2024-07-22

Information technology — User interfaces ~~— Framework for evaluating the~~ — Evaluating usability of ~~a~~ natural user interfaces

Technologie de l'information — Interfaces utilisateur — Cadre pour l'évaluation de l'utilisabilité d'une interface utilisateur naturelle

iTeh Standards
(https://standards.iteh.ai)
Document Preview

ISO/IEC PRF 4944
https://standards.iteh.ai/catalog/standards/iso/15c6d6f8-b2ad-4c50-ae2e-474c4822285b/iso-iec-prf-4944

~~Edited DIS -~~
~~MUST BE USED~~
~~FOR FINAL~~
~~DRAFT~~

~~Copyright notice~~

~~This~~FDIS stage

iTeh Standards
(https://standards.iteh.ai)
Document Preview

ISO/IEC PRF 4944
https://standards.iteh.ai/catalog/standards/iso/15c6d6f8-b2ad-4c50-ae2e-474c4822285b/iso-iec-prf-4944

~~Edited DIS - MUST BE USED FOR FINAL DRAFT~~

© ISO document is a working draft/IEC 2024

All rights reserved. Unless otherwise specified, or committee draft and is copyright-protected by ISO. While the reproductionrequired in the context of working drafts or committee drafts in any form for use by participants in the ISO standards development process is permitted without prior permission from ISO, neither its implementation, no part of this document nor any extract from itpublication may be reproduced, stored or utilized otherwise in any form or transmitted in any form for any other purposeby any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission from ISO. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

Requests for permission to reproduce this document for the purpose of selling it should be addressed as shown below or to ISO's member body in the country of the requester:

[Indicate the full address, telephone number, fax number, telex number, and electronic mail address, as appropriate, of the Copyright Manager of the ISO member body responsible for the secretariat of the TC or SC within the framework of which the working document has been prepared.]

Reproduction for sales purposes may be subject to royalty payments or a licensing agreement.

Violators may be prosecuted.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: + 41 22 749 01 11
E-mail: copyright@iso.org
Website: www.iso.org

Published in Switzerland

iTeh Standards
(https://standards.iteh.ai)
Document Preview

ISO/IEC PRF 4944
https://standards.iteh.ai/catalog/standards/iso/15c6d6f8-b2ad-4c50-ae2e-474c4822285b/iso-iec-prf-4944

© ISO/IEC 2022 – All rights reserved

Contents Page

Foreword vi
Introduction vii
1 Scope 1
2 Normative reference 1
3 Terms and definitions 1
3.1 Terms related to natural user 1
3.2 Terms related to usability 2
4 Natural user interfaces (NUI) 4
5 Evaluating usability of a natural user interface (NUI) 5
5.1 Framework 5
5.2 NUI as a system, product or service being evaluated 7
5.3 Evaluating usability for diverse NUI users 8
5.4 Evaluating usability for goals, tasks and interactions of NUI 8
5.5 Evaluating usability for diverse contexts of use of NUI 9
5.6 Components of usability 9
5.7 Evaluation based on use 10
6 Measuring usability of a NUI 11
6.1 Purposes of and measures for evaluation 11
6.2 Measures for evaluating the user interface of NUI 12
6.2.1 Evaluating user interface of NUI for accomplishing tasks 12
6.2.2 Effectiveness measures 12
6.2.3 Efficiency measures 13
6.2.4 Satisfaction measures 14
6.3 Measures for evaluating naturalness of interactions with NUI 14
6.3.1 Evaluating naturalness of interactions with NUI for accomplishing tasks 14
6.3.2 Effectiveness measures 15
6.3.3 Efficiency measures 16
6.3.4 Satisfaction measures 16
7 Reporting usability evaluation results 17
7.1 Content elements for reporting usability evaluations 17
7.2 Format for reporting usability evaluations 17
Bibliography 18

Foreword 3
Introduction 4
1 Scope 5
2 Normative reference 5
3 Terms and definitions 5
3.1 Natural user interface terms and definitions 5
3.2 Usability terms and definitions 6
4 Natural user interfaces 8

iTeh Standards
(https://standards.iteh.ai)
Document Preview
Edited DIS
MUST BE USED
FOR FINAL

© ISO/IEC 2022 – All rights reserved
© ISO/IEC 2024 – All rights reserved

DRAFT

5 Evaluating usability of a Natural User Interface (NUI) 9
5.1 Framework 9
5.2 NUI as a system, product, or service being evaluated 10
5.3 Evaluating usability for diverse NUI users 10
5.4 Evaluating usability for goals, tasks, and interactions of NUI 11
5.5 Evaluating usability for diverse contexts of use of NUI 11
5.6 Components of usability 12
5.7 Evaluation based on use 13
6 Measuring usability of a NUI 14
6.1 Purposes of and measures for evaluation 14
6.2 Measures for evaluating the user interface of NUI 14
6.2.1 Evaluating user interface of NUI for accomplishing tasks 14
6.2.2 Effectiveness measures 14
6.2.3 Efficiency measures 15
6.2.4 Satisfaction measures 16
6.3 Measures for evaluating naturalness of interactions with NUI 17
6.3.1 Evaluating naturalness of interactions with NUI for accomplishing tasks 17
6.3.2 Effectiveness measures 17
6.3.3 Efficiency measures 18
6.3.4 Satisfaction measures 19
7 Reporting usability evaluation results 19
7.1 Content elements for reporting usability evaluations 19
7.2 Format for reporting usability evaluations 19

iTeh Standards
(https://standards.iteh.ai)
Document Preview
ISO/IEC PRF 4944
https://standards.iteh.ai/catalog/standards/iso/15c6d6f8-b2ad-4c50-ae2e-474c4822285b/iso-iec-prf-4944

© ISO/IEC 2022 – All rights reserved

© ISO/IEC 2024 – All rights reserved

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/directiveswww.iso.org/directives or www.iec.ch/members_experts/refdocs).

ISO and IEC draw attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO and IEC take no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO and IEC [had/]had not[] received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents and https://patents.iec.ch.www.iso.org/patents and https://patents.iec.ch. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

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.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 35, *User interfaces*.

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-committeeswww.iso.org/members.html and www.iec.ch/national-committees.

iTeh Standards
(https://standards.iteh.ai)
Document Preview
ISO/IEC PRF 4944
https://standards.iteh.ai/catalog/standards/iso/15c6d6f8-b2ad-4c50-ae2e-474c4822285b/iso-iec-prf-4944

Edited DIS – MUST BE USED FOR FINAL DRAFT

© ISO/IEC 2022 – All rights reserved
© ISO/IEC 2024 – All rights reserved

Introduction

As smart devices such as smart phones and smart speakers have become popular, new forms of user interfaces have been introduced. One aspect of the new interfaces is mimicking natural ways of interacting with the devices and utilizing speech, gestures, body language, eye gaze, and other natural features of human communication through natural user interfaces (NUIs), which allow for faster, smoother, intuitive, and smarter interaction. However, while the concept of NUI is well defined, practical applications of NUI still need to be developed. This is strongly related to the lack of usability of NUI in smart devices.

When specified users of systems, products or services achieve their specified goals with effectiveness, efficiency and satisfaction in a specified context of use (as defined in ISO/IEC 9241-11), usability can be evaluated. Effectiveness is considered as the ability of users to complete tasks with the system (e.g. the NUI). Efficiency measures resources taken by users to complete specified tasks. Satisfaction measures comfort levels of user experience along with acceptance.

It is important that the usability evaluation of NUI concentrates on recognizing the user's intention and focuses on multiple modalities of information flows between the users and the devices.

This document describes a framework for evaluating the usability of NUI. Although the framework can be applied in most general contexts, it is specifically focused on optimizing user experiences in terms of NUI.

iTeh Standards
(https://standards.iteh.ai)
Document Preview

ISO/IEC PRF 4944
https://standards.iteh.ai/catalog/standards/iso/15c6d6f8-b2ad-4c50-ae2e-474c4822285b/iso-iec-prf-4944

© ISO/IEC 2022 – All rights reserved

© ISO/IEC 2024 – All rights reserved

iTeh Standards
(https://standards.iteh.ai)
Document Preview

ISO/IEC PRF 4944
https://standards.iteh.ai/catalog/standards/iso/15c6d6f8-b2ad-4c50-ae2e-474c4822285b/iso-iec-prf-4944

Information technology — User interfaces — Framework for evaluating the — Evaluating usability of a natural user interfaceinterfaces

1 Scope

This document provides a framework and, requirements and recommendations for evaluating the usability of a natural user interface (NUI) for systems, products or services. Measuring and reporting the usability of the NUI are also described. The usability evaluation focuses on the efficiency, effectiveness and satisfaction of the NUI. This document can also be applied to the usability evaluation of other user interfaces (UIs) for emerging technologies.

2 Normative reference

There are no normative references in this document.

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 9241-11, *Ergonomics of human-system interaction — Part 11: Usability: Definitions and concepts*

iTeh Standards
(https://standards.iteh.ai)
Document Preview

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO/IEC PRF 4944
https://standards.iteh.ai/catalog/standards/iso/15c6d6f8-b2ad-4c50-ae2e-474c4822285b/iso-iec-prf-4944

For the purposes of this document, the terms and definitions given in ISO 9241-11 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/obphttps://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/https://www.electropedia.org/

3.1 Terms related to natural user

3.1.1
user interface
UI
set of all the components of an interactive system that provide information and controls for the user to accomplish specific tasks with the interactive system

[SOURCE: ISO 9241-110:2020, 3.10]

© ISO/IEC 2022 – All rights reserved

3.1.2
natural user interface
NUI
user interface where the user operates the interface through a manner related to everyday human behaviours in a real world

Note 1 to entry: Natural refers to the user's expectations, behaviour and feelings that are involved in interacting with a NUI.

Note 2 to entry: Everyday human behaviours refer to behaviours that the user can be expected to have already learned.

Note 3 to entry: Interactions with NUIs typically model interactions performed in the natural world, including (but not limited to) touch, gestures and/or vocal interactions, or a combination thereof.

3.1.3
natural user interface interaction
NUI interaction
user-system interaction making use of a natural user interface

3.1.4
naturalness
correspondence with everyday interactions between humans and the real-world objects with which they interact

Note 1 to entry: Naturalness relates to everyday behaviours that the user can be expected to have already learned.

EXAMPLE To perform a "hello" gesture, the user refers to an object by pointing; to order something the user issues a vocal command; or to agree the user nods in the affirmative or voices a vocal onomatopoeia for agreement.

3.2 Terms related to usability

3.2.1
usability
extent to which a system, product or service 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: The "specified" users, goals and context of use refer to the particular combination of users, goals and context of use for which usability is being considered.

Note 2 to entry: The word "usability" is also used as a qualifier to refer to the design knowledge, competencies, activities and design attributes that contribute to usability, such as usability expertise, usability professional, usability engineering, usability method, usability evaluation, usability heuristic.

[SOURCE: ISO 9241-11:2018, 3.1.1]

3.2.2
user
person who interacts with a system, product, or service

Note 1 to entry: Users of a system, product or service include people who operate the system, people who make use of the output of the system and people who support the system (including providing maintenance and training).

[SOURCE: ISO 9241-11:2018, 3.1.7]

iTeh Standards (https://standards.iteh.ai) Document Preview
ISO/IEC PRF 4944
https://standards.iteh.ai/catalog/standards/iso/15c6d6f8-b2ad-4c50-ae2e-474c4822285b/iso-iec-prf-4944
Edited DIS – MUST BE USED FOR FINAL DRAFT

© ISO/IEC 2022 – All rights reserved
© ISO/IEC 2024 – All rights reserved